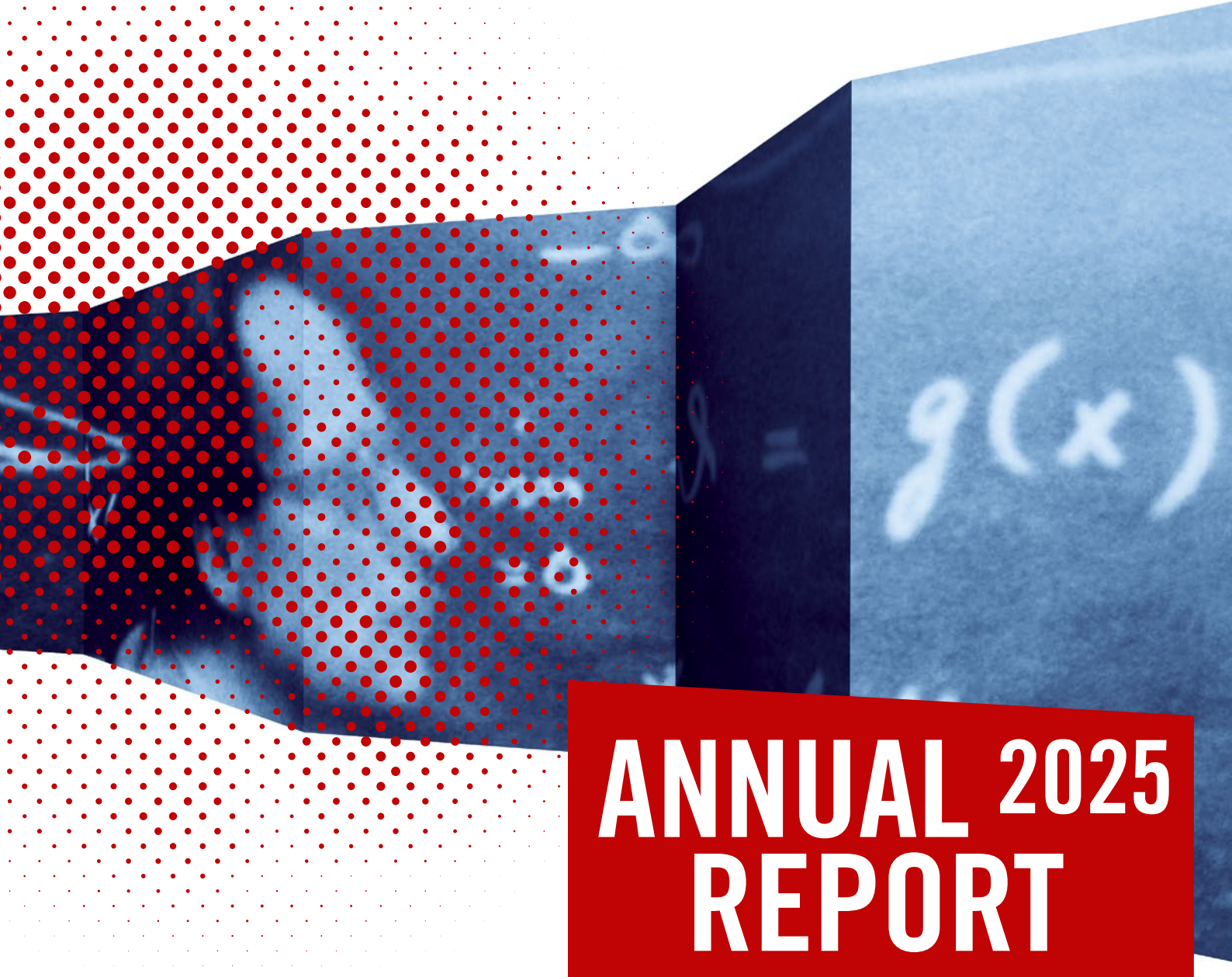




ANNUAL 2025 REPORT

THE INSTITUTE PURSUES ITS MISSION THROUGH A VARIETY OF PROGRAMMES

THE ERWIN SCHRÖDINGER INTERNATIONAL INSTITUTE FOR MATHEMATICS AND PHYSICS (ESI),

founded in 1993 and part of the University of Vienna since 2011, is dedicated to the advancement of scholarly research in all areas of mathematics and physics and, in particular, to the promotion of exchange between these disciplines.

THEMATIC PROGRAMMES offer the opportunity for a large number of scientists at all career stages to come together for discussions, brainstorming, seminars and collaboration. They typically last between 4 and 12 weeks, and are structured to cover several topical focus areas connected by a main theme. A programme may also include shorter workshop-like periods.

WORKSHOPS with a duration of up to two weeks focus on a specific scientific topic in mathematics or physics with an emphasis on communication and seminar style presentations.

THE JUNIOR RESEARCH FELLOWSHIP PROGRAMME supports external or local graduate students and recent postdocs to work on a project of their own.

THE SENIOR RESEARCH FELLOWSHIP PROGRAMME aims at attracting internationally renowned scientists to Vienna for visits to the ESI for up to several months. Senior Research Fellows contribute to the scientific training of graduate students and postdocs of Vienna's research institutions by teaching a course and by giving scientific seminars.

THE ESI FREQUENTLY HOSTS GRADUATE SCHOOLS organized by research groups at the University of Vienna on topics in mathematics or physics aimed at local as well as external PhD students.

THE RESEARCH IN TEAMS PROGRAMME offers support for research teams to carry out collaborative work on specific projects at the ESI in Vienna for periods of one to four months.

**ANNUAL 2025
REPORT**

DETAILED INFORMATION about all ESI programmes and the respective application procedures and deadlines are available on the ESI website

www.esi.ac.at



ESI Annual Report 2025

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Preface

Message of the Director

I am pleased to share the Annual Report 2025 of the Erwin Schrödinger Institute for Mathematics and Physics (ESI). The following pages describe the range of activities at the ESI in 2025, involving overall 988 researchers from all over the world.

Digital outreach complements our on-site activities: more than 1,500 recorded lectures and more than hundred of thousands of views on our YouTube channel extend the impact of the ESI. Nevertheless, while virtual platforms play an important role, they cannot provide the same effect as that of scholars meeting face-to-face. Blending cutting-edge online access and in-person exchange is by now a well-established ESI policy.

With the support of the University and especially of the Faculties of Mathematics and Physics, we are confident that the future activities of the ESI will continue to expand the frontiers of knowledge and to nurture the personal connections essential for scientific progress.

Adrian Constantin
Director of the ESI

September 2026

The Institute and its Mission

The Erwin Schrödinger International Institute for Mathematics and Physics (ESI), founded in 1993 and part of the University of Vienna since 2011, is committed to the promotion of scholarly research in mathematics and physics, with an emphasis on the interface between them.

It is the Institute's foremost objective to advance scientific knowledge in all areas of mathematics and physics and to create an environment where scientists can exchange ideas and fruitful collaborations can unfold. The Institute provides a place for focused collaborative research and interweaves leading international scholars, both in mathematics and physics, with the local scientific community. In particular, the research and the interactions that take place at the Institute are meant to have a lasting impact on those who pursue their scientific education in Vienna.

In the following, we will give a brief overview of the institutional structure of the ESI and the various programmatic pillars of its scientific activities. Thematic programmes form their core, supplemented by workshops, graduate schools and lecture courses given by Senior Research Fellows at the ESI. All activities include strong educational components. Guided by strict scientific criteria and supported by an international Scientific Advisory Board (SAB), the various actual components of the scientific activities of the ESI are chosen on a competitive basis.

The Institute currently pursues its mission in several ways:

- (a) primarily, by running four to six *thematic programmes* each year, selected about two years in advance on the basis of the advice of the international ESI Scientific Advisory Board;
- (b) by organizing additional *workshops* which focus on topical recent developments;
- (c) by a programme of *Senior Research Fellows* (SRF), who give lecture courses at the ESI for graduate students and post-docs;
- (d) by setting up *summer/winter schools* for graduate students and postdocs;
- (e) by a programme of *Junior Research Fellows* (JRF), which supports graduate students or recent postdocs to work on a project of their own that is either connected to a research direction carried out at the University of Vienna or to an ESI thematic programme;
- (f) by a programme of *Research in Teams* (RiT), which offers groups of two to four *Erwin Schrödinger Institute Scholars* the opportunity to work at the Institute for periods of one to four months;
- (g) by inviting *individual scientists* who collaborate with members of the local scientific community.

Scientific Activities in 2025

The list of research areas in mathematics and physics covered by the scientific activities of the Erwin Schrödinger Institute in 2025 shows a wide variety. In 2025, the following thematic programmes took place at the ESI:

- *Infinite-dimensional Geometry: Theory and Applications*
January 13 – February 14, 2025

Organizers: Tomasz Goliński (U of Białystok), Gabriel Larotonda (U of Buenos Aires), Alice Barbara Tumpach (WPI, Vienna), Cornelia Vizman (WU of Timisoara)

- *Entanglement in Many-body Quantum Matter: Dynamics, Dissipation, Equilibration*
May 12 – June 13, 2025
Organizers: Mari Carmen Banuls (MPI of Quantum Optics, Garching), Hannes Pichler (IQOQI, Innsbruck), Norbert Schuch (U of Vienna), Maksym Serbyn (ISTA, Klosterneuburg)
- *Reverse Mathematics*
June 23 – August 29, 2025
Organizers: Juan Aguilera (TU Vienna), Linda Brown Westrick (Penn State U), Noam Greenberg (Victoria U of Wellington), Denis Hirschfeldt (U of Chicago)
- *Free Boundary Problems*
September 29 – December 19, 2025
Organizers: Serena Dipierro (UWA, Perth), Julian Fischer (ISTA, Klosterneuburg), Matteo Novaga (U Pisa), Elisabetta Rocca (U of Pavia), Xavier Ros-Oton (U of Barcelona), Ulisse Stefanelli (U of Vienna), Enrico Valdinoci (UWA, Perth)

A detailed account of the thematic programmes that took place is given in subsequent sections of this report.

In addition to these thematic programmes, ten workshops, two graduate schools and the ESI Medal Award Ceremony 2025 took place on-site at the ESI in 2025, complemented by visits of some individual scholars who collaborated with scientists of the University of Vienna and the local community. Here is a list of these activities:

- *Workshop: Recent Perspectives on Non-crossing Partitions through Algebra, Combinatorics, and Probability*
February 17 – 21, 2025
Organizers: Adrian Celestino Rodriguez (TU Graz), Kurusch Ebrahimi-Fard (NTNU, Trondheim), James Mingo (Queen's U, Kingston), Martin Rubey (TU Vienna), Eleni Tzanaki (U of Crete), Yannic Vargas (CUNEF U, Madrid)
- *Workshop: Degenerate and Singular PDEs*
February 24 – 28, 2025
Organizers: Verena Bögelein (PLUS, Salzburg), Ugo Gianazza (U of Pavia), Juha Kinnunen (Aalto U), Naian Liao (PLUS, Salzburg)
- *Workshop: Structures in Banach Spaces*
March 17 – 21, 2025
Organizers: Antonio Aviles (U Murcia), Vera Fischer (U of Vienna), Grzegorz Plebanek (U of Wroclaw), Damian Sobota (U of Vienna)
- *Workshop: Uniform Distribution of Sequences*
April 22 – 25, 2025
Organizers: Henk Bruin (U of Vienna), Robbert Fokkink (TU Delft), Jörg Thuswaldner (MontanU Leoben)
- *Workshop: Quantum Harmonic Analysis*
May 5 – 9, 2025
Organizers: Markus Faulhuber (U of Vienna), Hans G. Feichtinger (U of Vienna), Franz Luef (NTNU, Trondheim)

- *Workshop: Extremal statistics in biology*
June 10 – 13, 2025
Organizers: Ariel Amir (Weizmann Institute, Rehovot), Christoph Dellago (U of Vienna), Ethan Levien (Dartmouth College)
- *Training: IMO Training 2025*
June 26 – 30, 2025 & October 26 – 31, 2025
Organizer: Theresia Eisenkölbl (U of Vienna)
- *Graduate School: ISAPP2025: Gravitational Waves: From Theory to Detection*
July 7 – 18, 2025
Organizers: Oliver Hahn (U of Vienna), Gianluca Inguglia (HEPHY Vienna), Josef Pradler (U of Vienna), Jochen Schieck (HEPHY and TU Vienna), Glenn van de Ven (U of Vienna)
- *Workshop: Eisenstein Series, Spaces of Automorphic Forms, and Applications*
September 1 – 5, 2025
Organizers: Neven Grbac (Juraj Dobrila U of Pula), Marcela Hanzer (U of Zagreb), Stephen S. Kudla (U of Toronto), Joachim Schwermer (U of Vienna)
- *Workshop: Charged Soft Matter: Bridging Theory and Experiment*
September 8 – 12, 2025
Organizers: Emanuela Bianchi (TU of Vienna), Peter Košován (Charles U Prague), Christos Likos (U of Vienna), Roman Staňo (U of Vienna)
- *Workshop: Putting the Cosmic Large-scale Structure on the Map: Theory Meets Numbers*
September 22 – 26, 2025
Organizers: Oliver Hahn (U of Vienna), Cornelius Rampf (Ruđer Bošković Institute), Cora Uhlemann (Bielefeld U)
- *ESI Medal Award Ceremony 2025*
November 7, 2025
Organizer: Christoph Dellago (U of Vienna, ESI Director)
- *Workshop: Quantum Many-body Systems and Bose-Einstein Condensation: A Mathematical Physics Perspective*
November 24 – 28, 2025
Organizers: Serena Cennatiempo (Gran Sasso Science Institute), Christian Hainzl (LMU Munich), Robert Seiringer (ISTA)

Senior Research Fellows

As in previous years, within the *Senior Research Fellows* programme, the ESI offered lecture courses on an advanced graduate level. In 2025 the ESI offered one of them, namely Yoshihiro Tonegawa's course on *Introduction to Brakke's Mean Curvature Flow*.

Research in Teams Programme

Established in 2012, the *Research in Teams* programme provides the opportunity for research teams of a few people to work at the Institute in order to concentrate on new collaborative research in mathematics and physics. The interaction between the team members is a central component of this programme. The following research teams worked at the ESI in 2025.

- Miguel Benitez (U of Salamanca), Andre H. Hoang (U of Vienna), Iain Stewart (MIT, Cambridge) & Zhiqian Sun (MIT, Cambridge), *Improving the Precision of Predictions for Event-Shape Distributions*, January 3 – February 28, 2025
- Erez Lapid (Weizmann Institute of Science, Rehovot) & Alberto Minguez (U of Vienna), *On Parabolic Induction for General Linear Groups*, January 8 – 22, March 12 – 26 & May 15 – 25, 2025
- Lars Andersson (Yanqi Lake Beijing Inst.), Marius A. Oancea (U of Vienna) & Claudio F. Paganini (U of Regensburg), *Weyl Pseudodifferential Calculus with Applications*, February 1 – March 2, 2025
- Praise Adeyemo (U of Ibadan), Dominic Bunnett (TU of Berlin), Livia Campo (U of Vienna), Balázs Szendroi (U of Vienna), *Projective Geometry, Combinatorics and Representation Theory from Polytopes*, May 17 – June 25, 2025
- Andrea Appel (U of Parma), Jianrong Li (U of Vienna), Tomasz Przezdziecki (U of Edinburgh), Bart Vlaar (BIMSA, Beijing), *Towards q -characters for quantum affine symmetric pairs*, June 8 – June 22, 2025 & January 11 – 24, 2026
- Kristan Jensen (U of Victoria), Alfredo Héctor Pérez Donoso (San Sebastian U, Santiago de Chile), Stefan Prohazka (U of Vienna), *Exploring the infrared triangle beyond Lorenz Symmetry*, June 15 – July 15, 2025
- Adrian Constantin (U of Vienna), Vladimir Kozlov (Linköping U), Evgeniy Lokharu (Lund U), Jörg Weber (U of Vienna), *Waves interacting with the Antarctic Circumpolar Current*, July 5 – 25 & September 14 – 19 & December 8 – 12, 2025

In the year 2025 the following Junior Research Fellows visited the ESI to work on their research projects:

- Isao Sauzedde (U of Warwick), *Gauge theory and Gaussian multiplicative chaos*, February 5 – March 5, 2025
- Saikat Mondal (IIT Kanpur), *Carroll and large- N* , March 3 – May 2, 2025
- Fufa Beyene (Kotebe U of Education), *The Cyclic Sieving Phenomenon (CSP)*, October 9 – December 8, 2025

Other activities

On November 12, 2025 an Erwin Schrödinger Lecture by Magdalena & Martin Gronau (ZfL, Berlin) on the topic “*überschrittene Grenzen. Erwin Schrödinger und die Herausforderungen der Wissenschaftsbiografie*” was held. A talk of great interest for the ESI since the reputation of Schrödinger is important for the Institute named after him.

The ESI also offered space for the following external activities:

- A lecture course for advanced PhD students “*Kicking off your PhD - Skills for a strong start*” organized by Roberto Cerbino and Christiane M Losert-Valiente Kroon from the Vienna Doctoral School of Physics, Faculty of Physics, U of Vienna, April 1, 7, 22, 29 and May 8, 2025

- Panel discussion “*Leaving the Blackboard Behind*” organized by Pedro del Real Lavergne, Faculty of Physics, U of Vienna, May 28, 2025, showing career Paths for Theoretical Physicists Outside Academia
- The ESI also hosted the workshop “*VIE-CRYPT '25 - Vienna Workshop on quantum cryptography beyond quantum key distribution*” organized by Philip Walther, Faculty of Physics, U of Vienna, June 16 - 18, 2025.
- The first day of the “*Workshop in Algebraic Geometry*” organized by Balazs Szendroi, Faculty of Mathematics, U of Vienna, June 20, 2025 including two talks:
 - Stavros Papadakis, U of Ioannina on “*Degenerate Kustin-Miller unprojection and volume normalization*”
 - Andre Mialebala Bouesso, Marien Ngouabi U / Warsaw on “*Pfaffian Calabi-Yau threefolds in six dimensional products of projective spaces*”
- A further lecture course for advanced PhD students “*Mastering your PhD*” organized by Roberto Cerbino and Christiane M Losert-Valiente Kroon from the Vienna Doctoral School of Physics, Faculty of Physics, U of Vienna, October 24, November 3 and 17, and December 5 and 15, 2025
- *Nábor Junior*, an international team competition for highschool students, organized by Michael Eichmair and Dmytro Rzhemovskiy of the project MmF (Mathematik macht Freude) at the Faculty of Mathematics, U of Vienna, November 21, 2025
- “*Equity and diversity*”, a workshop by Brigitte Bischof organized by Borivoje Dakic, Faculty of Physics, U of Vienna, December 9, 2025

As already in the years before, the ESI hosted also in 2025 the Seminars of the Vienna Master Class Mathematical Physics (MCMP), a joint activity of the Faculties of Mathematics and Physics, organized by David M. Fajman and Roland Donniger:

- Marko Sobak, Faculty of Mathematics, U of Vienna on “*Geometry of the Standard Model*”, March 31, 2025
- Frederick Moscatelli, Faculty of Mathematics, U of Vienna on “*Lie algebra methods for wave equation*”, November 18, 2025

In 2025 the ESI supported the *Simons Science School in Mathematics*, September 14 – 21, 2025 and the *Simons Science School in Chemistry and Physics*, September 28 – October 3, 2025 for Ukrainian high-school students financially with an substantial amount. These schools were organized by Michael Eichmair and Dmytro Rzhemovskiy of the project MmF (Mathematik macht Freude) at the Faculty of Mathematics, U of Vienna. The ESI also offered space for the activities on October 3, 2026 at the Institute. The main sponsor of the events was again the Simons Foundation, New York as in the year 2024.

The Institute's Management

Kollegium

The ESI is governed at the organizational and scientific level by a board ('Kollegium') of six scholars, all faculty members of the University of Vienna. Their term of office is three years. The members of this board are appointed by the Rector of the University after consultations with the Deans of the Faculties of Physics and Mathematics. In the period January 1 - December 31, 2025, the Kollegium consisted of A. Constantin (Mathematics), C. Dellago (Physics), M. Eichmair (Mathematics), I. Perugia (Mathematics), N. Schuch (Physics) and B. Weinzierl (Physics). All members of the Kollegium act as professors at the University of Vienna.

At the operational level, the ESI is managed by the director supported by one or two deputy directors. This team of directors is proposed by the Kollegium and appointed by the Rector of the University. Currently, the ESI is managed by Adrian Constantin (Director) and Bernadett Weinzierl (Deputy Director). Since the Kollegium was newly composed by January 2026, Christoph Dellago, Michael Eichmair and Ilaria Perugia left the board by the end of 2025. The ESI is very thankful to them, especially to Christoph Dellago (former Director) and Ilaria Perugia (former Deputy Director) for many years of valuable leadership and work for the Institute. As new members Ilse Fischer (Mathematics), Massimiliano Procura (Physics) and Ulisse Stefanelli (Mathematics) joined the board on January 1, 2026. Adrian Constantin, Professor of Mathematics, was appointed as the new Director of the ESI for the next three years. The new Deputy Director is Bernadett Weinzierl, Professor of Physics. Their term of office started with March 1, 2026.

Scientific Advisory Board

The scientific activities of the ESI are supervised by the Scientific Advisory Board (SAB), composed of eminent scholars in mathematics and physics. The SAB also reflects the international ties which are essential for the ESI. In 2025, the SAB consisted of: Anton Alekseev (U of Geneva), Douglas N. Arnold (U Minnesota), Maria Chudnovsky (Princeton U), Sandra Di Rocco (KTH, Stockholm) [chair], Domenico Giulini (U Hannover), Mariana Graña (CEA Paris-Saclay), Julia Kempe (NYU), and Francesco Sciortino (U of Rome).

The composition of the SAB of the ESI changed by the end of 2025. After two terms of office Douglas N. Arnold (U of Minnesota), Sandra Di Rocco (KTH, Stockholm) and Domenico Giulini (U of Hannover) have retired from the Board. The Institute is very grateful to them for many years of valuable advice and support. Susanne Brenner (Louisiana State U), Tatiana Toro (U of Washington) and Harro Meijer (U of Groningen) were appointed as new members from January 1, 2026 on.

Administration

There was no change in the composition of the ESI administration in 2025. The administration team continued its work with customary efficiency for our visitors, research fellows and board.

The ESI in 2025: facts and figures

Management and Administration:

Director: Christoph Dellago

Kollegium: Christoph Dellago (Director), Ilaria Perugia (Deputy Director), Adrian Constantin, Michael Eichmair, Norbert Schuch, Bernadett Weinzierl

Administration: Sophie Kurzmann, Maria Marouschek, Roxelane Schön, Beatrix Wolf (Head)

Computing and networking support: Marion Praschl, Thomas Leitner

Video recording and publishing: Sophie Kurzmann

International Scientific Advisory Board in 2025:

Anton Alekseev (U of Geneva)	Douglas N. Arnold (U Minnesota)
Maria Chudnovsky (Princeton U)	Sandra Di Rocco (KTH, Stockholm) [chair]
Domenico Giulini (U Hannover)	Mariana Graña (CEA Paris-Saclay)
Julia Kempe (NYU)	Francesco Sciortino (U of Rome)

Budget and visitors: In 2025 the support of ESI received from the University of Vienna amounted to **€790 000**. Furthermore, ESI obtained a total of €95 205 in third-party funds from external sources to support the various activities.

The total amount spent in 2025 on scientific activities was €482 324 while the expenditures for administration (mainly salaries) and infrastructure (mainly rent) were €547 490.

The total number of scientists visiting the Erwin Schrödinger Institute in 2025 was 988, see pages [108](#)–[127](#). Gender ratio: male: 702 (71.0 %), female: 211 (21.4 %), non-binary: 5 (0.5 %), prefer not to disclose or unspecified 70 (7.1 %). Moreover, 32 registered people participated online in various activities of the ESI.

ESI research documentation: Starting from January 2013, the ESI research output is tracked using the published articles and the arXiv database. The ESI website provides web links to these arXiv preprints and to the local ESI preprints collected until December 2013. It also contains the bibliographical data of the already published articles. Moreover, publications that appeared in 2025 but are related to past ESI activities, starting from 2011, have been tracked as well to provide long-term evidence of the ESI research outcome success.

The total number of preprints and publications contributed to the ESI research documentation database in 2025 is 88 [related to the activities in 2025: 80, related to the activities in previous years: 8], see pages [100](#)–[106](#) for details.

Since the summer of 2019, lectures given at the ESI are routinely recorded and the videos are published on the ESI YouTube-Channel. In total 442 videos were recorded in 2025 amounting to more than 240.5 hours of video material. These videos have been accessed 98 268 times in 2025 alone. Currently, the number of views is growing quickly indicating the strong interest for recorded ESI lectures in the community.

Scientific Reports

Main Research Programmes

Infinite-dimensional Geometry: Theory and Applications

Organizers: Tomasz Goliński (U of Białystok), Gabriel Larotonda (U of Buenos Aires), Alice Barbora Tumpach (WPI, Vienna), Cornelia Vizman (WU of Timisoara)

Dates: January 13 – February 14, 2025

Budget: ESI € 49 486

FWF grant I 5015 N (P.I. A.B.Tumpach) € 2 830

FWF grant PAT1179524 (P.I. A.B.Tumpach) € 564

Wolfgang Pauli Institut € 510

Report on the thematic programme

The aim of the programme was to reinforce the collaboration between scientists from Austrian research institutions and international institutions around the topic of infinite dimensional geometry. Direct applications of the theoretical aspects of infinite dimensional geometry to shape analysis and medical imaging were part of the programme.

Infinite-dimensional geometry is a relatively new branch of differential geometry. It's specific feature is that it heavily involves the tools of functional analysis and operator theory to solve problems, which are not present in the finite-dimensional setting. For example, boundedness of linear maps, closedness of images, existence of complementary subspaces are not automatic. Moreover, infinite-dimensional geometry is not a homogeneous branch. It has many flavors, ranging from purely formal constructions to rigid theorems in Banach settings. During the programme, all approaches were present, with special part played by Banach, Fréchet and convenient settings. Applications in Shape Analysis and Machine Learning concluded the programme.

Activities

The programme lasted five weeks, each devoted to different topics ranging from abstract theoretical questions to very concrete applications (e.g. in physics, computer science or medicine). During each week several mini-courses (2-3 each week) and keynote talks (around 5 per week) were organized. Each mini-course lasted 3 hours and each keynote talk lasted 1 hour. Short talks contributed by the participants, tutorials and software tutorials completed the programme.

The majority of participants were physically present. However, due to various reasons, some participants (including speakers) could not arrive in Vienna. In this situation they were offered a possibility of delivering a virtual talk via Zoom. Moreover most of the lectures were streamed live on-line and afterwards uploaded to Youtube.

The topics of each week were the following:

Week 1: Geometric structures and infinite-dimensional manifolds

Week 2: Dynamical systems and infinite-dimensional manifolds

Week 3: Homeomorphisms of S^1 and groups in infinite-dimensions

Week 4: Shape analysis and geometry

Week 5: Shape analysis and medical applications

Specific information on the thematic programme

The main goal of the programme was to gather the scientists of various backgrounds working on different problems which have non-zero intersection with the world of infinite-dimensional geometry. It is our belief that inviting a diverse group of researchers increases the scientific impact of the event.

The programme also offered early career scientists the opportunity to participate in the event by supporting their stay with per diems from the allocated budget. They were also given a possibility of delivering short talks, showcasing their own work, during the programme. All students and post-docs who submitted a talk were able to give an oral presentation. Almost 40 students and post-docs participated in the programme. On the other hand, mini-courses and tutorials gave them the possibility of getting acquainted with new topics, new results and interesting open problems.

The schedule was designed with special attention on under-represented groups. In particular, the number of female speakers and female participants were monitored during the whole preparation phase. Half of the mini-courses were held by women, and in total, the presentation time allocated to female researchers represents 34% (38,5 hours for contributions by female researchers for 111 hours in total). The financial support provided by ESI was also distributed with care between the participants, taking the gender dimension into account. We hope that this allowed everybody to feel comfortable and helped to achieve a pleasant working atmosphere.

List of early stage researchers divided by gender (students, pre- and post-docs):

Aseel AlNajjar, Bimmermann Johanna, Boffo Eugenia, Caliz Ana Chavez, Ciuclea Ioana, Coutinho Catarina, Deschamps Lina, Doležalová Anna, Douka Styliani, Grochulska Zofia, Lapenna Michela, Maignant Elodie, Meier Damaris, Pryymak Lidiya, Ravanpak Zohreh, Simonetti Angelica, Tarnowsky Annika, Wawreniuk Elwira.

Bisson Olivier, Cattafi Francesco, Coquinot Baptiste, Cosserat Oscar, Diaf Farid, Dumont Theo, Feitosa de Almeida Guilherme, Fotiadis Anastasios, Francois Anton, Gelman Ronny, Gomes Pereira Luís, Goldenberg Louis, Hartman Emmanuel, Houry Guillaume, Ishida Sadashige, Kessler Nathan, Magnet Robin, Maier Levin, Miyamoto David, Mouhli Rayane, Nishino Mao, Niestijl Milan, Pierron Thomas, Rahangdale Praful, Rudkiewicz Theo, Sassen Josua, Schwencke Nilo, Serieys Guillaume, Singh Karandeep Jandu, Szwagier Tom, Tinarrage Raphaël, Van Looy Jan-Willem, Vrabac Kenan, Zanchetta Ferdinando.

Outcomes and achievements

The programme was an opportunity for researchers working on all aspects of infinite dimensional geometry and applications in related fields to meet and discuss freely. During five weeks many new collaborations were initiated and many existing ones had a chance to be strengthened and renewed. Most of the talks were followed by lively discussions (with special activity, among others, by P. Michor and J. Grabowski), some of which lead to active collaborations. Not all of them has yet produced preprints, but we list here a couple noteworthy examples. Full list of preprints published so far can be found in Section *Publications and preprints contributed*.

1. P. Michor acknowledges discussions with A.B. Tumpach and P. Rahangdale during the meeting.
2. K.-H. Neeb and D. Beltiță continued collaboration on the project “Three-graded Lie groups and nets of real subspaces”
3. B. Janssens, A. Fotiadis, S. Haller, L. Ryvkin, and C. Vizman begun cooperation on Chevalley–Eilenberg cohomology of the Lie algebra of contact vector fields.
4. T. Wurzbacher collaborated with M. Egeileh on an article on supergeometrical formulation of mechanics and classical field theories. Moreover, inspired by the programme, T. Wurzbacher started a project on geometric quantisation of two-plectic manifolds with Frédéric Hélein.
5. T. Goliński, G. Larotonda, A.B. Tumpach continued their work on Nijenhuis operators on homogeneous spaces and Kähler structures of coadjoint orbits of unitary groups.
6. K. Tenenblat, A.B. Tumpach started a collaboration on Special vector fields on Riemannian manifolds of constant sectional curvature.
7. S. Preston, A.B. Tumpach continued to work on different ways to endow a smooth quotient space with a Riemannian metric
8. T. Diez, S. Haller, and C. Vizman begun cooperation on a class of coadjoint orbits of the symplectic diffeomorphism group.
9. S. Haller and C. Vizman continued their work on decorated and augmented nonlinear Grassmannians, to be found now in the preprint arXiv:2503.15363.
10. Z. Ravanpak and C. Vizman continued their work on metric degeneracies and gradient flows on symplectic leaves of a Poisson manifold endowed with a pseudo-Riemannian metric.
11. I. Ciuclea, S. Ishida, and C. Vizman continued the exploration of vortex sheet dynamics in 3D.
12. T. Goliński and E. Wawreniuk continued work on multi-mode integrable systems in quantum and classical settings, which will constitute part of her PhD thesis.

Short tutorials by J. Feydy, T. Goliński, G. Larotonda, A.B. Tumpach, C. Vizman allowed early career scientists an easy access to cutting-edge research.

The programme included also software tutorials, aimed showcasing and demonstrating the applications of infinite-dimensional geometry in shape analysis. It covered software such as Demeter Metamorphosis, scikit-shapes, Geomstats, PyVista.

List of talks**Week 1, January 13 - 17, 2025**

Madeleine Jotz (U of Würzburg)	Lie algebroid cohomology and ideals in Lie algebroids, 1 - 3
Francesco Cattafi (U of Würzburg)	PB-groupoids vs VB-groupoids
Aneta Sliżewska (U of Białystok)	Banach-Lie groupoids, 1 - 3
Eduardo Chiumiento (IAM, Buenos Aires)	Operator ideals and infinite-dimensional geometry, 1 - 3
Cornelia Vizman (WU Timisoara)	Central extensions in infinite dimensions
Anton Alekseev (U Genève)	Loop group Hamiltonian actions: a review
Alice Barbara Tumpach (WPI, TU Vienna & Lille U)	Banach Poisson-Lie groups
Milan Niestijl (U of Paderborn)	Holomorphic induction of unitary representations of BCH Fréchet-Lie groups
Karl-Hermann Neeb (FAU, Erlangen-Nürnberg)	Covariant projective representations of Hilbert-Lie groups
Daniel Beltita (IMAR, Bucharest)	Leaf spaces in Lie theory
Chiara Esposito (U of Salerno)	Global Homotopies for HKR Theorems in Differential Geometry
Praful Rahangdale (U of Paderborn)	Correspondence between infinite-dimensional Poisson-Lie groups and Lie bialgebras.
Elwira Wawreniuk (U of Białystok)	Some symplectic realizations of $e(3)^*$ and related integrable systems
Christian Blohmann (MPIM Bonn)	Lie algebras of diffeomorphism groups of non-compact manifolds, Part 1
David Miyamoto (MPIM, Bonn)	Lie algebras of diffeomorphism groups of non-compact manifolds, Part 2
Eugenia Boffo (Charles U, Prague)	Geometric and algebraic aspects in the quantization of gauge theories
Damaris Meier (U of Fribourg)	Uniformization of metric surfaces
Esteban Andruchow (UNGS, Buenos Aires)	Subspaces with or without a common complement
Tilman Wurzbacher (IECL, Metz)	Geometric prequantisation of two-plectic manifolds

Week 2, January 20 - 24, 2025

Anton Izosimov (U of Arizona, Tucson)	Infinite-dimensional geometry and integrable PDEs, 1 - 3
Oscar Cosserat (Georg-August-U, Göttingen)	Hamiltonian dynamics on Poisson manifolds and symplectic groupoids
Katarzyna Grabowska (U Warsaw)	Geometric Mechanics – Tulczyjew Triples, Algebroids, and Dirac Structures, 1 - 3
Tomasz Goliński (U of Białystok)	Banach manifolds and integrable systems around them
Ali Suri (U of Paderborn)	Conjugate points along spherical harmonics and quasi-geostrophic motion
Bas Janssens (TU Delft)	Central extensions of the group of exact volume preserving diffeomorphisms
Gabriel Larotonda (U of Buenos Aires)	Connections in infinite dimensional manifolds: the Ambrose-Palais-Singer way
Eva Miranda (UPC, Barcelona)	Euler flows as universal models for dynamical systems
Keti Tenenblat (U of Brasilia)	Classes of nonlinear PDEs related to metrics of constant curvature
Cornelia Vizman (WU of Timisoara)	Prequantizable coadjoint orbits of diffeomorphism groups

Stefan Haller (U of Vienna)	Augmented nonlinear Grassmannians as coadjoint orbits of classical diffeomorphism groups
Stephen Preston (Brooklyn College)	Geometry and curvature of diffeomorphism groups
Levin Maier (U Heidelberg)	On Mañé's Critical Value, the Magnetic Hunter-Saxton System, and an Infinite-Dimensional Magnetic Hopf-Rinow Theorem
Janusz Grabowski (IMPAN, Warsaw)	Geometry of quantum dynamics in infinite-dimensions
Alina Dobrogowska (U of Białystok)	A new look at Lie algebras
Baptiste Coquiot (ISTA)	Tracking Dissipative Dynamics with Geometry
François Gay-Balmaz (NTU, Singapore)	On Two Extensions of Arnold's Geometric Fluid Dynamics

Week 3, January 27 - 31, 2025

Anastasia Molchanova (TU Vienna)	Sobolev homeomorphisms and their weak limits, 1 - 3
Zofia Grochulska (Jyväskylä U)	Approximately differentiable homeomorphisms: derivatives and Jacobians
Laszlo Feher (U of Szeged)	Integrable Hamiltonian systems from Poisson reductions of doubles of compact Lie groups, 1 - 3
Tobias Diez (Shanghai Jiao Tong U)	Infinite-dimensional Symplectic Geometry, 1 - 3
Aseel AlNajjar (KAUST, Thuwal)	Asymptotic limits for strain-gradient viscoelasticity with nonconvex energies
Yurii Neretin (U of Graz & HSM MIPT)	Unitary representations of the group of diffeomorphisms of the circle
Alice Barbara Tumpach (WPI, Vienna)	The Universal Teichmüller space
Peter Michor (U of Vienna)	Remarks on Infinite dimensional symplectic and Poisson geometry
Alice Barbara Tumpach (WPI, Vienna)	Infinite-dimensional hyperkaehler quotients, Nahm's equations and coadjoint orbits
Johanna Bimmermann (Ruhr U, Bochum)	From Magnetically Twisted to Hyperkähler
Lina Deschamps (U Heidelberg)	On a hyperkähler view of the magnetic geodesic flow on CP^n .
Sadashige Ishida (ISTA)	More symplectic structures on the space of space curves
Najma Mosadegh (Azarbaijan Shahid Madani U)	Investigation on Minimal Surfaces, Biharmonic Submanifolds, and Their Applications in Discrete Geometry
Anna Doležalová (Czech Academy of Sciences, Prague)	Sobolev homeomorphisms in models of Nonlinear Elasticity
Tudor Stefan Ratiu (Shanghai Jiao Tong U)	Two reductions for the Teichmüller space
Olga Bernardi (U Padova)	Studying symplectic billiards: an overview and recent rigidity results
Ana Chavez Caliz (U Heidelberg)	Outer Symplectic Billiards
Farid Diaf (U Grenoble Alpes)	Vector fields on the hyperbolic plane and surfaces in half-pipe space
Anna Florio (Dauphine U, Paris)	Genericity of transverse homoclinic points for analytic convex billiards
Tien Zung Nguyen (Torus AI)	AI at Torus

Week 4, February 3 - 7, 2025

Blanche Buet (U Paris-Saclay)	Varifolds: variational manifolds., 1 - 3
Tom Needham (Florida State U, Tallahassee)	Gromov-Wasserstein Distance and Applications to Shape Graphs
Klas Modin (Chalmers U of Technology, Gothenburg)	Information geometry of diffeomorphism groups, 1 - 3

Rayane Mouhli (U Paris Cité)	Decorrelation of vector fields with speed of varifolds
Alice Le Brigant (Panthéon-Sorbonne, U Paris 1)	The L^p -Fisher-Rao metrics and alpha-connections
Thomas Pierron (ENS Paris-Saclay)	Extended LDDMM and applications to multi-scale matching problems
Guillaume Charpiat (INRIA Saclay)	Neural Network Growth for Frugal AI : a functional analysis viewpoint
Theo Rudkiewicz (INRIA Saclay)	Tensor decomposition in frugal neural networks
Manon Verbockhaven (INRIA Paris)	Growing Tiny Networks: Spotting Expressivity Bottlenecks and Fixing Them Optimally
Styliani Douka (INRIA Paris)	Growing arbitrary DAG networks: method and strategies
Nilo Schwencke (INRIA Paris)	Kernelizing information geometry for PINNs natural gradient
Rita Fioresi (U Bologna)	Learning Manifold and dimensionality reduction in Deep and Geometric Learning
Guilherme Feitosa de Almeida (SISSA, Trieste)	On the Correspondence Between Statistical Manifolds and Flat F-Manifolds in Hyperbolic geometry
Fabian Rupp (U of Vienna)	Conformally constrained minimization of total curvature
Alice Barbara Tumpach (WPI, Vienna)	Gauge invariant structures
Alain Trouvé (ENS Cachan)	From Shape Spaces to Spatial Transcriptomics: Mathematical Challenges in Molecular Computational Anatomy
Martin Bauer (Florida State U, Tallahassee)	Infinite dimensional Riemannian geometry and geometric data science
Minh Ha Quang (RIKEN AIP, Tokyo)	An information geometric and optimal transport framework for Gaussian processes
Guillaume Serieys (U Paris Cité)	On the metric geometry of general Lebesgue spaces and metrics accounting for the action of Sobolev diffeomorphisms.
Karen Habermann (U Warwick)	Geodesic and stochastic completeness for landmark space

Week 5, February 10 - 14, 2025

Pooran Memari (CNRS LIX, Paris)	Circle Patterns: Geometry, Analysis, and Applications, 1 - 3
Olivier Bisson (INRIA at U Côte d'Azur)	Differentiable Structures on Correlation Matrices with Applications in Neuroimaging
Emmanuel Hartman (U of Houston)	Parameterization Invariant Representations for Efficient Shape Learning
Xavier Pennec (INRIA at U Côte d'Azur)	Geometric Statistics with applications in Computational anatomy, 1 - 3
Tom Szwagier (INRIA at U Côte d'Azur)	The curse of isotropy: from principal components to principal subspaces
François-Xavier Vialard (U Gustave Eiffel, Paris)	On the training of infinite depth and width Residual Networks
Mao Nishino (Florida State U, Tallahassee)	Path constrained unbalanced optimal transport
Théo Dumont (U Gustave Eiffel, Paris)	Optimal transport maps via (corrected) gradient flows
Peter Kán (TU Vienna)	Reconstruction of Illumination in 3D Scenes
Ivona Brandic (TU Vienna)	Principles of Computational Sustainability
Alice Barbara Tumpach (WPI, Vienna)	Poisson structures and isospectral matrices
Frédéric Barbaresco (Thalesgroup, Palaiseau)	Transverse Symplectic Foliation Structure for Thermodynamics-Informed Neural Network and Lie-Groups Machine Learning
Nina Miolane (UC Santa Barbara)	Building G-Invariance in G-Equivariant Networks

Georg Langs (Medical U of Vienna)	From Brain Development and Reorganization to Reconstructing 77 Million Years of Cortical Evolution
Elodie Maignant (Zuse, Berlin)	Geometry of single-cell trajectories
Remco Duits (TU Eindhoven)	Geometric Learning via data-efficient PDE-G-CNNs: Training of Association Fields
Raphaël Tinarrage (ISTA)	Train-Free Segmentation in MRI with Cubical Persistent Homology
Stefan Ohrhallinger (TU Vienna)	The Sampling - Reconstruction Dual

Publications and preprints contributed

T. Goliński, G. Larotonda, A.B. Tumpach, *Nijenhuis operators on homogeneous spaces related to C^* -algebras*, [arXiv:2410.13557](#)[math.DG].

K. Habermann & E. Hartman, *Brownian motion on spaces of discrete regular curves*, [arXiv:2510.24593](#)[math.PR].

S. Haller, C. Vizman, *Nonlinear Grassmannians: plain, decorated, augmented*, [arXiv:2503.15363](#)[math.DG].

P. Michor, *The Schouten–Nijenhuis bracket in infinite dimension*, [arXiv:2504.15010](#)[math.DG].

A.B. Tumpach, *Hyperkaehler Marriage of the two sphere with the hyperbolic space*, [arXiv:2504.19945](#)[math.DG].

A.B. Tumpach, *Infinite-dimensional Siegel disc as symplectic and Kaehler quotient*, [arXiv:2504.19931](#)[math.SG].

Invited scientists

Simonetta Abenda, Anton Alekseev, Aseel AlNajjar, Esteban Andruchow, John Chukwunonso Aneke, Sylvain Arguillere, Frédéric Barbaresco, Martin Bauer, Daniel Beltita, Jerome Bertrand, Hadrien Bigo-Balland, Johanna Bimmermann, Tolga Birdal, Olivier Bisson, Christian Blohmann, Eugenia Boffo, Mireille Boutin, Blanche Buet, Dietrich Burde, Anna Calissano, Andreas Cap, Francesco Cattafi, Jonathan Cerqueira, Guillaume Charpiat, Ana Chavez Caliz, Sylvain Chevallier, Eduardo Chiumiento, Piotr T. Chruściel, Ioana Ciuclea, Baptiste Coquinot, Oscar Cosserat, Catarina Coutinho, Lina Deschamps, Farid Diaf, Alina Dobrogowska, Anna Doležalová, Styliani Douka, Remco Duits, Théo Dumont, Michel Egeileh, Chiara Esposito, Laszlo Feher, Guilherme Feitosa de Almeida, Jean Feydy, Rita Fioresi, Anna Florio, Anastasios Fotiadis, Anton Francois, François Gay-Balmaz, Ronny Gelman, Louis Goldenberg, Agnieszka Golińska, Tomasz Goliński, Luís Gomes Pereira, Katarzyna Grabowska, Janusz Grabowski, Zofia Grochulska, Karen Habermann, Stefan Haller, Minh Ha Quang, Emmanuel Hartman, Sonja Hohloch, Guillaume Houry, Sadashige Ishida, Anton Izosimov, Bas Janssens, Madeleine Jotz, Peter Kán, Hannes Kaufmann, Nathan Kessler, Sung Woon Kim, Georg Langs, Michela Lapenna, Gabriel Larotonda, Alice Le Brigant, Erwin Luesink, Levin Maier, Elodie Maignant, Damaris Meier, Pooran Memari, Peter Michor, Eva Miranda, David Miyamoto, Klas Modin, Anastasia Molchanova, Najma Mosadegh, Rayane Mouhli, Karl-Hermann Neeb, Tom Needham, Yuri Neretin, Tien Zung Nguyen, Milan Niestijl, Mao Nishino, Stefan Ohrhallinger, Andriy Panasyuk, Fernand Pelletier, Xavier Pennec, Thomas Pierron, Stephen Preston, Lidiya Prymak, Praful Rahangdale, Tudor Stefan Ratiu, Zohreh Ravanpak, Stéphane Rivaud, Salvador Rodríguez-Sanz, Theo Rudkiewicz, Fabian Rupp, Leonid Ryvkin, Vladimir Salnikov, Josua Sassen, Alexander Schmeding, Nilo Schwencke, Guillaume Serieys, Clayton Shonkwiler, Angelica Simonetti, Karandeep Jandu Singh, Aneta Sliżewska, Ali Suri, Tom Szwagier, Annika Tarnowsky, Ket Tenenblat, Raphaël Tinarrage, Alain Trouvé, Alice Barbara Tumpach, Daniele

Valeri, Jan-Willem Van Looy, Manon Verbockhaven, François-Xavier Vialard, Cornelia Vizman, Kenan Vrabac, Elwira Wawreniuk, Kathrin Welker, Tilmann Wurzbacher, Ferdinando Zanchetta.

Entanglement in Many-body Quantum Matter: Dynamics, Dissipation, Equilibration

Organizers: Mari Carmen Banuls (MPI of Quantum Optics, Garching), Hannes Pichler (IQOQI, Innsbruck), Norbert Schuch (U of Vienna), Maksym Serbyn (ISTA, Klosterneuburg)

Dates: May 12 – June 13, 2025

Budget: ESI € 37 242

Munich Center For Quantum Science and Technology (MCQST): € 5 000

Report on the thematic programme

Context

The traditional paradigm for understanding quantum matter has focused on the study of ground state phases. Here, entanglement provides the key to the classification of phases beyond Landau. Understanding the structure of this ground state entanglement has allowed for deep insights into the nature of systems exhibiting exotic quantum behaviour; in particular, it has enabled both a comprehensive classification of topological phases of matter without and with symmetries, and it has given rise to new powerful methods for the numerical simulation of such systems.

The recent advances in the field of quantum simulations have opened the door towards the study of quantum systems far from equilibrium. This paradigm shift led to the realization that the domain of dynamics, driven, and dissipative systems, as well as their equilibrium (thermal) states, offered a wealth of novel phenomena waiting to be understood. At the same time, the existing mathematical, physical, and numerical tools which had been developed for the study of zero-temperature equilibrium physics – based on its entanglement structure – turned out to be insufficient to attack these problems, as those systems exhibit a vastly higher (extensive) amount of entanglement.

At the same time, the investigation of the entanglement structure of non-equilibrium quantum systems led to crucial new insights. A prime example is the understanding of thermalization and its breakdown. Here, the theoretical exploration of many-body localization (MBL) – a fascinating nonequilibrium phase of matter where disorder prevents thermalization – revealed an unusually slow dynamics of entanglement, linked to a different entanglement structure of the many-body quantum eigenstates; and the discovery of scarred eigenstates with anomalously low entanglement has provided a unique window into the non-ergodic behaviour of certain quantum systems, challenging traditional notions of thermalization.

Despite this progress, many central questions in the field remain open. For instance, what entanglement scalings can be realized by highly excited eigenstates of interacting systems? Which are the universal types of entanglement dynamics in quantum quenches? Can we use the entanglement spectrum or bulk-boundary correspondence to generalize and probe nonequilibrium orders? What are the insights into driven systems, systems with dissipation or other nonunitary dynamics which their entanglement structure can give us? How can such phenomena be realized, and what can they be used for?

Goals of the programme

The goal of the ESI programme "Entanglement in many-body quantum matter: Dynamics, dissipation, and thermal equilibrium" was to bring together scientists from the different communities working on entangled quantum matter out of equilibrium and at finite temperature, with the aim of making key progress on the status of the field. Researchers working on these topics come from a diverse range of communities, from mathematical physics and analytical methods all the way to numerical simulations, and simultaneously with interests ranging from the study of model systems all the way to the practical realization of such systems both on the theoretical and on the experimental side. Therefore, a key goal of the programme was to bring together and stimulate intense interactions between researchers from these different communities, in accordance with the spirit of the ESI.

Specific information on the thematic programme

The programme was structured along three major topical directions: The classification of the behaviour of driven, non-equilibrium, and thermal systems, their numerical study, and their experimental realization. For each of these areas, let us now highlight some of the key open problems which were at the heart of the informal talks, workshop week and also informal discussions during the programme.

Classification and Universality.—The very notion of a phase in quantum systems is being entirely reshaped by factors such as external driving, finite temperatures, and dissipative mechanisms. This naturally raises a range of important questions: What phases can driven quantum systems exhibit, and what are their unique characteristics? What is the role played by chaotic dynamics, and how do such and other processes lead to thermalization? What quantum phases – both topological and symmetry protected topological (SPT) – can thermal states exhibit? Which novel phenomena do these new phases exhibit? How can they be detected, and what are their potential applications in quantum technologies?

Numerical Methods.—The difficulties in analytically describing systems far from equilibrium makes good numerical methods all the more important. At the same time, however, the large amount of entanglement present in these systems poses new kinds of challenges to their numerical simulation: How can we overcome the so-called “entanglement barrier” in simulating time evolution? How can we optimally simulate dissipative dynamics, in particular using tensor network methods? How can we speed up tensor-network based algorithms for simulating time evolutions by running them on quantum computers, especially in hybrid quantum-classical setups? How can we use methods other than tensor networks?

Quantum Simulations.—Quantum simulators are becoming a powerful tool for probing quantum matter in regimes that challenge state-of-the-art numerical techniques, and therefore driving the discovery of novel many-body phenomena. In order to connect the theory to the experimental work on quantum simulators and to stimulate further progress, we will actively engage experimental groups in the program. Key questions which we will pursue include: How can we use driven, dissipative or monitored systems for efficient state preparation in quantum simulators, e.g. of exotic quantum phases or resource states for quantum computation? How can we prepare thermal states and control temperature? How can we efficiently access characteristic many-body quantities, such as entanglement growth in dynamics, or long-range entanglement patterns in equilibrium in quantum simulation platforms?

Activities

The programme consisted of 5 weeks, with the second week hosting the workshop “Entangled matter out-of-equilibrium” that attracted a large number of participants. The workshop was the most intense point of the programme, attracting more than 50 participants and 19 talks. Several talks had a blackboard pedagogical format that encouraged questions and helped to engage the audience. Outside of the workshop week, the programme was structured to have a welcome meeting and one informal discussion per day, typically on topics proposed by participants. In particular, the first week of the programme had several discussions of complexity, integrability and thermalization; the third week of the program had focus on more experimental aspects, such as discussions on measurements in quantum systems, quantum simulation with molecules and weakly dissipative quantum systems. The fourth week focused on tensor networks and open systems and had discussions on entanglement structure, temporal entanglement and complexity of tensor networks. Finally, the last concluding week of the programme had discussion on the learning transitions and generalized entropies.

Overall, many of the discussions were open-ended, and stimulated further exchange between participants. Therefore the programme provided opportunities for long-term collaborations during weeks outside of the workshop and also helped to communicate the broader picture of the field exchanging a large number of ideas during the workshop week. The participants included both faculty, as well as postdocs and (mostly local) PhD students, helping the latter to learn about relevant problems in the field and also present their work through posters during the workshop week.

Outcomes and achievements

The ESI programme has initiated a large number of discussions which led to new collaborations. It has also allowed participants to follow up on and intensify existing collaborations and to complete joint projects. Below, we provide a sample of the activities carried out by participants during their stay at the ESI.

The blackboard talk on post-measurement Quantum Monte Carlo by David Luitz led to an intense discussion with Jerome Dubail, who noticed the similarity of the setup with his analytical work carried out by his group. This discussion has now materialized into a direct collaboration and inspired the generalization of the QMC-method for fixed subsystem magnetization as a measurement outcome. This project is expected to lead to one or more joint publications. The meeting was furthermore very useful to push forward a collaboration between Jens Bardarson and David Luitz on a generalization of the concept of the information lattice to operators.

Lorenzo Piroli has discussed and collaborated with Matteo Votto, Marko Ljubotina and Maksym Serbyn to finalize a project about “Learning mixed quantum states in large-scale experiments”. This project was completed soon after the end of the programme, and has led to the pre-print arXiv:2507.12550. In addition, Lorenzo Piroli has discussed with Georgios Styliaris about preparing quantum many-body states using local measurements and feedback. This has led to several follow-up exchanges, which may lead to a publication in the future. Finally, Lorenzo Piroli had multiple interactions with different participants. Most notably, he has discussed with Norbert Schuch about preparing matrix-product-states via local quantum circuits, with Fabian Essler and Jerome Dubail about certain families of exactly solvable Lindbladians, and with Hannes Pichler about implementation of quantum cellular automata using Rydberg atoms. Some of these discussions have continued after the end of the programme, and could lead to publishable results in the near future.

Ana Maria Rey engaged in a series of intellectually stimulating discussions with fellow researchers, which contributed to the development of new ideas and research directions. In particular, exchanges with Hannes Pichler focused on potential strategies for implementing emergent fermionic degrees of freedom through bosonic modes. Furthermore, discussions with Mari Carmen Bañuls addressed the design of numerical protocols that integrate matrix product states with DTWA. If successfully developed, such methods could represent a valuable advancement in the numerical simulation of spin models in two dimensions, especially in regimes where standard DTWA protocols are inadequate.

Juan Carrasquilla had several scientific exchanges with Zlatko Papić. During the programme, they were able to write down the Laughlin wave function in terms of a modified neural network. Currently, Juan Carrasquilla is exploring generalizing the neural network that embodies the Laughlin state into a more expressive ansatz to target many-body fermion effects beyond those already described by the Laughlin ansatz in several settings. Juan Carrasquilla also had stimulating discussions with Maksym Serbyn about machine learning and its role in simulating classical and quantum systems, as well as its role in combinatorial optimization.

Philipp Hauke and Lorenzi Piroli started discussions on extending the studies on non-stabilizer-magic in chaotic-to-ergodic transitions, presented by Philipp Hauke, to long-range non-stabilizer-ness, which may provide a better classification of high-non-stabilizer phases of matter. With Mari Carmen Bañuls, Philipp Hauke discussed the possibility to apply tensor-network codes to holographic quantum matter. Alex Turzillo collaborated with Naren Manjunath on a project related to the detection of SPT phases of mixed states, resulting in the preprint arXiv:2507.00127. With Jose Garre-Rubio, Andras Molnar, and Shuhei Ohyama, he discussed intrinsic topological phases of mixed states and aspects of fermionic matrix product operators, which led to ongoing collaborations. He also had fruitful discussions with Luca Tagliacozzo and Matteo Votto. Tibor Rakovszky has benefitted from fruitful discussions with Curt von Keyserlingk, Angela Capel, Alex Turzillo, Federica Surace, Sagar Vijay, Maksym Serbyn, Zala Lenarcic and Wen Wei Ho. In particular, Tibor Rakovszky and Curt von Keyserlingk collaborated on an ongoing research project involving spectral properties and stability in open non-equilibrium phases of matter.

Daniel Malz had discussions with Norbert Schuch on complexity of random tensor network contraction, and their relation to random circuit complexity, which led to a number of concrete questions to be investigated. For Roderich Moessner, the programme gave the opportunity for extensive discussions, where he in particular benefitted from discussing the results on many-body caging from my own as well as other groups. Finally, Frank Verstraete reports “The ESI programme was without a doubt one of the highlights of the year for me: inspiring discussions with Norbert Schuch and Dimitri Abanin, animated talks, and a spirit of discovery!”

List of talks

Workshop on “Entangled Matter Out-of-equilibrium”, May 19 – 23, 2025

Curt von Keyserlingk (KCL, London)	Finite-temperature quantum topological order in three dimensions
Lorenzo Piroli (U Bologna)	Long-range nonstabilizerness and phases of matter
Natalia Chepiga (TU Delft)	Tensor network perspective of quantum Kibble-Zurek mechanism
Andreas Läuchli (Paul Scherrer Institut, Villigen)	Thermalization Dynamics in Closed Quantum Many Body Systems: a Precision Large Scale Exact Diagonalization Study

Angela Capel (U of Cambridge)	Rapid thermalization of quantum dissipative many-body systems
Federica Maria Surace (CalTech)	Metastability in quantum many-body systems
Julian Leonard (ISTA, Klosterneuburg)	A photon-coupled atomic tweezer array
Ana Maria Rey (U of Colorado, Boulder)	New frontiers in quantum simulation and sensing via cavity mediated interactions
Fabian Essler (U Oxford)	Lindblad equations with decoupled BBGKY hierarchies and exact hydrodynamic projections
David Luitz (U Bonn)	Post-measurement Quantum Monte Carlo
Giulia Semeghini (Harvard U, Cambridge)	A mixed-species atom array for quantum computing and simulation
Monika Aidelsburger (LMU Munich)	Quantum Gas Microscopy of quantum many-body systems out-of-equilibrium
Philipp Hauke (U of Trento)	Complexity transitions in chaotic quantum systems
Jérôme Dubail (U Strasbourg)	Quantum many-body dynamics in 1D Bose gases: the role of the rapidities
Wen Wei Ho (NUS, Singapore)	Geometric quantum drives: Hyperbolically driven quantum systems and beyond
Juan Carrasquilla (ETH Zurich)	Neural network simulation of a spin glass dynamics transition
Frank Pollmann (TU Munich)	Probing Non-Equilibrium Topological Order on a Quantum Processor
Roderich Moessner (MPI Dresden)	Many-body cages: disorder-free glassiness from flat bands in Fock space, and many-body Rabi oscillations
Tibor Rakovszky (BME, Budapest)	Bottlenecks in quantum channels and defining quantum spin glass order

Individual discussions

Jérôme (U of Strasbourg)	Complexity in quantum many-body systems
Sagar Vijay (UC, Santa Barbara)	Fostering Long-range entanglement in mixed quantum matter
JS Caux (U of Amsterdam)	Integrability and complexity
Andrw Green (UC London)	Thermalization in closed systems
Zlatko Papic (U of Leeds)	Thermalization in Rydberg Atom Arrays
& Natalia Chepiga (TU of Delft)	
Matteo Votto (CNRS - U of Grenoble Alpes)	Measuring Properties in Quantum Simulators
Ana María Rey (U of Colorado, Bolder)	Quantum Simulation with Polar Molecules
Zala Lenarcic (Jozef Stefan Institute, Ljubljana)	Equilibration in (weakly) dissipative quantum systems
Frank Verstraete (U of Cambridge)	Entanglement structure and generalized symmetries in quantum spin chains
Dima Abanin (Princeton)	Temporal entanglement and complexity of dynamics of local observables
Daniel Malz (U of Copenhagen)	Complexity of tensor networks
Marko Znidaric (U of Ljubljana)	Decay of correlations and Ruelle-Pollicott resonances
Romain Vasseur (U of Geneva)	Bayesian inference and learnability phase transitions
Luca Tagliacozzo (IFF-CSIC, Madrid)	On spatio-temporal tensor networks, generalized entropies and their physical meaning

Publications and preprints contributed

T. Bhore, L. Su, I. Martin, A. A. Clerk, Z. Papic, *Quantum Mpemba effect without global symmetries*, [arXiv:2505.17181](#)[quant-ph].

N. Manjunath, A. Turzillo, Ch. Wang, *Detection of 2D SPT Phases under Decoherence*, [arXiv:2507.00127](#)[cond-mat.str-el].

A.-R. Negari, L. A. Lessa, S. Sahu, *Symmetry enforces entanglement at high temperatures*, [arXiv:2508.20166](#)[quant-ph].

J. Taylor, C. Voinea, Z. Papic, R. Fan, *Conformal scalar field theory from Ising tricriticality on the fuzzy sphere*, [arXiv:2506.22539](#)[cond-mat.str-el].

C. Voinea, R. Fan, N. Regnault, Z. Papic, *Regularizing 3D Conformal Field Theories via Anyons on the Fuzzy Sphere*, [arXiv:2411.15299](#)[cond-mat.stat-mech].

M. Votto, M. Ljubotina, C. Lancien, J. I. Cirac, P. Zoller, M. Serbyn, L. Piroli & B. Vermersch, *Learning mixed quantum states in large-scale experiments*, [arXiv:2507.12550](#)[quant-ph].

Invited scientists

Dmitry Abanin, Monika Aidelsburger, Mark Arildsen, Mari Carmen Banuls, Jens H Bardarson, Angela Capel, Juan Carrasquilla, Jean-Sébastien Caux, María Cea Fernández, Natalia Chepiga, Jean-Yves Desaulès, Neil Dowling, Jérôme Dubail, Fabian Essler, Shachar Fraenkel, Adrián Franco Rubio, Anna Francuz, Jose Garre Rubio, Andrew Green, Philipp Hauke, Wen Wei Ho, Aron Kerschbaumer, Andreas Klingler, Dmytro Kolisnyk, Marton Kormos, Ilya Kull, Tim Langen, Andreas Läuchli, Katharina Lehfuß, Zala Lenarcic, Julian Leonard, Marko Ljubotina, David Luitz, Daniel Malz Naren Manjunath, Refik Mansuroglu, Yuri Minoguchi, Aditi Mitra, Roderich Moessner, András Molnár, Eloi Nicolau Jiménez, Andreas Nunnenkamp, Shuhei Oyama, Zlatko Papic, Elena Petrova, Hannes Pichler, Lorenzo Piroli, Frank Pollmann, Tibor Rakovszky, Jie Ren, Ana Maria Rey, Alberto Ruiz de Alarcón, Subhayan Sahu, Norbert Schuch, Giulia Semeghini, Maksym Serbyn, Georgios Styliaris, Federica Maria Surace, Luca Tagliacozzo, Alex Turzillo, Bram Vanhecke, Romain Vasseur, Frank Verstraete, Lucia Vigliotti, Sagar Vijay, Curt von Keyserlingk, Matteo Votto, Marko Znidaric.

Reverse Mathematics

Organizers: Juan Aguilera (TU Vienna), Linda Brown Westrick (Penn State U), Noam Greenberg (Victoria U of Wellington), Denis Hirschfeldt (U of Chicago)

Dates: June 23 – August 29, 2025

Budget: € 53 170

Costs for scientists to participate in the programme were partially offset by the third-party funding for collaborations with local mathematicians participating in the programme, as well as for participation in co-located conferences such as the Logic Colloquium, the conference on the occasion of Saharon Shelah's 80th birthday, the Hirstfest, and Young Set Theory.

The programme benefited from travel cost subsidies by the Association for Symbolic Logic (ASL, ~ € 10 000), the Royal Society of New Zealand (~ NZ\$ 14 000), the National Science Foundation (NSF, ~ \$ 5 000), as well as networking funding from the Austrian Science Foundation (FWF, ~ € 1 000).

Report on the thematic programme

Reverse Mathematics is the branch of mathematics aimed at investigating the question: given a mathematical theorem ϕ , which axioms are necessary to prove ϕ ? Answering this question has the potential to yield new insight into the theorem as well as to result in new generalizations and connections to other seemingly unrelated theorem. The first article on the topic was published in 1975, 50 years before the programme, and the field has seen accelerated development in the last decade. The purpose of this programme was to survey the current state, exchange ideas, and establish new connections and collaborations, all with emphasis on the future directions of the field.

Activities

The scientific content of the programme cantered around the following focus weeks:

- Focus week 1 (week 2 of the programme): Workshop on *Reverse Mathematics and Generalised Computability Theory*: This week focused on the general computational methods employed in Reverse Mathematics and the applications that these have to set theory, algebra, and analysis.
- Focus week 2 (week 6 of the programme): Summer School on *Reverse Mathematics: New Paradigms*: This week served to introduce experts and non-experts to selected topics in Reverse Mathematics, and particularly those that would recur the week after.
- Focus week 3 (week 7 of the programme): Workshop on *Reverse Mathematics: New Paradigms*: This week focused on new developments and non-standard theories in Reverse Mathematics, particularly focusing on topology and Ramsey theory.
- Focus week 4 (week 10 of the programme): Workshop on *Reverse Mathematics: Beyond Logic*: This week focused on recent results obtained by applying methods from computability theory and proof theory to functional analysis and combinatorics, particularly the theory of well-quasi-orders and better-quasi-orders.

Outside of these focus weeks, the ESI saw continuous activity throughout the ten weeks in the form of informal discussions, collaborations between guests and local participants, regular visits, and impromptu lectures. All lectures took place in person, except for H. Friedman's lecture series on Strict Reverse Mathematics.

Specific information on the thematic programme

The programme was co-located with a variety of logic conferences taking place elsewhere in the city. Currently, the city of Vienna hosts what is possibly the largest community of logicians in the world and thus proved itself particularly attractive for junior researchers and students. Junior postdoctoral researchers attended the programme, gave talks, and established new connections with other junior and senior researchers; doctoral students saw the opportunity to meet other students and senior researchers and gained new perspectives on current and future developments in the field and how these connect with other areas of mathematics; advanced undergraduate and graduate students, as well as established researchers from other fields, attended the summer school and workshops and acquired new knowledge; and the leading researchers from the field worked together among themselves and with other guests towards future developments.

Outcomes and achievements

Old collaborations were strengthened and new collaborations were developed in the course of the programme. See *Publications and preprints contributed* for a partial list of submitted and in-progress articles arising from the programme. Notable new projects involving local and guest participants which arose as a consequence of the programme include:

- Collaboration between D. Rossegger and D. González and D. Turetsky on computable model theory.
- Collaboration between J. Aguilera, E. Hammatt, and N. Greenberg on generalised computability theory.
- Collaboration between J. Aguilera and A. Panagiotopoulos on reverse mathematics.
- Collaboration between T. Koupchinsky and K. Yokoyama on descriptive set theory and computability theory.

Two Master's students attending the summer school are now pursuing doctoral studies in mathematics as a consequence of the programme.

In order to continue the work started during the programme, participants have submitted applications for long-term funding to the FWF (at least four applications), the ERC (at least two applications), and MSCA (at least two applications), and the NZ Royal Society for topics stemming from their work at the ESI.

Given the large success of the meeting, and particularly of the workshop on generalised computability theory, follow-up conferences are currently being planned for 2027 and 2028.

List of talks

Workshop 1 on “Reverse Mathematics and Higher Computability Theory”, June 30 - July 4, 2025

Liang Yu (Nanjing U)	Digging Out Pointed Sets
Sy David Friedman (U of Vienna)	Stability, Genericity and Strength
Su Gao (Nankai U)	The computability of some problems in Borel combinatorics
Liling Ko (TU Vienna)	Dichotomy for classes of countable graphs
Philipp Lücke (U Hamburg)	Σ_1 – <i>definability</i> at higher cardinals
Raphaël Carroy (U Torino)	A well-quasi-order for continuous functions
Antonio Montalbán (UC, Berkeley)	The limit of deteremiancy in second order logic
Dominique Lecomte (LP THE, Paris)	Strong representation of Π^0_3 sets and dichotomies
Robert Lubarsky (FAU, Boca Ratón)	The Reverse Mathematics of Harrington's Principle
Hanul Jeon (Cornell U, Ithaca)	On proof-theoretic dilator and Pohlers' characteristic ordinals
Gian Marco Osso (U of Udine)	Separating classes of oracular strength related to cardinal characteristics over models of Δ^1_1 comprehension
Thibaut Koupchinsky (TU Vienna)	The reverse mathematics of analytic measurability
Natasha Dobrinen (Notre Dame)	Computability theoretic aspects of big Ramsey degrees
Daniel Turetsky (Victoria U of Wellington)	Iterated Graph Derivatives, Antiderivatives, and Priority Arguments
Martina Iannella (TU Vienna)	On Laver algebras and their embeddings
Johanna Franklin (Hofstra U, Hempstead)	Failure modes for highness for isomorphism

Josiah Jacobsen-Grocott (NTU Singapore)	A Weihrauch degree perspective on the difficulty of finding isomorphisms
Philipp Schlicht (U Siena)	Computations, countable ranks and complexity of Borel codes
Miroslav Zeleny (Charles U, Prague)	On the Luzin-Novikov theorem
Jan Kruschewski (TU Vienna)	Analysis of HOD for Admissible Structures
Vassilios Gregoriades (National and Technical U of Athens)	Classical versions of effective Borel uniformizations
Philip Welch (U Bristol)	Higher Type Recursion in Transfinite Computational models
Joseph Miller (U of Wisconsin-Madison)	Generic Muchnik reducibility
Selwyn Ng (NTU Singapore)	Some reducibilities in computability theory

Summer School on “Reverse Mathematics: New Paradigms”, July 28 - August 1, 2025

Ekaterina Fokina (TU Vienna)	Computable structure theory, Lecture 1 - 4
Damir Dzhafarov (U of Connecticut)	From topology to combinatorics, Lecture 1 - 4
Ludovic Patey (CNRS, Paris)	Lowness and avoidance: a guide to separation, Lecture 1 - 3
Keita Yokoyama (Tohoku U)	Reverse mathematics for analysis: an introduction, Lecture 1 - 4
Anton Freund (U of Würzburg)	The strength of better-quasi-orderings, via ordinal analysis, Lecture 1 - 4

Workshop 2 on “Reverse Mathematics: New Paradigms”, August 4 - 8, 2025

Peter Cholak (Notre Dame du Lac)	Coding in the universal n -clique free graph, H_{n+1} : Part I - II
Jeffrey Hirst (App State)	Some conservation results for higher order reverse mathematics
Keita Yokoyama (Tohoku U)	First-order strength of Ramsey’s theorem for pairs—from the perspective of proof size
Paul Shafer (U Leeds)	Revisiting the reverse mathematics of the Tietze extension theorem: preserving suprema
Leszek Kołodziejczyk (U Warsaw)	Scott ranks of models of fragments of PA
Giorgio Genovesi (U Leeds)	Another look at the relation between higher order arithmetic and set theory
Gavin Dooley (Notre Dame du Lac)	Iterated jump noncomputability and compactness
Sam Sanders (Ruhr U, Bochum)	The Big, Bigger, and Biggest Five of Reverse Mathematics, Part I - II
Andrew DeLapo (U of Connecticut)	Finding Discrete Subspaces of Hausdorff CSC Spaces
Java Darleen Villano (U of Connecticut)	Relativized computable categoricity
Heidi Benham (U of Connecticut)	Problem Reducibility of a Weakened Version of Ginsburg–Sands Theorem
Wei Wang (SYSU, Guangzhou)	Finite Combinatorics and Fragments of Arithmetic

Workshop 3 on “Reverse Mathematics: Beyond Logic”, August 25 - 29, 2025

David Fernández-Duque (U of Barcelona)	The fractal Goodstein principle
Miguel Aguilar (TU Vienna)	The Reverse Mathematics of the Mountain Pass Theorem, Part I - II
Aristotelis Panagiotopoulos (U of Vienna)	Incompleteness theorems for observables in general relativity
Alberto Marcone (U of Udine)	The barrier Ramsey theorem
Ulrich Kohlenbach (TU Darmstadt)	Logical analysis of proofs in non-smooth optimization using set-valued monotone operators

Giovanni Soldá (Ghent U)	Nash-Williams theorem for sequences of finite range in ATR ₀
Fedor Pakhomov (Ghent U)	Higman's lemma for bqo's is provable in ATR ₀
Andreas Weiermann (Ghent U)	How to treat Goodstein sequences via well partial orders.
Lorenzo Carlucci (U Roma 1)	Reductions of well-ordering principles to Ramsey-type and Hindman-type theorems
Harvey Friedman (Ohio State U, Columbus)	Strict Reverse Mathematics, Part I - III (online)

Publications and preprints contributed

M. Aguilar, J. Aguilar & D. Fernández-Duque, *The Reverse Mathematics of the Mountain Pass Theorem*, in progress.

J. Aguilar & D. Fernández-Duque, *The spectrum of hyperarithmetical soundness*, in progress.

J. Aguilar, A. Freund & F. Pakhomov, *Recursively Provable Dilators*, preprint.

J. Aguilar & N. Greenberg, *Initial segments of the constructible hierarchy satisfying Mostowski's collapse axiom*, in progress.

J. Aguilar & N. Greenberg, *E. Hammatt, hierarchy of finite-change degrees in admissible computability*, in progress.

J. Aguilar & H. Jeon, *Recursively Provable Ptykes*, in progress.

J. Aguilar, A. Fernández & J. Joosten, *The provably total set-recursive functions of KPI*, [arXiv:2510.14399](https://arxiv.org/abs/2510.14399) [math.LO].

J. Aguilar & T. Koupchinsky, *Binary Choice Games and Arithmetical Comprehension*, [arXiv:2510.12612](https://arxiv.org/abs/2510.12612) [math.LO].

J. Aguilar & T. Koupchinsky, *The limits of determinacy in higher-order arithmetic*, [arXiv:2411.04786](https://arxiv.org/abs/2411.04786) [math.LO].

J. Aguilar, T. Koupchinsky & K. Yokoyama, *The Reverse Mathematics of Analytic Measurability*, [arXiv:2603.22503](https://arxiv.org/abs/2603.22503) [math.LO].

J. Aguilar & R. Lubarsky, *Harrington's Principle in Second-Order Arithmetic*, in progress.

J. Aguilar, R. Lubarsky, & L. Pacheco, *Higher-Order Feedback Computability*, in progress.

J. Aguilar & F. Pakhomov, *Non-linearities in the analytical hierarchy*, preprint.

K. Benjelloun & B. Durand, *Recursive Pseudo Well-Orderings with Infinite Time Turing Machines*, in progress.

K. Benjelloun, B. Durand & G. Lafitte, *Stable Writability of reals via Infinite Time Turing Machines*, in progress.

G. Buriola & A. Weiermann, *Proof-Theoretic Relations between Higman's and Kruskal's theorem, and Independence Results for Tree-like Structures*, [arXiv:2511.11297](https://arxiv.org/abs/2511.11297) [math.LO].

L. Carlucci & G. Celli, *Weihrauch reducibility between Ramsey-type theorems and wellordering principles at the level of induction: A pilot study* [arXiv:2511.21481](https://arxiv.org/abs/2511.21481) [math.LO].

P. Cholak, *Ramsey Theorem and Bounding in Arithmetic*, [arXiv:2603.23704](https://arxiv.org/abs/2603.23704) [math.LO].

G. Dooley, *Iterated jump noncomputability and compactness*, [arXiv:2506.20620](https://arxiv.org/abs/2506.20620) [math.LO].

D. Fernández-Duque & A. Weiermann, *The Fractal Goodstein Principle*, [arXiv:2508.14768](https://arxiv.org/abs/2508.14768) [math.LO].

E. Frittaion & G. G. Genovesi, *Transfinite recursion from collapsing functions*, in progress.

E. Gadsby, *On the Slowing Down Phenomenon*, in progress.

- D. Gonzalez, D. Rossegger & D. Turetsky, *Scott Analysis up to the Vaught Ordinal*, in progress.
- N. Greenberg, J. Jacobson-Grocott, J. Miller & D. Turetsky, *Degrees of continuous functions on Baire space*, in progress.
- N. Greenberg, J. Miller & M. Soskova, *Relativizing randomness to enumeration oracles*, in progress.
- N. Greenberg, D. Lecomte, D. Turetsky & M. Zeleny, *Minimal examples for Σ^0_ξ graph colourings*, in progress.
- E. Hammat & H. T. Koh, *A sufficient condition for the density of the punctual degrees*, preprint.
- J. Hirst & C. Mummert, *Reverse mathematics and moduli of uniform continuity*, in progress.
- R. Lubarsky, *Delta and determinacy of the Boolean hierarchy over Σ^0_2* , in progress.
- A. Marcone & A. Volpi, *Reverse Mathematics and Dimension of Posets*, [arXiv:2603.18759](#)[math.LO].
- D. Norman & S. Sanders, *The uncountability of the reals and the Axiom of Choice*, [arXiv:2602.05558](#)[math.LO].
- S. Sanders, *On countability and representations*, [arXiv:2602.06728](#)[math.LO].
- S. Sanders, *Reverse Mathematics: there and back again*, Manuscript, 422 pages.
- S. Sanders & D. Taranovsky, *Numerical Choice, Riemann integration, and Reverse Mathematics*, [arXiv:2606.01420](#)[math.LO].
- W. Wang, *Iterated Jumps of Perfect Subtrees of Positive Trees*, in progress.

Invited scientists

Miguel Aguilar, Juan Aguilera, Alessandro Andretta, Heidi Benham, Kenza Benjelloun, Sapir Ben-Shahar, Laurent Bienvenu, Gabriele Buriola, Lorenzo Carlucci, Raphaël Carroy, William Chan, Peter Cholak, Alakh Dhruv Chopra, Chris Conidis, Andrew DeLapo, Andres Diaz Rojas, Isabel Diaz Rojas, Natasha Dobrinen, Gavin Dooley, Damir Dzhamalov, Luca Facchinetti, Anton Fernández, David Fernández-Duque, Ekaterina Fokina, Johanna Franklin, Anton Freund, Harvey Friedman, Sy David Friedman, Yuxiao Fu, Elijah Gadsby, Mariami Gamsakhurdia, Su Gao, Giorgio Genovesi, Kenneth Gill, Oriola Gjetaj, Sarah Gleghorn, Jun Le Goh, David Gonzalez, Zakkai Goriely, Noam Greenberg, Vassilios Gregoriades, Piotr Gruz, Ellen Hammatt, Jeffery Hirst, Edward Hou, Martina Iannella, Corrie Ingall, Josiah Jacobsen-Grocott, Hanul Jeon, Liling Ko, Ulrich Kohlenbach, Leszek Kołodziejczyk, Thibaut Kouptchinsky, Jan Kruschewski, Vlad Lazar, Dominique Lecomte, Lu Liu, Robert Lubarsky, Philipp Lücke, Stella Mahler, Alberto Marcone, Andrew Marks, Joseph Miller, Russell Miller, Sheila Miller Edwards, Antonio Montalbán, Sandra Müller, Carl Mummert, Antonio Nakid Cordero, Selwyn Ng, Orazio Nicolosi, Andre Nies, Gian Marco Osso, Fedor Pakhomov, Aristotelis Panagiotopoulos, Konstantinos Papafilippou, Ludovic Patey, Alvaro Pintado, Philipp Provenzano, Miguel Ramírez, Pedro Rodríguez Díaz, Dino Rossegger, Sam Sanders, Philipp Schlicht, Elijah Schulzki, Paul Shafer, Borja Sierra, Giovanni Soldá, Grigori Stepanov, Patryk Szlufik, Catalina Torres, Henry Towsner, Daniel Turetsky, Manlio Valenti, José Jeremías Valenzuela Morales, Java Darleen Villano, Andrea Volpi, Wei Wang, Jin Wei, Andreas Weiermann, Philip Welch, Keita Yokoyama, Liang Yu, Miroslav Zeleny.

Free Boundary Problems

Organizers: Serena Dipierro (U Western Australia, Perth), Julian Fischer (ISTA, Klosterneuburg), Matteo Novaga (U of Pisa), Elisabetta Rocca (U of Pavia), Xavier Ros-Oton (U Barcelona), Ulisse Stefanelli (U of Vienna), Enrico Valdinoci (U Western Australia, Perth)

Dates: September 29 – December 19, 2025

Budget: ESI € 58 636

FWF SFB F65 € 6 610

Report on the thematic programme

Activities

The thematic programme consisted of three workshop, a master course, series of lectures, and seminars. In particular, the following international workshops have been held

- Regularity of free boundary problems, September 29 to October 3, 2025.
Organizers: Serena Dipierro (U Western Australia, Perth), Xavier Ros-Oton (U Barcelona), Hui Yu (National U Singapore)
- Geometric and curvature-driven evolutions, November 10 to 14, 2025.
Organizers: Julian Fischer (ISTA, Klosterneuburg), Matteo Novaga (U Pisa), Yoshihiro Tonegawa (Inst. Science Tokyo)
- Free boundaries and growth, December 9 to 12, 2025.
Organizers: Alain Goriely (U of Oxford), Ulisse Stefanelli (U of Vienna), Elisabetta Rocca (U of Pavia)

Yoshihiro Tonegawa (Inst. Science Tokyo) was appointed ESI Senior Research Fellow during the programme and delivered a master course on *Introduction to Brakke's mean curvature flow*, 12h, October 27 to November 5, 2025. The course was taken by students in Vienna. Lectures have been recorded and are currently freely available online.

In addition, the following series of lectures have been organised:

- José Antonio Carrillo (U Oxford), Global minimizers of interaction energies, 3h, October 7 to 9, 2025.
- Joaquim Serra (ETH, Zurich), Stable solutions to the Allen-Cahn equation with bounded energy density, 3h, November 17 to 18, 2025.
- Max Fathi (U Paris Cité), Quantitative regularity for transport maps, 6h, November 20 to 21, 2025.

Eventually, we had seminars by Verena Bögelein (U of Salzburg), Frank Duzaar (U of Salzburg), Konstantinos Koumatos (U Sussex), Robert Lasarzik (WIAS, Berlin), Dirk Peschka (WIAS, Berlin), Tomáš Roubíček (Charles U, Prague).

A core aspect of the thematic program has been the long-term stay of many researchers. This particularly fostered interaction with the local mathematical community and the Vienna School of Mathematics.

Specific information on the thematic programme

The thematic programme hosted roughly 120 participants from Europe, Australia, Asia, and North America over a three-month period. A total of 97 talks or lectures have been schedule, many of which are currently available online.

The scientific focus ranged from classical obstacle-type problems and multi-phase variational models to geometric measure theory, curvature-driven flows, nonlocal and fractional free boundary problems, and applications to materials science, fluid mechanics, and biology.

Special emphasis has been placed on:

- Regularity theory and fine properties of free boundaries;
- Stability, approximation, and phase-field methods;
- Coupled bulk–surface and lower-dimensional PDE models;
- Interplay between sharp-interface and diffuse-interface descriptions.

The programme successfully fostered collaboration between traditionally distinct communities (elliptic/parabolic PDE, geometric analysis, applied modelling), creating a common platform for discussion and joint research.

In particular, the thematic programme hosted 28 postdoctoral researchers, 15 doctoral students, as well as a number of master students from Vienna. Early-career participants had the chance of spending extended time at the ESI, profiting from interaction with senior residents guests, initiating, and progressing collaborations.

Outcomes and achievements

The programme led to significant scientific exchange and promoted the initiation and the progress of a range of research projects. The interaction has also been the basis for the advancement on a number of open mathematical problems and has originated new contributions, see below.

In particular, new structural results were obtained on the stratification of singular and blow-up sets for measures and free boundary configurations, sharpening the understanding of dimension estimates and fine regularity properties. In parallel, ongoing work on generic regularity was finalized, providing stronger and more flexible criteria for regular behavior in variational free boundary problems.

Significant methodological progress was also achieved. Entropy techniques originally developed for quasilinear parabolic equations were further analyzed with a view toward extensions to coupled systems and to higher-order dynamics, opening the way to treating more complex evolution problems within a unified framework. In geometric analysis, new steps were taken in understanding the convergence of critical points in phase-field approximations of curvature-driven energies, clarifying the link between diffuse-interface models and sharp-interface geometric functionals. Discussions on curve and network flows, as well as on higher-dimensional mean curvature flows, led to generalizations of energy-based methods that are currently being developed into joint manuscripts.

On the modeling side, advances were made in the derivation of reduced-order descriptions for kinetic equations via stochastic thermodynamics with internal variables, identifying promising new research directions at the interface between analysis and mechanics. Progress was also reported in multiscale approaches to complex materials and biological systems, as well as in the treatment of nonlocal and higher-order Cahn–Hilliard-type models, where new questions concerning boundary data and well-posedness were formulated and partially resolved.

A final outcome of the thematic programme has been that of strengthening of the international visibility of the Vienna mathematical community in the field of free boundary problems.

List of talks**Workshop on “Regularity of Free Boundary Problems”, September 29 - October 3, 2025**

Nicola Soave (U Torino)	Singularly perturbed elliptic systems modeling partial separation and their free boundaries
Gianmaria Verzini (Politecnico Milano)	Singular analysis of a shape optimization problem arising in population dynamic
Jack Thompson (UWA, Perth)	The nonlocal halfspace theorem
Claudia Bucur (U degli Studi di Milano)	S-minimal functions: existence and continuity
Xavier Tolsa (AU Barcelona)	Rectifiability, Riesz transforms, and harmonic measure
Mihalis Mourgoglou (U del País Vasco)	Two-Phase Problems for Elliptic Measures for DMO Elliptic Operators
Xavier Fernandez-Real (EPFL, Lausanne)	Stable solutions for the one-phase problem
Dennis Kriventsov (Rutgers U)	Non-minimizing and min-max solutions to Bernoulli problems
Marvin Weidner (U of Bonn)	Regularity for the nonlocal one-phase problem
Mateusz Kwaśnicki (UST Wrocław)	Liouville’s theorems for Lévy operators
Sunghan Kim (Uppsala U)	Constraint maps: singularities vs free boundaries
Michele Caselli (SNS Pisa)	Coercivity and Gamma-convergence of the p-energy of sphere-valued Sobolev maps
Jiakun Liu (U Sydney)	Free boundary problems in optimal transportation
Aram Karakhanyan (U of Edinburgh)	A monotonicity formula for a class of quasilinear free boundary problems
María Soria-Carro (U Autonoma de Madrid)	An Elliptic-Parabolic Free Boundary Problem with Discontinuous Data
Wenhui Shi (RWTH Aachen)	Optimal rates for Mullins-Sekerka relaxation
Enrico Valdinoci (UWA, Perth)	Boundary continuity of nonlocal minimal surfaces in domains with singularities

Workshop on “Geometric Variational Problems”, November 10 - 14, 2025

Melanie Rupflin (U Oxford)	Quantitative estimates for the Dirichlet energy
Antonin Chambolle (CEREMADE, Paris)	A (tentative) phase-field approach for the curvature flow of non-oriented boundaries
Annalisa Cesaroni (U Padova)	Periodic tilings with minimal energy
Francesco Nobili (U Pisa)	Isoperimetric planar Tilings with unequal cells
Antonio De Rosa (U Bocconi, Milano)	Rigidity of critical points of hydrophobic capillary functionals
Felix Schulze (U Warwick)	Generic regularity of area minimising hypersurfaces up to dimension 11
Sebastian Schwarzacher (Uppsala U)	Regularity estimates of a fluid-free surface evolution
Fabian Rupp (U of Vienna)	Obstacle problems for elastic membranes – Existence, regularity, and rigidity
Helmut Abels (U of Regensburg)	Sharp Interface Limit of a Navier-Stokes/Allen-Cahn System with Vanishing Mobility
José Francisco Rodrigues (U Lisbon)	On Minimal and Capillary Surfaces with Bounded Slopes
Michael Goldman (CNRS & Ecole Polytechnique, Palaiseau)	Variational models for charge liquid drops
Marco Pozzetta (Politecnico Milano)	Quantitative isoperimetric inequalities in capillarity problems
Luigi De Masi (U of Trento)	Regularity of capillary minimal surfaces
Lauro Silini (ISTA, Klosterneuburg)	Stability of spheres in the Complex Hyperbolic Space

Davide Parise (Imperial College London)	Log-epiperimetric Inequalities for conformally invariant geometric variational problems
Anna Dall'Acqua (U Ulm)	On the free boundary elastic flow
Tatsuya Miura (Kyoto U)	A direction energy approach to elastica and elastic flow
Shokhrukh Kholmatov (U of Vienna)	Crystalline elastic flow of polygonal curves
Paola Pozzi (U Duisburg-Essen)	Elastic Flow Revisited
Sebastian Hensel (U Leipzig)	A weak-strong uniqueness principle for the Mullins-Sekerka equation
Tim Laux (U Heidelberg)	Equivalence of weak solution concepts for mean curvature flow
Salvatore Stuard (U degli Studi di Milano)	The epsilon-regularity theorem for Brakke flows near triple junctions
Alessandra Pluda (U Pisa)	Monotonicity formulas for the inverse mean curvature flow and the p-Laplacian
Xavier Lamy (IMT, Toulouse)	Minimality of the Hopf map for the Faddeev-Skyrme energy
Alice Marveggio (HCM, Bonn)	Convergence of a heterogeneous Allen-Cahn equation to weighted mean curvature flow
Theresa Simon (U Münster)	Linear stability of the self-similarly shrinking lens
Enric Florit-Simon (ETH Zurich)	Regularity for stable phase transitions
Andrea Poiatti (U of Vienna)	Global weak solutions to a Navier-Stokes/Mullins-Sekerka system with different densities and viscosities
Costante Bellettini (U College London)	Bernstein-type theorems for stable minimal hypersurfaces
Gaoming Wang (BIMSA, Beijing)	Allard-Type Regularity for Varifolds with Prescribed Contact Angles
Alessandro Pigati (U of Bocconi)	Anisotropic Allen-Cahn and convergence to anisotropic integrands
Harald Garcke (U of Regensburg)	Overhang Penalization in Additive Manufacturing via Phase Field Structural Topology Optimization with Anisotropic Energies

Workshop on “Free Boundaries and Growth”, December 9 - 12, 2025

Alberto Bressan (Penn State U)	Optimal shapes of tree roots and branches. A mathematical perspective
Maurizio Grasselli (Politecnico Milano)	Convergence to equilibrium of weak solutions to Cahn-Hilliard equations
Marta Lewicka (U Pittsburgh)	Convex integration for the Monge-Ampere system and the system of isometric immersion
Abramo Agosti (U of Pavia)	Inverse and constrained optimization problems with applications to personalized medicine
Pasquale Ciarletta (Politecnico Milano)	Diffuse interface models of active living matter
Giuseppe Zurlo (NUI Galway)	Micro-displacement tensor
Martin Kružík (Czech Academy of Sciences, Prague)	The effects of pressure loads in the dimension reduction of elasticity models
Luca Scarpa (Politecnico Milano)	Uniqueness by noise and doubly nonlinear evolution equations
Giuseppe Tomassetti (U Roma Tre)	Using stochastic thermodynamics with internal variables to model spreading of cell orientation under cyclic stretch
Elisa Davoli (TU Vienna)	Accretive growth for elastic solid
Georg Dolzmann (U of Regensburg)	Stress-modulated growth models
Alexander Erlich (CNRS, U Grenoble Alpes)	Incompatibility-driven growth
William Feldman (U of Utah, Saltlake City)	The pinning effect of dilute defects
Giulia Cavalleri (U of Pavia)	On a nonisothermal tumor growth model of Caginalp type

Andrea Signori (Politecnico Milano)	Dynamics of Active Droplets: From Self-Organization to Division
Kota Kumazaki (Kyoto U of Education)	Construction of strong solutions for a two-scale parabolic problem with a free boundary
Helmut Abels (U of Regensburg)	Local well-posedness of to the Cahn–Hilliard–Biot System
Pierluigi Colli (U of Pavia)	A sixth-order Cahn–Hilliard equation for curvature-induced phase separation
Matteo Fornoni (U Milan)	Optimal control of Cahn-Hilliard image inpainting models
Robert Lasarzik (WIAS, Berlin)	Weak Solutions and Weak–Strong Uniqueness for a Cahn–Hilliard-Type Model with Chemotaxis
Yoshihito Nakajima (Tohoku U)	Time-fractional nonlinear evolution equations involving time-dependent subdifferential operators
Alain Miranville (U de Le Havre Normandie)	The Cahn-Hilliard equation with a nonlinear source term
Takeshi Fukao (Ryukoku U)	Asymptotic analysis of transmission problems for gap junctions
Kei Fong Andrew Lam (Hong Kong Baptist U)	Complex pattern formation by Ginzburg-Landau and Swift-Hohenberg dynamics: Analysis and Numerical Simulations
Jonas Ingmanns (ISTA, Klosterneuburg)	Quantitative homogenization of geometric motions through random fields of obstacles
Goro Akagi (Tohoku U)	Optimal rate of convergence to fast diffusion on bounded domains
Guido De Philippis (U Padova)	Min-max construction of anisotropic minimal hypersurfaces
Anton Arnold (TU Vienna)	All relative entropies for general nonlinear Fokker-Planck equations
Mariya Ptashnyk (Heriot-Watt U, Edinburgh)	Multiscale modelling and analysis of growth of biological tissues
Harald Garcke (U of Regensburg)	Two-phase Navier–Stokes flow with viscoelasticity
Hao Wu (Fudan U, Shanghai)	On a diffuse-interface model for incompressible two-phase flows with chemotaxis and mass transport
Peter Markowich (U Vienna)	Measure-based approach to mesoscopic modeling of optimal transportation networks
Lev Truskinovsky (PSL, Paris)	Generalized Clapeyron’s Theorem

Individual talks

Jose‘ A. Carrillo (U Oxford)	Global minimizes of interaction energies, I & II
Dirk Peschka (WIAS Berlin)	Thin-Film Free Boundary Problems with Moving Contact Lines - Modelling, Numerics, and Model Hierarchies
Konstantinos Koumatos (U of Sussex)	On the role of quasiconvexity in dynamics
Yoshihiro Tonegawa (Inst. of Science Tokyo)	Introduction to Brakke’s Mean Curvature Flow, SRF Lecture Course 1 - 5
Tomas Roubicek (Charles U & Academy of Sciences)	Brief notes about the energy and entropy budget in Earth’s atmosphere, life due to Schrödinger, climate, and CO2 emissions
Robert Lasarzik (WIAS Berlin)	The energy-variational structure in evolution
Joaquim Serra (ETH)	Stable solutions to the Allen-Cahn equation with bounded energy density I & II
Max Fathi (Paris)	Quantitative regularity for transport maps I & II
Verena Bögelein (U of Salzburg)	Self-improvement phenomena in nonlinear evolution equations
Frank Duzaar (U of Salzburg)	Parabolic PDEs with Dynamic Data under a Bounded Slope Condition

Publications and preprints contributed

P. Colli, G. Gilardi, A. Signori & J. Sprekels, *Optimal Velocity Control of a Brinkman–Cahn–Hilliard System with Curvature Effects*, [arXiv:2601.05820](#) [math.OC].

L. De Masi, *Stratification of the single blow-up set for Radon measures*, [arXiv:2512.20498](#) [math.FA].

A. Dall’Acqua, F. Rupp, R. Schätzle & M. Schlierf, *Stability of the free boundary Willmore problem*, [arXiv:2601.18388](#) [math.AP].

W. M. Feldman & I. C. Kim, *The pinning effect of dilute defects*, [arXiv:2512.11152](#) [math.AP].

X. Fernández-Real & H. Yu, *Linearized equation and generic regularity in the Alt–Caffarelli problem*, [arXiv:2510.18330](#) [math.AP].

H. Garcke, K.F. Lam & R. Nürnberg. A. Signori, *On a Mullins–Sekerka model for the growth of active droplets modeling protocells: Stability analysis and numerical computations*, [arXiv:2601.11155](#) [math.AP].

A. Guerra, X. Lamy & K. Zemas, *Global minimality of the Hopf map in the Faddeev–Skyrme model with large coupling constant*, [arXiv:2507.10686](#) [math.AP].

B. Hu, Z. Wang, J. Xin & Z. Zhang, *A Stochastic Genetic Interacting Particle Method for Reaction-Diffusion-Advection Equations*, [arXiv:2511.12275](#) [math.NA].

F. Nobili, F. Renzi & F. Vitillaro, *Mosco-convergence of Cheeger energies on varying spaces satisfying curvature dimension conditions*, [arXiv:2511.13320](#) [math.MG].

U. Stefanelli, *A free boundary problem in accretive growth*, [arXiv:2601.08755](#) [math.AP].

Several additional collaborations are currently in progress.

Based on the interactions during the thematic program, Elisa Davoli (TU Vienna), Marta Lewicka (U of Pittsburgh), Elisabetta Rocca (U of Pavia), and Ulisse Stefanelli (U of Vienna) are now editing a special issue on *Analysis and numerics for free boundary problems* for the journal *Communications in Partial Differential Equations* (Taylor & Francis). The special issue is scheduled for publication in early 2027.

Invited scientists

Helmut Abels, Abramo Agosti, Goro Akagi, Nuno Alves, Anton Arnold, Costante Bellettini, Verena Bögelein, Alberto Bressan, Giovanni Brigati, Claudia Bucur, Sun-Sig Byun, Davide Carazzato, Jose Antonio Carrillo de la Plata, Michele Caselli, Giulia Cavalleri, Annalisa Cesaroni, Antonin Chambolle, Andrea Chiesa, Pasquale Ciarletta, Pierluigi Colli, Anna Dall’Acqua, Apostolos Damialis, Elisa Davoli, Luigi De Masi, Guido De Philippis, Antonio De Rosa, Serena Dipierro, Georg Dolzmann, Frank Duzaar, Alexander Erlich, Alberto Fanizza, Max Fathi, William Feldman, Xavier Fernandez-Real, Julian Fischer, Enric Florit-Simon, Irene Fonseca, Matteo Fornoni, Takeshi Fukao, Harald Garcke, Noah Geltner, Rossella Giorgio, Michael Goldman, Maurizio Grasselli, Sebastian Hensel, Peter Hironen, Jonas Ingmanns, Ansgar Jüngel, Aram Karakhanyan, Shokhrukh Kholmatov, Sunghan Kim, Konstantinos Koumatos, Dennis Kriventsov, Martin Kružík, Anna Kubin, Kota Kumazaki, Mateusz Kwaśnicki, Kei Fong Andrew Lam, Xavier Lamy, Robert Lasarzik, Tim Laux, Marta Lewicka, Jiakun Liu, Luca Lombardini, Jan Maas, Alice Marveggio, Sara Merino-Aceituno, Alain Miranville, Tatsuya Miura, Anastasia Molchanova, Mihalios Mourougolou, Yoshihito Nakajima, Francesco Nobili, Matteo Novaga, Vicent Pallardó-Juliá, Davide Parise, Dirk Peschka, Alessandro Pigati, Alessandra Pluda, Andrea Poiatti, Annamaria Pollino, Marco Pozzetta, Paola Pozzi, Mariya Ptashnyk, Filippo Quattrocchi, Samuele Riccò, Elisabetta Rocca, José Francisco Rodrigues, Xavier Ros-Oton, Tomáš Roubířek, Melanie Rupflin, Fabian Rupp, Alessandro Scapin, Luca Scarpa, Felix Schulze, Sebastian Schwarzacher, Daniele Semola, Joaquim Serra, Wenhui Shi, Andrea Signori, Lauro Silini, Theresa Simon, Nicola Soave, Giacomo Enrico Sodini, María Soria-Carro, Ulisse Stefanelli, Salvatore Stuvard, Jack Thompson, Xavier Tolsa,

Giuseppe Tomassetti, Yoshihiro Tonegawa, Lev Truskinovsky, Tobias Unterberger, José Miguel Urbano, Enrico Valdinoci, Gianmaria Verzini, Andreas Vikelis, Christian Wagner, Julian Walser, Gaoming Wang, Marvin Weidner, Georg Weiss, Hao Wu, Jack Xin, Hui Yu, Rada Ziganshina, Giuseppe Zurlo.

Workshops organized independently of the main programmes

Recent Perspectives on Non-crossing Partitions through Algebra, Combinatorics, and Probability

Organizers: Adrian Celestino Rodriguez (TU Graz), Kurusch Ebrahimi-Fard (NTNU, Trondheim), James Mingo (Queen's U, Kingston), Martin Rubey (TU Vienna), Eleni Tzanaki (U of Crete), Yannic Vargas (CUNEF U, Madrid)

Dates: February 17 – 21, 2025

Budget: ESI € 11 360

Report on the Workshop

The workshop “Recent Perspectives on Non-crossing Partitions through Algebra, Combinatorics, and Probability” aimed to foster a collaborative exploration of the structural properties of non-crossing partitions and their interaction with topics in Algebra, Combinatorics, Probability and Mathematical Physics by bringing together leading and emerging researchers from different fields. The objective was to provide a platform for discussing the pivotal role that non-crossing partitions play across these disciplines and to deepen our collective understanding of their mathematical and applicative significance.

By emphasizing the intricate combinatorial properties of non-crossing partitions, the workshop encouraged the examination of their internal structure as well as their capacity to bridge seemingly disparate mathematical domains. The event sought to stimulate dialogue and collaboration between experts, highlighting how the combinatorics of non-crossing partitions can inform and be informed by advances in other areas. This interdisciplinary gathering thus provided a fertile ground for exchanging knowledge, identifying open problems, and laying the groundwork for future research directions.

Activities

Three mini-courses, twelve talks and eleven mini talks were distributed over five days following six main scientific directions:

- Coxeter combinatorics
- Non-commutative Probability
- Hyperplane Arrangements and Geometry
- Cyclic Sieving phenomenon
- Dynamical Combinatorics
- Mathematical Physics

Specific information on the workshop

The event was quite heterogeneous, with many participants at different stages in the career path. About 40 percent of the participants were PhD and young postdocs which actively participated

in the scientific programme with talks and mini-talks. Next to the opportunity to present their work and to receive feedback, the workshop gave them the possibility to interact with prominent scientist in their field of expertise, all within a quite relaxed and friendly atmosphere.

List of participating Master and PhD students and their contributions

1. Danai Deligeorgaki (KTH)
2. Lucas Gagnon (York U) - mini talk
3. Grant Kaduck (Queen's U)
4. Katerina Kalampogia-Evangelinou (U of Athens) - mini talk
5. Gabriel Melo (Télécom Paris - Institut Polytechnique de Paris in Applied Mathematics and Computer Science)
6. Matthias Müüller (TU Graz) - mini talk
7. Jorge Luis Santos Silva (U Nacional Autónoma de México)
8. Marcus Schönfelder (U of Vienna)
9. Nikoleta Sevastaki (U of Crete)

List of participating post-doctoral scientists and their contributions

1. Andrew Campbell (IST Austria)
2. Jacob Campbell (U of Virginia) - mini talk
3. Galen Dorpalen-Barry (Texas A & M U) - mini talk
4. Theo Dovrouopoulos (Brandeis U) - mini talk
5. Alexander Lazar (Free U of Brussels) - mini talk
6. Daniel Perales Anaya (Texas A & M U) - mini talk
7. Stephan Pfannerer (U of Waterloo) - mini talk
8. Florian Schreier-Aigner (U of Vienna)
9. Nikolas Tapia (Weierstrass Institute Berlin) - mini talk
10. Pei-Lun Tseng (New York U Abu Dhabi) - mini talk

Outcomes and achievements

We are considering the publication of part of the contributions in a volume of proceedings.

List of talks

Philippe Biane (U Gustave Eiffel, Champs-sur-Marne)	Non-crossing partitions and combinatorics, from random matrices to free cumulants to parking functions, Lecture 1-3
Christian Stump (Ruhr U, Bochum)	A three-lecture journey through noncrossing Cataland, Lecture 1-3
Barbara Baumeister (U of Bielefeld)	The combinatorial approach to Coxeter and Artin groups
Alexander Lazar (ULB, Brussels)	Noncrossing Bonds in Ferrers Graphs
Lucas Gagnon (York U, Toronto)	Non-crossing partitions, equivariant cohomology, and polynomials

Emily Barnard (DePaul U, Chicago)	Lattice Theory of Noncrossing partitions and Noncrossing arc diagrams, Lecture 1-3
Christian Krattenthaler (U of Vienna)	Positive m -divisible non-crossing partitions and their cyclic sieving
Franz Lehner (TU Graz)	Some questions on cumulants
Pei-Lun Tseng (NYU, Abu Dhabi)	Non-crossing Linked Partitions and infinitesimal free multiplicative convolution
Daniel Perales Anaya (TAMU, College Station)	Iterative Families of Partitions
Matthias Müller (TU Graz)	The v -core label order and non-crossing partitions
Octavio Arizmendi Echegaray (CIMAT, Guanajuato)	A combinatorial identity for the set of partitions related to limit theorems in finite free probability theory
Viviane Pons (Paris-Saclay U)	A conjecture on descents, inversions and the weak order
Loïc Foissy (U of Littoral Côte d'Opale, Dunkerque)	Double bialgebra of noncrossing partitions
Matthieu Josuat-Vergès (U Paris Cité)	Parking functions as noncrossing cosets
Katerina Kalampoglia-Evangelinou (U Athens)	The chain polynomials of noncrossing partition lattices are real-rooted
Galen Dorpalen-Barry (TAMU, College Station)	The Poincare-extended ab-index
Joachim Kock (U Autònoma, Barcelona)	Decomposition spaces of noncrossing partitions in free probability
Nikolas Tapia (TU Berlin)	Shifted Substitution in Non-Commutative Multivariate Power Series with a View Toward Free Probability
Josue Vazquez-Becerra (CIMAT, Guanajuato)	Annular noncrossing permutations in non-commutative probability
Jacob Campbell (U Virginia)	Statistics on monotonically ordered non-crossing partitions
Susanna Fishel (ASU, Phoenix)	Parking functions and certain bond lattices
Drew Armstrong (U of Miami)	Rational Noncrossing Partitions and Associahedra
Theodosios Douvropoulos (Brandeis U)	Shi-like and Catalan-like deformations for restricted reflection arrangements.
Stephan Pfannerer (U Waterloo)	Non-crossing partitions and webs
Nathan Reading (NC State U, Raleigh)	Noncrossing partitions of a marked surface

Invited scientists

Octavio Arizmendi Echegaray, Emily Barnard, Barbara Baumeister, Philippe Biane, Marek Bożejko, Andrew Campbell, Jacob Campbell, Cesar Ceballos, Adrian Celestino Rodriguez, Danai Deligeorgaki, Galen Dorpalen-Barry, Theodosios Douvropoulos, Kurusch Ebrahimi-Fard, Wiktor Ejsmont, Susanna Fishel, Loïc Foissy, Lucas Gagnon, Dylan Gawlak, Matthieu Josuat-Vergès, Grant Kaduck, Katerina Kalampoglia-Evangelinou, Martin Kalck, Joachim Kock, Christian Krattenthaler, Alexander Lazar, Franz Lehner, Jianrong Li, Gabriel Mel, James Mingo, Matthias Müller, Philippe Nadeau, Daniel Perales Anaya, Stephan Pfannerer, Viviane Pons, Nathan Reading, Jorge Luis Santos Silva, Marcus Schönfelder, Florian Schreier-Aigner, Nikoleta Sevastaki, Roland Speicher, Christian Stump, Nikolas Tapia, Pei-Lun Tseng, Eleni Tzanaki, Yannic Vargas, Josue Vazquez-Becerra.

Degenerate and Singular PDEs

Organizers: Verena Bögelein (PLUS, Salzburg), Ugo Gianazza (U of Pavia), Juha Kinnunen (Aalto U), Naian Liao (PLUS, Salzburg)

Dates: February 23 – 28, 2025

Budget: ESI € 11 200

The FWF project 10.55776/P3629 contributed to the welcome evening and travel expenses and/or accommodation of P. Andrade, V. Bögelein, S. Blatt, F. Duzaar, K. Moring, C. Stanko & M. Strunk.

The following participants from the U of Salzburg (V. Bögelein, S. Blatt & P. Andrade) had their travel expenses and/or accommodation partly covered by Salzburg, and therefore, the corresponding per diem was saved.

The participants from Aalto U (T. Elenius, J. Kinnunen & L. Särkiö) had all their expenses covered by Aalto, and therefore, the corresponding per diem was saved.

The participants from the U of Pavia (U. Gianazza & Z. Li) had all their expenses covered by Pavia, and therefore, the corresponding per diem was saved.

Department of Mathematics of the U of Pavia: € 2 500.

Report on the Workshop

Partial differential equations of diffusion type are a fundamental tool for modeling various physical phenomena and engineering problems, such as, for example, oil flows in rock grains, turbulent filtration processes, groundwater flows, shallow water waves, phase changes of materials, and traffic congestion problems. The relevant PDEs are non-linear, and present a certain degenerate and/or singular nature. Important examples include but are not limited to the porous medium equation, the parabolic p -Laplace equation, the total variation flow, the Stefan problem, doubly non-linear parabolic equations, widely degenerate equations, as well as related non-local equations. Although all these topics have been extensively studied (as a matter of fact, some of them definitely more than others), nevertheless a host of very interesting problems, a lot of them directly linked to physical and engineering applications, has remained largely open, and to the organizers it seemed timely to try and have an overall picture of the state of the art.

Topics of the workshop included:

- Gradient regularity for the porous medium/fast diffusion equation,
- Wiener's criterion for non-linear parabolic equations,
- Boundary Harnack estimates,
- Regularity theory for Stefan-type problems,
- Regularity theory for widely degenerate equations.

The aim of the workshop was to provide a broad platform for researchers in the field, and particularly to encourage young researchers both to present their works and to interact with more senior mathematicians; in this way a wide circulation of ideas, methods and techniques could come about.

Activities

The official activities of the workshop were limited to the talks listed in the corresponding section below. We aimed at striking a balance between talks by senior mathematicians, and contributions by junior researchers. In this way, interesting and recent results could be made easily available, with the obvious possibility to ask right away questions and offer remarks to

the authors; at the same time, younger mathematicians had the opportunity to present both their achievements and their research projects, benefitting from the interactions of the participants.

When setting up the programme, a lot of time was left *empty* on purpose, so that the participants could have the opportunity to continue the discussions which had come about because of the talks, carry on their already existing collaborations, and even start new research projects. It was rather frequent to see participants leaving the premises of ESI quite late in the evening, because they had seized the opportunity of all the facilities, and had continued working largely past the usual office time with old and new collaborators.

Specific information on the workshop

Approximately half of the participants were young researchers, meaning by this both PhD students and post-docs; moreover, there were also some mathematicians who have just obtained a tenure-track position at their university, and who can therefore be considered as junior scientists.

The workshop followed a similar scientific meeting held at Mittag-Leffler Institute in Sweden in Spring 2024; although some of the organizers were the same (V. Bögelein, U. Gianazza, J. Kinnunen), there was only a very limited overlap of the main scientific subjects, and, above all, the list of invitees was largely different. This was done on purpose. Indeed, the number of researchers working on the topics listed above is quite large, but rather frequently, people know each other by name, but they do not scientifically interact as much as one would think. Hence, ESI offered us the unique opportunity to widen the network of direct and active connections, and we believe this has had a very positive impact on the ongoing mathematical work in the field.

Outcomes and achievements

An interesting feature of the workshop was the possibility to have quite a large group of researchers coming from Asia (Japan, South Korea, People's Republic of China). Although interactions with mathematicians from these countries is definitely much easier today than it was in the past, nevertheless collaborations are still at a limited level, particularly when compared with the amount of working connections among mathematicians from Europe and/or from the USA. In our opinion, establishing these new relationships and reinforcing already existing collaborations among European and Asian researchers is definitely one of most interesting outcomes of the workshop.

We think there is a second achievement, which might seem immaterial, but in our opinion is not: the very friendly environment provided by ESI made interactions between senior, well-known researchers and junior, less experienced mathematicians, very easy, rather informal and straightforward. Therefore, young people felt somehow encouraged to freely ask questions, and this definitely was a booster for good scientific interactions.

List of talks

Cristiana De Filippis (U of Parma)	μ -ellipticity and nonautonomous integrals
Hongjie Dong (Brown U, Providence)	Sobolev estimates for parabolic and elliptic equations with uniformly degenerate coefficients
Olli Saari (UPC, Barcelona)	Sparse Calderón-Zygmund estimates for divergence form equations
Pêdra Andrade (PLUS, Salzburg)	Interior regularity estimates for fully nonlinear equations with arbitrary nonhomogeneous degeneracy laws

Yoshikazu Giga (U Tokyo)	On a sharp interface limit of the Kobayashi-Warren-Carter energy
Wojciech Gorny (U of Vienna)	Characterisation of weak solutions to gradient flows of general linear growth functionals
Shuntaro Tsubouchi (U Tokyo)	Gradient continuity for the parabolic $(1, p)$ -Laplace system with an external force term
Michael Strunk (PLUS, Salzburg)	Gradient regularity for a class of widely degenerate parabolic equations
Filomena De Filippis (U of Parma)	Regularity for multi-phase problems at nearly linear growth
Anna Zatorska-Goldstein (U Warsaw)	Optimization problems related to the heat equation on lower dimensional structures
Chao Zhang (HIT, Harbin)	Some recent results on the mixed local and nonlocal problems
Linhan Li (U of Edinburgh)	Solvability of L^p Regularity problem for parabolic operators with rough coefficients
Benjamin Gess (Bielefeld U)	Optimal regularity for nonlocal porous media equations
Iwona Chlebicka (U Warsaw)	Discarding Lavrentiev's Gap in Non-autonomous and Non-Convex Variational Problems
Marvin Weidner (U of Barcelona)	Harnack inequalities for parabolic nonlocal equations
Anna Balci (Charles U, Prague)	Local and Nonlocal Zaremba Problems with Degenerate Weights
Jose Mazon (U of Valencia)	Evolution problems with perturbed 1-Laplacian type operators on random walk spaces
Tianling Jin (HKUST, Hong Kong)	Regularity and dynamics for some nonlinear diffusion equations on bounded domains
Samuele Riccò (TU Vienna)	Global higher integrability and Hardy inequality for double-phase functionals
Simon Blatt (PLUS, Salzburg)	Degenerate and Singular Fractional Equations and Optimally Embedded Submanifolds
Calvin Stanko (PLUS, Salzburg)	Existence of variational solutions to doubly nonlinear systems in noncylindrical domains
Wontae Kim (Uppsala U)	Complex valued nonlinear PDEs
Kenta Nakamura (Nichidai, Tokyo)	Local boundedness and concentration phenomenon for the p -Sobolev flow
Giuseppe Mingione (U of Parma)	Partial regularity in nonlocal problems
Ulisse Stefanelli (U of Vienna)	Regularity of sublevels for Hamilton-Jacobi solutions

Publications and preprints contributed

F. Bäuerlein, S. Ricco, & L. Schätzler, *Global higher integrability and Hardy inequalities for double-phase functionals under a capacity density condition*, [arXiv:2503.21580](#)[math.AP].

V. Bögelein, F. Duzaar, N. Liao & K. Moring, *Gradient estimates for the fractional p -Poisson equation*, [arXiv:2503.05903](#)[math.AP].

S. Ciani, U. Gianazza, Z. Li, *Phragmén-Lindelöf-type theorems for functions in Homogeneous De Giorgi Classes*, in preparation.

K. Ebrahimi-Fard, L. Foissy, J. Kock, F. Patras, *Operads of (noncrossing) partitions, interacting bialgebras, and moment-cumulant relations*, [arXiv:1907.01190](#)[math.CO].

L. Foissy, *Bialgebras in cointeraction, the antipode and the eulerian idempotent*, [arXiv:2201.11974](#)[math.RA].

L. Foissy, *Chromatic polynomials and bialgebras of graphs*, [arXiv:1611.04303](#)[math.RA].

L. Foissy, *Cointeraction on noncrossing partitions and related polynomial invariant*, [arXiv:2501.18212](#) [math.CO].

Invited scientists

Pêdra Andrade, Anna Balci, Simon Blatt, Verena Bögelein, Radu Ioan Bot, Sun-Sig Byun, Iwona Chlebicka, Simone Ciani, Cristiana De Filippis, Filomena De Filippis, Bauyrzhan Derbissaly, Hongjie Dong, Frank Duzaar, Theo Elenius, Yuzhou Fang, Benjamin Gess, Ugo Gianazza, Yoshikazu Giga, Rossella Giorgio, Franz Gmeineder, Wojciech Gorny, Eurica Henriques, Tianling Jin, Sunghan Kim, Wontae Kim, Juha Kinnunen, Linhan Li, Zheng Li, Naian Liao, Alexandros Matsoukas, Jose Mazon, Giuseppe Mingione, Kristian Moring, Kim Myyrylainen, Kenta Nakamura, Samuele Riccò, Olli Saari, Lauri Sarkio, Leah Schätzler, Christoph Scheven, Sebastian Schwarzacher, Calvin Stanko, Ulisse Stefanelli, Michael Strunk, Shuntaro Tsubouchi, Marvin Weidner, Anna Zatorska-Goldstein, Chao Zhang.

Structures in Banach Spaces

Organizers: Antonio Avilés (U Murcia), Vera Fischer (U of Vienna), Grzegorz Plebanek (U of Wrocław), Damian Sobota (U of Vienna)

Dates: March 17 – 21, 2025

Budget: ESI € 9 852

U of Wrocław € 1 800 (used to cover accommodation of 4 participants)

Report on the Workshop

The main goal of the conference was to bring together experts and junior researchers working in various branches of mathematics, such as e.g. functional analysis, metric geometry, operator theory, or logic, and investigating their connections with structural, combinatorial, geometric, and topological properties of Banach spaces.

Activities

During the workshop 11 plenary talks and 28 short contributed talks were given. The plenary talks were given by the invited scientists listed below, among them 3 were young researchers. The talks oscillated around the following scientific directions:

- general Banach space theory,
- geometry of Banach spaces,
- operator theory,
- combinatorial Banach spaces,
- Banach spaces of Lipschitz functions,
- Banach spaces of continuous functions,
- Banach lattices.

The above listed topics constitute the most central and active research lines in the modern Banach space theory, hence the workshop perfectly reflexed its current research state as well as, conversely, to the great extent responded to the needs of the Banach space theory community.

Organisation of the workshop

Each day of the workshop, except Friday, was divided into the morning session and afternoon session, which began with 1–2 plenary talks followed by 2–4 contributed talks. As the workshop ended on Friday, this day only the morning session was organized, during which only contributed talks were given.

After each talk a period of 5–15 minutes was reserved for a discussion, asking questions, and making comments. This way the audience had an opportunity to better understand the talks as well as, e.g., yield the speaker suggestions for their future research. During long coffee breaks and free time after the afternoon sessions the participants could not only discuss already given talks, but also collaborate on new topics or scientific problems related to Banach space theory.

Most of the talks given during the workshop were recorded and published online on the ESI's official YouTube channel. Presentations for the talks are available on the auxiliary website of the workshop at the address:

<https://sites.google.com/view/structures-in-banach-spaces/>.

On Wednesday evening the conference dinner took place in the restaurant Heuriger Mayer am Pfarrplatz, during which the participants had the chance to get to know each other on more personal level and hence to tighten their contacts, both scientific and professional as well as personal, which is especially important for young researchers, who, being at the very beginning of their career paths, may find the scientific world intimidating.

Specific information on the workshop

The workshop gathered in total 57 researchers from 12 different countries, among them 12 young researchers and 17 MSc and PhD students. All of them actively participated in the lectures and discussions after the talks, as well as in scientific collaborations which ocured during breaks and free times. In that, young researchers and students got the opportunity to interact with and benefit from senior researchers, which will definitely profit their future scientific careers. The wide extent of scientific topics presented during the talks will also help these groups in choosing their future research directions, which will be the most interesting and suitable for them, as well as broadened their scientific horizons and knowledge.

List of young researchers who participated in the workshop and their contribution:

- Ramón J. Aliaga (U Polit cnica de Val ncia) – participation
- Ben De Bondt (U of M nster) – participation
- Miguel Garc a Bravo (U Complutense of Madrid) – talk
- Eva Perneck  (Czech Technical U) – plenary talk
- No  de Rancourt (U of Lille) – participation
- Abraham Rueda Zoca (U of Granada) – plenary talk
- Tommaso Russo (U of Innsbruck) – talk
- Alberto Salguero-Alarc n (Complutense U of Madrid) – talk
- Zden k Silber (Czech Academy of Sciences, Prague) – talk

- Damian Sobota (U of Vienna) – local organizer
- Sebastián Tapia García (VADOR, TU Vienna) – talk
- Alessandro Vignati (U Paris Cité) – plenary talk
- Henrik Wirzenius (Czech Academy of Sciences, Prague) – talk

List of MSc and PhD students that participated in the workshop and of their contribution:

- Miguel Ángel Ruiz (U de Castilla-La Mancha) – talk
- Juliusz Banecki (Jagiellonian U) – participation
- Juan Guerrero Viu (U of Zaragoza) – talk
- Sebastian Jachimek (U of Wrocław) – talk
- Maciej Korpalski (U of Wrocław) – talk
- Todor Manev (Sofia U) – talk
- Esteban Martínez Vañó (U of Granada) – participation
- David Muñoz-Lahoz (UAM-ICMAT) – talk
- Víctor Olmos Prieto (UNED) – talk
- Juliusz Pham (Polish Academy of Sciences, Warsaw) – participation
- Luis David Reyes Sáenz (National Autonomous U of Mexico) – talk
- Małgorzata Rojek (U of Warsaw/Polish Academy of Sciences, Warsaw) – participation
- Thomas Speckhofer (Johannes Kepler U Linz) – talk
- Daylen Thimm (U of Innsbruck) – talk
- Nazaret Trejo (U Complutense of Madrid) – poster
- Tomasz Wawrzycki (Jagiellonian U) – participation
- Tomasz Żuchowski (U of Vienna/U of Wrocław) – local organizer

Outcomes and achievements

During the workshop, participants constituted several research groups that only began or continued research related to Banach space theory. Among such groups were, e.g., the following: (1) P. Borodulin-Nadzieja, B. Farkas, J. López-Abad working on properties of combinatorial Banach spaces; (2) M. Korpalski, P. Koszmider, W. Marciszewski developing the classification of nonseparable $C(K)$ -spaces; (3) W. Kubiś, A. Leiderman investigating the role of Fraïssé limits in topology; (4) A. Pelczar-Barwacz, Z. Silber, T. Wawrzycki studying topological properties of bidual Banach spaces; (5) E. Pernecká, R. Aliaga working on Lipschitz-free spaces; (6) D. Sobota, S. Jachimek investigating the projection constants of hyperplanes in $C(K)$ -spaces; etc. To the organizers' knowledge, all of the above mentioned groups of collaborating participants are preparing preprints containing results obtained during the workshop as well as are continuing their collaboration even several months after the event. Several of these research groups involve young researchers and students, e.g., (2), (4), and (6).

List of talks

Marián Fabian (Czech Academy of Sciences, Prague)	Asplund and weak Asplund properties of Banach spaces and beyond
Stevo Todorčević (U Toronto)	Compact sets of Baire class one functions
Jose Ansorena (U Rioja)	Uniqueness of unconditional basis in Banach spaces: overview and recent advances
Olav Nygaard Dovland (U of Agder)	Diameter 2 properties, a survey
María Japón (U of Seville)	Some applications of Boolean algebras and the Stone representation theorem to fixed point theory
Christian Bargetz (U of Innsbruck)	On extremal nonexpansive mappings
Sebastián Tapia García (TU Vienna)	Horofunction extension of metric spaces and Banach spaces
Alessandro Vignati (U Paris Cité)	The weak Extension Principle and its coarse version
Niels Laustsen (Lancaster U)	The Baernstein and Schreier spaces, and operators on them
Henrik Wirzenius (Czech Academy of Sciences, Prague)	Closed subideals of bounded operators
Anna Pelczar-Barwacz (Jagiellonian U, Krakow)	A criterion for 2^c operator ideals on Banach spaces
Miguel Ángel Ruiz Risueño (UCLM, Albacete)	Operators with dense range and in Banach spaces with a separable quotient
Piotr Koszmider (IMPAN, Warsaw)	On subspaces of indecomposable Banach spaces
Wiesław Kubiś (Academy of Sciences, Prague)	Generic operators
Thomas Speckhofer (JKU, Linz)	Dimension dependence of factorization problems
Abraham Rueda Zoca (U of Granada)	Space of vector valued Lipschitz functions and the Daugavet property
Eva Pernecká (CTU Prague)	De Leeuw representation of functionals in Lipschitz-free spaces
Juan Guerrero Viu (U Zaragoza)	Projective Tensor Products: The Pursuit of Norm-Attainment
Jerzy Kakol (Adam Mickiewicz U, Poznan)	The Grothendieck property for spaces $Lip_0(M)$ of Lipschitz functions
Jose Orihuela (U Murcia)	An old problem of Joram Lindenstrauss
Jesús Castillo (UNEX, Badajoz)	Somehow off-limits: The 3-space problem for Isomorphic Polyhedrality
Tommaso Russo (U of Innsbruck)	Discrete subgroups of Banach spaces and lattice tilings
Miguel García Bravo (Complutense U, Madrid)	Density of smooth function with no critical points within the set of continuous functions on Banach spaces
Daylen Thimm (U of Innsbruck)	True σ -porosity for Alternating Projection Orders
Jordi López-Abad (UNED, Madrid)	F_σ -ideals, colorings, and representation in Banach spaces.
Piotr Borodulin-Nadzieja (U of Wroclaw)	Combinatorial Banach spaces
Sebastian Jachimek (U of Wroclaw)	On the spaces dual to combinatorial Banach spaces
Victor Olmos Prieto (UNED, Madrid)	The Banach-Saks rank of a separable weakly compact set
Zdeněk Silber (Czech Academy of Sciences, Prague)	A separable Banach space of nontrivial Baire order
Witold Marciszewski (U Warsaw)	Counting Banach spaces $C(K)$
Maciej Korpalski (U of Wroclaw)	Semadeni derivative of Banach spaces and functions on nonmetrizable rectangles
Eugene Bilokopytov (U Alberta, Edmonton)	Von Neumann-Maharam problem for vector lattices
Arkady Leiderman (Ben-Gurion U, Beer-Sheva)	On w^* -binormality of the dual space $C_k(X)'$
Todor Manev (Sofia U)	Continuous functions on Fedorchuk compacta

Ondřej Kalenda (Charles U, Prague)	Simpliciality of vector-valued function spaces
David Muñoz-Lahoz (U Autonoma de Madrid)	AM-algebras
Luis David Reyes Sáenz (UNAM, Mexico City)	Q-points, Q-measures, and L-orthogonality
Alberto Salguero-Alarcón (Complutense U, Madrid)	Free objects in p-Banach lattices
Ondřej Zindulka (CTU Prague)	Fractal measures in Polish groups and Banach spaces: cardinal invariants

Publications and preprints contributed

C. A. De Bernardi, T. Russo, J. Somaglia, *Lattice tilings of Hilbert spaces*, [arXiv:2505.04267](#)[math.FA].

A. Jiménez-Vargas, A. Rueda Zoca, *Lipschitz interpolating sequences*, [arXiv:2503.18169](#)[math.FA].

A. Jiménez-Vargas, A. Rueda Zoca, *Transfinite (almost isometric) ideals in Banach spaces*, [arXiv:2505.04178](#)[math.FA].

G. Rancher, *Weak Compactness and Property*, unpublished.

Invited scientists

Fernando Albiac, Ramón Aliaga, Jose Ansorena, Antonio Aviles, Juliusz Banecki, Christian Bargetz, Eugene Bilokopytov, Piotr Borodulin-Nadzieja, Jesús Castillo, Ben De Bondt, Noé de Rancourt, Marián Fabian, Barnabas Farkas, Vera Fischer, Miguel García Bravo, Juan Guerrero Viu, Sebastian Jachimek, María Japón, Jerzy Kąkol, Ondřej Kalenda, Maciej Korpalski, Piotr Koszmider, Wiesław Kubiś, Niels Laustsen, Arkady Leiderman, Jordi López-Abad, Todor Manev, Witold Marciszewski, Esteban Martínez Vañó, David Muñoz-Lahoz, Olav Nygaard Dovland, Victor Olmos Prieto, Jose Orihuela, Anna Pelczar-Barwacz, Eva Pernecká, Juliusz Pham, Grzegorz Plebanek, Gerhard Rancher, Luis David Reyes Sáenz, Małgorzata Rojek, Abraham Rueda Zoca, Miguel Ángel Ruiz Risueño, Tommaso Russo, Alberto Salguero-Alarcón, Zdeněk Silber, Damian Sobota, Thomas Speckhofer, Sebastián Tapia García, Daylen Thimm, Stevo Todorčević, Nazaret Trejo, Alessandro Vignati, Tomasz Wawrzycki, Dirk Werner, Henrik Wirzenius, Lyubomyr Zdomskyy, Ondřej Zindulka, Tomasz Żuchowski.

Uniform Distribution of Sequences

Organizers: Henk Bruin (U of Vienna), Robbert Fokkink (TU Delft), Jörg Thuswaldner (MontanU Leoben)

Dates: April 22 – 25, 2025

Budget: ESI € 10 000
Elsevier € 1 000

Report on the Workshop

This workshop was devoted to interactions between continued fraction algorithms (in dimension one and mostly higher) and arithmetic, automatic and uniformly distributed sequences. Problems

in this area inspired a lot of work in dynamical systems in general, and the techniques that were developed over the years found applications well beyond their original motivation. Milestones in the theory were achieved by Austrian and Dutch mathematicians and collaborations between them: Hlawka-Koksma and Kuipers-Niederreiter. The fact that it is now 50 years since the publication of the hugely influential monograph by Lauwerens Kuipers and Harald Niederreiter was one of the reasons for organizing the workshop.

Activities

The themes of the workshop were

- Continued fractions and their relation to dynamics
- Symbolic shifts and combinatorics of words
- Lattices, tiles, and probabilistic methods

The talks were organized around six general lectures on the themes of the workshop and their connection to uniform distribution. Pierre Arnoux gave a lecture on the relation between continued fractions and symbolic dynamics directed to a general audience. Harald Niederreiter was a guest of honour and gave a historical lecture on the cooperation between Austrian and Dutch mathematicians. Results from his monograph with Kuipers came up as key components in many of the talks.

Specific information on the workshop

We had a substantial group of young researchers, including PhD students and postdocs, who presented their work, fostering collaboration and knowledge exchange. Overall, the event was a success, advancing the field and strengthening international research networks. workshop, establishing new connections.

We had a substantial group of young researchers, many of whom presented their work.

List of Young Researchers

Name	Position	Affiliation	Contribution/Benefit
Slade Sanderson	Pre-doc	Utrecht	Main speaker. Initiated joint research on number theory and automata with the research group from Liège.
Golafshan Mehdi	Pre-doc	Liège	Presented new results on Diophantine approximation.
Silvia Radinger	Pre-doc	Vienna	Presented her latest work on S-adic subshifts and Bratteli diagrams with Henk Bruin.
Ayreena Bakhtawar	Post-doc	Warszaw	Completed joint work with Kraaikamp on continued fractions.

Continued on next page

Name	Position	Affiliation	Contribution/Benefit
Bastian Espinoza	Post-doc	Liège	Talked about his results with Julien Leroy and Pierre Stas on S-adic subshifts and Arnoux-Rauzy fractals
Pierre Popoli	Post-doc	Liège	Gave a talk on the new concept of additive complexity and its connection to automatic theorem proving.
Ela Krawczyk	Post-doc	Vienna	Gave a talk on dynamical properties of substitution sequences.
Lucia Rossi	Post-doc	Vienna	Gave a talk on rational base numeration and its relation to algebraic number theory.

Outcomes and achievements

Most participants of the workshop regularly meet online weekly through the one-world seminars of Combinatorics of Words (Waterloo, Canada) and Numeration (Paris). They now had the opportunity to exchange ideas and results in person, which worked very well. The offices at ESI were used even during the evenings.

An unexpected feature was the increase use of automatic theorem proving, using the software package Walnut. It came up in many of the talks and the use of this innovative tool is on the rise in this area of mathematics.

List of talks

Robert Tichy (TU Graz)	Limit theorems for lacunary sequences and discrepancy
Veronica Becher (U de Buenos Aires)	Normal numbers with digit dependencies
Pierre Arnoux (U Aix-Marseille)	Continued fractions as an induction process on a family of dynamical systems: three examples
Reem Yassawi (QMU London)	Tameness or otherwise of the Tribonacci shift
Harald Niederreiter (RICAM, Linz)	Uniform Distribution: A Dutch-Austrian Success Story
Sebastien Labbé (U Bordeaux)	Metallic mean Wang tiles and their Rauzy fractals
Emilie Charlier (U of Liège)	Regularity of positional numeration systems without a dominant root
Silvia Radinger (U of Vienna)	Interval Translation Maps: Renormalization and Weak Mixing
Hitoshi Nakada (Keio U)	On dynamics of some continued fraction maps
Pierre Popoli (U of Liège)	Additive word complexity and Walnut
Slade Sanderson (Utrecht U)	Descendants of the mother of all continued fractions
Wieb Bosma (Radboud U)	Computing or Reasoning? New Examples Link
	Innovative Systems! (A 67th birthday talk)
Elzbieta Krawczyk (U of Vienna)	Tameness, nullness, and amorphic complexity of automatic systems.
Bastian Espinoza (U of Liège)	Dynamics of dendric subshifts
Nikolay Moshchevitin (TU Vienna)	Dirichlet improvability in L_p -norms

Michel Rigo (U of Liège)	Automatic proofs in combinatorial game theory
Olga Lukina (Leiden U)	Skew-product systems over infinite interval exchange transformations
Olivier Carton (Paris Cité U)	Rauzy dimension and finite state dimension
Tom Schmidt (Oregon State U, Corvallis)	First expansive returns and cross sections
Valérie Berthé (Paris Cité U)	Equidistribution modulo finite groups in shifts
Lukas Spiegelhofer (MontanU Leoben)	Thue–Morse along the sequence of cubes
Golafshan Mehdi (U of Liège)	Leading Digits, Factor Complexity, and Flows on Homogeneous Spaces: A Dynamical Approach
Lucia Rossi (TU Vienna)	Digit expansions in rational and algebraic basis
Yasushi Nagai (Shinshu U)	A Special Case of the Binary S-adic Pisot Conjecture
Henk Don (Radboud U)	Constructing morphisms for arithmetic subsequences of Fibonacci
Shigeki Akiyama (Tsukuba U)	Badly approximable numbers and Delone sets
Joanna Kułaga-Przymus (NCU, Torun)	B-free sets and the existence of natural density
Michael Baake (Bielefeld U)	Symmetries, spectra and eigenfunctions of simple B-free lattice systems

Publications and preprints contributed

A. Bakhtawar & C. Kraaikamp, *Sharpening Vahlen’s result in Diophantine approximation*, [arXiv:2504.20640](#)[math.DS].

W. Bosma, R. Bruin, R. Fokkink, A. Reuijl & T. Tromp, *Using Walnut to solve problems from the OEIS*, [arXiv:2503.04122](#)[math.NT].

H. Bruin & O. Lukina, *Skew-product systems over infinite interval exchange transformations*, [arXiv:2408.14079](#)[math.NT].

K. Dajani, C. Kraaikamp, H. Nakada & R. Natsui, *A new class of α -Farey maps and an application to normal numbers*, [arXiv:2405.10921](#)[math.DS].

Invited scientists

Shigeki Akiyama, Felipe Arbulú, Pierre Arnoux, Michael Baake, Ayreena Bakhtawar, Veronica Becher, Valérie Berthé, Christa Binder, Wieb Bosma, Henk Bruin, Olivier Carton, Emilie Charlier, Karma Dajani, Henk Don, Michael Drmota, Bastian Espinoza, Robbert Fokkink, Peter Grabner, Hiroaki Ito, Cor Kraaikamp, Elzbieta (Ela) Krawczyk, Savinien Kreczman, Joanna Kułaga-Przymus, Sebastien Labbé, Niels Langeveld, Benoit Loridant, Olga Lukina, Juan Marshall-Maldonado, Golafshan Mehdi, Nikolay Moshchevitin, Clemens Muellner, Yasushi Nagai, Hitoshi Nakada, Harald Niederreiter, Pierre Popoli, Silvia Radinger, Antoine Renard, Michel Rigo, Lucia Rossi, Slade Sanderson, Klaus Schmidt, Tom Schmidt, Peter Schmitt, Lukas Spiegelhofer, Wolfgang Steiner, Manon Stipulanti, Paul Surer, Jörg Thuswaldner, Robert Tichy, Maria Clara Werneck, Reem Yassawi, Agamemnon Zafeiropoulos.

Quantum Harmonic Analysis

Organizers: Markus Faulhuber (U of Vienna), Hans G. Feichtinger (U of Vienna), Franz Luef (NTNU, Trondheim)

Dates: May 5 – 9, 2025

Budget: ESI € 11 406

FWF € 1 705 (towards the social dinner)

ÖFG € 981 (contribution towards travel expenses for early-career researchers)

Report on the workshop

The goal of this workshop was to deepen existing and establish new connections between QHA, the theory of Toeplitz operators on Bargmann-Fock and Bergman spaces, mathematical physics, quantum information, machine learning, and time-frequency analysis.

These objectives have definitely been achieved since we managed to attract a number of new researchers from quantum information theory and quantum mechanics to attend this workshop. Several members of the machine learning community have also participated and have added novel aspects to the quantum harmonic analysis community. Finally, the core of researchers in quantum harmonic analysis has also intensified their research interactions with each other. They have also taken the opportunity to engage in discussions with some of the first-time participants.

Activities

The workshop consisted of introductory lectures, plenary lectures, and contributed talks. In addition, there was ample time for discussion and a social dinner. The expenses for the dinner were partially covered by the Austrian Science Fund (FWF).

Specific information on the workshop

The workshop hosted 50 participants, including about 30 early-career researchers at the PhD student and postdoc level. The ratio of talks given by professors and young researchers was also about 2:3. Among the registered participants were 10 female researchers. Dr. Diana Stoeva (U of Vienna) participated as a local researcher without registration. The organizers tried hard to increase the number of women, but still, male researchers mainly occupy the field, and some female invitees from outside of Europe had to decline the invitation for various reasons.

The workshop contained 7 plenary talks and 23 contributed talks. The plenary lectures were held by (in chronological order)

- Dr. Daniel Abreu (U of Vienna)
- Prof. Elena Cordero (U of Torino)
- Dr. Robert Fulsche (industry)
- Prof. Richard Küng (JKU Linz)
- Prof. David Gross (U of Cologne)
- Prof. Ursula Molter (U Buenos Aires)
- Dr. Irina Shafkulovska (U of Vienna)

This means that women gave 3 out of the 7 plenary lectures. Of those, Dr. Irina Shafkulovska is an up-and-coming young postdoctoral researcher (1 year after PhD), also making early-career researchers visible.

Outcomes and achievements

The following collaborations have been established during the workshop.

- Prof. Azita Mayeli (CUNY), Prof. Franz Luef (NTNU), Helge Samuelsen (NTNU): Recovery problems in the quantum harmonic setting.
- Prof. Elena Cordero (U Torino), Dr. Gianluca Giacchi (U Svizzera Italiana), Edoardo Pucci (U Torino): Wave packet analysis of metaplectic operators.
- Prof. Elena Cordero (U Torino), Edoardo Pucci (U Torino), Prof. Joachim Toft (Linnaeus U): Necessary conditions for localization operators to be in the Schatten p -class, with $0 < p < 1$.
- Prof. Elena Cordero (U Torino), Prof. Franz Luef (NTNU), Prof. Joachim Toft (Linnaeus U): Quantum harmonic analysis of operators in the Schatten- p classes, with $0 < p < 1$.
- Dr. Ahmed Abdeljawad (RICAM Linz), Prof. Elena Cordero (U Torino): Neural Approximation in Time-Frequency Analysis.
- Dr. Vishwa Dewage (Clemson U), Dr. Markus Faulhuber (U Vienna): FWF ESPRIT programme "*Quantum harmonic analysis and applications*". For details please see [Grant-DOI 10.55776/ESP2699225](https://doi.org/10.55776/ESP2699225).

List of talks

Franz Luef (NTNU, Trondheim), held by Henry McNulty	Introduction to QHA and Gabor frames
Hans G. Feichtinger (U of Vienna)	Discrete Time-Frequency Analysis via MATLAB
Michael Speckbacher (Acoustics Research Institute, Vienna)	Spectral deviation of Toeplitz operators on vector-valued reproducing kernel Hilbert spaces
Erling Svela (NTNU, Trondheim)	A large sieve principle for the operator STFT with applications to Cohen's class
Luis Daniel Abreu (U of Vienna)	Classical phase space representations of density operators with classical and quantum Gabor transforms
Are Austad (U Oslo)	New classes of hermitian algebras
Elena Cordero (U Torino)	Wigner Analysis of Operators controlling ghost frequencies
Edoardo Pucci (U Torino)	Understanding of linear operators through Wigner analysis
Helge Jørgen Samuelsen (NTNU, Trondheim)	Fourier-Wigner multipliers in Quantum Harmonic Analysis
Robert Fulsche (Leibniz U Hannover)	Heisenberg-smooth operators and QHA
Michael Gjertsen (NTNU, Trondheim)	Towards a Theory of Quantum Harmonic Analysis on Riemannian Manifolds
Joachim Toft (Linnaeus U)	Orlicz convolutions in QHA with applications to Orlicz Schatten properties for Toeplitz operators
Azita Mayeli (CUNY, New York)	Localization operators, wave packets, and eigenvalue distributions
Richard Küng (JKU, Linz)	Probably efficient machine learning for quantum many- body problems
Mario Ullrich (JKU, Linz)	How many measurements are needed to learn a vector?
Ahmed Abdeljawad (RICAM, Linz)	Approximation with Neural Networks in Fourier Lebesgue Spaces
David Gross (U Cologne)	On Euler or on Cayley
Jean Pierre Gazeau (Paris Cité U)	Gabor regularisation of Minkowski space-time
Apostolos Vourdas (U of Bradford)	The Grothendieck inequality in Quantum Mechanics and Harmonic Analysis

Mariano del Olmo (UVS)	Special functions, Groups, Harmonic Analysis and Rigged Hilbert Spaces
Margit Pap (U Pécs)	Properties of hyperbolic convolution on the unit disc and applications
Carlos Cabrelli (U of Buenos Aires)	Frames by orbits of Bounded Operators
Ursula Molter (U of Buenos Aires)	Weaving Frames and Riesz bases
Vishwa Dewage (Clemson U)	An operator heat semigroup and the Berger-Coburn theorem
Johannes Testorf (NTNU, Trondheim)	Toeplitz and time-frequency localization operators on the flat torus
Raffael Hagger (Christian-Albrechts-U, Kiel)	Compact operators on locally compact abelian group
Lukas Köhldorfer (Acoustics Research Institute, Vienna)	Approximation properties and characterization of operator coorbit spaces
Hannes Wendt (U Oslo)	A Duflo-Moore theorem for ergodic group actions on semifinite von Neumann algebras
Irina Shafkulovska (U of Vienna)	Uncertainty Principles for Metaplectic Time-Frequency Representations
Gianluca Giacchi (U Svizzera Italiana)	Recent developments on Hardy's uncertainty principle
Lenny Neyt (U of Vienna)	Hermite expansions for spaces of functions with nearly optimal time-frequency decay
Maurice de Gosson (Acoustics Research Institute, Vienna)	Polar Duality and the Donoho–Stark Uncertainty Principle

Publications and preprints contributed

E. Cordero, G. Giacchi & E. Pucci, *Wave packet analysis of metaplectic operators in Gelfand-Shilov spaces and applications to Schrödinger equations*, in progress.

A. Abdeljawad & E. Cordero, *Neural Approximation in Time-Frequency Analysis*, in progress.

Invited scientists

Ahmed Abdeljawad, Luis Daniel Abreu, Are Austad, Aksel Bergfeldt, Dimitri Bytchenkoff, Carlos Cabrelli, Elena Cordero, Maurice de Gosson, Mariano del Olmo, Vishwa Dewage, Monika Dörfler, Ulrik Enstad, Markus Faulhuber, Hans G. Feichtinger, Robert Fulsche, Jean Pierre Gazeau, Gianluca Giacchi, Michael Gjertsen, Karlheinz Gröchenig, David Gross, Anupam Gumber, Raffael Hagger, Jukka Kiukas, Andreas Klotz, Lukas Köhldorfer, Richard Küng, Franz Luef, Felipe Marceca, Azita Mayeli, Henry McNulty, Thomas Mejstrik, Ursula Molter, Ryo Muramatsu, Lenny Neyt, Eduard Ortega, Margit Pap, Edoardo Pucci, Helge Jørgen Samuelsen, Norbert Schuch, Irina Shafkulovska, Mitra Shamsabadi, Michael Speckbacher, Erling Svela, Johannes Testorf, Joachim Toft, Alice Barbara Tumpach, Mario Ullrich, Apostolos Vourdas, Hannes Wendt, Jan Zimmermann.

Extremal statistics in biology

Organizers: Ariel Amir (Weizmann Institute, Rehovot), Christoph Dellago (U of Vienna), Ethan Levien (Dartmouth College)

Dates: June 10 – 13, 2025

Budget: ESI € 2 768

Weizmann Institute, Rehovot € 9 226

Report on the Workshop

Activities

The workshop was held over the course of four days. Each day consisted of 7-8 half hour research talks with one hour of coffee break for each hour of talks. In addition to the research talks, the public ESI lecture was held on the first day of the workshop and introduced participants and graduate students to the major developments in the field. The coffee breaks resulted in lively scientific discussion and opportunities for feedback on the talks. We also held free time in the afternoon and a social dinner for all participants.

Specific information on the workshop

The workshop included 2 grad students (Spencer Hobson-Gutierrez, Simon Rella) and 2 junior (meaning pre-tenure) researchers (Ethan Levien, Julie Tourniaire) who all gave presentations and participated in discussions. The workshop provided opportunities for these researchers to network with the international community and develop collaborations across disciplines.

Outcomes and achievements

The workshop provided an opportunity for many researchers to receive feedback and share ideas across disciplines. The theory of extreme value statistics spans many areas of biology, from evolution to single-cell physiology, while also having deep connections to mathematical physics for example, techniques used to study spin glasses are rooted in extreme value theory. A major benefit of the workshop was to expose researchers primarily focused on biological problems to the rich theoretical frameworks for dealing with extreme value problems, while also providing new application-driven challenges for more mathematically focused researchers.

Some examples are as follows:

- In evolutionary biology, there is a distinct community of mathematicians working on theoretical aspects of population genetics models including workshop participants Emmanuel Schertzer and Julie Tourniaire, which typically holds conferences separately from experimental biologists and physicists such as participant Oskar Hallatschek. A number of talks bridged this boundary, raising awareness of novel mathematical models in the physics/biology communities and vice versa. There was a particularly lively discussion — largely driven by talks from Julie Tourniaire, Emmanuel Schertzer, and Herbert Levine — around the significance of pushed vs. pulled waves in evolution.
- Mathematicians interested in extreme value statistics and large deviation theory including participants Ethan Levien and James MacLaurin were able to learn about cutting-edge experimental work from presentations by Dan Needleman, Jane Kondev, and Naama Brenner, among others, which provided a wealth of new mathematical challenges. James MacLaurin's talk on the mathematics of extreme first passage times, though motivated by biophysical applications, inspired discussions on potential applications to phenotypic switching.

- A recurring theme, highlighted in talks by Tibor Antal and Naama Brenner, was the question: What are the signatures of extremes in data, and are there situations where we encounter extreme value distributions that are not the result of underlying extremal statistics?

As described above, the workshop also provided a valuable networking opportunity for both junior and senior participants.

List of talks

Jane Kondev (Brandeis U)	Extreme value statistics and length control of filaments in cells
Dan Needleman (Harvard U)	Measuring and modeling the dynamics of mitotic error correction
Ethan Levien (Dartmouth College)	Extremal statistics in biology: growth, search and disorder
Gasper Tkacik (ISTA, Vienna)	Avalanches and neural oscillations in a simple model near criticality
Julie Tourniaire (MLPU, Besancon)	A branching particle system as a model of FKPP fronts
Ariel Amir (Weizmann Institute, Rehovot)	Extremal events dictate population growth rate inference
Oded Agam (HU of Jerusalem)	Field-Theoretical Perspectives on Morphogenesis in Hydra Regeneration
Tamar Friedlander (HU of Jerusalem)	Reconciling conflicting selection pressures in the plant self-incompatibility system
Ethan Levien (Dartmouth College)	Learning extremal statistics
Simone Pigolotti (Okinawa IST)	Statistical physics of growing systems
Andela Saric (ISTA, Klosterneuburg)	One becomes two & two become one: cell reshaping across evolution
Spencer Hobson-Gutierrez (NYU, New York)	Evolutionary Advantage of Cell Size Control
Calin Guet (ISTA, Klosterneuburg)	Biology, Context, Statistics
James MacLaurin (NJIT, Newark)	Extreme first passage times for populations of identical rare events
Tibor Antal (U of Edinburgh)	Metastasis formation models
Kavita Jain (JNCASR, Jakkur)	Effective parameters in population biology
Naama Brenner (Technion Haifa)	Analyzing Bacterial Growth with Extreme Value Statistics
Oskar Hallatschek (UC, Berkeley)	Who acquires infections from whom: Neutral allele frequencies can tell
David Lacoste (ESPCI, Paris)	Inhibition of bacterial growth by antibiotics: a minimal model
Simon Rella (ISTA, Klosterneuburg)	The novel and the extreme: Connections between record statistics and models of innovation
Ulrich Gerland (TU Munich)	Rare event statistics and molecular bet-hedging in enzyme systems
Herbert Levine (Northeastern U, Boston)	Fluctuation-dominated Fronts; A Failure of the Small Noise Approximation
Emmanuel Schertzer (U of Vienna)	Selection of the fittest or selection of the luckiest?
David Holcman (ENS Paris)	Extreme statistics in molecular and cellular biology
Sebastian Fürthauer (TU Vienna)	The physics of highly crosslinked cytoskeletal networks
G. Cigdem Yalcin (Istanbul U)	How can superstatistics approach be applied to investigate complex biological systems?
David Kessler (Bar Ilan U)	Thymic Selection of T Cells - A Problem in Extreme Value Statistics

Publications and preprints contributed

K. Jain & H. Sumuni, *Dynamics of fixation probability in a population with fluctuating size*, [arXiv:2508.18828\[q-bio.PE\]](#).

A. Jangid, O. N. Feldheim & T. Friedlander, *Volatile but persistent co-existence of self-compatibility and self-incompatibility in plants*, [DOI:10.1101/2025.11.30.691363](#).

Invited scientists

Oded Agam, Ariel Amir, Tibor Antal, Naama Brenner, Christoph Dellago, Tamar Friedlander, Sebastian Fürthauer, Ulrich Gerland, Calin Guet, Oskar Hallatschek, Spencer Hobson-Gutierrez, David Holcman, Kavita Jain, David Kessler, Jane Kondev, David Lacoste, Ethan Levien, Herbert Levine, James MacLaurin, Daniel Needleman, Simone Pigolotti, Simon Rella, Andela Saric, Emmanuel Schertzer, Gasper Tkacik, Julie Tourniaire, G. Cigdem Yalcin.

IMO Training 2025

Organizers: Theresia Eisenkölbl (U of Vienna)

Dates: June 30 – July 4, 2025 & October 25 – 31, 2025

Budget: ESI € 3 819

which was used for the following costs:

Accommodation costs, part 1: € 1 527

Accommodation costs, part 1: € 1 145

Provisions, part 2: € 1 147

Additional sponsoring cam from Janestreet & Huawei and amounted to € 1 597

Report on the training

The goal of the event was to prepare the Austrian team for IMO (International Mathematical Olympiad) and MEMO (Middle European Mathematical Olympiad). The more general aim is to enable the best high school students to become proficient at many mathematical subjects and problem-solving early on and prepare them for a mathematics career.

Activities

The event included talks on all the main topics of international mathematics competitions for high school students (algebra, combinatorics, geometry, number theory), discussion and interactive problem solving, a training competition and participation in the Iranian Combinatorics Olympiad, a challenging international competition organised by young Iranian mathematicians and taking place in many countries at once.

Specific information on the training

Due to the nature of the event, the young participants had the chance to increase their mathematical knowledge significantly. The presenters included prae-docs and post-docs.

Outcomes and achievements

We are happy to report that this year, the Austrian team at the MEMO received a silver medal, a bronze medal and two honorable mentions. The Austrian team at IMO received 1 gold medal, 1 silver medal, 3 bronze medals and one honorable mention at the International Mathematical Olympiad in Sunshine Coast, Australia in July 2025.

List of talks

June 2025

Martin Bierbaumer (U of Vienna)	Kombinatorik
David Buchmaier Bofill (U of Vienna)	Algebra
Theresia Eisenkölbl (U of Vienna)	Zahlentheorie
Georg Weisbier (U of Vienna)	Geometrie

October 2025

Theresia Eisenkölbl (U of Vienna)	Projektive Geometrie
Dominik Pultar (BRG Wien 6)	Substitutionsmethoden für Ungleichungen
Mihail Grecu (BRG Wien 22)	Zahlentheorie und Geometrie
Ivan Izmetstiev (TU Vienna)	Erzeugende Funktionen und Catalanzahlen

Participants

Martin Bierbaumer, Letizia Bräuer, David Buchmaier Bofill, Matija Bucic, Philipp Bui, Theresia Eisenkölbl, Valentin Glatz, Mihail Grecu, Philipp Gutenthaler, Ivan Izmetstiev, Maksym Kuzmov, William Shi, Jan Strehn, Ziao Suo, André Tremetsberger, Benedek Ürgé, Georg Weisbier, Lorenz Werner, Dinmukhamed Yegebayev, Yelyzaveta Yevtushenko, Felix Zeilinger.

ISAPP2025: Gravitational Waves: From Theory to Detection

Organizers: Oliver Hahn (U of Vienna), Gianluca Inguglia (OEAW), Josef Pradler (U of Vienna & OEAW), Jochen Schieck (OEAW), Glenn Van de Ven (U of Vienna)

Dates: July 7 – 18, 2025

Budget: ESI € 11 790

Report on the Summer School

Scientific Summary

According to the theory of general relativity, gravity is not a force acting between objects and transmitted through space; gravity is instead the result of the space-time curvature caused by the presence of mass or energy. If a massive object, such as a black hole (BH), would change its position in space due to an acceleration, as in the case of two BHs orbiting each other in a binary system, it would create continuous changes to the curvature of the space-time; these changes propagate at the speed of light and are what we call gravitational waves (GWs). When a

GW passes through a GW detector, typically a laser interferometer, it causes the detector's arms to stretch and contract. As a consequence, the (laser) light travelling along its arms will create an interference pattern, which in turn produces a detectable signal. By studying this signal, one can infer the properties of the system that has generated the GW.

Since the experimental discovery in 2015, gravitational waves have opened a new observational window to the Universe, and several unexpected results have already been obtained. Interestingly the field of gravitational wave research is growing and extending beyond pure astronomy, astrophysics, or cosmology and it now embraces several subfield of sciences that can be enhanced and better understood via gravitational waves studies. Many of the observations, in fact, gave rise to new questions about compact object formation, hierarchical mergers, and fundamental physics. The observation of black holes in the so called mass gap, or black holes masses where astrophysics doesn't offer a viable process for production, indicates that a lot of new insights about the Universe will be revealed through the study of gravitational waves. Remarkably, gravitational waves have also been observed in coincidence with photons in the mergers of neutron stars initiating the field of multimessenger astronomy.

The summer school "Gravitational Waves, from theory to detection" focused on providing several international participants with a solid basic understanding of the underlying theory of gravitational wave production and their experimental detection, as well as the implications for astrophysics, cosmology, and fundamental physics.

Highlights and Outcomes

- The school allowed a large group of international student to understand the core concepts and the challenges of gravitational wave research. It also allowed to show the engagement of the Viennese community into this emerging field of research.
- The world-renowned lectures delivered very well structured lectures complemented by large amount of time dedicated to question and answer sessions, exercise sessions. To be mentioned is the exercise session of the lecture on gravitational wave detectors, where students, divided in groups, were tasked to build a small interferometer (provided by the lecturer) to observe interference pattern.
- A poster session took place on the third day of the school. Students presented a 1 minute summary of their poster before the session highlighting the main aspects of the poster and inviting people to visit their posters to ask questions. The session was attended by all participants and allowed very interesting exchanges among all participants in an informal setting.
- a satellite outreach event took place at the Italian Embassy that hosted a lecture by Prof. Marco Pallavicini about the Einstein Telescope.

Conclusions and Outlook

The school allowed all its participant to understand the basic of the field of gravitational wave research, and as mentioned, has allowed to show the interest and commitment of the local Viennese community to this field. Thanks to the school new collaborations between the organizers and with the lecturers have been initiated.

List of talks

Clifford M. Will (U of Florida, Gainesville)	Introduction to Gravitational Waves, Lecture 1 - 2
Zoltan Haiman (ISTA, Klosterneuburg)	Multimessenger Astronomy, Lecture 1 - 2
Jessica Steinlechner (U of Maastricht)	Gravitational Wave Detectors, Lecture 1 - 2
Elena Cuoco (U Bologna)	Data Analysis and Signal Processing, Lecture 1 - 2
Lijing Shao (KAVLI Peking U)	Tests of General Relativity, Lecture 1 - 2
Angelo Ricciardone (U of Pisa)	Gravitational Wave Cosmology, Lecture 1 - 3
Tania Regimbau (LAPP Annecy)	Stochastic Gravitational Wave Background, Lecture 1 - 2
Michela Mapelli (U Heidelberg)	Sources of Gravitational Waves, Lecture 1 - 2
Jan Harms (Gran Sasso Science Institute, L'Aquila)	Quantum Sensing in Gravitational Wave Detection, Lecture 1 - 2
Costantino Pacilio (U Milano-Bicocca)	Gravitational Wave Probes of Fundamental Physics
Gideon Koekoek (U of Maastricht)	Public Outreach and Education

Invited scientists

Wen-Yuan Ai, Saulo Albuquerque, David Alvarez, Matteo Ballelli, Rasila Banu, Stefano Bartolomei, Daniel Beltran, Janus Brink, Alicia Calafat, Gianmarco Carmagnini, Isabella Caruso, Balázs Cirok, Stefano Colace, Elena Cuoco, William Delplanque, Francesca Noemi Di Bari, Ulyana Dupletsa, Mohamed Samy Abdelmotteleb Elzokm, Maximilian Fahrecker, Yavuz Can Gençel, Manuel Goimil-García, Samuel Gomez, Liliana Grancanin, Elisa Grilli, Oliver Hahn, Zoltan Haiman, Jan Harms, Gianluca Inguglia, Maria-Catalina Isfan, Kata Karácsonyi, Gideon Koekoek, Daniil Krichevskiy, Garance Lankesterbroche, Alessandro Longo, Lorenzo Lunghini, Rajesh Kumar Maiti, Michela Mapelli, Luca Massaro, Tobia Matcovich, Shaoqiang Meng, Chiara Anna Montecuolo, Anna Moreso Serra, Stefan Nellen, Anirudh Nemmani, Costantino Pacilio, Kevin Park, Tobias Pausch, Alessia Perego, Florentina Pislán, Josef Pradler, Jan Ramaj, Tania Regimbau, Angelo Ricciardone, Federica Santucci, Jochen Schieck, Lijing Shao, Brecht Sloodmaekers, Jessica Steinlechner, Igor Stellet, Dawid Stepanovic, Leonardo Torcellini, Glenn van de Ven, Kristyna Vitulova, Tristan Weaver, Ann Cathrin Wesener, Clifford M. Will, Changhao Xu, Jesus Gabriel Yopez Moreno, Iman Zabett.

Eisenstein Series, Spaces of Automorphic Forms, and Applications

Organizers: Neven Grbac (U Pula), Marcela Hanzer (U Zagreb), Stephen S. Kudla (U Toronto), Joachim Schwermer (U of Vienna)

Dates: September 1 – 5, 2025

Budget: ESI € 9 581

Croatian Science Foundation project HRZZ-IP-2022-10-4615 € 2 400

Report on the Workshop

The main focus of the workshop was on several aspects of the theory of automorphic forms with an emphasis on the relations among the internal structure of spaces of automorphic forms, the Langlands functoriality principle, automorphic L -functions, and questions in geometry, in particular, those regarding locally symmetric spaces. These are associated with arithmetic subgroups Γ of a given reductive algebraic group G defined over an algebraic number field k .

Special attention was given to the theory of Eisenstein series and their ubiquitous role within the theory of automorphic forms. The fine structure of spaces of automorphic forms is essentially determined by the cuspidal support related to cuspidal automorphic representations of Levi subgroups of G and the Eisenstein series (or residues thereof) attached to them. In addition, degenerate Eisenstein series, that is, those series attached to automorphic representations which occur in the residual spectrum of Levi subgroups play an important role. In both cases, the study of the analytic properties, their relation to arithmetic, in the form of the theory of automorphic L -functions, is essential. Of course, the theory of local and global representations of G has to be used in these investigations.

The wide range of current research was evident as topics included:

- structure of spaces of automorphic forms and related integrality questions
- analytic properties of (degenerate) Eisenstein series
- various approaches via the construction of specific automorphic forms to get hold of the cohomology of arithmetic groups
- cohomology classes represented by Eisenstein series and special values of automorphic L -functions
- a purely geometric approach to the cohomology of arithmetic groups
- Arthur packets, functoriality, locally and globally generic representations

The workshop served as the catalyst for new research directions towards comparison and combination of various approaches to the cohomology of arithmetic groups, with a view towards arithmetic applications.

Activities

The core of the workshop consisted of a limited number of highly regarded talks given at the ESI Boltzmann Lecture Hall every day. The topics of the talks were the latest research results, often not yet published, within the main themes explored in the workshop. There were two talks in the morning sessions, and two in the afternoon sessions, with coffee breaks and a (relatively long) lunch break. Wednesday's and Friday's afternoons were free. Hence, there was sufficient time for discussions, collaborations, networking and engaging in new research directions and projects. On Wednesday evening, a workshop dinner was organized at Heuriger Feuerwehr Wagner in Grinzing. This social event, in the middle of the workshop week, encouraged networking in an informal context and relaxed otherwise very intensive week of research and scientific exchange.

The ESI served as a perfect hub for exchange of ideas and scientific collaborations and discussions. The hospitality and productive, yet peaceful, atmosphere fostered the scientific activities of the workshop. Hence, our gratitude goes to the ESI for the opportunity to organize the workshop, and the ESI staff for their generous hospitality, excellent administrative support before, during and after the workshop, and all their efforts related to the event.

Specific information on the workshop

The workshop was attended by 28 participants including the organizers N. Grbac and J. Schwermer. Unfortunately, due to serious health issues, on short notice, the two organizers M. Hanzer

und S. S. Kudla could not come to Vienna. Among the participants 6 of them belong to the local Viennese academic community. There were 3 PhD students and 1 postdoctoral researcher attending the workshop. They all appreciated the opportunity, not only to hear the latest research results of prominent scientists in the field, but also to get engaged in discussions and possible collaborations and future projects with renowned researchers, which could provide a strong momentum in these early stages of their scientific development.

During the workshop, the total of 18 talks were given. Using the ESI recording facilities, 10 talks were recorded and are made publicly available at the ESI website of the workshop and at the ESI YouTube channel. In these two months since the workshop was held, the recorded talks have already accumulated 300 views.

Outcomes and achievements

During the workshop very recent findings were communicated in the talks, which facilitated during breaks and free afternoons the exchange of ideas, discussions of new directions and lines of research and plans for new projects among the participants. The existing collaborations were deepened, and several new ones were initiated. Junior researchers benefited from the opportunity to discuss their ideas and learn from renowned experts in the field. The result of the workshop is also the work done on several joint papers of participants in different phases of their preparation.

List of talks

Neven Grbac (UNIPU)	A new method to determine the regions of holomorphy for Eisenstein series using the Franke filtration
David Soudry (Tel Aviv U)	Poles of Eisenstein series on general linear groups induced from two Speh representations
Shih-Yu Chen (NTHU)	On the Blasius conjecture for the twisted standard L-functions
Nadya Gurevich (Ben-Gurion U, Beer-Sheva)	Generalized Fourier transforms for exceptional groups and minimal representations.
Binyong Sun (IASM, Zhejiang U)	Archimedean modular symbols and automorphic periods
Freydoon Shahidi (Purdue U)	Some Conjectures on Arthur Packets and L-packets
Anna Pippich (U of Konstanz)	Special values of Green's functions on hyperbolic 3-space
Fabian Januszewski (U of Paderborn)	Cohomology of arithmetic groups and integral structures on automorphic representations
Laurent Clozel (U Paris-Saclay)	Invariance of the zeroes of automorphic L-functions by conjugation of coefficients
Haruzo Hida (UCLA)	Adjoint L-values and the Tate conjecture
Kartik Prasanna (U of Michigan, Ann Arbor)	Representations of GL_2 over $\mathbb{Z}/p\mathbb{Z}$ and congruences for hypergeometric polynomials
Wee Teck Gan (U of Singapore)	Triality and Triviality of some instances of Functoriality
Francis Brown (U Oxford)	Cohomology of the general linear group over the integers
Spencer Leslie (Boston College)	A new relative trace formula and central values of standard L-functions
Petar Bakic (U of Utah, Saltlake City)	On quaternionic representations and exceptional theta lifts
Sonja Žunar (U Zagreb)	On a family of Poincaré series
Barbara Bošnjak (U Zagreb)	The irreducibility criterion for representations induced from the essentially Speh representations and the representation of Arthur type

Harald Grobner (U of Vienna) On Deligne's conjecture for automorphic motives over CM-fields

Publications and preprints contributed

There are no contributed publications and preprints yet that would reflect the outcome of the workshop, since most of the collaborations and projects mentioned above are still ongoing and will lead to publications only in the future. Acknowledgement of ESI support will be added to these preprints and papers during the next revision of the respective works.

Invited scientists

Petar Bakic, Don Blasius, Barbara Bošnjak, Francis Brown, Shih-Yu Chen, Laurent Clozel, Rahul Dalal, Mohamed Ez Zarraq, Wee Teck Gan, Neven Grbac, Lovro Greganić, Harald Grobner, Nadya Gurevich, Haruzo Hida, Fabian Januszewski, Christian Kaiser, Erez Lapid, Spencer Leslie, Joachim Mahnkopf, Anna Pippich, Kartik Prasanna, Anthony Scholl, Joachim Schwermer, Freydoon Shahidi, David Soudry, Binyong Sun, Sonja Žunar.

Charged Soft Matter: Bridging Theory and Experiment

Organizers: Emanuela Bianchi (TU Vienna), Peter Košován (Charles U, Prague), Christos Likos (U of Vienna), Roman Staňo (U of Vienna)

Dates: September 8 – 12, 2025

Budget: ESI € 10 224
CECAM € 10 000

Report on the Workshop

Charged soft matter entails a broad variety of systems, sharing one common feature: they contain charged macromolecules or colloidal particles, typically few nanometers in size, accompanied by salt ions and other charged small molecules, and polar solvents. The relevant systems range from cellular membraneless organelles to protein solutions, bio-inspired or synthetic polymers, inverse patchy colloids or polymer-electrolytes found in modern battery systems. Although very different in nature, these systems share the same physics, predominantly controlled by interplay of electrostatic interactions and thermal fluctuations.

Unfortunately, most of the research in the field of charged soft matter is carried out in communities centered mainly around the target systems named above, allowing only limited exchange across these communities. This leads not only to differences in nomenclatures and concepts, but also to reinventions and rediscoveries of phenomena.

The aim of this workshop was to provide an interdisciplinary platform for scientific exchange between these different communities investigating charged soft matter, underlining the shared aspects of the involved physics.

Activities

The core activities of the workshop were the scientific talks and subsequent plenary discussions, both taking place in the Boltzmann Lecture Hall with natural continuation during the coffee breaks. We hosted 38 speakers, and everyone received the same platform: a 30 minute slot for presentation and discussion. The opening lecture of the workshop by Peter Schrutemberger put emphasis on basic concepts and on general introduction of the field with a more pedagogic approach, effectively setting the stage for the entire workshop. With the opening lecture focusing on colloidal particles, the following two lectures of the sessions introduced polyelectrolytes and biomolecular condensates respectively, collectively giving an excellent overview of the field in full breadth. Throughout the week, the contributions were grouped in topical sessions of three or two talks each, separated by coffee breaks or lunch breaks. Generally, we scheduled topics of basic research first to establish the principles, and topics of applied research later in the week. When scheduling the sessions, we also tried to balance the factors of career stage, gender and geography, in addition to the scientific relevance.

On the third day of the workshop, we hosted a poster session with 18 posters at the ESI. The posters stayed on display during the whole duration of the workshops.

We also organized two social activities – the welcome reception to close the first day and the workshop dinner on the fourth day. The reception took place at the ESI with external catering, after the first session of the talks. The conference dinner took place at a local restaurant recommended by the ESI. We have received positive feedback on both of these events and also on the coffee breaks which all provided space for further networking and discussions.

Specific information on the workshop

We committed to promote inclusivity in career stage, geography and gender in the selection of the invitees and of the participants from the registration for the open scientific public. The preferences were continuously adjusted on the fly to balance the representation in all of the above categories. In the end, the workshop hosted 19 professors or senior scientists, 10 assistant professors or junior group leaders, 13 postdoctoral researchers, 16 doctoral candidates and 2 undergraduate students. We estimate the gender composition as 20 female and 40 male participants, with female participation of more than 33%, thereby exceeding the threshold of 20% requested by the Erwin Schrödinger Institute. The participants' institutions collectively reside over 19 countries across 3 continents (AT: 7, CY: 1, CZ: 7, FI: 3, FR: 3, DE: 9, GR: 1, IL: 2, IT: 2, NL: 3, NO: 1, PL: 3, RS: 1, SK: 1, SI: 3, SE: 5, CH: 1, GB: 3, US: 4).

Outcomes and achievements

Primary Outcomes

The primary outcome of the workshop was the establishment of new contacts between researchers from distinct fields, such as polymer science, biophysics, physical chemistry or molecular biology, and the transfer of knowledge between those fields.

Together, the community identified the main limitations as:

- (a) different language used by various communities to describe the same phenomena
- (b) focus on different details when interpreting the same observations, and attributing the same observations to different sources.

The way to address these limitations is to cultivate the contact between the individual fields, and to enhance the overlap between them, which can be achieved, for example, by organizing

more workshops or conferences.

More specific open questions formulated during the workshop include:

- (a) Can we use liquid-state theories to describe the phase separation in protein solutions? Do the mean-field theories have quantitative or predictive power?
- (b) How to experimentally characterize gels or condensates with rheology or microscopy across all of the relevant length scales and time scales?
- (c) Is pH inside the gels and condensates the same as outside? Under what conditions?
- (d) Is the notion of a phase and phase separation applicable for biomolecular aggregates, clusters or structures such as centrosomes?
- (e) What level or resolution is needed to model condensates and polyelectrolytes computationally? Do we need explicit small ions or explicit solvent? Is the assumption of a uniform ionic strength and permittivity across the whole condensate phase a valid one?
- (f) Can we use theoretical models and simulations to rationalize kinetics of polymerization of charged monomers?

Potential Social Benefits

One of the main goals of our workshop was to bridge theory with experiment and basic research with applied one. Many of the contributions have a direct industrial, medicinal or technological relevance. Interactions between the participants could improve the application capabilities, provide deeper fundamental understanding and potentially result in novel directions in materials research, with a couple of specific examples given below.

- (a) Monoclonal antibodies are being used as a diagnostic sensor and also a therapeutic in cancer treatment. Our workshops helped to connect the experimental characterization platforms (Stradner, Schurtenberger) with the computational design (Pineda, Camerin, Blanco) of the antibodies, and also to establish parallels between antibodies and patchy colloids (Lund, Dhont, Sacana, van Oostrum).
- (b) Misfolding and aggregation of charged proteins in condensates has been proposed as one of the key mechanisms in development of Alzheimer's disease or Parkinson's disease. Recent progress in experimental microfluidic characterization of relevant protein condensates (Ausserwöger) in connection with new rheological (Naghilou, Parisi) and calorimetric (Ballauff) methods could deepen our fundamental understanding of condensate aging and protein aggregation.
- (c) Complex coacervation emerges as one of motifs in encapsulation of cells (Lacík), biocompatible hydrogels (Sedláčik) or generation of artificial tissues (Nader), all of them already being employed in the medical practice. Dedicated sessions of our workshops proposed a theoretical framework for design of coacervates (Mittal, Motezakker) or electroadhesive gels (Nejedlá).
- (d) Smart biomaterials based on DNA nanotechnology (Elezgaray), self-assembly (Voets) or on external driving by stimuli (Walther) all present a new paradigm in the material engineering, which could be guided by computer modelling (Larson, Schneider).

Other Tangible Outcomes

Most of the participants consented to recording of their talks and publishing them on the [YouTube channel](#) of the Erwin Schrödinger Institute where they can be accessed by the scientific public. The workshop also provided ample opportunities for networking, and we are expecting several joint proposals and new collaborations emerging.

The Take-home Message of the Workshop

Communities from different backgrounds should communicate closely to exploit the existing complementary knowledge. Many recent experimental observations can be rationalized by

existing theories. For other observations, the appropriate theories still need to be developed. Such communication can be successful and extremely fruitful but requires initial effort and thinking out of the box from all participating parties. Bridging some of the above knowledge gaps should be feasible in the near future.

List of talks

Peter Schurtenberger (Lund U)	Exploring charge effects in soft matter: responsive particles, shape anisotropy and the role of charge patches
Ilja Voets (TU Eindhoven)	On Complex(ed) Relations: the Power and Peculiarities of Nanoscopic Polyelectrolyte-based Particles
Jeetain Mittal (TAMU, College Station)	From Wiggles to Flow: Multiscale Dynamics of Charged Protein Condensates
David Andelman (Tel Aviv U)	Remembering Rudi Podgornik: Charged liquids, electrified interfaces and more
Anže Božič (Jozef Stefan Institute Ljubljana)	Evolutionary changes in charge on spike protein of SARS-CoV-2
Nataša Adžić (IPB, Belgrade)	Field-theoretic approach to charged Janus colloids beyond mean field
Andreas Walther (U Mainz)	Phase Separation of DNA: From Fundamentals to Artificial Cells
Ronald Larson (U of Michigan, Ann Arbor)	pH and Salt-Dependent Charging and Coacervation of Weak Polyelectrolytes: Hydrophobic Effects
Stefanie Schneider (RWTH Aachen)	Monte Carlo Simulations of pH-sensitive polyelectrolyte microgels
Matthias Ballauff (FU Berlin)	Driving Forces in the Formation of Biocondensates of Highly Charged Proteins
Hannes Ausserwöger (U of Cambridge)	Biomolecular condensates sustain pH gradients at equilibrium through charge neutralisation
Jeffrey Everts (U Warsaw)	The interplay between electric double layers and nematic order
Vitja Beltram (Jozef Stefan Institute, Ljubljana)	Charged Active Nematics
Ahmad Reza Motezakker (KTH, Stockholm)	Simulation of Structure and Mechanics in Electrostatic Hybrid Networks
Tomáš Sedláčik (UCT Prague)	Charge in Double-Network Hydrogels: A Key to Understanding Toughening Synergy?
Dikla Kolan (Haifa U)	Propagation of a chemo-mechanical phase boundary in polyacrylate gels
Stefano Sacanna (NYU, New York)	Harnessing Coulombic Forces to guide Colloidal Self-assembly
Peter D J van Oostrum (BOKU Vienna)	Harnessing the Triboelectric Effect for Patchy Particles Synthesis: Properties and Self-Assembly
Jan Dhont (FZ Jülich)	Temperature Induced Migration of Interacting Charged Colloidal Particles
Ulrich Scheler (IPF Dresden)	Counterion condensation, effective charge and ligand binding on macromolecules studied by PFG NMR
Iris Smokers (Radboud U)	Selective ion binding and uptake shape the microenvironment of biomolecular condensates
Friederike Schmid (U Mainz)	Using simulations to understand the role of charge interactions in drug delivery systems
Daniele Parisi (U Groningen)	Asymmetry in Biopolymer Complex Coacervates: Decoding the Interplay of Molecular Weight, Flexibility, and Ionic Strength

Aida Naghilou (Med U Vienna)	Scanning probe microscopy for elucidating the rheological properties of biomolecular condensates during gelation and rejuvenation
Mehdi Vahdati (U of Strasbourg)	Unifying the dynamics of viscoelastic liquids across the complex coacervation phase diagram: time-polyelectrolyte-salt superposition
Fabrizio Camerin (Lund U)	A Colloidal Framework for Decoding Charge Heterogeneity in Antibody Solutions
Sebastian Pineda Pineda (Charles U, Prague)	Patchy charge distribution affects the pH in protein solutions during dialysis.
Mikael Lund (Lund U)	Anisotropic Interactions and Intermolecular Pose Exploration using Subdivided Spheres
Christos Likos (U of Vienna)	Polymer topology and charged soft matter: a tale of rings
Franco Ferrari (U Szczecin)	Some nontrivial thermodynamic properties of polymer catenanes and chainmails in a salt solution
Igor Lacík (SAS, Bratislava)	Propagation rate coefficient in radical polymerization for charged monomers polymerized in aqueous solutions
Morine Nader (U of Maryland)	Electroadhesion: Reversibly Adhering Hydrogels to Tissues Using Electric Fields
Marketa Schmidt Cernohorska (UJEP, Usti nad Labem)	resilience in centrosome kinetics
Adam Harmat (Aalto U)	Biomechanical Toward "phase" diagrams in multidomain protein solutions in vitro
Valerio Sorichetti (ISTA, Klosterneuburg)	Charged for attraction: How biomolecular condensates pull chromosomes together
Cristian Micheletti (SISSA, Trieste)	Nanopore translocation of entangled DNA and RNA filaments
Juan Elezgaray (CNRS, U of Bordeaux)	DNA origamis: their folding process and their interactions with lipid membranes
Jennifer Tersteegen (Aalto U)	Diverse non-equilibrium behavior of protein condensates in electric fields

Publications and preprints contributed

J.K.G.Dhonta & W.J.Briels, *Temperature-induced migration of electro-neutral interacting colloidal particles*, in: Journal of Colloid And Interface Science. [Journal of Colloid and Interface Science, 2024, 666, 457-471.](#)

J.K.G.Dhonta & W.J.Briels, *Temperature induced migration of interacting charged colloidal particles: an irreversible thermodynamics approach*, in: Journal of Colloid And Interface Science. [Soft Matter, 2025, 21, 4498-4516.](#)

R. Staňo & P. Kosovan, *Charge regulation enables uptake of ampholytes to polyelectrolyte brushes*, [doi:10.26434/chemrxiv-2025-dh46q](#).

Invited scientists

Neda Abbasi, Nataša Adžić, Reyhaneh Afghani Farimani, Terpsichori Alexiou, David Andelman, Hannes Ausserwöger, Matthias Ballauff, Vitja Beltram, Emanuela Bianchi, Pablo Blanco, Anže Božič, Fabrizio Camerin, Saikat Chakraborty, Gabriel Debais, Jan Dhont, Juan Elezgaray, Jeffrey Everts, Franco Ferrari, Steph Flores, Francesca Galluzzi, Adam Harmat, Panagiotis Ilia, Vojtěch Kepřta, Dikla Kolan, Peter Košov, Igor Lacík, Ronald Larson, Christos Likos, Mikael Lund, Theodora Menidiati, Cristian Micheletti, Jeetain Mittal, Ahmad Reza Motezakker, Morine Nader, Aida Naghilou, Magdaléna Nejedlá, Ipsita Padhee, Daniele Parisi, Sebastian Pineda Pineda, Stefano Sacanna, Ulrich Scheler, Friederike

Schmid, Marketa Schmidt Cernohorska, Stefanie Schneider, Peter Schurtenberger, Tomáš Sedláčik, Amir Sheikh Shoaie, Iris Smokers, Valerio Sorichetti, Eliška Stančíková, Roman Staňo, Anna Stradner, Andrea Tagliabue, Jennifer Tersteegen, Mehdi Vahdati, Peter D J van Oostrum, Ilja Voets, Fran Ivan Vrbán, Andreas Walther, Takahiro Yokoyama.

Putting the Cosmic Large-scale Structure on the Map: Theory Meets Numbers

Organizers: Oliver Hahn (U of Vienna), Cornelius Rampf (RBI, Zagreb), Cora Uhlemann (Bielefeld U)

Dates: September 22 – 26, 2025

Budget: ESI € 9 778

Report on the Workshop

Activities

We organized an international workshop focused on emerging methods in cosmology, with particular emphasis on so-called *field-level inference*. The event brought together experts in theoretical modelling, numerical simulations, and data analysis, as well as early-career researchers. The programme consisted of invited talks, discussion sessions, and collaborative working groups. Topics included large-scale structure modelling, forward simulations of the Universe, statistical inference techniques, and the treatment of observational systematics. A key component of the workshop was to foster exchange between different communities, including simulation experts, statisticians, and observers.

In addition to formal presentations, substantial time was dedicated to open discussions aimed at identifying common challenges and opportunities for future research.

To facilitate more focused progress, participants formed smaller working groups addressing specific subproblems, such as statistical methods, modelling uncertainties, and computational challenges. These groups enabled more detailed exchanges and helped structure the outcomes of the workshop.

Specific information on the workshop

The workshop addressed recent advances in extracting cosmological information from increasingly complex datasets. Traditional approaches often rely on summary statistics (such as correlation functions), which compress the data and may discard part of the available information.

A central theme of the meeting was the development of *field-level inference* methods, which instead analyses the full cosmological field (e.g. galaxy distributions or matter density maps). This approach has the potential to improve the precision and accuracy of cosmological measurements by making fuller use of the data.

Discussions covered both conceptual and practical aspects, including:

- the statistical foundations of these methods,

- modelling uncertainties and observational systematics,
- computational challenges associated with large-scale simulations,
- and validation strategies to ensure robust scientific results.

The workshop also highlighted connections to broader topics such as multi-probe analyses and the interpretation of non-Gaussian features in cosmological data.

Outcomes and achievements

The workshop successfully brought together a diverse group of researchers and facilitated active collaboration across subfields. A number of key challenges and open questions were identified, particularly in relation to statistical methodology, physical modelling, and computational requirements.

One important outcome is the initiation of a community effort to synthesise the current state of the field. In particular, participants have begun preparing a *white paper* that will summarise recent progress, outline open problems, and provide guidance for future developments.

Beyond this, the workshop helped to:

- strengthen existing collaborations and establish new ones,
- clarify the advantages and limitations of emerging inference techniques,
- and define a roadmap for future work in this rapidly developing area.

Overall, the meeting contributed to consolidating a growing research direction that is expected to play an important role in the analysis of upcoming cosmological surveys. For example, a subset of participants (T. Kacprzak, C. Uhlemann, F. Leclercq, G. Lavaux, N. Porqueres) submitted the proposal ‘Euclid Simulation-Driven Infrastructure for Cosmological Inference’ to the Euclid-internal pre-selection for the [Horizon Europe call SPACE \(Scientific analysis and exploitation of space data\)](#).

List of talks

David Alonso Monge (U Oxford)	Projected clustering: the information in N-point statistics
Adrian E. Bayer (Princeton U)	Field-Level BAO Reconstruction and Beyond
Jiamin Hou (U of Cambridge)	4-point correlation function measurement from DESI Y1
Chiara Moretti (SISSA, Trieste)	Measuring dark energy without prior-volume effects
Florent Leclercq (IAP, Paris)	Accelerated forward modelling of dark matter dynamics: ML-safety and perfect parallelism
Julia Stadler (LMU Munich)	Perturbative Forward-Modeling of Galaxy Surveys for Field-Level Cosmology
Kazuyuki Akitsu (KEK, Tsukuba)	Do we really gain from field-level inference? A comparison with joint power spectrum and bispectrum analysis
Carolina Cuesta-Lazaro (Harvard U, Cambridge)	Implicit vs Explicit field level inference
Jia Liu (Kavli IPMU)	HalfDome Cosmological Simulations
Cornelius Rampf (RBI, Zagreb)	Time-efficient cosmological simulations with and without a quantum analogue
Laila Linke (U of Innsbruck)	Third-Order Weak Lensing as a Bridge to Simulation-Based Inference
Tomasz Kacprzak (LMU Munich)	Combined probes with AI-SBI
Ashim Sen Gupta (Bielefeld U)	Abbreviating the simulation of structure formation in extended cosmologies

Florian List (MPI for Astrophysics, Garching)	DISCO-DJ: Differentiable Simulations for COsmology - Done with Jax
Thomas Flöss (U of Vienna)	Field-level inference with DISCO-DJ
Ken Osato (U Chiba)	Field-level inference with differentiable GridSPT forward model
Takahiro Nishimichi (Kyoto Sangyo U)	A propagator-based approach to mitigate cosmic variance in cosmological N-body simulations
Natalia Porqueres (CEA Paris-Saclay)	Field-level inference of weak lensing data
Zoltan Haiman (ISTA, Klosterneuburg)	The effect of intrinsic alignments on weak lensing statistics in hydrodynamical simulations
Eleni Tsaprazi (Imperial College London)	Field-level inference of H_0 from simulated type Ia supernovae in the local Universe
Elisabeth Krause (U of Arizona, Tucson)	Requirements for the next mock challenge
Ben Horowitz (Kavli IPMU)	Novel Forward Models and Solver-in-Loop Approaches for Joint Astrophysics and Cosmological Constraints
Drew Jamieson (MPI for Astrophysics, Garching)	Simulating the Initial Conditions of the Universe
Azadeh Moradinezhad Dizgah (LAPTh Annecy)	Parity in Composite-Field Galaxy Correlators
Yin Li (PCL, Shenzhen)	Differentiable modeling of the Universe in the age of machine learning
Jens Stücker (U of Vienna)	Gaussian Lagrangian Galaxy Bias
Jens Jasche (U Stockholm)	Tracing Cosmic Origins: Building a Digital Twin of the Universe with Field-Level Inference
Cora Uhlemann (Bielefeld U)	Going Below and Beyond: A Dive into One-Point Statistics
Francois Lanusse (CEA Paris-Saclay)	Hybrid Forward Models and Efficient Interference
Boryana Hadzhiyska (UC, Berkeley)	Searching for Primordial Non-Gaussianity: Spectroscopic Surveys
Zvonimir Vlah (RBI, Zagreb)	Modelling Cosmological Correlators on the Sky
Guilhem Lavaux (IAP, Paris)	Cosmic velocity field for cosmological parameter inference
Guido D'Amico (U of Parma)	The analysis of DES 3×2pt data within the EFTofLSS

Publications and preprints contributed

A. Andrews et al., *Field-Level Inference of Primordial Non-Gaussianity with the Quijote Simulation Suite*, [arXiv:2603.20855](#)[astro-ph.CO].

A. E. Bayer, L. Parker, D. Valcin, S. Chen, Ch. Modi & U. Seljak, *Field-Level Inference from Galaxies: BAO Reconstruction*, [arXiv:2603.15732](#)[astro-ph.CO].

F. List, O. Hahn, T. Flöss & L. Winkler, *DISCO-DJ II: a differentiable particle-mesh code for cosmology*, [arXiv:2510.05206](#)[astro-ph.CO].

H. Simon, F. Lanusse & A. de Mattia, *Benchmarking field-level cosmological inference from galaxy redshift surveys*, [arXiv:2504.20130](#)[astro-ph.CO].

Invited scientists

Kazuyuki Akitsu, David Alonso Monge, Raul Angulo, Adrian E. Bayer, Sandrine Codis, Carolina Cuesta-Lazaro, Guido D'Amico, Alejandro Estrada Llesta, Thomas Flöss, Boryana Hadzhiyska, Oliver Hahn, Zoltan Haiman, Ben Horowitz, Jiamin Hou, Anne Hutter, Drew Jamieson, Jens Jasche, Tomasz Kacprzak, Elisabeth Krause, Francois Lanusse, Guilhem Lavaux, Florent Leclercq, Yin Li, Laila Linke,

Florian List, Jia Liu, Azadeh Moradinezhad Dizgah, Chiara Moretti, Takahiro Nishimichi, Ken Osato, Natalia Porqueres, Cornelius Rampf, Ashim Sen Gupta, Julia Stadler, Jens Stücker, Eleni Tsaprazi, Cora Uhlemann, Zvonimir Vlah, Lukas Winkler.

Symposium: ESI Medal Award Ceremony 2025

Organizer: Christoph Dellago, ESI Director (U Vienna)

Dates: November 7, 2025

ESI Medal

The *Medal of the Erwin Schrödinger Institute for Mathematics and Physics*, in short ESI-Medal, has been created to recognize outstanding achievements in any area of mathematics or physics, including contributions at the interface of the two fields.

The ESI-Medal is awarded annually and emphasis is generally given to recent achievements not older than ten years. There is no age limitation for the recipient and ordinarily the ESI-Medal is awarded to one person only.

The recipient of the ESI-Medal receives a medal, a certificate and a monetary award of € 4 000. Nominations for the ESI Medal can be made by organizers of current and previous ESI Thematic Programmes, current and former ESI Senior Research Fellows, former members of the Scientific Advisory Board (SAB) of the ESI, former recipients of the ESI Medal, former Directors of the ESI and the President of the ESI Association. The recipient is selected by the Scientific Advisory Board of the ESI.

Winner of the ESI Medal 2025

The winner of the *Medal of the Erwin Schrödinger Institute for Mathematics and Physics* for the year 2025 was Michele Parrinello, Professor Emeritus at the Eidgenössische Technische Hochschule Zürich and Senior Researcher at the Istituto Italiano di Tecnologia in Genova.

Professor Michele Parrinello was honoured for his seminal contributions to computational science, particularly through the development of groundbreaking algorithms that have opened new frontiers in soft matter, biological, and condensed matter physics, as well as for applying these methods to solve important open problems. Among his most recent achievements are the advancement of metadynamics sampling techniques, which have revolutionized the study of complex free-energy landscapes—including those associated with protein conformational changes—and the pioneering integration of machine learning with molecular dynamics, a transformative leap that is redefining the frontiers of numerical simulations. He is also recognized for his efforts in promoting transparency and reproducibility in computational science.

Award Ceremony

The award ceremony took place on November 7, 2025 at the ESI Boltzmann Lecture Hall.

Schedule of the Ceremony

Christoph Dellago, ESI Director (U of Vienna)	Welcome
Georg Kresse (U of Vienna)	Auxiliary field quantum Monte-Carlo: recent advances and applications to solids
Mariana Rossi (U of Cambridge)	Predictive simulations of weakly bound systems
Giuseppe Foffi (Paris-Saclay U)	Laudatio
Christoph Dellago, ESI Director (U of Vienna)	Award of the ESI Medal
Michele Parrinello (ETH Zürich & IIT Genova)	Award Lecture
Christoph Dellago, ESI Director (U of Vienna)	Closing

Quantum Many-body Systems and Bose-Einstein Condensation: A Mathematical Physics Perspective

Organizers: Serena Cenatiempo (Gran Sasso Science Institute, L'Aquila), Christian Hainzl (LMU Munich), Robert Seiringer (ISTA, Klosterneuburg)

Dates: November 24 – 28, 2025

Budget: ESI € 8 160

SFB Serene Cenatiemp € 4 800

IAMP € 1 500

AIP € 871

Report on the Workshop

The rigorous mathematical analysis of many-body systems in quantum mechanics has been an important subdiscipline of Mathematical Physics for many decades, and has led to numerous fruitful connections between various aspects of physics and mathematics. The goal of this workshop was to bring together the key players in this and adjacent fields, to discuss the current state-of-the-art as well as possible future directions. We also used the occasion of the workshop to honor the achievements of Jakob Yngvason, who celebrated his 80th birthday in 2025.

Activities

During the workshop, we had four one-hour lectures and 26 forty-minutes talks. The four longer lectures were intended to give non-technical overviews accessible for a broader audience. The shorter talks were of a more technical nature, and covered a broad range of topics. In the selection of speakers we aimed for diversity as far as scientific subfield, age and gender are concerned.

Specific information on the workshop

The first of the longer lectures, given by Jan Philip Solovej, reviewed the progress in Mathematical Physics in the last three decades towards a rigorous proof of various formulas for the ground state energy (and, more generally, the free energy at non-zero temperature) of quantum gases predicted in the physics literature, and expected to be valid as asymptotic expansions at

low density. The second lecture, by Stefano Giorgini, gave an overview of the current state-of-the-art in theoretical and computational physics concerning the solution of quantum many-body problems, with a focus on dilute quantum gases. The third lecture by Rupert Frank reviewed the history of the Lieb–Thirring Inequalities, from their introduction 50 years ago in the celebrated proof by Lieb and Thirring of the stability of matter in quantum mechanics, to recent efforts towards understanding the value of the sharp constants in the various inequalities. Finally, the forth longer lecture was given by Francesca Ferlaino, who explained the status of current experimental physics research on ultra-cold atomic gases.

The shorter talks covered topics ranging from the latest results on the asymptotic expansion of the ground state energy of dilute Bose and Fermi gases, supersolids and superconductors, Bose–Einstein condensation, to anyons, the fractional quantum Hall effect, and topological insulators.

Outcomes and achievements

While it is too early to expect specific outcomes resulting from the workshop, the intense discussions after the talks and during the breaks were surely very beneficial to all the participants in the workshop. Having participants from a variety of different subfields led to a particularly lively and inspirational atmosphere. Younger participants appreciated the opportunity to see how Jakob Yngvason’s research has opened new lines of research that remain fruitful today.

List of talks

Jan Philip Solovej (U of Copenhagen)	Seventy Years of the Mathematical Physics of the Bose Gas
Benjamin Schlein (U Zurich)	Upper bound for Wu’s correction to the ground state energy of a dilute Bose gas
Arnaud Triay (LMU Munich)	The free energy of dilute Bose gases at low temperature
Stefano Giorgini (U of Trento)	Exact solution of many-body problems using quantum Monte-Carlo: applications to ultracold atoms
Andreas Deuchert (Virginia Tech)	Recent developments in the analysis of Bose gases at positive temperature
Valentin Zagrebnov (U Aix-Marseille)	About the observation of Bose-Einstein Condensation in Liquid 4^He
Bruno Nachtergaele (UC Davis)	The Charge Gap, the Neutral Gap, and Fractional Quantum Hall Systems
David Dereudre (U of Lille)	DLR Equations for the Superstable Bose Gas at any Temperature and Activit
Soren Fournais (U of Copenhagen)	Tunnelling formulae for magnetic operators
Emanuela L. Giacomelli (U Milan)	The Huang-Yang-conjecture for the low density Fermi gas
Teun van Nuland (Technical U Delft)	Many-body physics and resolvent algebras
Jan Dereziński (U Warsaw)	Damping of phonons at low temperature
Mathieu Lewin (U Paris-Dauphine)	Gross-Pitaevskii equation for supersolids
Christian Brennecke (U Bonn)	BEC with optimal rate in the Gross-Pitaevskii Limit
Cristina Caraci (U of Geneva)	Euclidean field theories as limit of interacting Bose gases
Phan Thanh Nam (LMU Munich)	Derivation of Φ_3^4 theory from many-body quantum mechanics
Simone Rademacher (LMU Munich)	Long-time validity of Bogoliubov theory
Alessandro Olgati (Politecnico Milano)	Third order correction to the ground state energy of a Bose gas in the Gross-Pitaevskii regime
Rupert Frank (LMU Munich)	Stability of matter: The 50th anniversary of the Lieb–Thirring proof

Jean-Bernard Bru (U Basque Country)	Exchange Interactions and Cuprate Superconductivity
Morris Brooks (U Zurich)	The effective mass of the Fröhlich polaron at strong coupling
Chiara Saffirio (U of Basel)	Semiclassical analysis of mean-field type equations
Michele Correggi (Politecnico di Milano)	Existence of Bulk Vortices in Superconductors with Strong Magnetic Fields
Lukas Junge (U of Copenhagen)	Dilute Bosons in two Dimensions
Francesca Ferlaino (U of Innsbruck)	Supersolids in Magnetic Gases: From Roton Softening to Quantum Vortices
Nicolas Rougerie (ENS de Lyon)	Hartree and magnetic Thomas-Fermi approximations for 2D anyons
Peter Pickl (U Tübingen)	Impurities in the Fermi-Gas
Ian Jauslin (Rutgers U)	Non-perturbative behavior of interacting Bosons at intermediate densities
Alessandro Giuliani (U Roma III)	Universality of the topological phase transition in the interacting Haldane model

Invited scientists

Niels Benedikter, Chiara Boccato, Christian Brennecke, Morris Brooks, Jean-Bernard Bru, Cristina Caraci, Serena Cenatiempo, Martin Ravn Christiansen, Michele Correggi, David Dereudre, Jan Dereziński, Davide Desio, Andreas Deuchert, Michiel De Wilde, Francesca Ferlaino, Søren Fournais, Rupert Frank, Emanuela L. Giacomelli, Stefano Giorgini, Théotime Girardot, Alessandro Giuliani, Harald Grosse, Florian Haberberger, Christian Hainzl, Ian Jauslin, Lukas Junge, Jonas Lampart, Asbjørn Baekgaard Lauritsen, Jinyeop Lee, Marius Lemm, Nikolai Leopold, Mathieu Lewin, Léo Morin, Bruno Nachtergaele, Phan Thanh Nam, Marcin Napiórkowski, Jakob Oldenburg, Alessandro Olgiati, Marco Olivieri, Lorenzo Pettinari, Peter Pickl, Lorenzo Pigozzi, Alessandro Pizzo, Marcello Porta, Simone Rademacher, Robin Reuvers, Tanja Rindler-Daller, Nicolas Rougerie, Chiara Saffirio, Diane Saint Aubin, Benjamin Schlein, Severin Schraven, Robert Seiringer, Heinz Siedentop, Jan Philip Solovej, Stefan Teufel, Francesco Toschi, Arnaud Triay, Daniel Ueltschi, Teun van Nuland, François Visconti, Simone Warzel, Jakob Yngvason, Valentin Zagrebnov.

Research in Teams

Research in Teams Project 1: Improving the Precision of Predictions for Event-Shape Distributions

Collaborators: Miguel Benitez-Rathgeb (U of Salamanca), André H. Hoang (U of Vienna), Iain W. Stewart (MIT Cambridge), Zhiqian Sun (MIT Cambridge)

Dates: January 3 – February 28, 2025

Budget: ESI € 7 200

Report on the project

In the course of the project a number of different important concrete results have been achieved. These are summarized below.

First, we have carried out a detailed reanalysis of the strong coupling determination from the thrust distribution at $\text{NNLL} + \mathcal{O}(\alpha_s^3)$ in Ref. [4], Hoang and Stewart have coauthored in 2010, scrutinizing and updating all relevant theoretical ingredients, and addressing the concerns brought forward in Ref. [5]. We updated the non-singular contributions at $\mathcal{O}(\alpha_s^2)$ and $\mathcal{O}(\alpha_s^3)$, carefully studied the stability of the resummation of large logarithms based on the dijet factorization and assessed the potential additional uncertainties concerning the hadronization correction coming from hard 3-jet configurations. As far as the updates concerning the non-singular corrections is concerned, we found that they have only very little impact on the theoretical description. In our study of the resummation we did not find any evidence of instability of dijet factorization based resummation: resummation is fully compatible with the results from fixed-order perturbation theory and reliable, and in particular, the estimate of the remaining perturbative uncertainty based on the variation of profile renormalization scale functions is realistic. To address the potential impact of hadronization corrections coming from hard 3-jet configurations, we implemented an additional thrust-value dependent uncertainty in the norm of the dominant dijet hadronization parameter Ω_1 that increases when the thrust value increases further away from the peak region. We found that this additional source of uncertainty also has very little impact on the final outcome for the fits. Finally, to reduce the potential impact of further uncertainties due to non-perturbative effects coming from 3-jet configurations, we reduced the upper bound for the thrust values used for the fits to the data from 0.33 to 0.15. This leads to a slight increase of the statistical uncertainties, but the fits remain very stable and reliable. As the final outcome for the strong coupling we obtained $\alpha_s(M_Z) = 0.1136 \pm 0.0012$ (in the R-gap scheme at the reference scale 2 GeV). We also obtained the value $\Omega_1 = 0.331 \pm 0.049$ GeV, consistent with the results from Ref. [4]. Our results demonstrates that the discrepancy of our results from the PDG world average cannot possibly be caused by non-perturbative effects coming from hard 3-jet configurations. Our results have been published in Ref. [1] and has been accepted for publication in JHEP at the time of writing of this report.

Second, we have written an article laying out in detail the theory of the factorization and resummation of logarithms and the treatment of nonperturbative effects in the dijet region for the heavy jet mass HJM distribution. The article, which gives the results at $\text{N}^3\text{LL}' + \text{NNLO}$ order and also accounts for the subtraction of the leading infrared renormalon from the large-angle soft radiation, represents the currently most comprehensive and concise treatment of all known theoretical contributions relevant for the HJM distribution. An essential novel insight gained in

our theory analysis is that the HJM distribution in the peak region is sensitive to new types of moments of the two-dimensional di-hemisphere nonperturbative soft function that arises when it is the nonperturbative soft modes (and not the perturbative ones) that decide which of the two hemispheres are heavier. As the exact shape of the nonperturbative soft function is a priori unknown, our observation underlines the fact that there is no universal single parameter that can parametrize the nonperturbative effects even in the dijet region. This insight is very important as it shows that the assumption, that a single parameter can be used to parametrize nonperturbative effects in the entire HJM distribution, is not correct. The article is accessible as Ref. [3] and has been accepted for publication in JHEP at the time of writing of this report.

Third, we worked out a new $N^3LL' + N^2LL_{sh} + NNLO$ α_s determination from the heavy jet mass ρ distribution. So far strong coupling analyses from fits to the heavy jet mass distribution have been notoriously unstable. In our new work we combined the dijet factorization (and resummation) reported on in Ref. [3] with the novel factorization in the Sudakov-shoulder region (based on hard 3-jet configuration) developed in Ref. [6,7] at the perturbative as well as nonperturbative level. This leads to fits for $\alpha_s(M_Z)$ and two leading nonperturbative parameters, Ω_1^ρ and Θ_1 , the latter parametrizing nonperturbative power corrections in the 3-jet region. In our analysis we found in particular that including the correlation of theoretical uncertainties among different values of ρ is another important aspect to achieve stable fits to the data. Our final results from the fit read $\alpha_s(M_Z) = 0.1145^{+0.0021}_{-0.0019}$ with $\Omega_1^\rho = 0.57 \pm 0.09$ GeV and $\Theta_1 = -0.50 \pm 0.17$ GeV. Using the insights from Ref. [3] we excluded the difficult peak region in our fit analysis. A highly interesting outcome of our analysis is that the negative value for Θ_1 , the nonperturbative parameter for the 3-jet power correction is compatible with the renormalon calculations [5,8] which were also the basis of Ref. [5]. The results give an indication of the limited range of validity of the approach advocated in Ref. [5]. Our results have been published in the article [2], which is currently under review in Physical Review Letters.

Fourth, we have also been working on theoretical avenues to further shed light on the theoretical properties of nonperturbative corrections to event shape distributions in the transition region between 2-jet and 3-jet regime and for the 3- and multi-jet region for the thrust distribution. In contrast to recent analyses available in the literature on this matter, which were mostly based on renormalon-motivated considerations based on the so-called dispersive model [9-11], our focus is on approaches consistent with the effective field theory paradigm. Here the focus is on the systematic formulation of Wilson-line based vacuum matrix elements representing nonperturbative corrections and the matching procedure to separate perturbative from nonperturbative effects with a controlled scheme-dependence. We believe that this approach is more general as it also optionally allows (and does not require) to account for infrared renormalons. In this approach it is essential to properly identify the different phase space regions where the various physical perturbative and nonperturbative modes are well separated. As already outlined in our proposal, this requires the introduction of an additional resolution parameter (beyond the event-shape variable itself) to better distinguish between two- and different kinds of three- or multi-jet configurations. As a starting point we adopted the 2-jettiness (τ_2) and 3-jettiness τ_3 variables, which have already been successfully applied in jet-substructure studies. We identified the theoretical structure of modes in the different regions in the $\tau_2 - \tau_3$ plane and found that the simple distinction into dijet and three-jet regions (not surprisingly) too naive. We have initiated several studies to explore these regions, which we believe are very promising and currently ongoing.

We conclude by expressing our gratitude to the ESI Research in Teams Programme, which was instrumental to achieve the results summarized in this report.

Publications and preprints contributed

M. A. Benitez, A. H. Hoang, V. Mateu, I. W. Stewart & G. Vita, *On determining $\alpha_s(m_Z)$ from dijets in $e+e$ thrust*, [arXiv:2412.15164](#)[hep-ph].

M. A. Benitez, A. Bhattacharya, A. H. Hoang, V. Mateu, M. D. Schwartz, I. W. Stewart et al., *A Precise Determination of α_s from the Heavy Jet Mass Distribution*, [arXiv:2502.12253](#)[hep-ph].

A. H. Hoang, V. Mateu, M. D. Schwartz & I. W. Stewart, *Precision e^+e^- Hemisphere Masses in the Dijet Region with Power Corrections*, [arXiv:2506.09130](#)[hep-ph].

References

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- [2] M. A. Benitez, A. Bhattacharya, A. H. Hoang, V. Mateu, M. D. Schwartz, I. W. Stewart et al., *A Precise Determination of α_s from the Heavy Jet Mass Distribution*, [arXiv:2502.12253](#)[hep-ph].
- [3] A. H. Hoang, V. Mateu, M. D. Schwartz & I. W. Stewart, *Precision e^+e^- Hemisphere Masses in the Dijet Region with Power Corrections*, [arXiv:2506.09130](#)[hep-ph].
- [4] R. Abbate, M. Fickinger, A. H. Hoang, V. Mateu & I. W. Stewart, *Thrust at N^3LL with Power Corrections and a Precision Global Fit for $\alpha_s(m_Z)$* , [arXiv:1006.3080](#)[hep-ph].
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- [6] A. Bhattacharya, M. D. Schwartz & X. Zhang, *Sudakov shoulder resummation for thrust and heavy jet mass*, [arXiv:2205.05702](#)[hep-ph].
- [7] A. Bhattacharya, J. K. L. Michel, M. D. Schwartz, I. W. Stewart & X. Zhang, *NNLL resummation of Sudakov shoulder logarithms in the heavy jet mass distribution*, [arXiv:2306.08033](#)[hep-ph].
- [8] F. Caola, S. Ferrario Ravasio, G. Limatola, K. Melnikov, P. Nason & M. A. Ozelik, *Linear power corrections to e^+e^- shape variables in the three-jet region*, [arXiv:2204.02247](#)[hep-ph].
- [9] Y. L. Dokshitzer, G. Marchesini & B. R. Webber, *Dispersive approach to power behaved contributions in QCD hard processes*, [arXiv:hep-ph/9512336](#)[hep-ph].
- [10] Y. L. Dokshitzer, A. Lucenti, G. Marchesini & G. P. Salam, *Universality of $1/Q$ corrections to jet-shape observables rescued*, [arXiv:hep-ph/9707532](#)[hep-ph].
- [11] G. P. Korchemsky & S. Tafat, *On power corrections to the event shape distributions in QCD*, [arXiv:hep-ph/0007005](#)[hep-ph].

Research in Teams Project 2: On Parabolic Induction for General Linear Groups

Collaborators: Erez Lapid (Weizmann Institute of Science, Rehovot) and Alberto Mínguez (U of Vienna)

Dates: January 8 – 22, March 12 – 26 and May 15 – 25, 2025

Budget: ESI € 2 400

Report on the project

Scientific Background

Representation theory of general linear groups over local non-archimedean fields was inaugurated by Joseph Bernstein and Andrei Zelevinsky in their seminal work of the late 1970's and early 1980's [1,2]. It culminated in the classification of irreducible representations in terms of multisegments [3] – objects that combine mysterious data (supercuspidal representations) with easy to describe combinatorial data. This classification is in accordance with the local Langlands correspondence.

Far-reaching connections between representation theory of GL_n and other objects, such as quantum groups [4], were established over the years and proved very useful.

A key notion is the concept of $\square$ -irreducible representations, which are analogues of real modules, whose importance gained prominence in [5,6,7,8] among other places, especially in connection to cluster algebras. In particular, it is conjectured that $\square$ -irreducible representations correspond to rigid modules of the preprojective algebra.

In [9] we characterized combinatorially $\square$ -irreducible representations in a certain class of irreducible representations satisfying suitable regularity assumptions.

In [10] a binary operation on the set of irreducible components of Lusztig's nilpotent varieties pertaining to a quiver was defined. In the case of type A this was studied further in [11] in connection with representation theory of GL_n over a local non-archimedean field, leading to new conjectures relating the binary operation to the socle of parabolic induction, and therefore to irreducibility questions. The binary operation is neither commutative nor associative. The commutativity of two irreducible components is conjecturally equivalent to irreducibility of parabolic induction when one of the irreducible components is rigid.

Project aims and scope

Our main focus was twofold:

1. Extend the results of [9] and [11] to more general irreducible representations.
2. Understand combinatorially the binary operation of [10] in type A in terms of multisegments.

These goals are closely intertwined.

A particular case of the second goal was to substantiate and better understand the following concrete phenomenon which was observed empirically. The binary operation of [10] gives rise to a map

$$\begin{aligned} &\{\text{ordered pairs of subsets of } \{1, \dots, n\} \text{ with the same cardinality}\} \\ &\longrightarrow \text{321-avoiding permutations of } \{1, \dots, n\} \end{aligned} \tag{1}$$

The size of the left-hand side is $\binom{2n}{n}$ while the size of the right-hand side is the Catalan number $C_n = \frac{1}{n+1} \binom{2n}{n}$. The map seems to be $(n+1)$ -to-one.

Outcomes and achievements

The main conceptual progress is a new combinatorial approach for understanding rigidity of modules of the preprojective algebra of type A . We are not yet able to prove it in general but

we have a precise combinatorial algorithm that conjecturally detects rigidity. Since it is easy to detect rigidity by a randomized algorithm, there is overwhelming evidence for this conjecture. Roughly speaking, for any multisegment one can form a matrix with m rows, depending on m parameters where m is a simple, explicit combinatorial invariant depending on the multisegment. The corresponding irreducible component is rigid if and only if generically, this matrix has rank m . The empirical discovery is that if this holds, then after setting some of the parameters equal to 0, one gets a square submatrix of size $m \times m$ which up to permutation is upper triangular with non-zero diagonal entries. Moreover, the set of relevant parameters forms an interesting combinatorial structure by itself, and can be obtained by a simple recursive procedure. This leads to an efficient algorithm which conjecturally detects rigidity. We verified some theoretical aspects of the algorithm. However, at this stage there is still a missing combinatorial ingredient for the proof of the validity of the combinatorial algorithm in general.

The combinatorial algorithm also suggests a simple way to detect commutativity of two irreducible rigid components.

Of course, ultimately one would like to relate the above combinatorial algorithm to $\square$ -irreducibility.

We also engaged students in our projects.

Johannes Droschl, a former PhD student at U of Vienna supervised by the second PI, formulated a conjectural statement relating the order of the pole of intertwining operators to the generic dimension of the Hom space between pairs of modules in the corresponding irreducible components. He verified this conjecture when one of the representations is in the class considered in [9].

Markus Reibnegger, a current PhD student at U of Vienna found a concise combinatorial description of the map (I). In particular, this explains why the map is $(n + 1)$ -to-one.

Publications and preprints contributed

J. Droschl, *Poles of intertwining operators in terms of irreducible components of Lusztig's characteristic variety in type A*, [arXiv:2508.13817](#) [math.RT].

References

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Research in Teams Project 3: Weyl Pseudodifferential Calculus with Applications

Collaborators: Lars Andersson (Yanqi Lake Beijing Institute), Marius A. Oancea (U of Vienna) and Claudio F. Paganini (U of Regensburg)

Invited guests: Gabriel Schmid (U of Genoa), Benjamin Moser (Master student, U of Vienna)

Dates: February 1 – March 2, 2025

Budget: ESI € 3 040

Report on the project: Weyl pseudodifferential calculus with applications

In physics, quantization represents a systematic procedure that promotes a classical mechanical system described by phase space quantities to a quantum mechanical system described by operators acting on Hilbert spaces. From a mathematical point of view, this can be understood in terms of pseudodifferential calculus, which relates operators with their classical symbols. A natural choice of quantization on $\mathbb{R}^n$ is Weyl quantization, which satisfies a list of desirable properties: real symbols correspond to Hermitian operators and symplectic transformations on the symbol correspond to unitary transformations on the operator. When $\mathbb{R}^n$ is replaced by a generic manifold, the definition of quantization becomes more delicate. Our main goal for this project is to understand the geometric and analytic properties of Weyl quantization on manifolds.

Scientific Background

In Ref. [1], Dereziński, Latosiński and Siemssen introduced the balanced geodesic Weyl quantization, a generalization of the Weyl quantization, with the aim of studying natural operators on Lorentzian manifolds. Following Ref. [1], Weyl quantization on $\mathbb{R}^n$ can be defined as follows. We consider the vector space $\mathcal{X} = \mathbb{R}^n$, together with its dual space $\mathcal{X}^\#$. By the Schwartz kernel theorem, every tempered distribution $B(x, y) \in \mathcal{S}'(\mathcal{X} \times \mathcal{X})$, known as the Schwartz kernel, defines a continuous operator $B : \mathcal{S}(\mathcal{X}) \rightarrow \mathcal{S}'(\mathcal{X})$. Here, $\mathcal{S}$ denotes the Schwartz space of test functions, while $\mathcal{S}'$ denotes the space of tempered distributions. We also introduce the classical symbol $b \in \mathcal{S}'(\mathcal{X} \times \mathcal{X}^\#)$. Then, quantization can be defined as the following map between symbols and Schwartz kernels (or equivalently operators): For any $\tau \in \mathbb{R}$, we associate with b the operator $Op_\tau(b) : \mathcal{S}(\mathcal{X}) \rightarrow \mathcal{S}'(\mathcal{X})$, given by the Schwartz kernel

$$Op_\tau(b)(x, y) := \int_{\mathcal{X}^\#} b(x + \tau(y - x), p) e^{\frac{i(x-y) \cdot p}{\hbar}} \frac{dp}{(2\pi\hbar)^n}. \quad (1)$$

We call $Op_\tau(b)$ the τ -quantization of the symbol b , and the Weyl quantization corresponds to the choice of $\tau = 1/2$. Note that the quantization depends on a fixed positive constant $\hbar$. Furthermore, the above quantization can also be extended to generic Lorentzian manifolds, as shown in Ref. [1]. However, the result in Ref. [1] are limited to operators that act on scalar fields.

Project aims and scope

Our first goal for this Research in Teams programme at the ESI was to extend these results from [1] to more general operators acting on fields (sections of vector bundles) of direct physical interest, such as Dirac, electromagnetic or linearized gravitational fields. This extension is motivated by our previous work on the gravitational spin Hall effect of light [2-4], as well as the general interest for Weyl calculus in semiclassical approximations [5] and chiral kinetic theory [6].

The definition of the Weyl quantization for the scalar field case from Ref. [1] was the starting point for our work. As shown there, the generalization to curved spacetime has to replace the addition of coordinates with the exponential map. In the case of vector bundles equipped with a connection, the parallel transport of the fibers needs to be taken into account, which leads to additional contributions related to the holonomy of the connection. We aim to incorporate these additional considerations into a more general definition of Weyl quantization.

Outcomes and achievements

During our stay at the ESI we managed to clarify the conceptual setup for the Weyl quantization in curved spacetimes for arbitrary bundles. More precisely, so far we managed to formulate a mathematically well-defined Weyl quantization for operators acting on sections of vector bundles, including an asymptotic expansion for the star product of two symbols and a definition of the Wigner function for sections of vector bundles. Furthermore, we have calculated the Weyl symbols for operators of physical interest (Dirac, Maxwell, linearized gravity).

We made substantial progress towards establishing the formalism, which we will finalize in the upcoming months, and our results will be presented in a first paper. This should lay the groundwork for future collaborations where we will explore four fields for application: semi-classical analysis of wave propagation, chiral kinetic theory [6], the correspondence between wave equations and Moyal-type equations for the Wigner functions, and causal fermion systems [7].

Publications and preprints contributed

We are currently preparing a paper that will contain the results of our work during our stay at the ESI. Furthermore, some of the team members also worked on a closely related topic, and the results are now available as a preprint [8].

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Research in Teams Project 4: Projective Geometry, Combinatorics and Representation Theory from Polytopes

Collaborators: Praise Adeyemo (U of Ibadan), Dominic Bunnnett (TU of Berlin), Livia Campo (U of Vienna), Balázs Szendroi (U of Vienna)

Invited guest: Fabián Levicán (U of Vienna)

Dates: May 17 – June 25, 2025

Budget: ESI € 3 280

Report on the project

Scientific Background

Our Research in Teams project focused on questions in algebraic and discrete geometry, concerning the combinatorial and geometric properties of lattice simplices and their associated projective toric varieties. We also discussed issues around the strengthening of pure mathematics research in Nigeria and ongoing international collaboration.

Project aims and scope

Classification of normal and non-normal polytopes

1. The context: A central theme in toric geometry is the correspondence between lattice polytopes and projective toric varieties: to each lattice polytope one can associate a polarised toric variety, where the geometry of the variety and the embedding are intimately linked to the combinatorics of the polytope. Properties such as normality and very ampleness of the polytope reflect directly in the normality of the homogeneous coordinate ring and the projective normality of the embedding, respectively, or, equivalently, in the behaviour of the associated line bundle.

2. Formulating and Testing Conjectures

It is well known that not every weighted projective space admits a very ample generator of its Picard group. In fact, only a single explicit example appears in the literature — due to Ogata — that of $O(30)$ on the weighted projective 3-space $\mathbb{P}(1, 6, 10, 15)$. Working in the context of rectangular simplices, a natural subclass, we have provided many further examples of this phenomenon, focusing on the rich structure of the simplices that fail to be normal or very ample. Over the course of the stay, we developed conjectures, confirmed numerous cases, and introduced a new framework for analysing such simplices by partitioning them into arithmetic

equivalence classes. This direction of our work was based on use of the mathematical software `polymake`; we tested thousands of simplices to try and uncover a pattern.

The experimentation revealed that the only non-normal rectangular 3-simplices were parametrised by triples of numbers of the form (a, b, c) with a, b and c pairwise coprime. Recognising this, we conjectured that the number of edge lattice points — governed by the arithmetic of the defining weights — provides a test to determine very ampleness. This led to a new, shortened proof of a result of Payne [1], which relates very ampleness of a polytope to the presence of sufficiently many lattice points along its edges. This in turn enabled us to revisit Ogata's example and confirm our initial suspicion: that it is, in a precise sense, archetypal of the non-very ample case:

Theorem. If a weighted projective 3-space $\mathbb{P}(1, q_1, q_2, q_3)$ is such that the generator of the Picard group is not very ample, then the weights are of the form $q_1 = ab$, $q_2 = ac$, $q_3 = bc$ for coprime a, b, c .

Motivated by this, we conjectured that in dimension $d \geq 3$, the rectangular simplex determined by the first d prime numbers would be non-normal and would in fact maximise the normal index among all rectangular simplices in that dimension. Unfortunately, this conjecture fails already in dimension 4.

Our final conjecture was that for simplices, very ampleness and normality might in fact be equivalent. This is proved for 3 dimensional simplices by Ogata in [2]. However, this turned out to be false: in conversation with Winfried Bruns, we were pointed to a known counterexample in the literature. Notably, though, this example is not rectangular, and so the question remains open in that more restricted setting. While we no longer feel confident conjecturing that the two properties coincide for rectangular simplices, the question remains open.

3. Equivalence Classes via Bruns–Gubeladze

In a different direction, building on results of Bruns and Gubeladze [3], we were able to group all rectangular simplices into equivalence classes, simplifying the classification problem. The structure of the equivalence classes enabled us to design an explicit algorithm that produces a rectangular simplex of maximal normal index in any dimension, thus proving:

Proposition. There exists in every dimension ≥ 3 a rectangular simplex with maximal normality index.

We remark that from these results and methods, one sees how rare and tightly structured the non-normal cases are.

Outcomes and Future Directions

Summary and what's next.

The stay at the ESI proved essential for clarifying the theoretical framework of our project. We confirmed several conjectures, provided a framework to study families of examples, and developed new methods for classifying simplices. The insights gained have significantly advanced our understanding of normality in low-dimensional cases.

We aim to further investigate the connection between prime distributions and non-normality. The problem of finding a non-normal, very ample rectangular simplex remains a motivating challenge.

A paper detailing our progress is in an advanced stage of preparation.

Other discussions on combinatorial algebraic geometry

The research team also conducted discussions on some other topics in combinatorial algebraic

geometry. While these were less substantial, they may allow further joint work between team members.

1. Chopped cubes and birational transformations

We had a discussion around birational maps arising from a series of polytopes that we called “chopped cubes”, a set of polytopes interpolating between the n -dimensional standard rectangular simplex and the hypercube. The Ehrhart theory of these chopped cubes exhibits some interesting patterns. We were not able to formulate a good research question in this direction but the subject would certainly provide a good topic for a strong Masters student.

2. Permutation patterns and flag varieties

Discussions were also held on permutation patterns and their relationship to the cohomology of (full and partial) flag varieties.

Mathematics development in Nigeria

As one of our collaborators came from Nigeria, it was natural for us to continue discussions around mathematics development and cooperation with Nigerian colleagues. Apart from continuing direct collaborative research, the following directions were discussed:

An application to CIRM to hold a meeting for European and African colleagues in algebraic geometry to strengthen cooperation, building on our collaboration as well as similar recent events in the UK (Abran Gannibal Project and ICMS).

A workshop on Algebra, geometry and topology at the University of Ibadan, to be held likely in 2027, along the lines of a similar workshop held in 2023.

Development of a scheme in which a group of international mathematicians would co-supervise Nigerian Masters students in modern areas of pure mathematics.

Acknowledgments

We would like to thank the Erwin Schrödinger Institute for its support and the opportunity to work in a stimulating research environment. Special thanks to Winfried Bruns and Lars Kastner for valuable conversations.

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Research in Teams Project 5: Towards q -characters for quantum affine symmetric pairs

Collaborators: Andrea Appel (U of Parma), Jianrong Li (U of Vienna), Tomasz Przezdziecki (U of Edinburgh), Bart Vlaar (BIMSA, Beijing)

Dates: June 8 – 21, 2025 & January 11 – 24, 2026

Budget: ESI € 5 920

Report on the project

Scientific Background

In the past decade, the foundational contributions of Letzter and Kolb [1,2] have sparked a renewed interest within the mathematical community in the theory of quantum symmetric pairs (QSP). The work of Bao and Wang [3,4] has unveiled profound and unexpected connections with Kazhdan-Lusztig theory, canonical and crystal basis, and provided the backbone of the prolific research programme outlined in Wang's presentation at ICM 2022 [5]. Further noteworthy advancements, emphasizing connections with integrable systems and categorification, have been obtained by Balagovic and Kolb [6,7], Bao, Shan, Wang, and Webster [8], and Ehrig and Stroppel [9].

Roughly, a QSP algebra is to a symmetric space what a quantum group is to a Poisson-Lie group. More precisely, a QSP is the datum of a quantum group and a coideal subalgebra which quantizes the Lie subalgebra of fixed points corresponding to an involutive Lie algebra automorphism. Building on previous work by Bao and Wang, Balagovic and Kolb relied on quantum symmetric pairs of finite type to introduce in [7] a new operator, called *the* universal K-matrix (corresponding to a fixed QSP). Together with the universal R-matrix, it produces solutions of the reflection equation, thus providing new insight on the role of quantum groups and QSPs in the theory of integrable models. The reflection equation appeared in the eighties in seminal work of Cherednik [10] and Sklyanin [11] on quantum integrable systems with a boundary condition. Its solutions are indeed commonly referred to as K-matrices, and describe the factorization conditions of particles moving on a half-line or a segment. As such, the reflection equation is to be thought of as a *boundary counterpart* of the Yang-Baxter equation, the K-matrix of the R-matrix, and, more generally, the QSP of the quantum group. This compelling parallelism has been transparent since the work of Letzter. It later motivated the alternative terminology of ι -quantum groups, as used by Wang for quantum symmetric pairs.

The parallelism between the structural theory of quantum groups and quantum symmetric pairs of finite-type has been already established at various levels. The categorical interpretation of the universal K-matrix in terms of braided module categories was proved by Kolb [12]; a version of the Schur-Weyl duality was constructed by Fan, Lai, Li, Lu, Wang, and Watanabe [13]; the boundary analogue of the renowned Drinfeld-Kohno theorem was provided by De Commer, Neshveyev, Tuset, and Yamashita [14,15]; the Hall algebra realisation of QSPs was obtained by Lu and Wang [16]; the *relative* quantum Weyl group operators for QSPs have been consistently defined by Wang and Zhang [17].

Unsurprisingly, the parallelism extends to quantum affine algebras and quantum affine symmetric pairs, with increasingly technical and computationally challenging proofs. In the case of quantum affine symmetric pairs of ADE split type, Lu and Wang introduced in [18] the analogue of the loop (or Drinfeld) presentation for quantum affine algebras. Their construction mixed the work of Baseilhac and Kolb on the q -Onsager algebra [19] and the geometric realisation of the latter obtained in [20]. This was extended to BCFG split type by Zhang [21]. A geometric interpretation of these result is given by Lu and Ruan [22,23]. Finally, a loop presentation for quantum affine symmetric pairs of *restrictable quasi-split type*, that is corresponding to a diagram involution fixing the affine node, was given in [24].

Project aims and scope

The aim of the project is to develop a boundary q -character theory for quantum symmetric pairs using several complementary approaches. One approach relies on the spectra of the operators $\Theta_{i,k}$ appearing in the Drinfeld-type presentation of Lu and Wang. Another approach is based

on the study and factorization properties of K-matrices.

Outcomes and achievements

During the Research in Teams programme at ESI, we studied boundary q -characters of finite-dimensional modules for quantum symmetric pairs of split and quasi-split types. Consider a quasi-split affine quantum symmetric pair of type AIII, this case is of particular interest thanks to the existence of geometric realizations and Schur–Weyl dualities. We establish factorization and coproduct formulae for the Drinfeld–Cartan series in the Lu–Pan–Wang–Zhang ‘new Drinfeld’-style presentation, generalizing the split type results from our earlier work [25,26]. As an application, we construct a boundary analogue of the q -character map, and show that it is compatible with Frenkel and Reshetikhin’s original q -character homomorphism. We also initiated a systematic study of factorization properties of K-matrices and took first steps toward the investigation of quantum toroidal symmetric pairs.

Publications and preprints contributed

J.-R. Li & T. Przydziecki, *Compatibility of Drinfeld presentations and q -characters for affine Kac–Moody quantum symmetric pairs: quasi-split case*, [arXiv:2601.02165](https://arxiv.org/abs/2601.02165)[math.QA].

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Research in Teams Project 6: Exploring the infrared triangle beyond Lorenz Symmetry

Collaborators: Kristan Jensen (U of Victoria), Alfredo Héctor Pérez Donoso (San Sebastian U, Santiago de Chile), Stefan Prohazka (U of Vienna)

Dates: June 15 – July 15, 2025

Budget: ESI € 1 280

Report on the project

Scientific Background

In recent years, the infrared properties of gauge theories and gravity have been the focus of major advances. These developments have uncovered an unexpected link among three concepts that were traditionally viewed as unrelated: soft theorems, asymptotic symmetries, and the memory effect. Together, they form what is now known as the infrared triangle. The universality of the infrared triangle in Lorentz-invariant theories, such as electromagnetism, Yang-Mills field theories and General Relativity, naturally raises a broader question: does this framework extend

beyond Lorentzian physics? Progress toward this idea has already begun with a recent study of a fractonic gauge model known as scalar charge theory. This non-relativistic model is described by gapless modes that mediate interactions between fractons, quasiparticles with constrained mobility that have become very important in modern condensed matter research. These initial results encourage a broader investigation of how the infrared triangle might manifest in other non-Lorentzian systems.

Project aims and scope

The main aim of the project is to explore the possible extension of the infrared triangle to systems that do not possess Lorentz symmetry. In particular, the focus is on systems with gapless modes that may exhibit a non-trivial infrared structure. Indeed, many condensed-matter systems of interest feature gapless excitations while lacking Lorentz symmetry. Beyond purely academic interest, if the infrared triangle is also present in such systems, this could open the door to accessible tabletop experiments capable of detecting measurable infrared effects, such as the memory effect, directly in condensed-matter settings.

Outcomes and achievements

As a first step in this line of research, we studied in detail several properties of a theory describing “planons,” the traceless scalar charge theory. Planons are quasiparticles whose motion is restricted to planes orthogonal to their associated dipole moments. These excitations belong to the broader family of fractonic theories. The traceless scalar charge theory is a gauge theory with gapless excitations and has been shown to be dual to a theory of elasticity describing the dynamics of topological defects, such as disclinations and dislocations.

A distinctive feature of this theory is that its symmetries are governed by the so-called “planon group,” whose generators correspond to space and time translations, rotations, electric charge, dipole moment, and the trace of the quadrupole moment. Notably, this symmetry group does not include boosts, rendering the theory Aristotelian in nature. Owing to an isomorphism between the planon group and the standard Galilei group (up to an additional central extension), we demonstrated in Ref. [1] that the elementary excitations of this theory can be described in terms of coadjoint orbits in the classical setting and unitary irreducible representations in the quantum setting of the Galilei group. In particular, the often-overlooked massless orbits of the Galilei group play a central role in the description of dipole excitations in the planon theory. This result is noteworthy, as it provides a concrete physical realization of these orbits, which are typically regarded as exotic. Furthermore, in Ref. [1] we investigated the case of composite dipoles formed from elementary monopoles and developed their description in terms of a Schrödinger-like equation.

These results constitute only an initial step in a broader, long-term research programme. Current and ongoing work focuses on uncovering the infrared structure of this theory, including the study of soft theorems and memory effects.

Another line of research, which is currently in progress, is devoted to the study of the infrared triangle in realistic superfluid systems such as He_4 . In this setting, the presence of massless Goldstone bosons, identified with phonons, leads to the emergence of non-trivial infrared phenomena. These effects are of particular interest due to their potential connection with experimentally observable signatures, especially in relation to possible tests of the memory effect. As a result, this line of investigation opens a promising avenue for connecting theoretical

developments with feasible laboratory experiments. The outcomes of this work are expected to be published during the first semester of 2026.

In a slightly different but closely related context, which is fundamental to the connection between conserved charges and soft theorems, Ref. [2] introduced a novel framework for understanding the matching conditions of fields between past and future null infinity. These matching conditions play a crucial role in establishing the conservation of the charges relevant for soft theorems during a scattering process. The central insight of our approach lies in a precise characterization of the roles of advanced and retarded radiation in the matching conditions, together with a systematic treatment of radial logarithmic terms. Indeed, we showed that the matching conditions arise as a direct consequence of the absence of radial logarithmic terms in the fields near spatial infinity. In other words, imposing a precise falloff behavior of fields at spatial infinity, such as the electromagnetic field, necessarily leads to the matching conditions. From a physical perspective, this mechanism can be understood as a process of destructive interference between advanced and retarded radiation in the vicinity of spatial infinity. These techniques are expected to be directly applicable, for example, to the superfluid analysis described previously.

Additionally, the execution of the project in Vienna provided the basis for one of the researchers to initiate a new collaboration with researchers at TU Vienna, focused on the study of Carrollian properties of spacetime and Carrollian black holes. These results are expected to be published in early 2026.

In sum, the Research in Teams project “Exploring the infrared triangle beyond Lorentz symmetry” has been highly successful, resulting in two new preprints, one of which has already been published, two additional works currently in progress, and the opening of a completely new avenue of research.

Publications and preprints contributed

A. Pérez, K. Jensen & St. Prohazka, *Planons and their Carroll-Galilei symmetries*, [arXiv:2508.08390](#)[cond-mat.str-el].

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Research in Teams Project 7: Waves interacting with the Antarctic Circumpolar Current

Collaborators: Adrian Constantin (U of Vienna), Vladimir Kozlov (Linköping U), Evgeniy Lokharu (Lund U), Jörg Weber (U of Vienna)

Dates: July 5 – 25, September 14 – 19 & December 8 – 12, 2025

Budget: ESI € 3 920

Report on the project

Scientific Background

A classical and central object in mathematics and physics alike are travelling water waves, propagating in one spatial direction without changing shape, featuring a free surface and being subject to Euler's equations. Historically, almost all the literature, going back all the way to Laplace and Lagrange in the 18th century, concerned two-dimensional waves (where the flow is independent of the third spatial variable and the fluid-air interface only varies in one horizontal direction). This is mainly because here one has access to vorticity conservation, a stream function, and tools from complex analysis. Moreover, the mathematical theory has advanced greatly in this century, in particular regarding rotational waves, with all of the team members as contributors.

On large, geophysical scales the two-dimensional Euclidean geometry is no longer accurate, and effects of the Earth's curvature and rotation become relevant. Before the start of this project, there was a lack of mathematical theory taking fully account of these effects.

Project aims and scope

The main motivation of the project was to investigate how waves interact with the Antarctic Circumpolar Current (ACC). The ACC is arguably the most significant ocean current, its vast zonal transport linking the southern regions of the Atlantic, Pacific and Indian Oceans and thus enabling a global ocean circulation. The wind-driven ACC is the only ocean current that completely encircles the polar axis, flowing eastward, unobstructed by landmasses, between 40°S and 60°S. Therefore, the study of waves travelling on the ACC serves as a paradigm for geophysical water waves for which the Earth's geometry and rotation are salient driving mechanisms.

While the ACC itself was studied recently in considerable mathematical detail, the goal of this project was to construct zonally periodic, zonally propagating waves riding on the ACC, subject to the well-known kinematic and dynamic conditions on their free surface.

Outcomes and achievements

A key difficulty of the construction is that, due to the geometry, the three velocity components cannot as easily be separated as in Euclidean geometry in order to restrict to certain symmetry classes (like 2D instead of fully 3D flows) as a first step. This is why we mainly considered the linearised problem, where one can argue that the meridional velocity component is negligible (which is in fact a reasonable assumption for the Southern Ocean, at least in certain bands with strong zonal currents).

One main idea at this point is to meridionally slice the ocean and introduce a stream function on each slice. This follows in some parts the classical theory of 2D waves, but requires substantial modifications in the project's setting. We have derived a novel partial differential equation for this stream function, parametrised by latitude, for arbitrary variations of the density and the Bernoulli function with respect to the stream function.

In order to construct linear waves, we have then derived the dispersion relation (a relation between frequency and speed of the waves). For purpose of illustration, we have mainly considered a certain special case for which all computations remain explicit. We have then analysed the dispersion relation in detail and identified parameter regimes which give rise to linear waves. Here, a novel key difficulty is to ensure that the zonal frequency is an integer to ensure periodic matching after one revolution about the polar axis. Moreover, we have found parameter values giving rise to realistic flow pictures.

This Research in Teams opens the door for several conceivable follow-up projects, which the team members plan to pursue together in the future. These include the investigation of other, slightly more general cases (such as accounting for density variations), and the extension of our results to certain nonlinear settings.

Publications and preprints contributed

A. Constantin, V. Kozlov, E. Lokharu & J. Weber., *Waves interacting with the Antarctic Circumpolar Current*, in preparation.

Senior Research Fellows Programme

To stimulate the interaction with the local scientific community the ESI offers regular lecture courses on an advanced graduate level taught by Senior Research Fellows of the ESI. In exceptional cases this programme also includes long-term research stays of small groups or individual distinguished researchers. These lecture courses are highly appreciated by Vienna's students and researchers.

This year's programme covered the following Lecture Course:

Lecture Courses, Winter Term 2025/26:

Yoshihiro Tonegawa (Institute of Science Tokyo):

Introduction to Brakke's Mean Curvature Flow

Lecture Course 250124 VU: October 16 – November 27, 2024

Start: Monday, October 27, 2025

Further dates: Wednesday, October 29 and Friday, October 31, Tuesday, November 4 and Wednesday, November 5, 2025

All days: 15:15 - 17:00

Yoshihiro Tonegawa: Introduction to Brakke's Mean Curvature Flow

Prof. Yoshihiro Tonegawa (Institute of Science Tokyo): October 16 – November 27, 2025

Course

The mean curvature flow (MCF) is a family of surfaces evolving in time whose velocity is equal to the mean curvature at each point and time. It is one of the most important geometric evolution problems with many avenues of studies. The course will focus on the approach initiated by Brakke in the 1970's in the framework of geometric measure theory among other approaches. Starting with some preliminaries on the measure-theoretic aspects, the basic properties of MCF as well as some advanced topics such as the general existence theory had been covered.

Aim of the course:

The aim of the course was to familiarize the students with basic concepts in geometric measure theory first, and to present basic measure-theoretic properties of mean curvature flow in the setting of Brakke flow. The course was given as a series of lectures.

Research

First I would like to thank the staff at ESI who accommodated my pleasant research stay for three weeks and Professor Ulisse Stefanelli for the invitation. I was pleased to find a number of young researchers genuinely interested in the subject of Brakke flow. I believe that I could convey the essential points of how to construct the Brakke flow which is hard to see by reading the proof since it is technically involved. It is a powerful method to construct generalized solutions for geometric flows and they should be able to take advantage of the techniques in the future. In particular there should be a good possibility in the direction of interactive system with fluid flow, and I hope that this course furnished a good starting point.

Lecture Notes

Reading list:

Brakke's mean curvature flow: an introduction, Springer Briefs in Mathematics, Springer, 2019, Yoshihiro Tonegawa.

Publications and preprints contributed

The collaborative work is expected in the interactive system of two-phase Navier-Stokes equation and surface evolution problems in the future.

Erwin Schrödinger Lectures 2025

The Erwin Schrödinger Lectures are directed towards a general audience of mathematicians and physicists. In particular, it is an intention of these lectures to inform non-specialists and graduate students about recent developments and results in some area of mathematics or physics.

Magdalena & Martin Gronau: überschrittene Grenzen. Erwin Schrödinger und die Herausforderungen der Wissenschaftsbiografik

Speakers: Magdalena & Martin Gronau (ZfL, Berlin)

Dr. Dr. Magdalena Gronau ist Chemikerin und Literatur- und Kulturwissenschaftlerin. Nach Stationen u.a. an der Universität Innsbruck, am IFK Wien, an der McGill-University Montréal, an der Universität Erfurt und der HU Berlin (Erwin Schrödinger-Fellowship des FWF) ist sie seit 2023 Freigeist-Fellow der VolkswagenStiftung am Leibniz-Zentrum für Literatur- und Kulturforschung Berlin.

Martin Gronau hat als Altertumswissenschaftler und Gräzist u.a. an den Universitäten Innsbruck, Frankfurt und Padova, am IFK Wien, an der Fudan University Shanghai, der McGill-University Montréal und der Universität Erfurt geforscht. Seit 2023 ist er wissenschaftlicher Mitarbeiter am Leibniz-Zentrum für Literatur- und Kulturforschung Berlin im Projekt „Die Philologie der Physiker“.

Date: November 12, 2025

Abstract: Seit Ende 2021 sind schwerwiegende Vorwürfe gegen den Physiker Erwin Schrödinger (1887-1961) erhoben worden, die von Pädophilie bis hin zu wiederholtem sexuellen Missbrauch reichen. Diese Anschuldigungen haben den öffentlichen Ruf des Nobelpreisträgers erheblich beschädigt.

In der medialen und akademischen Debatte wurde wiederholt die Frage aufgeworfen, ob diese gravierenden Vorwürfe überhaupt gerechtfertigt sind, litt die Diskussion doch unter einer unklaren Faktenlage: Zentrale Quellen waren bislang weitgehend unzugänglich. Dies hängt zumindest teilweise mit der Veröffentlichung einer Biografie zusammen (Schrödinger: Life and Thought von Walter Moore, 1989), die bereits zum Zeitpunkt ihres Erscheinens als problematisch galt.

Im Rahmen des Vortrags werden zahlreiche bisher unberücksichtigte Quellen (u.a. die als Ephemeriden bezeichneten Tagebücher Schrödingers, Briefe betroffener Frauen und Dokumente aus dem Nachlass des Biografen) ausgewertet. Auf dieser Grundlage wird nicht nur die Genese des Skandals um Erwin Schrödinger analysiert, sondern auch ein alternativer Blick auf Schrödingers komplexes Privatleben geworfen, der auch die Perspektiven der bislang weitgehend stumm gebliebenen Partnerinnen des Physikers berücksichtigt.

Junior Research Fellows Programme

Isao Sauzedde: Gauge theory and Gaussian multiplicative chaos

Isao Sauzedde (U of Warwick): January 4 – March 5, 2025

Report

My visit to the Erwin Schrödinger Institute in 2025 lasted from January 5th to March 5th. During these two months, I mostly worked with Nathanaël Berestycki from the University of Vienna, and this collaboration led to a paper [1] which is the main scientific contribution obtained during the programme.

The programme was also the opportunity for me to interact with many members of the various laboratories in Vienna. While learning myself various aspects of statistical mechanics in particular, I participated in the scientific life in Vienna by giving a talk on *Random fields and polymer representation*¹ at the *(Not So) Informal Probability Seminar*, which is shared between the University of Vienna and TU Vienna.

The main result we obtained in [1] can be described as follows. We construct an application which glues loops to a simple path. Then, we prove that when the simple path is distributed like the SLE_2 trace and the loops are distributed like a Brownian loop soup, the path obtained from the gluing operation is distributed like a Brownian motion.

This solves a conjecture from 2003 from W. Werner and G. Lawler [2], which had previously drawn significant attention and led to several results, including [3,4], which had not fully solved the conjecture.

This was also the opportunity to discuss several other projects which may lead to further collaborations.

Overall, my stay in Vienna was a great opportunity for me. I am very grateful to the ESI for providing it, and I hope I will have further occasions to visit in the future.

References

- [1] N. Berestycki & I. Sauzedde, *Brownian paths as loop-decorated sles*, [arXiv:2602.04673](https://arxiv.org/abs/2602.04673) [math.PR].
- [2] G. F. Lawler & W. Werner, The Brownian loop soup. *Probability theory and related fields*, 128(4):565–588, 2004.
- [3] A. Sapozhnikov & D. Shiraishi, On Brownian motion, simple paths, and loops. *Probab. Theory Relat. Fields*, 172(3-4):615–662, 2018.
- [4] D. Zhan, Loop-erasure of planar Brownian motion. *Commun. Math. Phys.*, 303(3):709–720, 2011.

¹<https://mathematik.univie.ac.at/forschung/biomathematik-dynamische-systeme-/finanzmathematik-und-wahrscheinlichkeitsrechnung/stochastik-und-finance-mathematik/not-so-informal-probability-seminar/nachrichtenvolldarstellung-nsis/news/random-fields-and-polymer-representation/>

Publications and preprints contributed

N. Berestycki & I. Sauzedde, *Brownian paths as loop-decorated sles*, [arXiv:2602.04673](https://arxiv.org/abs/2602.04673)[math.PR].

Saikat Mondal: Carroll and large-N

Saikat Mondal (IIT Kanpur): March 3 – May 2, 2025

Report

In my PhD, a considerable portion of my research is oriented around Carrollian symmetry and its applications in various branches of Physics. Carrollian symmetry refers to the spacetime symmetry that emerges in a singular limit, where the speed of light tends to zero. Although introduced a long time back in 1965 by Lévy-Leblond and independently by Sen Gupta, this symmetry has recently gained interest in theoretical physics, especially in the studies of asymptotic symmetries, flat space holography, and non-Lorentzian geometries. This symmetry group is very much intertwined with generic null hypersurfaces.

Because of the degenerate structure, Carrollian manifolds can be best understood as fibre-bundles where there are separate metrics on the fibre and the base, instead of an usual single non-degenerate metric for the entire spacetime.

During my two-month stay in Vienna, I have focussed on this work, where we have explicitly computed quasi-normal modes for scalar perturbation in flat space cosmologies, which we believe, will be particularly useful in the understanding of flat space holography in the same spirit of AdS/CFT correspondence [1].

Scalar fields and 3d flat space cosmology

In this paper, we have explored the 3d Einstein gravity in a spacetime with zero cosmological constant. Other than the global Minkowski spacetime as a solution, there exists another solution, described by the following metric

$$ds^2 = \frac{\hat{r}_+^2(r^2 - r_0^2)}{r^2} dt^2 - \frac{r^2 dr^2}{\hat{r}_+^2(r^2 - r_0^2)} + r^2 \left(d\phi - \frac{r_0 \hat{r}_+}{r^2} dt \right)^2. \quad (1)$$

These solutions with horizon at $r = r_0$, goes by the name of Flat Space Cosmology(FSC). In terms of the mass M and angular momentum J , the two parameters $\hat{r}_+$ and r_0 are related as $\hat{r}_+ = \sqrt{8GM}$ and $r_0 = \sqrt{\frac{2G}{M}} J$. They form the most general zero mode solutions to 3-dim asymptotically flat spacetime (AFS) with Barnich-Compère boundary conditions. Just like this AFS can be found by taking the large radius limit from the AdS_3 , these FSCs also arise in the similar large radius limit of non-extremal BTZ solutions. FSCs are called shifted-boost orbifolds of Minkowski spacetime, in the same spirit like BTZ black holes are known to be quotients of AdS_3 . In this work, we have particularly studied the scalar perturbations in this FSC background. To proceed further, we use the suitable coordinate system, defined as

$$\tau^2 = T^2 - X^2 = \frac{r^2 - r_0^2}{\hat{r}_+^2}, \quad y = Y, \quad x = \hat{r}_+ t \quad (r > r_0) \quad (2a)$$

$$\rho^2 = X^2 - T^2 = \frac{r_0^2 - r^2}{\hat{r}_+^2}, \quad y = Y, \quad x = \hat{r}_+ t \quad (r < r_0). \quad (2b)$$

Here, we have imposed the solutions must satisfy the following conditions, (1) : The solutions are bounded at spatial infinities $|x| \rightarrow \infty$ and (2) : The solutions are regular at the cosmological horizon $\tau = 0$. We will be looking at $r > r_0$ and here the general solution can be written as follows:

$$\Psi = \underbrace{J_{\pm i \frac{p}{E}}(\omega_p \tau) e^{ipx} e^{i \frac{n}{r_0} y}}_{\text{oscillatory along } x} + \underbrace{e^{-EN|x|} J_N(\omega_N \tau) e^{i \frac{n}{r_0} y}}_{\text{decaying along } x} \quad (3)$$

Here p and n are the eigenvalues of the two Killing vectors of the FSC geometry and $N \in \mathbb{N}$. Interestingly this solution can also be found to be matching after taking the flat space limit from solutions in the BTZ case. Now imposing the hard wall condition on the cosmological horizon, we have computed the quasi-normal modes for scalar perturbation, which are given by,

$$\omega_{i,r}^2 = \sqrt{A_{n,N}^2 + B_{n,N}^2} \mp A_{n,N}, \text{ where } A_{n,N} = \frac{n^2 - N^2 \hat{r}_+^2 + m^2 r_0^2}{2r_0^2}, \quad B_{n,N} = \frac{\hat{r}_+ n N}{r_0}, \quad (4)$$

m being the mass of the scalar probe.

In the second part, using these new found quasi-normal modes, we tried to construct the one-loop partition function following the DHS method [2]. In some limit of parameter space, we have been able to reproduce known results in the literature. In summary,

Conditions	quasi-normal frequencies	One-loop partition function $\left(\frac{Z^{(1)}(m)}{e^{\text{Pol}(m)}} \right)^{-1}$
$m \rightarrow \infty$	$\omega_i = 0, \omega_r = m$	$\prod_{k_1, k_2=0}^{\infty} \left(1 - \exp \left(\frac{2\pi}{\hat{r}_+} ((k_1 - k_2) + mr_0) \right) \right)$
$N = 0, m \rightarrow 0$	$\omega_i = 0, \omega_r = \frac{n}{r_0} + \frac{m^2 r_0}{2n}$	$\prod_n \left(1 - \exp \left(-\frac{2\pi r_0}{\hat{r}_+} \left(\frac{2n}{r_0} + \frac{m^2 r_0^2}{2n^2} \right) \right) \right)$
$m = 0$	$\omega_i = \frac{\hat{r}_+ N}{r_0}, \omega_r = \frac{n}{r_0}$	$\prod_{a, N=0}^{\infty} (1 - \exp(-\pi \hat{r}_+ (a - N)))$

Table 1: Partition Functions in various approximations

Additionally, due to this fellowship opportunity, I have managed to collaborate on a new project with Daniel Grumiller and his group at TU Vienna. This project focuses on understanding the existence of the flow between the electric and magnetic Carroll theory. We aim to make this paper available online in the near future.

Acknowledgement

Many thanks to the ESI for giving me the opportunity to do my research in Vienna and to engage in physics discussions with the people of U of Vienna and TU Vienna. I would like to

thank Prof. Daniel Grumiller for being my host during my visit at the ESI. I would also like to acknowledge the hospitality of ESI, Vienna and TU Venna. I also like to thank the secretaries of both the ESI and TU Vienna for helping me out during my stay.

Publications and preprints contributed

A. Bagchi, S. Biswas, A. Kakkar & S. Mondal, *Scalar fields and 3D Flat Space Cosmologies*, [arXiv:2506.02148](#) [hep-th]

References

- [1] D. Birmingham, I. Sachs and S. N. Solodukhin, *Conformal field theory interpretation of black hole quasinormal modes*, Phys. Rev. Lett. 88 (2002), 151301.
- [2] F. Denef, S. A. Hartnoll and S. Sachdev, *Black hole determinants and quasinormal modes*, Class. Quant. Grav. 27 (2010), 125001.

Fufa Beyene: Cyclic Sieving Phenomenon for circular Dyck paths with a given number of peaks

Fufa Beyene (Kotebe U of Education): October 10 – December 9, 2025

Report

Given a set X of combinatorial objects, an action on X of a cyclic group $G = \langle g \rangle$ with generator g of order n , and a polynomial $f(q)$ in q with non-negative integer coefficients, we say that the triple (X, G, f) exhibits *the cyclic sieving phenomenon*, if the number of elements of X fixed by g^k equals $f(e^{2\pi i k/n})$ for all non-negative integers k .

Alexandersson, Linusson and Potka [1, Theorem 22] proved the stance of cyclic sieving phenomenon for circular Dyck paths under a natural action of the cyclic group. They conjectured that [1, Theorem 22] can be refined by taking the number of circular peaks of the circular Dyck path into account.

Question: Find a refinement of the instance of the CSP for circular Dyck paths under a natural action of the cyclic group according to the number of circular peaks.

Krattenthaler and Mohanty [2, Theorem 1] gave the generating function for the joint distribution of the statistics of the number of descents and major index using the Gaussian binomial coefficient.

Theorem 1. *Given $c, d \in \mathbb{Z}, d > c$, let $L_{c,d}^+(\lambda, \mu)$ be the set of all lattice paths from $\mu = (\mu_1, \mu_2)$ to $\lambda = (\lambda_1, \lambda_2)$ which do not cross the lines $y = x + d$ and $y = x + c$. If $\lambda_1 + c \leq \lambda_2 \leq \lambda_1 + d$ and $\mu_1 + c \leq \mu_2 \leq \mu_1 + d$, then*

$$\sum_{p \in L_{c,d}^+(\lambda, \mu)} x^{\text{des}(p)} q^{\text{maj}(p)} = \sum_{n \geq 0} x^n \sum_{k \in \mathbb{Z}} q^{n^2 + k^2(d-c+1) - k(1-c+\mu_2-\mu_1)} \\ \times \left(\begin{bmatrix} \lambda_1 - \mu_1 - k(d-c) \\ n+k \end{bmatrix}_q \begin{bmatrix} \lambda_2 - \mu_2 + k(d-c) \\ n-k \end{bmatrix}_q \right)$$

$$- \begin{bmatrix} \lambda_2 - \mu_1 - k(d - c) - c + 1 \\ n + k \end{bmatrix}_q \begin{bmatrix} \lambda_1 - \mu_2 + k(d - c) + c - 1 \\ n - k \end{bmatrix}_q, \quad (1)$$

where $\begin{bmatrix} a \\ b \end{bmatrix}_q$ is the Gaussian binomial coefficient

$$\begin{bmatrix} a \\ b \end{bmatrix}_q = (1 - q^a)(1 - q^{a-1}) \cdots (1 - q^{a-b+1}) / (1 - q^b)(1 - q^{b-1}) \cdots (1 - q).$$

A circular Dyck path of height n and width w is specified via an area sequence such that $a_1, \dots, a_n$ satisfy

- $0 \leq a_i \leq w - 1$ for $1 \leq i \leq n$,
- $a_{i+1} \leq a_i + 1$ for $1 \leq i \leq n$,

where the index is taken $(\text{mod } n)$ in the second condition.

A *circular peak* of a (circular) Dyck path is an index $i \in [n]$ such that $a_{i+1} \leq a_i$ in its area sequence, where the index is taken $(\text{mod } n)$.

A circular Dyck path p of height n and width w is characterized by (μ, b) , where $\mu = (\mu_1, \mu_2) = (j, 0)$, $1 \leq j \leq w$, $\lambda = (j + n, n - 1)$, and b a binary word $b_1 b_2 \cdots b_{2n}$ with $b_{2n} = 1$, and never crossing the diagonals $y = x - 1$ and $y = x - w - 1$.

Let $|\text{CDP}(n, w, m)|$ denote the number of circular Dyck paths having height n , width w , and circular peaks m .

Outcome: During this Fellowship, I have been collaborating with Christian Krattenthaler, U of Vienna. We were able to obtain the required polynomial in q with non-negative coefficients, and we were able to prove that the polynomial is the q -enumeration of the $\text{CDP}(n, w, m)$.

Let $\delta := m^2 + k^2(w + 1) - k(w + 1 - j)$. We have proved the following theorem during my stay at ESI.

Theorem 2. *We have the q -enumeration*

$$|\text{CDP}(n, w, m)|_q := \sum_{k \in \mathbb{Z}} \sum_{j=1}^w q^\delta \left(\begin{bmatrix} n - 1 - kw \\ m - 1 + k \end{bmatrix}_q \begin{bmatrix} n + kw \\ m - k \end{bmatrix}_q - \begin{bmatrix} n - j - kw + w \\ m - 1 + k \end{bmatrix}_q \begin{bmatrix} n + j + kw - w - 1 \\ m - k \end{bmatrix}_q \right)$$

There is a natural C_n -action on $\text{CDP}(n, w, m)$, where the generator shifts the area sequence cyclically by one step to the right.

Theorem 3. *Let α acts on $\text{CDP}(n, w, m)$ by cyclically shifting the area sequence by one step. Then the triple*

$$(\text{CDP}(n, w, m), \langle \alpha \rangle, |\text{CDP}(n, w, m)|_q)$$

exhibits a cyclic sieving phenomenon.

While proving this theorem remains the most challenging part of the project, our recent progress is very promising, and we anticipate having a complete proof soon. Thus, hoping to have a paper on arXiv soon.

I had a very fruitful discussion with Christian and his Combinatorics team at the University of Vienna. Over the past few weeks, I have been regularly attending their weekly Tuesday seminars, as well as an Algebraic Combinatorics course taught by Prof. Ilse Fischer. These opportunities have significantly expanded both my academic knowledge and my professional network.

References

- [1] P. Alexandersson, S. Linusson & S. Potka, *The cyclic sieving phenomenon on circular Dyck paths*, [arXiv:1903.01327](#) [math.CO].
- [2] Ch. Krattenthaler & S. G. Mohanty, *On lattice path counting by major and descents*, *Europ. J. Combin.*, 14 (1993), 43–51.
- [3] V. Reiner, D. Stanton & D. E. White, *The cyclic sieving phenomenon*, *Journal of Combinatorial Theory*, Series A, 108(1):17–50, October 2004. [doi:10.1016/j.jcta.2004.04.009](#).
- [4] B. E. Sagan, *Congruence properties of q -analogs*, *Advances in Mathematics*, 95(1):127–143, September 1992. [doi:10.1016/0001-8708\(92\)90046-n](#).

Seminars and colloquia outside main programmes and workshops

642 seminar and colloquia talks have taken place at the ESI in 2025 including the following individual talks. The list does not include the talks of external organized activities the ESI hosted at its premises. For these talks see “other activities” in the overview chapter “Scientific activities 2025”.

Christopher Deninger (U Münster): “*A pro-algebraic fundamental group for topological spaces and an arithmetic application*”, September 11, 2025

Erwin Schrödinger Lecture by Magdalena & Martin Gronau (ZfL, Berlin): “*überschrittene Grenzen. Erwin Schrödinger und die Herausforderungen der Wissenschaftsbiografie*”, November 12, 2025

ESI Research Documentation

ESI research in 2025: publications and arXiv preprints

The following codes indicate the association of publications and preprints with specific ESI activities:

AFS = Structures in Banach Spaces

AGW = Reverse Mathematics

BLG = Degenerate and Singular PDEs

BPS = Entanglement in many-body quantum matter: Dynamics, dissipation, equilibration

EMV = Recent Perspectives on Non-crossing Partitions through Algebra, Combinatorics, and Probability

FLF = Quantum Harmonic Analysis

HSC = Quantum Many-body Systems and Bose-Einstein Condensation: A Mathematical Physics Perspective

IMO = IMO Training 2025

LAD = Extremal statistics in biology

LKS = Charged Soft Matter: Bridging Theory and Experiment

LTV = Infinite-dimensional Geometry: Theory and Applications

Medal = ESI Medal

PHI = ISAPP2025: Gravitational Waves: From Theory to Detection

RIT = Research in Teams

RSV = Free Boundary Problems

SGH = Eisenstein Series, Spaces of Automorphic Forms, and Applications

SRF = Senior Research Fellows

TFB = Uniform Distribution of Sequences

UHR = Putting the Cosmic Large-scale Structure on the Map: Theory Meets Numbers

THEMATIC PROGRAMMES

Infinite-dimensional Geometry: Theory and Applications (LTV)

T. Goliński, G. Larotonda, A.B. Tumpach, *Nijenhuis operators on homogeneous spaces related to C^* -algebras*, [arXiv:2410.13557](#)[math.DG].

K. Habermann & E. Hartman, *Brownian motion on spaces of discrete regular curves*, [arXiv:2510.24593](#)[math.PR].

S. Haller, C. Vizman, *Nonlinear Grassmannians: plain, decorated, augmented*, [arXiv:2503.15363](#)[math.DG].

P. Michor, *The Schouten–Nijenhuis bracket in infinite dimension*, [arXiv:2504.15010](#)[math.DG].

A.B. Tumpach, *Hyperkaehler Marriage of the two sphere with the hyperbolic space*, [arXiv:2504.19945](#)[math.DG].

A.B. Tumpach, *Infinite-dimensional Siegel disc as symplectic and Kaehler quotient*, [arXiv:2504.19931](#)[math.SG].

Entanglement in Many-body quantum matter: Dynamics, dissipation, equilibration (BPS)

T. Bhore, L. Su, I. Martin, A. A. Clerk, Z. Papic, *Quantum Mpemba effect without global symmetries*, [arXiv:2505.17181](#)[quant-ph].

N. Manjunath, A. Turzillo, Ch. Wang, *Detection of 2D SPT Phases under Decoherence*, [arXiv:2507.00127](#)[cond-mat.str-el].

A.-R. Negari, L. A. Lessa, S. Sahu, *Symmetry enforces entanglement at high temperatures*, [arXiv:2508.20166](#)[quant-ph].

J. Taylor, C. Voinea, Z. Papic, R. Fan, *Conformal scalar field theory from Ising tricriticality on the fuzzy sphere*, [arXiv:2506.22539](#)[cond-mat.str-el].

C. Voinea, R. Fan, N. Regnault, Z. Papic, *Regularizing 3D Conformal Field Theories via Anyons on the Fuzzy Sphere*, [arXiv:2411.15299](#)[cond-mat.stat-mech].

M. Votto, M. Ljubotina, C. Lancien, J. I. Cirac, P. Zoller, M. Serbyn, L. Piroli & B. Vermersch, *Learning mixed quantum states in large-scale experiments*, [arXiv:2507.12550](#)[quant-ph].

Reverse Mathematics (AGW)

M. Aguilar, J. Aguilera & D. Fernández-Duque, *The Reverse Mathematics of the Mountain Pass Theorem*, in progress.

J. Aguilera & D. Fernández-Duque, *The spectrum of hyperarithmetical soundness*, in progress.

J. Aguilera, A. Freund & F. Pakhomov, *Recursively Provable Dilators*, in progress.

J. Aguilera & N. Greenberg, *Initial segments of the constructible hierarchy satisfying Mostowski's collapse axiom*, in progress.

J. Aguilera & N. Greenberg, *E. Hammatt, hierarchy of finite-change degrees in admissible computability*, in progress.

J. Aguilera & H. Jeon, *Recursively Provable Ptykes*, in progress.

J. Aguilera, A. Fernández & J. Joosten, *The provably total set-recursive functions of KPI*, [arXiv:2510.14399](#)[math.LO].

J. Aguilera & T. Koupchinsky, *Binary Choice Games and Arithmetical Comprehension*, [arXiv:2510.12612](#)[math.LO].

J. Aguilera & T. Koupchinsky, *The limits of determinacy in higher-order arithmetic*, [arXiv:2411.04786](#)[math.LO].

- J. Aguilera, T. Koupchinsky & K. Yokoyama, *The Reverse Mathematics of Analytic Measurability*, [arXiv:2603.22503](#) [math.LO].
- J. Aguilera & R. Lubarsky, *Harrington's Principle in Second-Order Arithmetic*, in progress.
- J. Aguilera, R. Lubarsky, & L. Pacheco, *Higher-Order Feedback Computability*, in progress.
- J. Aguilera & F. Pakhomov, *Non-linearities in the analytical hierarchy*, in progress.
- K. Benjelloun & B. Durand, *Recursive Pseudo Well-Orderings with Infinite Time Turing Machines*, in progress.
- K. Benjelloun, B. Durand & G. Lafitte, *Stable Writability of reals via Infinite Time Turing Machines*, in progress.
- G. Buriola & A. Weiermann, *Proof-Theoretic Relations between Higman's and Kruskal's theorem, and Independence Results for Tree-like Structures*, [arXiv:2511.11297](#) [math.LO].
- L. Carlucci & G. Celli. *Weihrauch reducibility between Ramsey-type theorems and wellordering principles at the level of induction: A pilot study* [arXiv:2511.21481](#) [math.LO].
- P. Cholak, *Ramsey Theorem and Bounding in Arithmetic*, [arXiv:2603.23704](#) [math.LO].
- G. Dooley, *Iterated jump noncomputability and compactness*, [arXiv:2506.20620](#) [math.LO].
- D. Fernández-Duque & A. Weiermann, *The Fractal Goodstein Principle*, [arXiv:2508.14768](#) [math.LO].
- E. Frittaion & G. G. Genovesi, *Transfinite recursion from collapsing functions*, in progress.
- E. Gadsby, *On the Slowing Down Phenomenon*, in progress.
- D. Gonzalez, D. Rossegger & D. Turetsky, *Scott Analysis up to the Vaught Ordinal*, in progress.
- N. Greenberg, J. Jacobson-Grocott, J. Miller & D. Turetsky, *Degrees of continuous functions on Baire space*, in progress.
- N. Greenberg, J. Miller & M. Soskova, *Relativizing randomness to enumeration oracles*, in progress.
- N. Greenberg, D. Lecomte, D. Turetsky & M. Zeleny, *Minimal examples for Σ^0_ξ graph colourings*, in progress.
- E. Hammat & H. T. Koh, *A sufficient condition for the density of the punctual degrees*, preprint.
- J. Hirst & C. Mummert, *Reverse mathematics and moduli of uniform continuity*, in progress.
- R. Lubarsky, *Delta and determinacy of the Boolean hierarchy over Σ^0_2* , in progress.
- A. Marcone & A. Volpi, *Reverse Mathematics and Dimension of Posets*, [arXiv:2603.18759](#) [math.LO].
- D. Norman & S. Sanders, *The uncountability of the reals and the Axiom of Choice*, [arXiv:2602.05558](#) [math.LO].
- S. Sanders, *On countability and representations*, [arXiv:2602.06728](#) [math.LO].
- S. Sanders, *Reverse Mathematics: there and back again*, Manuscript, 422 pages.
- S. Sanders & D. Taranovsky, *Numerical Choice, Riemann integration, and Reverse Mathematics*, [arXiv:2606.01420](#) [math.LO].

W. Wang, *Iterated Jumps of Perfect Subtrees of Positive Trees*, in progress.

Free Boundary Problems (RSV)

P. Colli, G. Gilardi, A. Signori & J. Sprekels, *Optimal Velocity Control of a Brinkman–Cahn–Hilliard System with Curvature Effects*, [arXiv:2601.05820](#)[math.OC].

L. De Masi, *Stratification of the single blow-up set for Radon measures*, [arXiv:2512.20498](#)[math.FA].

A. Dall’Acqua, F. Rupp, R. Schätzle & M. Schlierf, *Stability of the free boundary Willmore problem*, [arXiv:2601.18388](#)[math.AP].

W. M. Feldman & I. C. Kim, *The pinning effect of dilute defects*, [arXiv:2512.11152](#)[math.AP].

X. Fernández-Real & H. Yu, *Linearized equation and generic regularity in the Alt-Caffarelli problem*, [arXiv:2510.18330](#)[math.AP].

H. Garcke, K.F. Lam & R. Nürnberg. A. Signori, *On a Mullins–Sekerka model for the growth of active droplets modeling protocells: Stability analysis and numerical computations*, [arXiv:2601.11155](#)[math.AP].

A. Guerra, X. Lamy & K. Zemas, *Global minimality of the Hopf map in the Faddeev–Skyrme model with large coupling constant*, [arXiv:2507.10686](#)[math.AP].

B. Hu, Z. Wang, J. Xin & Z. Zhang, *A Stochastic Genetic Interacting Particle Method for Reaction-Diffusion-Advection Equations*, [arXiv:2511.12275](#)[math.NA].

F. Nobili, F. Renzi & F. Vitillaro, *Mosco-convergence of Cheeger energies on varying spaces satisfying curvature dimension conditions*, [arXiv:2511.13320](#)[math.MG].

U. Stefanelli, *A free boundary problem in accretive growth*, [arXiv:2601.08755](#)[math.AP].

WORKSHOPS

Degenerate and Singular PDEs (BLG)

F. Bäuerlein, S. Ricco, & L. Schätzler, *Global higher integrability and Hardy inequalities for double-phase functionals under a capacity density condition*, [arXiv:2503.21580](#)[math.AP].

V. Bögelein, F. Duzaar, N. Liao, K. Moring, *Gradient estimates for the fractional p -Poisson equation*, [arXiv:2503.05903](#)[math.AP].

S. Ciani, U. Gianazza, Z. Li, *Phragmén–Lindelöf-type theorems for functions in Homogeneous De Giorgi Classes*, in preparation.

K. Ebrahimi-Fard, L. Foissy, J. Kock, F. Patras, *Operads of (noncrossing) partitions, interacting bialgebras, and moment-cumulant relations*, [arXiv:1907.01190](#)[math.CO].

L. Foissy, *Bialgebras in cointeraction, the antipode and the eulerian idempotent*, [arXiv:2201.11974](#)[math.RA].

L. Foissy, *Chromatic polynomials and bialgebras of graphs*, [arXiv:1611.04303](#)[math.RA].

L. Foissy, *Cointeraction on noncrossing partitions and related polynomial invariant*, [arXiv:2501.18212](#)[math.CO].

Structures in Banach Spaces (AFS)

C.A. De Bernardi, T. Russo, J. Somaglia, *Lattice tilings of Hilbert spaces*, [arXiv:2505.04267](#)[math.FA].

A. Jiménez-Vargas, A. Rueda Zoca, *Lipschitz interpolating sequences*, [arXiv:2503.18169](#)[math.FA].

A. Jiménez-Vargas, A. Rueda Zoca, *Transfinite (almost isometric) ideals in Banach spaces*, [arXiv:2505.04178](#)[math.FA].

G. Rancher, *Weak Compactness and Property*, unpublished.

Uniform Distribution of Sequences (TFB)

A. Bakhtawar & C. Kraaikamp, *Sharpening Vahlen's result in Diophantine approximation*, [arXiv:2504.20640](#)[math.DS].

W. Bosma, R. Bruin, R. Fokkink, A. Reuijl & T. Tromp, *Using Walnut to solve problems from the OEIS*, [arXiv:2503.04122](#)[math.NT].

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K. Dajani, C. Kraaikamp, H. Nakada & R. Natsui, *A new class of α -Farey maps and an application to normal numbers*, [arXiv:2405.10921](#)[math.DS].

Quantum Harmonic Analysis (FLF) E. Cordero, G. Giacchi & E. Pucci, *Wave packet analysis of metaplectic operators in Gelfand-Shilov spaces and applications to Schrödinger equations*, in progress.

A. Abdeljawad & E. Cordero, *Neural Approximation in Time-Frequency Analysis*, in progress.

Extremal statistics in biology (LAD)

K. Jain & H. Sumuni, *Dynamics of fixation probability in a population with fluctuating size*, [arXiv:2508.18828](#)[q-bio.PE].

A. Jangid, O. N. Feldheim & T. Friedlander, *Volatile but persistent co-existence of self-compatibility and self-incompatibility in plants*, [DOI:10.1101/2025.11.30.691363](#).

Charged Soft Matter: Bridging Theory and Experiment (LKS)

J.K.G.Dhonta & W.J.Briels, *Temperature-induced migration of electro-neutral interacting colloidal particles*, in: Journal of Colloid And Interface Science. [Journal of Colloid and Interface Science](#), 2024, 666, 457-471.

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Roman Staňo & Peter Košován, *Charge Regulation Enables Uptake of Ampholytes to Polyelectrolyte Brushes*, in: ACS Macro Letters. [ACS Macro Lett.](#) 2026, 15, 1, 102–111.

Putting the Cosmic Large-scale Structure on the Map: Theory Meets Numbers (UHR)

A. Andrews et al., *Field-Level Inference of Primordial Non-Gaussianity with the Quijote Simulation Suite*, [arXiv:2603.20855](#)[astro-ph.CO].

A. E. Bayer, L. Parker, D. Valcin, S. Chen, Ch. Modi & U. Seljak, *Field-Level Inference from Galaxies: BAO Reconstruction*, [arXiv:2603.15732](#)[astro-ph.CO].

F. List, O. Hahn, T. Flöss & L. Winkler, *DISCO-DJ II: a differentiable particle-mesh code for cosmology*, [arXiv:2510.05206](#)[astro-ph.CO].

H. Simon, F. Lanusse & A. de Mattia, *Benchmarking field-level cosmological inference from galaxy redshift surveys*, [arXiv:2504.20130](#)[astro-ph.CO].

RESEARCH IN TEAMS (RIT)

P. Adeyemo, D. Bunnett & F. Levicán, *Embeddings of weighted projective spaces*, [arXiv:2510.05076](#)[math.AG].

L. Andersson, B. Moser, M. A. Oancea, C. F. Paganini, G. Schmid, *Pseudodifferential Weyl calculus on vector bundles*, [arXiv:2507.11965](#)[math-ph].

M. A. Benitez, A. H. Hoang, V. Mateu, I. W. Stewart & G. Vita, *On determining $\alpha_s(m_Z)$ from dijets in $e+e$ thrust*, [arXiv:2412.15164](#)[hep-ph].

M. A. Benitez, A. Bhattacharya, A. H. Hoang, V. Mateu, M. D. Schwartz, I. W. Stewart et al., *A Precise Determination of α_s from the Heavy Jet Mass Distribution*, [arXiv:2502.12253](#)[hep-ph].

M. Briceño, H. A. González, M. Henneaux & A. Pérez, *Matching conditions at null infinity in the presence of logarithms: the role of advanced and retarded radiation*, [arXiv:2510.21072](#)[hep-th].

A. Constantin, V. Kozlov, E. Lokharu & J. Weber, *Waves interacting with the Antarctic Circumpolar Current*, in preparation.

J. Droschl, *Poles of intertwining operators in terms of irreducible components of Lusztig's characteristic variety in type A*, [arXiv:2508.13817](#)[math.RT].

J. Figueroa-O'Farrill, S. Pekar, A. Pérez & S. Prohazka, *Planons and their Carroll-Galilei symmetries*, [arXiv:2508.08390](#)[hep-th].

A. H. Hoang, V. Mateu, M. D. Schwartz & I. W. Stewart, *Precision e^+e^- Hemisphere Masses in the Dijet Region with Power Corrections*, [arXiv:2506.09130](#)[hep-ph].

M. A. Oancea, T. B. Mieling & G. Palumbo, *Quantum geometric tensors from sub-bundle geometry*, [arXiv:2503.17163](#)[math-ph].

J.-R. Li & T. Przydzicki, *Compatibility of Drinfeld presentations and q -characters for affine Kac-Moody quantum symmetric pairs: quasi-split case*, [arXiv:2601.02165](#)[math.QA].

A. Pérez, K. Jensen & St. Prohazka, *Planons and their Carroll-Galilei symmetries*, [arXiv:2508.08390](#)[cond-mat.str-el].

JUNIOR RESEARCH FELLOWS PROGRAMME (JRF)

A. Bagchi, S. Biswas, A. Kakkar & S. Mondal, *Scalar fields and 3D Flat Space Cosmologies*, [arXiv:2506.02148](#)[hep-th].

N. Berestycki & I. Sauzedde, *Brownian paths as loop-decorated sles*, [arXiv:2602.04673](#)[math.PR].

ESI research in previous years: additional publications and arXiv preprints

The following papers and publications complement the ESI preprints already taken into account in the previous years.

CDFG24 = Carrollian Physics and Holography, 2024

COZ24 = Lensing and Wave Optics, 2024

CSZ23 = Spectral Theory and Mathematical Relativity, 2023

DFC24 = Linking Microscopic Processes to the Macroscopic Rheological Properties in Inert and Living Soft Materials, 2024

RIT 2023 = Research in Teams, 2023

SLE11 = Nonlinear Water Waves, 2011

Ch. H. Cashen, P. Dani, K. Schreve & E. Stark, *Conformal dimension bounds, Pontryagin sphere boundaries, and algebraic fibering of right-angled Coxeter groups*, [arXiv:2510.03430](#)[math.GR], (RIT2023).

P. T. Chruściel & R. Wutte, *Gluing-at-infinity of two-dimensional asymptotically locally hyperbolic manifolds*, [arXiv:2401.04048](#)[gr-qc], (CSZ23).

T. Kano, *Tunamis on a deep open sea and on a sloping beach – a mathematical theory*, [arXiv:2409.17269](#)[math.AP], (SLE 2011).

N. Kolezakis, St. Aime, R. Pastore, V. Guida, G. D Avino, P. Edera, *Microscopic structure and dynamics of shear-thinning suspensions of polydisperse, repulsive vesicles*, [arXiv:2501.04758](#)[cond-mat.soft], (DFC24).

R. McNees & C. Zwickel, *The symplectic potential for leaky boundaries*, [arXiv:2408.13203](#)[hep-th], (CDFG24).

R. McNees & C. Zwickel, *(Anti)-de Sitter with leaky boundaries and corners*, [arXiv:2512.03170](#)[hep-th], (CDFG24).

P. Pareek, P. Sollich, S. K. Nandi & L. Berthier *Scaling the glassy dynamics of active particles: Tunable fragility and reentrance*, [arXiv:2506.09589](#)[cond-mat.soft], (DFC24).

V. Perlick, *Characterisation of circular light rays in a plasma*, [arXiv:2502.18831](#)[gr-qc], (COZ24).

A. Siciliano, R. Pastore, F. Greco & F. Rusciano, *An Effective Volume Fraction Controls Both Dynamics and Thermodynamics in Vesicle Suspensions with Tunable Electrostatic Interactions*, [Ind. Eng. Chem. Res. 2025, 64, 38, 18938–18949](#), (DFC24).

H. Ubach, *Self-lensing of moving gravitational-wave sources can break the microlensing crossing timescale degeneracy*, [arXiv:2512.08898](#)[astro-ph.HE], (COZ24).

List of all visitors in 2025

A total of 988 scientists visited the ESI in 2025.

The gender distribution is as follows:

male: 702

female: 211

prefer not to disclose: 12

non-binary: 5

unspecified: 58

Affiliation by country:

ARG, Argentina: 4

AUS, Australia: 4

AUT, Austria: 263

BEL, Belgium: 20

BRA, Brazil: 2

BGR, Bulgaria: 1

CAN, Canada: 10

CHL, Chile: 1

CHN, China: 13

HRV, Croatia: 6

CYP, Cyprus: 1

CZE, Czech Republic: 22

DNK, Denmark: 7

ETH, Ethiopia: 1

FIN, Finland: 8

FRA, France: 83

DEU, Germany: 105

GRC, Greece: 6

HKG, Hong Kong: 1

HUN, Hungary: 6

IND, India: 2

IRL, Ireland: 1

ISR, Israel: 13

ITA, Italy: 91

JPN, Japan: 22

KAZ, Kazakhstan: 1

KOR, Korea (Republic of): 3

MEX, Mexico: 4

NLD, Netherlands: 20

NZL, New Zealand: 3
 NGA, Nigeria: 1
 NOR, Norway: 14
 POL, Poland: 37
 PRT, Portugal: 2
 ROU, Romania: 6
 SAU, Saudi Arabia: 2
 SRB, Serbia: 1
 SGP, Singapore: 6
 SVK, Slovakia: 2
 SVN, Slovenia: 5
 ESP, Spain: 45
 SWE, Sweden: 16
 CHE, Switzerland: 19
 TWN, Taiwan: 1
 TUR, Turkey: 1
 ARE, United Arab Emirates: 1
 GBR, United Kingdom of Great Britain and Northern Ireland: 38
 USA, United States of America: 90

The following codes indicate the association of visitors with specific ESI activities:

AFS25 = Structures in Banach Spaces
 AGW25 = Reverse Mathematics
 BLG25 = Degenerate and Singular PDEs
 BPS25 = Entanglement in Many-body Quantum Matter: Dynamics, Dissipation, Equilibration
 EM25 = ESI Medal Award Ceremony 2025
 EMV25 = Recent Perspectives on Non-crossing Partitions through Algebra, Combinatorics, and Probability
 FLF25 = Quantum Harmonic Analysis
 HSC25 = Quantum Many-body Systems and Bose-Einstein Condensation: A Mathematical Physics Perspective
 IMO25 = IMO 2025
 IS25 = Individual Visiting Scientists 2025
 JRF = Junior Research Fellow Programme
 LAD25 = Extremal Statistics in Biology
 LKS25 = Charged Soft Matter: Bridging Theory and Experiment
 LTV25 = Infinite-dimensional Geometry: Theory and Applications
 PHI25 = ISAPP2025: Gravitational Waves: From Theory to Detection
 RIT = Research in Teams Programme
 RSV25 = Free Boundary Problems
 SGH25 = Eisenstein Series, Spaces of Automorphic Forms, and Applications
 SRF = Senior Research Fellowship Programme
 TFB25 = Uniform Distribution of Sequences
 UHR25 = Putting the Cosmic Large-scale Structure on the Map: Theory Meets Numerics

Abanin Dmitry, Princeton U; 2025-06-02 - 2025-06-05, BPS25

Abbasi Neda, U Szczecin; 2025-09-07 - 2025-09-13, LKS25

Abdeljawad Ahmed, RICAM, Linz; 2025-05-05 - 2025-05-09, FLF25

Abels Helmut, U of Regensburg; 2025-11-10 - 2025-11-14, 2025-12-08 - 2025-12-12, RSV25
Abreu Luis Daniel, U of Vienna; 2025-05-05 - 2025-05-09, FLF25
Adeyemo Praise, U of Ibadan; 2025-05-17 - 2025-06-26, RIT25
Adžić Nataša, IPB, Belgrade; 2025-09-07 - 2025-09-12, LKS25
Afghani Farimani Reyhaneh, U of Vienna; 2025-09-08 - 2025-09-12, LKS25
Agam Oded, HU of Jerusalem; 2025-06-09 - 2025-06-22, LAD25
Agosti Abramo, U of Pavia; 2025-12-08 - 2025-12-13, RSV25
Aguilar Miguel, TU Vienna; 2025-06-30 - 2025-08-29, AGW25
Aguilera Juan, TU Vienna; 2025-06-23 - 2025-08-29, AGW25
Ai Wen-Yuan, HEPHY Vienna; 2025-07-07 - 2025-07-20, PHI25
Aidelsburger Monika, LMU Munich; 2025-05-20 - 2025-05-22, BPS25
Akagi Goro, Tohoku U; 2025-12-07 - 2025-12-13, RSV25
Akitsu Kazuyuki, KEK, Tsukuba; 2025-09-21 - 2025-09-28, UHR25
Akiyama Shigeki, U of Tsukuba; 2025-04-21 - 2025-04-26, TFB25
Albiac Fernando, Public U Navarra; 2025-03-16 - 2025-03-22, AFS25
Albuquerque Saulo, U Urbino; 2025-07-06 - 2025-07-20, PHI25
Alekshev Anton, U of Geneva; 2025-01-13 - 2025-01-15, LTV25; 2025-11-07 - 2025-11-09, EM25
Alexiou Terpsichori, U of Vienna; 2025-09-08 - 2025-09-12, LKS25
Aliaga Ramón, UPV Valencia; 2025-03-16 - 2025-03-21, AFS25
AlNajjar Aseel, KAUST, Thuwal; 2025-01-26 - 2025-02-01, LTV25
Alonso Monge David, U Oxford; 2025-09-21 - 2025-09-24, UHR25
Alvarez David, PAS; 2025-07-08 - 2025-07-18, PHI25
Alves Nuno, U of Vienna; 2025-10-07 - 2025-12-19, RSV25
Amir Ariel, Weizmann Institute, Rehovot; 2025-06-09 - 2025-06-20, LAD25
Andelman David, Tel Aviv U; 2025-09-07 - 2025-09-14, LKS25
Andersson Lars, BIMSA, Beijing; 2025-02-02 - 2025-02-10, RIT25
Andrade Pêdra, PLUS, Salzburg; 2025-02-23 - 2025-02-28, BLG25
Andretta Alessandro, U Torino; 2025-06-29 - 2025-07-06, AGW25
Aneke John Chukwunonso, U of Vienna; 2025-01-13 - 2025-02-14, LTV25
Angulo Raul, DIPC; 2025-09-22 - 2025-09-27, UHR25
Ansorena Jose, U Rioja; 2025-03-16 - 2025-03-22, AFS25
Antal Tibor, U of Edinburgh; 2025-06-08 - 2025-06-13, LAD25
Arbulú Felipe, Jules Vernes U; 2025-04-20 - 2025-04-25, TFB25
Arguillere Sylvain, U of Lille; 2025-02-02 - 2025-02-06, LTV25
Arildsen Mark, SISSA, Trieste; 2025-06-01 - 2025-06-07, BPS25
Arizmendi Echegaray Octavio, CIMAT, Guanajuato; 2025-02-16 - 2025-02-22, EMV25
Arnold Anton, TU Vienna; 2025-10-08 - 2025-11-21, RSV25
Arnold Douglas, U of Minnesota; 2025-11-06 - 2025-11-11, EM25
Arnoux Pierre, U Aix-Marseille; 2025-04-21 - 2025-04-25, TFB25
Ausserwöger Hannes, U of Cambridge; 2025-09-09 - 2025-09-12, LKS25
Austad Are, U Oslo; 2025-05-04 - 2025-05-10, FLF25
Aviles Antonio, U Murcia; 2025-03-17 - 2025-03-21, AFS25
Baake Michael, Bielefeld U; 2025-04-22 - 2025-04-25, TFB25
Bakhtawar Ayreena, IMPAN, Warsaw; 2025-04-21 - 2025-04-26, TFB25
Bakic Petar, U of Utah, Saltlake City; 2025-08-31 - 2025-09-05, SGH25
Balci Anna, Charles U, Prague; 2025-02-23 - 2025-02-28, BLG25
Ballauff Matthias, FU Berlin; 2025-09-07 - 2025-09-14, LKS25
Ballelli Matteo, Gran Sasso Science Institute, L'Aquila; 2025-07-07 - 2025-07-19, PHI25
Banecki Juliusz, Jagiellonian U, Krakow; 2025-03-17 - 2025-03-21, AFS25
Banu Rasila, U of Vienna; 2025-07-07 - 2025-07-18, PHI25
Banuls Mari Carmen, MPI of Quantum Optics, Garching; 2025-06-08 - 2025-06-13, 2025-05-18 - 2025-05-30, BPS25
Barbaresco Frédéric, Thalesgroup, Palaiseau; 2025-02-13 - 2025-02-14, LTV25
Bardarson Jens H, KTH Stockholm; 2025-05-11 - 2025-05-23, BPS25
Bargetz Christian, U of Innsbruck; 2025-03-16 - 2025-03-21, AFS25

Bartolomei Stefano, U degli Studi di Firenze; 2025-07-06 - 2025-07-19, PHI25
Bauer Martin, Florida State U, Tallahassee; 2025-02-01 - 2025-02-09, LTV25
Baumeister Barbara, Bielefeld U; 2025-02-16 - 2025-02-21, EMV25
Bayer Adrian E., Princeton U; 2025-09-22 - 2025-09-25, UHR25
Becher Veronica, U de Buenos Aires; 2015-04-19 - 2015-04-28, TFB25
Bellettini Costante, U College London; 2025-11-10 - 2025-11-14, RSV25
Beltita Daniel, IMAR, Bucharest; 2025-01-12 - 2025-01-18, LTV25
Beltram Vitja, Jozef Stefan Institute, Ljubljana; 2025-09-09 - 2025-09-12, LKS25
Beltran Daniel, CIEMAT; 2025-07-06 - 2025-07-18, PHI25
Benedikter Niels, U Milan; 2025-11-23 - 2025-11-29, HSC25
Benham Heidi, U of Connecticut; 2025-07-27 - 2025-08-09, AGW25
Benitez Miguel, USAL; 2025-01-04 - 2025-02-02, RIT25
Benjelloun Kenza, U Côte d'Azur, Nice; 2025-06-29 - 2025-07-05, AGW25
Ben-Shahar Sapir, U of Wisconsin-Madison; 2025-07-27 - 2025-08-19, 2025-07-21 - 2025-07-25, AGW25
Bergfeldt Aksel, ENS Paris; 2025-05-05 - 2025-05-09, FLF25
Berthé Valérie, Paris Cité U; 2025-04-21 - 2025-04-25, TFB25
Bertrand Jerome, IMT, Toulouse; 2025-02-02 - 2025-02-12, LTV25
Beyene Fufa, KUE; 2025-10-09 - 2025-12-08, JRF0125
Bianchi Emanuela, TU Vienna; 2025-09-08 - 2025-09-12, LKS25
Biane Philippe, U Gustave Eiffel, Champs-sur-Marne; 2025-02-15 - 2025-02-21, EMV25
Biberhofer Sascha, U of Vienna; 2025-09-03 - 2025-09-05, SGH25
Bienvenu Laurent, CNRS, Bordeaux; 2025-06-29 - 2025-07-20, AGW25
Bierbaumer Martin, U of Vienna; 2025-06-30 - 2025-06-30, IMO25
Bigo-Balland Hadrien, MyFit Solutions; 2025-02-03 - 2025-02-14, LTV25
Bilokopytov Eugene, U Alberta, Edmonton; 2025-03-16 - 2025-03-22, AFS25
Bimmermann Johanna, Ruhr U, Bochum; 2025-01-28 - 2025-01-31, LTV25
Binder Christa, TU Vienna; 2025-04-22 - 2025-04-22, TFB25
Bisson Olivier, INRIA at U Côte d'Azur; 2025-02-02 - 2025-02-14, LTV25
Blanco Pablo, NTNU, Trondheim; 2025-09-08 - 2025-09-12, LKS25
Blasius Don, UCLA; 2025-08-31 - 2025-09-06, SGH25
Blatt Simon, PLUS, Salzburg; 2025-02-23 - 2025-02-28, BLG25
Blohmman Christian, MPI for Mathematics, Bonn; 2025-01-10 - 2025-01-18, LTV25
Boccatto Chiara, U Pisa; 2025-11-22 - 2025-11-29, HSC25
Boffo Eugenia, Charles U, Prague; 2025-01-12 - 2025-01-17, LTV25
Bögelein Verena, PLUS, Salzburg; 2025-02-23 - 2025-02-28, BLG25; 2025-11-25 - 2025-11-29, RSV25
Borodulin-Nadzieja Piotr, U of Wroclaw; 2025-03-16 - 2025-03-25, AFS25
Bosma Wieb, Radboud U; 2025-04-21 - 2025-04-27, TFB25
Bošnjak Barbara, U Zagreb; 2025-08-31 - 2025-09-06, SGH25
Bot Radu Ioan, U of Vienna; 2025-02-24 - 2025-02-28, BLG25
Boutin Mireille, TU Eindhoven; 2025-02-10 - 2025-02-16, LTV25
Božejko Marek, U of Wroclaw; 2025-02-16 - 2025-02-21, EMV25
Božič Anže, Jozef Stefan Institute, Ljubljana; 2025-09-07 - 2025-09-13, LKS25
Bräuer Letizia, BRG Enns; 2025-10-26 - 2025-10-31, IMO25
Brennecke Christian, U Bonn; 2025-11-23 - 2025-11-26, HSC25
Brenner Naama, Technion Haifa; 2025-06-11 - 2025-06-18, LAD25
Bressan Alberto, Penn State U; 2025-12-08 - 2025-12-13, RSV25
Brigati Giovanni, ISTA, Klosterneuburg; 2025-12-08 - 2025-12-19, RSV25
Brink Janus, U of Vienna; 2025-07-07 - 2025-07-18, PHI25
Brooks Morris, U Zurich; 2025-11-26 - 2025-11-29, HSC25
Brown Francis, U Oxford; 2025-09-02 - 2025-09-05, SGH25
Bru Jean-Bernard, U Basque Country; 2025-11-23 - 2025-11-28, HSC25
Bruin Henk, U of Vienna; 2025-04-22 - 2025-04-25, TFB25
Buchmaier Bofill David, U of Vienna; 2025-06-30 - 2025-07-04, 2025-10-27 - 2025-10-31, IMO25
Bucic Matija, U of Vienna; 2025-10-27 - 2025-10-31, IMO25

Bucur Claudia, U degli Studi di Milano; 2025-09-28 - 2025-10-02, RSV25
Buet Blanche, U Paris-Saclay; 2025-02-02 - 2025-02-12, LTV25
Bui Philipp, Wiedner Gymnasium Wien; 2025-06-30 - 2025-07-04, IMO25
Bunnett Dominic, TU Berlin; 2025-06-11 - 2025-06-22, RIT25
Burde Dietrich, U of Vienna; 2025-03-23 - 2025-03-28, 2025-10-13 - 2025-10-17, IS25; 2025-01-13 - 2025-02-14, LTV25
Buriola Gabriele, U Verona; 2025-07-27 - 2025-08-01, AGW25
Bytchenkoff Dimitri, Austrian Academy of Sciences; 2025-05-05 - 2025-05-10, FLF25
Byun Sun-Sig, Seoul National U; 2025-02-24 - 2025-02-28, BLG25; 2025-09-24 - 2025-10-03, RSV25
Cabrelli Carlos, U of Buenos Aires; 2025-05-03 - 2025-05-10, FLF25
Calafat Alicia, U de Les Illes Balears; 2025-07-06 - 2025-07-19, PHI25
Calissano Anna, Imperial College London; 2025-02-09 - 2025-02-14, LTV25
Camerin Fabrizio, Lund U; 2025-09-07 - 2025-09-12, LKS25
Campbell Andrew, ISTA, Klosterneuburg; 2025-02-17 - 2025-02-21, EMV25
Campbell Jacob, U Virginia; 2025-02-16 - 2025-02-22, EMV25
Campo Livia, U of Vienna; 2025-05-17 - 2025-06-26, RIT25
Capel Angela, U of Cambridge; 2025-05-19 - 2025-05-24, BPS25
Caraci Cristina, U of Geneva; 2025-11-23 - 2025-11-30, HSC25
Carazzato Davide, U of Vienna; 2025-10-08 - 2025-12-12, RSV25
Carlucci Lorenzo, U Roma 1; 2025-08-24 - 2025-08-30, AGW25
Carmagnini Gianmarco, U degli Studi di Firenze; 2025-07-07 - 2025-07-18, PHI25
Carrasquilla Juan, ETH Zurich; 2025-05-19 - 2025-05-23, BPS25
Carrillo de la Plata Jose Antonio, U Oxford; 2025-10-01 - 2025-10-11, RSV25
Carroy Raphaël, U Torino; 2025-06-29 - 2025-07-05, AGW25
Carton Olivier, Paris Cité U; 2025-04-21 - 2025-04-25, TFB25
Caruso Isabella, U degli Studi di Firenze; 2025-07-07 - 2025-07-19, PHI25
Caselli Michele, SNS Pisa; 2025-09-29 - 2025-12-19, RSV25
Castillo Jesús, UNEX, Badajoz; 2025-03-16 - 2025-03-22, AFS25
Cattafi Francesco, U of Würzburg; 2025-01-12 - 2025-01-17, LTV25
Caux Jean-Sébastien, U of Amsterdam; 2025-05-12 - 2025-05-25, BPS25
Cavalleri Giulia, U of Pavia; 2025-12-01 - 2025-12-19, RSV25
Cea Fernández María, MPIQ, Munich; 2025-06-09 - 2025-06-13, BPS25
Ceballos Cesar, TU Graz; 2025-02-16 - 2025-02-18, EMV25
Celestino Rodriguez Adrian, TU Graz; 2025-02-16 - 2025-02-21, EMV25
Cenatiempo Serena, Gran Sasso Science Institute, L'Aquila; 2025-11-23 - 2025-11-28, HSC25
Cerbino Roberto, U of Vienna; 2025-11-07 - 2025-11-07, EM25
Cesaroni Annalisa, U Padova; 2025-11-09 - 2025-11-15, RSV25
Chambolle Antonin, CEREMADE, Paris; 2025-11-09 - 2025-11-14, RSV25
Chan William, TU Vienna; 2025-06-30 - 2025-08-30, AGW25
Charlier Emilie, U of Liège; 2025-04-21 - 2025-04-26, TFB25
Charpiat Guillaume, INRIA Saclay; 2025-02-02 - 2025-02-05, LTV25
Chavez Caliz Ana, U Heidelberg; 2025-01-19 - 2025-01-31, LTV25
Chen Shih-Yu, NTHU; 2025-08-31 - 2025-09-06, SGH25
Chepiga Natalia, TU Delft; 2025-05-17 - 2025-05-31, BPS25
Chiesa Andrea, U of Vienna; 2025-11-10 - 2025-11-14, RSV25
Chlebicka Iwona, U Warsaw; 2025-02-23 - 2025-02-28, BLG25
Cholak Peter, Notre Dame du Lac; 2025-08-02 - 2025-08-11, AGW25
Chopra Alakh Dhruv, Ghent U; 2025-07-28 - 2025-08-04, AGW25
Christiansen Martin Ravn, ISTA, Klosterneuburg; 2025-11-24 - 2025-11-28, HSC25
Chruściel Piotr T., U of Vienna; 2025-01-27 - 2025-01-31, LTV25
Ciani Simone, U Bologna; 2025-02-23 - 2025-02-28, BLG25
Ciarletta Pasquale, Politecnico Milano; 2025-12-06 - 2025-12-10, RSV25
Cirok Balázs, U of Szeged; 2025-07-06 - 2025-07-15, PHI25
Ciuclea Ioana, WU of Timisoara; 2025-01-12 - 2025-01-25, LTV25
Clozel Laurent, U Paris-Saclay; 2025-08-31 - 2025-09-06, SGH25

Codis Sandrine, CNRS/AIM; 2025-09-19 - 2025-09-26, UHR25
Colace Stefano, U Genova; 2025-07-07 - 2025-07-18, PHI25
Colli Pierluigi, U of Pavia; 2025-12-08 - 2025-12-12, RSV25
Conidis Chris, CUNY; 2025-08-20 - 2025-08-30, AGW25
Constantin Adrian, U of Vienna; 2025-07-15 - 2025-07-25, RIT25; 2025-11-07 - 2025-11-08, EM25
Coquinet Baptiste, ISTA; 2025-01-20 - 2025-01-24, LTV25
Cordero Elena, U Torino; 2025-05-05 - 2025-05-09, FLF25
Correggi Michele, Politecnico Milano; 2025-11-21 - 2025-11-28, HSC25
Cosserrat Oscar, Georg-August-U, Göttingen; 2025-01-19 - 2025-01-22, LTV25
Coutinho Catarina, U Bologna; 2025-02-09 - 2025-02-15, LTV25
Cuesta-Lazaro Carolina, Harvard U, Cambridge; 2025-09-21 - 2025-09-25, UHR25
Cuoco Elena, U Bologna; 2025-07-09 - 2025-07-14, PHI25
Dajani Karma, Utrecht U; 2025-04-21 - 2025-04-26, TFB25
Dalal Rahul, U of Vienna; 2025-09-01 - 2025-09-05, SGH25
Dall'Acqua Anna, U Ulm; 2025-11-09 - 2025-11-14, RSV25
Damialis Apostolos, EMS Berlin; 2025-11-09 - 2025-11-13, RSV25
D'Amico Guido, U of Parma; 2025-09-23 - 2025-09-26, UHR25
Davoli Elisa, TU Vienna; 2025-09-29 - 2025-12-19, RSV25
Debais Gabriel, Aalto U; 2025-09-08 - 2025-09-12, LKS25
De Bondt Ben, U Münster; 2025-03-16 - 2025-03-21, AFS25
De Filippis Cristiana, U of Parma; 2025-02-23 - 2025-02-27, BLG25
De Filippis Filomena, U of Parma; 2025-02-23 - 2025-02-28, BLG25
de Gosson Maurice, Acoustics Research Institute, Vienna; 2025-05-04 - 2025-05-09, FLF25
Dekimpe Karel, KU Leuven; 2025-10-13 - 2025-10-17, 2025-03-23 - 2025-03-28, IS25
DeLapo Andrew, U of Connecticut; 2025-07-27 - 2025-08-10, AGW25
Dellago Christoph, U of Vienna; 2025-06-10 - 2025-06-13, LAD25; 2025-11-07 - 2025-11-08, EM25
del Olmo Mariano, UVS; 2025-05-05 - 2025-05-10, FLF25
Delplanque William, U of Mons; 2025-07-06 - 2025-07-19, PHI25
De Masi Luigi, U of Trento; 2025-11-09 - 2025-11-13, RSV25
Deninger Christopher, U Münster; 2025-09-09 - 2025-09-21, IS25
De Philippis Guido, U Padua; 2025-12-09 - 2025-12-13, RSV25
de Rancourt Noé, U of Lille; 2025-03-16 - 2025-03-24, AFS25
Derbissaly Bauyrzhan, Institute of Mathematics and Mathematical Modeling; 2025-02-24 - 2025-02-28, BLG25
Dereudre David, U of Lille; 2025-11-24 - 2025-11-28, HSC25
Derezinski Jan, U Warsaw; 2025-11-24 - 2025-11-28, HSC25
De Rosa Antonio, U Bocconi, Milano; 2025-11-09 - 2025-11-16, RSV25
Desaules Jean-Yves, ISTA, Klosterneuburg; 2025-05-19 - 2025-06-13, BPS25
Deschamps Lina, U Heidelberg; 2025-01-27 - 2025-02-01, LTV25
Desio Davide, ISTA, Klosterneuburg; 2025-11-24 - 2025-11-28, HSC25
Deuchert Andreas, Virginia Tech; 2025-11-24 - 2025-11-30, HSC25
Dewage Vishwa, Clemson U; 2025-05-04 - 2025-05-13, FLF25
De Wilde Michiel, ISTA, Klosterneuburg; 2025-11-24 - 2025-11-28, HSC25
Dhont Jan, FZ Jülich; 2025-09-07 - 2025-09-12, LKS25
Diaf Farid, U Grenoble Alpes; 2025-01-26 - 2025-02-01, LTV25
Diaz Rojas Andres, U de Barcelona; 2025-08-24 - 2025-08-30, AGW25
Diaz Rojas Isabel, U of Sheffield; 2025-08-24 - 2025-08-30, AGW25
Dipierro Serena, UWA, Perth; 2025-09-28 - 2025-10-05, RSV25
Di Rocco Sandra, KTH Stockholm; 2025-11-07 - 2025-11-09, EM25
Dobrinen Natasha, Notre Dame du Lac; 2025-06-29 - 2025-07-24, AGW25
Dobrogowska Alina, U of Białystok; 2025-01-19 - 2025-01-26, LTV25
Doležalová Anna, Czech Academy of Sciences, Prague; 2025-01-26 - 2025-01-31, LTV25
Dolzmann Georg, U of Regensburg; 2025-12-08 - 2025-12-13, RSV25
Don Henk, Radboud U; 2025-04-22 - 2025-04-26, TFB25
Dong Hongjie, Brown U, Providence; 2025-02-23 - 2025-03-01, BLG25

Dooley Gavin, Notre Dame du Lac; 2025-07-27 - 2025-08-07, AGW25
Dörfler Monika, U of Vienna; 2025-05-05 - 2025-05-09, FLF25
Dorpalen-Barry Galen, TAMU, College Station; 2025-02-17 - 2025-02-22, EMV25
Douka Styliani, INRIA Paris; 2025-02-04 - 2025-02-06, LTV25
Douvropoulos Theodosios, Brandeis U; 2025-02-16 - 2025-02-22, EMV25
Dowling Neil, U Cologne; 2025-05-27 - 2025-05-31, BPS25
Drnota Michael, TU Vienna; 2025-04-22 - 2025-04-25, TFB25
Dubail Jérôme, U Strasbourg; 2025-05-11 - 2025-05-23, BPS25
Duits Remco, TU Eindhoven; 2025-02-10 - 2025-02-16, LTV25
Dumont Théo, U Gustave Eiffel, Paris; 2025-02-02 - 2025-02-15, LTV25
Dupletsa Ulyana, HEPHY Vienna; 2025-07-07 - 2025-07-18, PHI25
Duzaar Frank, PLUS, Salzburg; 2025-02-23 - 2025-02-28, BLG25; 2025-11-23 - 2025-11-29, RSV25
Dzhafarov Damir, U of Connecticut; 2025-07-27 - 2025-08-10, AGW25
Ebrahimi-Fard Kurusch, NTNU, Trondheim; 2025-02-16 - 2025-02-21, EMV25
Eichmair Michael, U of Vienna; 2025-11-07 - 2025-11-08, EM25
Eisenkölbl Theresia, U of Vienna; 2025-06-30 - 2025-07-04, 2025-10-27 - 2025-10-31, IMO25
Ejsmont Wiktor, UST Wroclaw; 2025-02-16 - 2025-02-21, EMV25
Elenius Theo, Aalto U; 2025-02-23 - 2025-03-01, BLG25
Elezgaray Juan, CNRS, U of Bordeaux; 2025-09-07 - 2025-09-15, LKS25
Elzokm Mohamed Samy Abdelmotteleb, Gran Sasso Science Institute, L'Aquila; 2025-07-06 - 2025-07-19, PHI25
Enstad Ulrik, U Oslo; 2025-05-04 - 2025-05-11, FLF25
Erlach Alexander, CNRS -U Grenoble Alpes; 2025-12-07 - 2025-12-13, RSV25
Espinoza Bastian, U of Liège; 2025-04-21 - 2025-04-26, TFB25
Esposito Chiara, U of Salerno; 2025-01-12 - 2025-01-19, LTV25
Essler Fabian, U Oxford; 2025-05-18 - 2025-05-23, BPS25
Estrada Llesta Alejandro, U of Vienna; 2025-09-22 - 2025-09-26, UHR25
Everts Jeffrey, U Warsaw; 2025-09-07 - 2025-09-13, LKS25
Ez Zarraq Mohamed, U of Vienna; 2025-09-01 - 2025-09-05, SGH25
Fabian Marián, Czech Academy of Sciences, Prague; 2025-03-16 - 2025-03-21, AFS25
Facchinetti Luca, U of Udine; 2025-07-27 - 2025-08-01, AGW25
Fahrecker Maximilian, U of Vienna; 2025-07-07 - 2025-07-18, PHI25
Fang Yuzhou, HIT, Harbin; 2025-02-23 - 2025-03-01, BLG25
Fanizza Alberto, TU Vienna; 2025-09-29 - 2025-12-19, RSV25
Farkas Barnabas, TU Vienna; 2025-03-17 - 2025-03-21, AFS25
Fathi Max, U Paris Cité; 2025-09-29 - 2025-12-19, RSV25
Faulhuber Markus, U of Vienna; 2025-05-05 - 2025-05-09, FLF25
Feher Laszlo, U of Szeged; 2025-01-26 - 2025-02-02, LTV25
Feichtinger Hans G., U of Vienna; 2025-05-05 - 2025-05-09, FLF25
Feitosa de Almeida Guilherme, SISSA, Trieste; 2025-02-02 - 2025-02-07, LTV25
Feldman William, U of Utah, Saltlake City; 2025-12-05 - 2025-12-12, RSV25
Ferdinand Anna, MIT, Cambridge; 2025-01-12 - 2025-02-12, RIT25
Ferlandina Francesca, U of Innsbruck; 2025-11-25 - 2025-11-28, HSC25
Fernández Anton, TU Vienna; 2025-06-30 - 2025-08-29, AGW25
Fernández-Duque David, U of Barcelona; 2025-08-24 - 2025-08-30, AGW25
Fernandez-Real Xavier, EPFL, Lausanne; 2025-09-28 - 2025-10-01, RSV25
Ferrari Franco, U Szczecin; 2025-09-07 - 2025-09-13, LKS25
Feydy Jean, INRIA Paris; 2025-02-03 - 2025-02-14, LTV25
Fischer Julian, ISTA, Klosterneuburg; 2025-09-29 - 2025-12-19, RSV25
Fischer Vera, U of Vienna; 2025-03-17 - 2025-03-21, AFS25
Fishel Susanna, ASU, Phoenix; 2025-02-16 - 2025-02-23, EMV25
Flores Steph, U Manchester; 2025-09-07 - 2025-09-13, LKS25
Florit-Simon Enric, ETH Zurich; 2025-11-11 - 2025-11-15, RSV25
Flóss Thomas, U of Vienna; 2025-09-22 - 2025-09-26, UHR25
Foffi Giuseppe, Paris-Saclay U; 2025-11-06 - 2025-11-09, EM25

Foissy Loïc, U of Littoral Côte d'Opale, Dunkerque; 2025-02-16 - 2025-02-22, EMV25
 Fokina Ekaterina, TU Vienna; 2025-06-30 - 2025-08-31, AGW25
 Fokkink Robbert, TU Delft; 2025-04-22 - 2025-04-26, TFB25
 Fonseca Irene, Carnegie Mellon U, Pittsburgh; 2025-10-11 - 2025-10-15, 2025-10-17 - 2025-10-18, RSV25
 Fornoni Matteo, U Milan; 2025-12-08 - 2025-12-13, RSV25
 Fotiadis Anastasios, UCB Lyon; 2025-01-19 - 2025-02-01, LTV25
 Fournais Soren, U of Copenhagen; 2025-11-23 - 2025-11-26, HSC25
 Fraenkel Shachar, Tel Aviv U; 2025-05-25 - 2025-06-07, BPS25
 Francois Anton, ENS Paris-Saclay; 2025-02-03 - 2025-02-14, LTV25
 Franco Rubio Adrián, U of Vienna; 2025-05-18 - 2025-06-12, BPS25
 Francuz Anna, U of Vienna; 2025-05-12 - 2025-06-13, BPS25
 Frank Rupert, LMU Munich; 2025-11-23 - 2025-11-28, HSC25
 Franklin Johanna, Hofstra U; 2025-06-29 - 2025-07-13, 2025-07-19 - 2025-07-28, AGW25
 Fredenhagen Stefan, U of Vienna; 2025-11-07 - 2025-11-07, EM25
 Freund Anton, U of Würzburg; 2025-07-27 - 2025-08-02, AGW25
 Friedlander Tamar, HU of Jerusalem; 2025-06-09 - 2025-06-22, LAD25
 Friedman Sy David, U of Vienna; 2025-06-30 - 2025-07-04, AGW25
 Fu Yuxiao, U of Connecticut; 2025-07-27 - 2025-08-01, AGW25
 Fukao Takeshi, Ryukoku U; 2025-12-08 - 2025-12-13, RSV25
 Fulsche Robert, Leibniz U Hannover; 2025-05-04 - 2025-05-09, FLF25
 Fürthauer Sebastian, TU Vienna; 2025-06-10 - 2025-06-13, LAD25
 Gadsby Elijah, CUNY; 2025-07-27 - 2025-08-09, AGW25
 Gagnon Lucas, York U, Toronto; 2025-02-16 - 2025-02-22, EMV25
 Galluzzi Francesca, FORTH; 2025-09-07 - 2025-09-13, LKS25
 Gamsakhurdia Mariami, TU Wien; 2025-07-30 - 2025-08-15, AGW25
 Gan Wee Teck, U of Singapore; 2025-08-31 - 2025-09-06, SGH25
 Gao Su, Nankai U; 2025-06-28 - 2025-07-05, AGW25
 García Bravo Miguel, Complutense U of Madrid; 2025-03-17 - 2025-03-21, AFS25
 Garcke Harald, U of Regensburg; 2025-11-10 - 2025-11-14, 2025-12-08 - 2025-12-12, RSV25
 Garre Rubio Jose, IFT UAM-CSIC, Madrid; 2025-05-26 - 2025-05-30, BPS25
 Gawlak Dylan, Queen's U, Kingston; 2025-02-17 - 2025-02-21, EMV25
 Gazeau Jean Pierre, Paris Cité U; 2025-05-04 - 2025-05-10, FLF25
 Gelman Ronny, HU of Jerusalem; 2025-02-03 - 2025-02-08, LTV25
 Geltner Noah, TU Vienna; 2025-10-07 - 2025-10-09, RSV25
 Gençel Yavuz Can, U Zurich; 2025-07-06 - 2025-07-19, PHI25
 Genovesi Giorgio, U Leeds; 2025-07-27 - 2025-08-10, AGW25
 Gerland Ulrich, TU Munich; 2025-06-09 - 2025-06-14, LAD25
 Gess Benjamin, TU Berlin; 2025-02-24 - 2025-02-28, BLG25
 Giacchi Gianluca, U Svizzera Italiana; 2025-05-05 - 2025-05-09, FLF25
 Giacomelli Emanuela L., U Milan; 2025-11-23 - 2025-11-29, HSC25
 Gianazza Ugo, U of Pavia; 2025-02-23 - 2025-02-28, BLG25
 Gill Kenneth, La Salle U, Philadelphia; 2025-07-24 - 2025-08-04, AGW25
 Giorgini Stefano, U of Trento; 2025-11-23 - 2025-11-29, HSC25
 Giorgio Rossella, TU Vienna; 2025-02-27 - 2025-02-28, BLG25; 2025-09-29 - 2025-12-19, RSV25
 Girardot Théotime, Gran Sasso Science Institute, L'Aquila; 2025-11-23 - 2025-11-29, HSC25
 Giuliani Alessandro, U Roma III; 2025-11-24 - 2025-11-28, HSC25
 Giulini Domenico, Leibniz U Hannover; 2025-11-06 - 2025-11-09, EM25
 Gjertsen Michael, NTNU, Trondheim; 2025-05-04 - 2025-05-09, FLF25
 Gjetaj Oriola, Ghent U; 2025-07-27 - 2025-08-10, 2025-08-25 - 2025-08-29, AGW25
 Glatz Valentin, BG/BRG Graz; 2025-07-02 - 2025-07-04, IMO25
 Gleghorn Sarah, U of Cambridge; 2025-07-26 - 2025-08-02, AGW25
 Gmeineder Franz, U of Konstanz; 2025-02-23 - 2025-02-28, BLG25
 Goh Jun Le, NUS, Singapore; 2025-07-19 - 2025-07-30, 2025-06-28 - 2025-07-12, AGW25
 Goimil-García Manuel, NBI, Copenhagen; 2025-07-06 - 2025-07-18, PHI25

Goldenberg Louis, DS; 2025-02-10 - 2025-02-14, LTV25
 Goldman Michael, CNRS & Ecole Polytechnique, Palaiseau; 2025-11-10 - 2025-11-14, RSV25
 Goliński Tomasz, U of Białystok; 2025-01-12 - 2025-02-02, LTV25
 Gomes Pereira Luís, UC, Santa Barbara; 2025-02-09 - 2025-02-15, LTV25
 Gomez Samuel, U de Les Illes Balears; 2025-07-06 - 2025-07-19, PHI25
 Gonzalez David, UC, Berkeley; 2025-08-12 - 2025-08-24, AGW25
 Goriely Zakkai, UC, Berkeley; 2025-07-27 - 2025-08-02, AGW25
 Gorny Wojciech, U of Vienna; 2025-02-24 - 2025-02-28, BLG25
 Grabner Peter, TU Graz; 2025-04-21 - 2025-04-25, TFB25
 Grabowska Katarzyna, U Warsaw; 2025-01-19 - 2025-01-26, LTV25
 Grabowski Janusz, IMPAN, Warsaw; 2025-01-12 - 2025-02-02, LTV25
 Grana Mariana, IPhT Saclay; 2025-11-07 - 2025-11-08, EM25
 Grancanin Liliana, U of Vienna; 2025-07-07 - 2025-07-07, PHI25
 Grasselli Maurizio, Politecnico Milano; 2025-12-07 - 2025-12-10, RSV25
 Grbac Neven, UNIPU; 2025-08-31 - 2025-09-06, SGH25
 Grecu Mihail, BRG Wien 22; 2025-07-01 - 2025-07-04, 2025-10-27 - 2025-10-31, IMO25
 Green Andrew, U College London; 2025-05-15 - 2025-05-23, BPS25
 Greenberg Noam, Victoria U of Wellington; 2025-06-26 - 2025-07-26, AGW25
 Greganić Lovro, UNIPU; 2025-08-31 - 2025-09-06, SGH25
 Gregoriades Vassilios, National and Technical U of Athens; 2025-06-29 - 2025-07-05, AGW25
 Grilli Elisa, NBI, Copenhagen; 2025-07-06 - 2025-07-16, PHI25
 Grobner Harald, U of Vienna; 2025-09-01 - 2025-09-05, SGH25
 Gröchenig Karlheinz, U of Vienna; 2025-05-05 - 2025-05-09, FLF25
 Grochulska Zofia, JYU, Jyväskylä; 2025-01-26 - 2025-02-01, LTV25
 Gronau Madalena, LfZ Berlin; 2025-11-12 - 2025-11-13, IS25
 Gronau Martin, LfZ Berlin; 2025-11-12 - 2025-11-13, IS25
 Gross David, U Cologne; 2025-05-06 - 2025-05-09, FLF25
 Grosse Harald, U of Vienna; 2025-11-24 - 2025-11-28, HSC25; 2025-06-13 - 2025-06-20, IS25
 Gruza Piotr, U Warsaw; 2025-06-29 - 2025-07-06, 2025-07-27 - 2025-08-04, AGW25
 Gudapati Nishanth Abu, College of the Holy Cross, Worcester; 2025-06-13 - 2025-07-12, IS25
 Guerrero Viu Juan, U Zaragoza; 2025-03-16 - 2025-03-22, AFS25
 Guet Calin, ISTA, Klosterneuburg; 2025-06-10 - 2025-06-13, LAD25
 Gumber Anupam, U of Vienna; 2025-05-05 - 2025-05-09, FLF25
 Gurevich Nadya, Ben-Gurion U, Beer-Sheva; 2025-08-31 - 2025-09-07, SGH25
 Gutenthaler Philipp, BRG Schloss Wagrain Vöcklabruck; 2025-06-30 - 2025-07-04, IMO25
 Haberberger Florian, LMU Munich; 2025-11-23 - 2025-11-29, HSC25
 Habermann Karen, U Warwick; 2025-02-01 - 2025-02-15, LTV25
 Hagger Raffael, Christian-Albrechts-U, Kiel; 2025-05-04 - 2025-05-09, FLF25
 Hahn Oliver, U of Vienna; 2025-07-07 - 2025-07-11, PHI25; U of Vienna; 2025-09-22 - 2025-09-26, UHR25
 Haiman Zoltan, ISTA, Klosterneuburg; 2025-07-07 - 2025-07-11, PHI25; 2025-09-22 - 2025-09-26, UHR25
 Hainzl Christian, LMU Munich; 2025-11-23 - 2025-11-29, HSC25
 Hallatschek Oskar, UC, Berkeley; 2025-06-11 - 2025-06-15, LAD25
 Haller Stefan, U of Vienna; 2025-01-13 - 2025-02-14, LTV25
 Hammatt Ellen, TU Wien; 2025-06-30 - 2025-08-29, AGW25
 Ha Quang Minh, RIKEN AIP, Tokyo; 2025-02-05 - 2025-02-15, LTV25
 Harmat Adam, Aalto U; 2025-09-08 - 2025-09-12, LKS25
 Harms Jan, Gran Sasso Science Institute, L'Aquila; 2025-07-15 - 2025-07-18, PHI25
 Hartman Emmanuel, U of Houston; 2025-02-03 - 2025-02-14, LTV25
 Hauke Philipp, U of Trento; 2025-05-20 - 2025-05-23, BPS25
 Henriques Eurica, U de Trás-os-Montes; 2025-02-23 - 2025-02-28, BLG25
 Hensel Sebastian, U Leipzig; 2025-11-09 - 2025-11-12, RSV25
 Hida Haruzo, UCLA; 2025-08-31 - 2025-09-05, SGH25
 Hirst Jeffry, App State; 2025-08-03 - 2025-08-10, AGW25

Hirvonen Peter, TU Vienna; 2025-10-07 - 2025-10-09, RSV25
Ho Wen Wei, NUS, Singapore; 2025-05-18 - 2025-05-25, BPS25
Hoang André H., U of Vienna; 2025-01-03 - 2025-02-22, RIT25
Hobson-Gutierrez Spencer, NYU, New York; 2025-06-09 - 2025-06-13, LAD25
Hohloch Sonja, U Antwerpen; 2025-01-21 - 2025-01-26, LTV25
Holcman David, ENS Paris; 2025-06-08 - 2025-06-13, LAD25
Horowitz Ben, Kavli IPMU; 2025-09-21 - 2025-09-26, UHR25
Hou Edward, Caltech; 2025-06-29 - 2025-07-05, AGW25
Hou Jiamin, U of Cambridge; 2025-09-19 - 2025-09-27, UHR25
Houry Guillaume, INRIA Paris; 2025-02-03 - 2025-02-14, LTV25
Hutter Anne, U of Vienna; 2025-09-22 - 2025-09-26, UHR25
Iannella Martina, TU Wien; 2025-06-30 - 2025-07-04, AGW25
Ilija Panagiotis, CyI; 2025-09-08 - 2025-09-12, LKS25
Ingall Corrie, U of Connecticut; 2025-07-24 - 2025-08-04, AGW25
Ingmanns Jonas, ISTA, Klosterneuburg; 2025-11-10 - 2025-11-14, 2025-12-09 - 2025-12-12, RSV25
Inguglia Gianluca, HEPHY Vienna; 2025-07-07 - 2025-07-18, PHI25
Isfan Maria-Catalina, ISP; 2025-07-06 - 2025-07-19, PHI25
Ishida Sadashige, ISTA; 2025-01-13 - 2025-02-14, LTV25
Ito Hiroaki, MontanU Leoben; 2025-04-22 - 2025-04-25, TFB25
Izmestiev Ivan, TU Vienna; 2025-10-29 - 2025-10-30, IMO25
Izosimov Anton, U of Arizona, Tucson; 2025-01-18 - 2025-01-25, LTV25
Jachimiek Sebastian, U of Wroclaw; 2025-03-16 - 2025-03-22, AFS25
Jacobsen-Grocott Josiah, NTU Singapore; 2025-06-27 - 2025-07-13, AGW25
Jain Kavita, JNCASR, Jakkur; 2025-06-09 - 2025-06-14, LAD25
Jamieson Drew, MPI for Astrophysics, Garching; 2025-09-21 - 2025-09-27, UHR25
Janssens Bas, TU Delft; 2025-01-19 - 2025-01-25, LTV25
Januszewski Fabian, U of Paderborn; 2025-08-31 - 2025-09-05, SGH25
Japón María, U of Seville; 2025-03-15 - 2025-03-21, AFS25
Jasche Jens, U Stockholm; 2025-09-22 - 2025-09-26, UHR25
Jauslin Ian, Rutgers U; 2025-11-26 - 2025-11-29, HSC25
Jeon Hanul, Cornell U, Ithaca; 2025-06-23 - 2025-07-02, AGW25
Jin Tianling, HKUST, Hong Kong; 2025-02-24 - 2025-02-28, BLG25
Josuat-Vergés Matthieu, Paris Cité U; 2025-02-16 - 2025-02-21, EMV25
Jotz Madeleine, U of Würzburg; 2025-01-12 - 2025-01-17, LTV25
Junge Lukas, U of Copenhagen; 2025-11-23 - 2025-11-28, HSC25
Jüngel Ansgar, TU Vienna; 2025-11-24 - 2025-12-05, RSV25
Kacprzak Tomasz, LMU Munich; 2025-09-21 - 2025-09-26, UHR25
Kaduck Grant, Queen's U, Kingston; 2025-02-16 - 2025-02-22, EMV25
Kaiser Christian, MPIM, Bonn; 2025-08-30 - 2025-09-08, SGH25
Kąkol Jerzy, Adam Mickiewicz University in Poznan; 2025-03-16 - 2025-03-22, AFS25
Kalampoglia-Evangelinou Katerina, U Athens; 2025-02-16 - 2025-02-22, EMV25
Kalck Martin, U of Graz; 2025-02-16 - 2025-02-21, EMV25
Kalenda Ondřej, Charles U, Prague; 2025-03-16 - 2025-03-22, AFS25
Kán Peter, TU Vienna; 2025-02-12 - 2025-02-12, LTV25
Karácsonyi Kata, U of Szeged; 2025-07-06 - 2025-07-18, PHI25
Karakhanyan Aram, U of Edinburgh; 2025-10-01 - 2025-10-03, RSV25
Kempe Julia, CIMS, New York; 2025-11-07 - 2025-11-08, EM25
Kepřta Vojtěch, Charles U, Prague; 2025-09-08 - 2025-09-12, LKS25
Kerschbaumer Aron, ISTA, Klosterneuburg; 2025-05-12 - 2025-06-12, BPS25
Kessler Nathan, ENS Paris-Saclay; 2025-02-09 - 2025-02-15, LTV25
Kholmatorov Shokhrukh, U of Vienna; 2025-09-29 - 2025-12-19, RSV25
Kim Sunghan, Uppsala U; 2025-02-22 - 2025-03-01, BLG25; 2025-09-28 - 2025-10-02, RSV25
Kim Sung Woon, Jeju National U; 2025-01-15 - 2025-02-14, LTV25
Kim Wontae, Uppsala U; 2025-02-23 - 2025-02-28, BLG25
Kinnunen Juha, Aalto U; 2025-02-23 - 2025-03-01, BLG25

Kiukas Jukka, Aberystwyth; 2025-05-04 - 2025-05-11, FLF25
 Klingler Andreas, U of Vienna; 2025-05-12 - 2025-06-13, BPS25
 Klotz Andreas, U of Vienna; 2025-05-05 - 2025-05-09, FLF25
 Ko Liling, TU Vienna; 2025-06-30 - 2025-08-29, AGW25
 Kock Joachim, U Autonoma, Barcelona; 2025-02-15 - 2025-02-22, EMV25
 Koekoek Gideon, U of Maastricht; 2025-07-05 - 2025-07-20, PHI25
 Köhldorfer Lukas, Acoustics Research Institute, Vienna; 2025-05-05 - 2025-05-09, FLF25
 Kohlenbach Ulrich, TU Darmstadt; 2025-08-23 - 2025-08-29, AGW25
 Kolan Dikla, Haifa U; 2025-09-07 - 2025-09-13, LKS25
 Kolisnyk Dmytro, ISTA, Klosterneuburg; 2025-05-12 - 2025-06-12, BPS25
 Kołodziejczyk Leszek, U Warsaw; 2025-08-03 - 2025-08-09, AGW25
 Kondev Jane, Brandeis U; 2025-06-09 - 2025-06-14, LAD25
 Kormos Marton, BME, Budapest; 2025-05-18 - 2025-05-30, BPS25
 Korpalski Maciej, U of Wrocław; 2025-03-16 - 2025-03-22, AFS25
 Košován Peter, Charles U, Prague; 2025-09-08 - 2025-09-12, LKS25
 Koszmider Piotr, IMPAN, Warsaw; 2025-03-16 - 2025-03-20, AFS25
 Koumamos Konstantinos, U Sussex; 2025-10-06 - 2025-10-20, RSV25
 Kouptchinsky Thibaut, TU Wien; 2025-06-30 - 2025-08-29, AGW25
 Kozlov Vladimir, Linköping U; 2025-07-05 - 2025-07-25, 2025-09-14 - 2025-09-19, RIT25
 Kraaikamp Cor, TU Delft; 2025-04-21 - 2025-04-26, TFB25
 Krattenthaler Christian, U of Vienna; 2025-02-17 - 2025-02-21, EMV25
 Krawczyk Elzbieta (Ela), U of Vienna; 2025-04-20 - 2025-04-27, TFB25
 Kreczman Savinien, U of Liège; 2025-04-21 - 2025-04-25, TFB25
 Krichevskiy Daniil, U. of Stavanger; 2025-07-07 - 2025-07-18, PHI25
 Kriventsov Dennis, Rutgers U; 2025-09-28 - 2025-10-04, RSV25
 Kruschewski Jan, TU Vienna; 2025-06-30 - 2025-07-03, AGW25
 Kružík Martin, Czech Academy of Sciences, Prague; 2025-12-08 - 2025-12-12, RSV25
 Kubin Anna, TU Vienna; 2025-12-10 - 2025-12-12, RSV25
 Kubiś Wiesław, Academy of Sciences, Prague; 2025-03-17 - 2025-03-25, AFS25
 Kułaga-Przymus Joanna, NCU, Torun; 2025-04-22 - 2025-04-26, TFB25
 Kull Ilya, U of Vienna; 2025-05-12 - 2025-06-13, BPS25
 Kumazaki Kota, Kyoto U of Education; 2025-12-08 - 2025-12-13, RSV25
 Küng Richard, JKU, Linz; 2025-05-06 - 2025-05-08, FLF25
 Kuzmov Maksym, BRG1; 2025-10-28 - 2025-10-31, IMO25
 Kwaśnicki Mateusz, UST Wrocław; 2025-09-29 - 2025-10-03, RSV25
 Labbé Sebastien, U Bordeaux; 2025-04-21 - 2025-04-25, TFB25
 Lacík Igor, SAS, Bratislava; 2025-09-08 - 2025-09-12, LKS25
 Lacoste David, ESPCI, Paris; 2025-06-08 - 2025-06-15, LAD25
 Lam Kei Fong Andrew, Hong Kong Baptist U; 2025-12-09 - 2025-12-12, RSV25
 Lampart Jonas, U de Bourgogne, Dijon; 2025-11-23 - 2025-11-28, HSC25
 Lamy Xavier, IMT, Toulouse; 2025-11-09 - 2025-11-15, RSV25
 Langen Tim, TU Vienna; 2025-05-21 - 2025-05-21, BPS25
 Langeveld Niels, MontanU Leoben; 2025-04-21 - 2025-04-25, TFB25
 Langs Georg, Med U Vienna; 2025-02-14 - 2025-02-14, LTV25
 Lankester-broche Garance, U of Vienna; 2025-07-07 - 2025-07-18, PHI25
 Lanasse Francois, CEA Paris-Saclay; 2025-09-21 - 2025-09-26, UHR25
 Lapenna Michela, U Bologna; 2025-02-09 - 2025-02-14, LTV25
 Lapid Erez, Weizmann Institute, Rehovot; 2025-05-15 - 2025-05-25, 2025-01-08 - 2025-01-22, 2025-03-12 - 2025-03-26, RIT25
 Lapid Erez, Weizmann Institute, Rehovot; 2025-08-30 - 2025-09-08, 2025-09-12 - 2025-09-14, SGH25
 Larotonda Gabriel, U of Buenos Aires; 2025-01-14 - 2025-02-06, LTV25
 Larson Ronald, U of Michigan, Ann Arbor; 2025-09-07 - 2025-09-12, LKS25
 Lasarzik Robert, WIAS, Berlin; 2025-10-24 - 2025-11-07, 2025-10-18 - 2025-10-24, 2025-12-08 - 2025-12-12, RSV25
 Läuchli Andreas, EPFL, Lausanne; 2025-05-18 - 2025-05-20, BPS25

Lauritsen Asbjorn Baekgaard, U Paris-Dauphine; 2025-11-23 - 2025-11-29, HSC25
Laustsen Niels, Lancaster U; 2025-03-15 - 2025-03-20, AFS25
Laux Tim, U Heidelberg; 2025-11-10 - 2025-11-13, RSV25
Lavaux Guilhem, IAP, Paris; 2025-09-22 - 2025-09-26, UHR25
Lazar Alexander, ULB, Brussels; 2025-02-16 - 2025-02-22, EMV25
Lazar Vlad, Ghent U; 2025-07-27 - 2025-08-02, AGW25
Le Brigant Alice, Panthéon-Sorbonne, U Paris 1; 2025-02-02 - 2025-02-06, LTV25
Leclercq Florent, IAP, Paris; 2025-09-20 - 2025-09-26, UHR25
Lecomte Dominique, SU, Paris; 2025-06-29 - 2025-07-04, AGW25
Lee Jinyeop, U of Basel; 2025-11-23 - 2025-11-29, HSC25
Lehfuß Katharina, U of Vienna; 2025-05-19 - 2025-05-21, BPS25
Lehner Franz, TU Graz; 2025-02-16 - 2025-02-21, EMV25
Leiderman Arkady, Ben-Gurion U, Beer-Sheva; 2025-03-17 - 2025-03-24, AFS25
Lemm Marius, U Tübingen; 2025-11-23 - 2025-11-27, HSC25
Lenarcic Zala, Jozef Stefan Institute, Ljubljana; 2025-05-26 - 2025-06-07, BPS25
Leonard Julian, ISTA, Klosterneuburg; 2025-05-19 - 2025-05-22, BPS25
Leopold Nikolai, Constructor U.; 2025-11-24 - 2025-11-28, HSC25
Leslie Spencer, Boston College; 2025-08-31 - 2025-09-06, SGH25
Levicán Fabián, U of Vienna; 2025-05-17 - 2025-06-25, RIT25
Levien Ethan, Dartmouth College; 2025-06-09 - 2025-06-13, LAD25
Levine Herbert, Northeastern U, Boston; 2025-06-09 - 2025-06-13, LAD25
Lewicka Marta, U Pittsburgh; 2025-12-07 - 2025-12-15, RSV25
Lewin Mathieu, Paris-Dauphine; 2025-11-23 - 2025-11-26, HSC25
Li Jianrong, U of Vienna; 2025-02-17 - 2025-02-21, EMV25
Li Linhan, U of Edinburgh; 2025-02-23 - 2025-02-28, BLG25
Li Zheng, U of Pavia; 2025-02-23 - 2025-02-28, BLG25
Liao Naian, PLUS, Salzburg; 2025-02-23 - 2025-02-28, BLG25
Likos Christos, U of Vienna; 2025-09-08 - 2025-09-12, LKS25
Linke Laila, U of Innsbruck; 2025-09-21 - 2025-09-26, UHR25
List Florian, MPI for Astrophysics, Garching; 2025-09-21 - 2025-09-26, UHR25
Liu Jia, Kavli IPMU; 2025-09-21 - 2025-09-27, UHR25
Liu Jiakun, U Sydney; 2025-09-28 - 2025-10-04, RSV25
Liu Lu, Central South University; 2025-08-04 - 2025-08-09, AGW25
Ljubotina Marko, TU Munich; 2025-05-18 - 2025-05-24, BPS25
Lokharu Evgeniy, Lund U; 2025-07-05 - 2025-07-25, 2025-12-08 - 2025-12-12, RIT25
Lombardini Luca, U of Vienna; 2025-09-29 - 2025-12-19, RSV25
Longo Alessandro, INFN, Firenze; 2025-07-05 - 2025-07-21, PHI25
López-Abad Jordi, UNED Madrid; 2025-03-16 - 2025-03-26, AFS25
Loridant Benoît, MontanU Leoben; 2025-04-22 - 2025-04-25, TFB25
Lubarsky Robert, FAU, Boca Ratón; 2025-06-23 - 2025-06-27, 2025-06-29 - 2025-07-05, AGW25
Lücke Philipp, U Hamburg; 2025-06-29 - 2025-07-04, AGW25
Luef Franz, NTNU, Trondheim; 2025-05-06 - 2025-05-10, FLF25
Luitz David, U Bonn; 2025-05-20 - 2025-05-28, BPS25
Lukina Olga, Leiden U; 2025-04-21 - 2025-04-26, TFB25
Lund Mikael, Lund U; 2025-09-08 - 2025-09-12, LKS25
Lunghini Lorenzo, U Napoli; 2025-07-06 - 2025-07-19, PHI25
Maas Jan, ISTA, Klosterneuburg; 2025-09-29 - 2025-12-19, RSV25
MacLaurin James, NJIT, Newark; 2025-06-09 - 2025-06-14, LAD25
Mahler Stella, TU Vienna; 2025-07-29 - 2025-07-29, AGW25
Mahnkopf Joachim, U of Vienna; 2025-09-01 - 2025-09-05, SGH25
Maier Levin, U Heidelberg; 2025-01-22 - 2025-01-30, 2025-02-03 - 2025-02-09, LTV25
Maignant Elodie, Zuse, Berlin; 2025-02-02 - 2025-02-15, LTV25
Maiti Rajesh Kumar, HEPHY Vienna; 2025-07-07 - 2025-07-19, PHI25
Malz Daniel, U of Copenhagen; 2025-06-02 - 2025-06-06, BPS25
Manev Todor, Sofia U; 2025-03-16 - 2025-03-22, AFS25

Manjunath Naren, Perimeter Institute, Waterloo; 2025-05-11 - 2025-05-18, BPS25
 Mansuroglu Refik, Uni Wien; 2025-05-12 - 2025-06-13, BPS25
 Mapelli Michela, U Heidelberg; 2025-07-15 - 2025-07-17, PHI25
 Marceca Felipe, U of Vienna; 2025-05-08 - 2025-05-09, FLF25
 Marciszewski Witold, U Warsaw; 2025-03-16 - 2025-03-22, AFS25
 Marcone Alberto, U of Udine; 2025-08-25 - 2025-08-29, 2025-08-04 - 2025-08-09, AGW25
 Marks Andrew, UC, Berkeley; 2025-06-30 - 2025-07-04, AGW25
 Marshall-Maldonado Juan, NCU, Torun; 2025-04-21 - 2025-04-26, TFB25
 Martínez Vañó Esteban, U Granada; 2025-03-16 - 2025-03-22, AFS25
 Marveggio Alice, HCM, Bonn; 2025-11-11 - 2025-11-14, RSV25
 Massaro Luca, Maastricht U; 2025-07-06 - 2025-07-20, PHI25
 Matcovich Tobia, Unipg; 2025-07-06 - 2025-07-12, PHI25
 Matsoukas Alexandros, National and Technical U of Athens; 2025-02-23 - 2025-03-01, BLG25
 Mayeli Azita, CUNY, New York; 2025-05-03 - 2025-05-10, FLF25
 Mazon Jose, U of Valencia; 2025-02-23 - 2025-03-01, BLG25
 McNulty Henry, Cognite AS; 2025-05-04 - 2025-05-09, FLF25
 Mehdi Golafshan, U of Liège; 2025-04-20 - 2025-04-25, TFB25
 Meier Damaris, U of Fribourg; 2025-01-13 - 2025-01-19, LTV25
 Mejstrik Thomas, U of Vienna; 2025-05-05 - 2025-05-09, FLF25
 Mel Gabriel, CRM, Barcelona; 2025-02-16 - 2025-02-21, EMV25
 Memari Pooran, CNRS LIX, Paris; 2025-02-08 - 2025-02-15, LTV25
 Meng Shaoqiang, U of Vienna; 2025-07-07 - 2025-07-18, PHI25
 Menidiati Theodora, FZ Jülich; 2025-09-07 - 2025-09-13, LKS25
 Micheletti Cristian, SISSA, Trieste; 2025-09-07 - 2025-09-12, LKS25
 Michor Peter, U of Vienna; 2025-01-13 - 2025-02-14, LTV25
 Miller Joseph, U of Wisconsin-Madison; 2025-06-26 - 2025-07-05, AGW25
 Miller Russell, CUNY, New York; 2025-06-29 - 2025-07-05, AGW25
 Miller Edwards Sheila, ASU, Phoenix; 2025-07-02 - 2025-07-05, AGW25
 Mingione Giuseppe, U of Parma; 2025-02-23 - 2025-03-01, BLG25
 Mingo James, Queen's U, Kingston; 2025-02-16 - 2025-02-22, EMV25
 Minguez Alberto, U of Vienna; 2025-05-15 - 2025-05-25, 2025-01-08 - 2025-01-22, 2025-03-12 - 2025-03-26, RIT25
 Minoguchi Yuri, TU Vienna; 2025-05-16 - 2025-06-13, BPS25
 Miranda Eva, UPC, Barcelona; 2025-01-19 - 2025-01-24, LTV25
 Miranville Alain, U Le Havre Normandie; 2025-12-08 - 2025-12-13, RSV25
 Mitra Aditi, NYU, New York; 2025-05-17 - 2025-05-30, BPS25
 Mittal Jeetain, TAMU, College Station; 2025-09-07 - 2025-09-12, LKS25
 Miura Tatsuya, Kyoto U; 2025-11-09 - 2025-11-15, RSV25
 Miyamoto David, MPIM, Bonn; 2025-01-12 - 2025-01-18, LTV25
 Modin Klas, Chalmers U of Technology, Gothenburg; 2025-02-02 - 2025-02-07, LTV25
 Moessner Roderich, MPI Dresden; 2025-05-21 - 2025-05-31, BPS25
 Molchanova Anastasia, TU Vienna; 2025-01-27 - 2025-01-31, LTV25; 2025-09-29 - 2025-12-19, RSV25
 Molnár András, U of Vienna; 2025-05-12 - 2025-06-13, BPS25
 Molter Ursula, U of Buenos Aires; 2025-05-03 - 2025-05-10, FLF25
 Moncrief Vincent, Yale U, New Haven; 2025-05-15 - 2025-07-19, IS25
 Mondal Saikat, IITK, Kanpur; 2025-03-03 - 2025-05-02, JRF0225
 Montalbán Antonio, UC, Berkeley; 2025-06-30 - 2025-07-05, AGW25
 Montecuoello Chiara Anna, U Napoli; 2025-07-09 - 2025-07-15, PHI25
 Moradinezhad Dizgah Azadeh, LAPTh Annecy; 2025-09-20 - 2025-09-26, UHR25
 Moreso Serra Anna, U de Barcelona; 2025-07-06 - 2025-07-18, PHI25
 Moretti Chiara, SISSA, Trieste; 2025-09-21 - 2025-09-26, UHR25
 Morin Léo, U of Copenhagen; 2025-11-24 - 2025-11-28, HSC25
 Moring Kristian, PLUS, Salzburg; 2025-02-23 - 2025-02-28, BLG25
 Moshchevitin Nikolay, TU Vienna; 2025-04-22 - 2025-04-25, TFB25
 Motezakker Ahmad Reza, KTH, Stockholm; 2025-09-07 - 2025-09-13, LKS25

Mouhli Rayane, U Paris Cité; 2025-02-02 - 2025-02-15, LTV25
Mourgoglou Mihalís, U del País Vasco; 2025-09-28 - 2025-10-17, 2025-11-29 - 2025-12-15, RSV25
Muellner Clemens, TU Vienna; 2025-04-22 - 2025-04-24, TFB25
Müller Matthias, TU Graz; 2025-02-16 - 2025-02-21, EMV25
Mummert Carl, Marshall U; 2025-07-31 - 2025-08-08, AGW25
Muñoz-Lahoz David, U Autonoma de Madrid; 2025-03-15 - 2025-03-21, AFS25
Muramatsu Ryo, Tokyo U of Science; 2025-05-05 - 2025-05-09, FLF25
Myrskylainen Kim, Charles U, Prague; 2025-02-23 - 2025-03-01, BLG25
Nachtergaele Bruno, UC Davis; 2025-11-23 - 2025-11-29, HSC25
Nadeau Philippe, Institute Camille Jordan, U Lyon; 2025-02-16 - 2025-02-22, EMV25
Nader Morine, U of Maryland; 2025-09-07 - 2025-09-12, LKS25
Nagai Yasushi, Shinshu U; 2025-04-23 - 2025-04-27, TFB25
Naghilou Aida, Med U Vienna; 2025-09-08 - 2025-09-12, LKS25
Nakada Hitoshi, Keio U; 2025-04-21 - 2025-04-27, TFB25
Nakajima Yoshihito, Tohoku U; 2024-12-08 - 2024-12-13, RSV25
Nakamura Kenta, Nichidai, Tokyo; 2025-02-23 - 2025-03-02, BLG25
Nam Phan Thanh, LMU Munich; 2025-11-23 - 2025-11-29, HSC25
Napiórkowski Marcin, U Warsaw; 2025-11-23 - 2025-11-28, HSC25
Narnhofer Heide, U of Vienna; 2025-11-07 - 2025-11-07, EM25
Neeb Karl-Hermann, FAU Erlangen-Nürnberg; 2025-01-12 - 2025-01-19, LTV25
Needham Tom, Florida State U, Tallahassee; 2025-02-02 - 2025-02-08, LTV25
Needleman Daniel, Harvard U, Cambridge; 2025-06-09 - 2025-06-14, LAD25
Nejedlá Magdaléna, Charles U, Prague; 2025-09-08 - 2025-09-11, LKS25
Nellen Stefan, HEPHY Vienna; 2025-07-07 - 2025-07-18, PHI25
Nemmani Anirudh, NCAC PAS, Warsaw; 2025-07-06 - 2025-07-18, PHI25
Neretin Yurii, U of Graz & HSM MIPT; 2025-01-13 - 2025-02-15, LTV25
Neyt Lenny, U of Vienna; 2025-05-05 - 2025-05-09, FLF25
Ng Selwyn, NTU Singapore; 2025-06-29 - 2025-07-04, AGW25
Nguyen Tien Zung, Torus AI; 2025-01-30 - 2025-02-02, LTV25
Nicolau Jiménez Eloi, ISTA, Klosterneuburg; 2025-05-19 - 2025-06-13, BPS25
Nicolosi Orazio, U Torino; 2025-06-29 - 2025-07-05, 2025-07-27 - 2025-08-02, AGW25
Niederreiter Harald, RICAM, Linz; 2025-04-22 - 2025-04-25, TFB25
Nies Andre, U of Auckland; 2025-08-24 - 2025-08-30, 2025-08-22 - 2025-08-23, AGW25
Niestijl Milan, U of Paderborn; 2025-01-11 - 2025-01-25, LTV25
Nishimichi Takahiro, Kyoto Sangyo U; 2025-09-22 - 2025-09-27, UHR25
Nishino Mao, Florida State U, Tallahassee; 2025-02-02 - 2025-02-14, LTV25
Nobili Francesco, U Pisa; 2025-10-31 - 2025-11-21, RSV25
Novaga Matteo, U Pisa; 2025-11-06 - 2025-11-14, RSV25
Nunnenkamp Andreas, U of Vienna; 2025-05-12 - 2025-06-13, BPS25
Nygaard Dovland Olav, U of Agder; 2025-03-16 - 2025-03-22, AFS25
Oancea Marius A., U of Vienna; 2025-02-01 - 2025-02-28, RIT25
Ohrhallinger Stefan, TU Vienna; 2025-02-10 - 2025-02-14, LTV25
Oldenburg Jakob, U Zurich; 2025-11-23 - 2025-11-29, HSC25
Olgiati Alessandro, Politecnico Milano; 2025-11-23 - 2025-11-27, HSC25
Olivieri Marco, UPC, Barcelona; 2025-11-23 - 2025-11-29, HSC25
Olmos Prieto Victor, UNED; 2025-03-16 - 2025-03-22, AFS25
Orihuela Jose, U Murcia; 2025-03-16 - 2025-03-22, AFS25
Ortega Eduard, NTNU, Trondheim; 2025-05-05 - 2025-05-09, FLF25
Osato Ken, U Chiba; 2025-09-21 - 2025-10-01, UHR25
Osso Gian Marco, U of Udine; 2025-07-27 - 2025-08-08, 2025-06-29 - 2025-07-05, 2025-08-24 - 2025-08-30, AGW25
Oyama Shuhei, U of Vienna; 2025-05-12 - 2025-06-13, BPS25
Pacilio Costantino, U Milano-Bicocca; 2025-07-13 - 2025-07-18, PHI25
Padhee Ipsita, Charles U, Prague; 2025-09-08 - 2025-09-12, LKS25
Paganini Claudio, U of Regensburg; 2025-01-31 - 2025-03-02, RIT25

Pakhomov Fedor, Ghent U; 2025-08-25 - 2025-08-29, AGW25
Pallardó-Julà Vicent, U of Vienna; 2025-11-10 - 2025-12-19, RSV25
Panagiotopoulos Aristotelis, U of Vienna; 2025-06-23 - 2025-08-29, AGW25
Pap Margit, U Pécs; 2025-05-04 - 2025-05-09, FLF25
Papafilippou Konstantinos, Ghent U; 2025-07-28 - 2025-08-02, AGW25
Papic Zlatko, U Leeds; 2025-05-17 - 2025-06-07, BPS25
Parise Davide, Imperial College London; 2025-11-02 - 2025-11-23, RSV25
Parisi Daniele, U Groningen; 2025-09-10 - 2025-09-14, LKS25
Park Kevin, ISTA, Klosterneuburg; 2025-07-14 - 2025-07-18, PHI25
Patey Ludovic, CNRS, Paris; 2025-07-26 - 2025-07-31, AGW25
Pausch Tobias, TU Vienna; 2025-07-07 - 2025-07-18, PHI25
Pelczar-Barwacz Anna, Jagiellonian U, Krakow; 2025-03-16 - 2025-03-22, AFS25
Pennec Xavier, INRIA at U Côte d'Azur; 2025-02-10 - 2025-02-14, LTV25
Perales Anaya Daniel, TAMU, College Station; 2025-02-16 - 2025-02-22, EMV25
Perego Alessia, U Milano-Bicocca; 2025-07-07 - 2025-07-18, PHI25
Pérez Donoso Alfredo Héctor, San Sebastian U; 2025-06-25 - 2025-07-11, RIT25
Pernecká Eva, CTU Prague; 2025-03-16 - 2025-03-21, AFS25
Perugia Ilaria, U of Vienna; 2025-11-07 - 2025-11-08, EM25
Peschka Dirk, WIAS, Berlin; 2025-10-05 - 2025-10-11, RSV25
Petrova Elena, ISTA, Klosterneuburg; 2025-05-12 - 2025-06-13, BPS25
Pettinari Lorenzo, U of Trento; 2025-11-24 - 2025-12-01, HSC25
Pfannerer Stephan, U Waterloo; 2025-02-16 - 2025-02-22, EMV25
Pham Juliusz, IMPAN, Warsaw; 2025-03-16 - 2025-03-22, AFS25
Pichler Hannes, IQOQI, Innsbruck; 2025-05-18 - 2025-05-24, BPS25
Pickl Peter, U Tübingen; 2025-11-23 - 2025-11-29, HSC25
Pierron Thomas, ENS Paris-Saclay; 2025-02-02 - 2025-02-09, 2025-01-19 - 2025-01-25, LTV25
Pigati Alessandro, U Bocconi, Milano; 2025-11-09 - 2025-11-15, RSV25
Pigolotti Simone, Okinawa IST; 2025-06-09 - 2025-06-17, LAD25
Pigozzi Lorenzo, ISTA, Klosterneuburg; 2025-11-24 - 2025-11-27, HSC25
Pineda Pineda Sebastian, Charles U, Prague; 2025-09-08 - 2025-09-12, LKS25
Pintado Alvaro, UPenn, Philadelphia; 2025-07-27 - 2025-08-09, AGW25
Pippich Anna, U of Konstanz; 2025-08-31 - 2025-09-04, SGH25
Piroli Lorenzo, U Bologna; 2025-05-18 - 2025-05-24, BPS25
Pislan Florentina, ISP; 2025-07-06 - 2025-07-19, PHI25
Pizzo Alessandro, U Tor Vergata, Rome; 2025-11-23 - 2025-11-28, HSC25
Plebanek Grzegorz, U of Wroclaw; 2025-03-16 - 2025-03-22, AFS25
Pluda Alessandra, U Pisa; 2025-11-09 - 2025-11-17, RSV25
Poiatti Andrea, U of Vienna; 2025-10-07 - 2025-12-19, RSV25
Pollino Annamaria, TU Vienna; 2025-10-07 - 2025-12-19, RSV25
Pollmann Frank, TU Munich; 2025-05-21 - 2025-05-24, BPS25
Pons Viviane, Paris-Saclay U; 2025-02-17 - 2025-02-20, EMV25
Popoli Pierre, U of Liège; 2025-04-21 - 2025-04-26, TFB25
Porqueres Natalia, CEA Paris-Saclay; 2025-09-21 - 2025-09-26, UHR25
Porta Marcello, SISSA, Trieste; 2025-11-23 - 2025-11-27, HSC25
Pozzetta Marco, Politecnico Milano; 2025-10-31 - 2025-11-15, RSV25
Pozzi Paola, U Duisburg-Essen; 2025-11-10 - 2025-11-14, RSV25
Pradler Josef, U of Vienna; 2025-07-07 - 2025-07-18, PHI25
Prasanna Kartik, U of Michigan, Ann Arbor; 2025-08-31 - 2025-09-06, SGH25
Preston Stephen, Brooklyn College; 2025-01-12 - 2025-01-24, LTV25
Prohazka Stefan, U of Vienna; 2025-06-15 - 2025-07-15, RIT25
Provenzano Philipp, Ghent U; 2025-07-27 - 2025-08-02, AGW25
Pryymak Lidiya, HSU; 2025-02-04 - 2025-02-14, LTV25
Ptashnyk Mariya, Heriot-Watt U, Edinburgh; 2025-11-22 - 2025-12-19, 2025-10-13 - 2025-10-17, RSV25
Pucci Edoardo, U Torino; 2025-05-04 - 2025-05-09, FLF25

Quattrocchi Filippo, ISTA, Klosterneuburg; 2025-09-29 - 2025-11-28, RSV25
Racher Gerhard, PLUS, Salzburg; 2025-03-17 - 2025-03-19, AFS25
Rademacher Simone, LMU Munich; 2025-11-23 - 2025-11-29, HSC25
Radinger Silvia, U of Vienna; 2025-04-22 - 2025-04-26, TFB25
Rahangdale Praful, U of Paderborn; 2025-01-12 - 2025-02-01, LTV25
Rakovszky Tibor, BME, Budapest; 2025-05-17 - 2025-06-04, BPS25
Ramaj Jan, Comenius U, Bratislava; 2025-07-07 - 2025-07-18, PHI25
Ramírez Miguel, U of Barcelona; 2025-08-25 - 2025-08-30, AGW25
Rampf Cornelius, RBI, Zagreb; 2025-09-21 - 2025-09-26, UHR25
RATIU Tudor Stefan, Shanghai Jiao Tong U; 2025-01-23 - 2025-02-04, LTV25
Ravanpak Zohreh, WU of Timisoara; 2025-02-02 - 2025-02-08, LTV25
Reading Nathan, NC State U, Raleigh; 2025-02-16 - 2025-02-22, EMV25
Regimbau Tania, LAPP Annecy; 2025-07-11 - 2025-07-16, PHI25
Rella Simon, ISTA, Klosterneuburg; 2025-06-10 - 2025-06-13, LAD25
Ren Jie, U Leeds; 2025-05-25 - 2025-05-31, BPS25
Renard Antoine, U of Liège; 2025-04-21 - 2025-04-25, TFB25
Reuvers Robin, U Roma III; 2025-11-23 - 2025-11-29, HSC25
Rey Ana Maria, U of Colorado, Boulder; 2025-05-18 - 2025-05-30, BPS25
Reyes Sáenz Luis David, UNAM, Mexico City; 2025-03-15 - 2025-03-22, AFS25
Ricciardone Angelo, U Pisa; 2025-07-13 - 2025-07-17, PHI25
Riccó Samuele, TU Vienna; 2025-02-24 - 2025-02-28, BLG25; 2025-09-29 - 2025-12-19, RSV25
Rigo Michel, U Liege; 2025-04-20 - 2025-04-26, TFB25
Rindler-Daller Tanja, U of Vienna; 2025-11-24 - 2025-11-28, HSC25
Rivaud Stéphane, INRIA Paris; 2025-02-02 - 2025-02-08, LTV25
Rocca Elisabetta, U of Pavia; 2025-12-09 - 2025-12-12, RSV25
Rodrigues José Francisco, U Lisbon; 2025-11-10 - 2025-11-14, RSV25
Rodríguez Díaz Pedro, U of Barcelona; 2025-08-25 - 2025-08-30, AGW25
Rodríguez-Sanz Salvador, U Zaragoza; 2025-02-10 - 2025-02-14, LTV25
Rojek Małgorzata, IMPAN, Warsaw; 2025-03-16 - 2025-03-21, AFS25
Ros-Oton Xavier, U of Barcelona; 2025-09-29 - 2025-10-03, RSV25
Rossegger Dino, TU Vienna; 2025-07-01 - 2025-08-30, AGW25
Rossi Lucia, TU Vienna; 2025-04-22 - 2025-04-25, TFB25
Roubíček Tomáš, Charles U, Prague; 2025-10-05 - 2025-11-07, RSV25
Rougerie Nicolas, ENS de Lyon; 2025-11-23 - 2025-11-29, HSC25
Rudkiewicz Theo, INRIA Saclay; 2025-02-01 - 2025-02-07, LTV25
Rueda Zoca Abraham, U of Granada; 2025-03-16 - 2025-03-22, AFS25
Ruiz de Alarcón Alberto, CUNEF U, Madrid; 2025-05-18 - 2025-05-31, BPS25
Ruiz Risueño Miguel Ángel, UCLM, Albacete; 2025-03-15 - 2025-03-19, AFS25
Rupflin Melanie, U Oxford; 2025-11-09 - 2025-11-14, RSV25
Rupp Fabian, U of Vienna; 2025-01-17 - 2025-02-14, LTV25; 2025-09-29 - 2025-12-19, RSV25
Russo Tommaso, U of Innsbruck; 2025-03-16 - 2025-03-21, AFS25
Ryvkin Leonid, CNRS / U Lyon 1; 2025-01-12 - 2025-01-25, LTV25
Saari Olli, UPC, Barcelona; 2025-02-23 - 2025-03-01, BLG25
Sacanna Stefano, NYU, New York; 2025-09-07 - 2025-09-13, LKS25
Saffirio Chiara, U of Basel; 2025-11-25 - 2025-11-28, HSC25
Sahu Subhayan, Perimeter Institute, Waterloo; 2025-05-11 - 2025-05-17, BPS25
Saint Aubin Diane, U Zurich; 2025-11-23 - 2025-11-28, HSC25
Sako Akifumi, Tokyo U of Science; 2025-06-12 - 2025-06-21, IS25
Salguero-Alarcón Alberto, Complutense U of Madrid; 2025-03-16 - 2025-03-22, AFS25
Samuelsen Helge Jørgen, NTNU, Trondheim; 2025-05-04 - 2025-05-09, FLF25
Sanders Sam, Ruhr U, Bochum; 2025-08-02 - 2025-08-10, AGW25
Sanderson Slade, Utrecht U; 2025-04-21 - 2025-04-26, TFB25
Santos Silva Jorge Luis, UNAM, Oaxaca; 2025-02-17 - 2025-02-22, EMV25
Santucci Federica, U Torino; 2025-07-06 - 2025-07-18, PHI25
Saric Andela, ISTA, Klosterneuburg; 2025-06-10 - 2025-06-11, LAD25

Sarkio Lauri, Aalto U; 2025-02-23 - 2025-02-28, BLG25
Sassen Josua, ENS Paris-Saclay; 2025-02-08 - 2025-02-14, LTV25
Sauzedde Isao, U Warwick; 2025-01-04 - 2025-03-05, JRF0325
Scapin Alessandro, U degli Studi di Milano; 2025-10-26 - 2025-11-14, RSV25
Scarpa Luca, Politecnico Milano; 2025-12-04 - 2025-12-09, RSV25
Schätzler Leah, Aalto U; 2025-02-23 - 2025-03-01, BLG25
Scheler Ulrich, IPF Dresden; 2025-09-08 - 2025-09-12, LKS25
Schertzer Emmanuel, U of Vienna; 2025-06-10 - 2025-06-13, LAD25
Scheven Christoph, U Duisburg-Essen; 2025-02-23 - 2025-03-01, BLG25
Schieck Jochen, HEPHY and TU Vienna; 2025-07-07 - 2025-07-18, PHI25
Schlein Benjamin, U Zurich; 2025-11-23 - 2025-11-28, HSC25
Schlicht Philipp, U Siena; 2025-06-30 - 2025-07-06, AGW25
Schmid Friederike, U Mainz; 2025-09-07 - 2025-09-12, LKS25
Schmid Gabriel, U Genova; 2025-01-31 - 2025-03-02, RIT25
Schmidt Klaus, U of Vienna; 2025-04-22 - 2025-04-25, TFB25
Schmidt Tom, Oregon State U, Corvallis; 2025-04-21 - 2025-04-26, TFB25
Schmidt Cernohorska Marketa, UJEP, Usti dan Labem; 2025-09-08 - 2025-09-12, LKS25
Schmitt Peter, U of Vienna; 2025-04-22 - 2025-04-22, TFB25
Schneider Stefanie, RWTH Aachen; 2025-09-07 - 2025-09-12, LKS25
Scholl Anthony, U of Cambridge; 2025-08-31 - 2025-09-06, SGH25
Schönfelder Marcus, U of Vienna; 2025-02-17 - 2025-02-21, EMV25
Schraven Severin, TU Munich; 2025-11-23 - 2025-11-28, HSC25
Schreier-Aigner Florian, U of Vienna; 2025-02-17 - 2025-02-21, EMV25
Schuch Norbert, U of Vienna; 2025-05-12 - 2025-06-13, BPS25; 2025-05-05 - 2025-05-09, FLF25;
2025-11-07 - 2025-11-08, EM25
Schulze Felix, U Warwick; 2025-11-09 - 2025-11-14, RSV25
Schulzki Elijah, TU Vienna; 2025-07-27 - 2025-08-02, AGW25
Schwarzacher Sebastian, Uppsala U; 2025-02-24 - 2025-02-28, BLG25; 2025-10-15 - 2025-10-19, 2025-11-10 - 2025-11-14, RSV25
Schwenke Nilo, INRIA Paris; 2025-02-03 - 2025-02-07, LTV25
Schwermer Joachim, U of Vienna; 2025-08-31 - 2025-09-06, SGH25
Sciortino Francesco, U Roma 1; 2025-11-06 - 2025-11-09, EM25
Sedláčik Tomáš, UCT Prague; 2025-09-08 - 2025-09-12, LKS25
Seiringer Robert, ISTA, Klosterneuburg; 2025-11-24 - 2025-11-28, HSC25
Semeghini Giulia, Harvard U, Cambridge; 2025-05-19 - 2025-05-23, BPS25
Sen Gupta Ashim, Bielefeld U; 2025-09-21 - 2025-09-29, UHR25
Serbyn Maksym, ISTA, Klosterneuburg; 2025-05-12 - 2025-06-13, BPS25
Serieys Guillaume, U Paris Cité; 2025-02-03 - 2025-02-14, LTV25
Serra Joaquim, ETH Zurich; 2025-11-17 - 2025-11-18, RSV25
Sevastaki Nikoleta, U of Crete; 2025-02-17 - 2025-02-21, EMV25
Shafer Paul, U Leeds; 2025-07-26 - 2025-08-11, AGW25
Shafkulovska Irina, U of Vienna; 2025-05-05 - 2025-05-09, FLF25
Shahidi Freydoon, Purdue U; 2025-09-01 - 2025-09-05, SGH25
Shamsabadi Mitra, U of Vienna; 2025-05-05 - 2025-05-09, FLF25
Shao Lijing, KAVLI Peking U; 2025-07-08 - 2025-07-13, PHI25
Sheikh Shoaib Amir, TU Dresden; 2025-09-07 - 2025-09-12, LKS25
Shi Wenhui, RWTH Aachen; 2025-09-28 - 2025-10-04, RSV25
Shi William, BRG4, Vienna; 2025-06-30 - 2025-07-04, IMO25
Shonkwiler Clayton, CSU, Fort Collins; 2025-02-02 - 2025-02-08, LTV25
Siedentop Heinz, LMU Munich; 2025-11-23 - 2025-11-28, HSC25
Sierra Borja, U Bern; 2025-07-27 - 2025-08-08, AGW25
Signori Andrea, Politecnico Milano; 2025-12-03 - 2025-12-12, RSV25
Silber Zdeněk, Academy of Sciences, Prague; 2025-03-16 - 2025-03-21, AFS25
Silini Lauro, ISTA, Klosterneuburg; 2025-09-29 - 2025-12-12, RSV25
Simon Theresa, U Münster; 2025-11-03 - 2025-11-21, 2025-12-01 - 2025-12-05, RSV25

Simonetti Angelica, Ud'A; 2025-02-09 - 2025-02-15, LTV25
Singh Karandeep Jandu, JMU; 2025-01-12 - 2025-01-18, LTV25
Slizewska Aneta, U of Białystok; 2025-01-12 - 2025-01-26, LTV25
Slootmaekers Brecht, Maastricht U; 2025-07-06 - 2025-07-19, PHI25
Smokers Iris, Radboud U; 2025-09-07 - 2025-09-12, LKS25
Soave Nicola, U Torino; 2025-09-28 - 2025-10-02, RSV25
Sobota Damian, U of Vienna; 2025-03-16 - 2025-03-22, AFS25
Sodini Giacomo Enrico, U of Vienna; 2025-12-09 - 2025-12-12, RSV25
Soldá Giovanni, Ghent U; 2025-08-04 - 2025-08-08, 2025-08-23 - 2025-08-30, AGW25
Solovej Jan Philip, U of Copenhagen; 2025-11-23 - 2025-11-28, HSC25
Soria-Carro María, U Autonoma de Madrid; 2025-09-28 - 2025-10-04, RSV25
Sorichetti Valerio, ISTA, Klosterneuburg; 2025-09-08 - 2025-09-12, LKS25
Soudry David, Tel Aviv U; 2025-08-31 - 2025-09-05, SGH25
Speckbacher Michael, Acoustics Research Institute, Vienna; 2025-05-05 - 2025-05-09, FLF25
Speckhofer Thomas, JKU, Linz; 2025-03-16 - 2025-03-21, AFS25
Speicher Roland, U of Saarland; 2025-02-16 - 2025-02-22, EMV25
Spiegelhofer Lukas, MontanU Leoben; 2025-04-22 - 2025-04-25, TFB25
Stadler Julia, LMU Munich; 2025-09-21 - 2025-09-27, UHR25
Stančíková Eliška, Charles U, Prague; 2025-09-09 - 2025-09-12, LKS25
Stanko Calvin, PLUS, Salzburg; 2025-02-23 - 2025-02-28, BLG25
Staño Roman, U of Vienna; 2025-09-07 - 2025-09-13, LKS25
Stefanelli Ulisse, U of Vienna; 2025-09-29 - 2025-12-19, RSV25; 2025-02-27 - 2025-02-28, BLG25
Steiner Wolfgang, CNRS, Paris; 2025-04-21 - 2025-04-25, TFB25
Steinlechner Jessica, U of Maastricht; 2025-07-06 - 2025-07-10, PHI25
Stellet Igor, CBPF; 2025-07-06 - 2025-07-19, PHI25
Stepanov Grigorii, TU Vienna; 2025-06-30 - 2025-08-29, AGW25
Stepanovic Dawid, U of Vienna; 2025-07-07 - 2025-07-18, PHI25
Stewart Iain W., MIT, Cambridge; 2025-01-03 - 2025-02-28, RIT25
Stipulanti Manon, U of Liège; 2025-04-21 - 2025-04-26, TFB25
Strehn Jan, BG/BRG/WRG Wien 13; 2025-06-30 - 2025-07-04, IMO25
Strunk Michael, PLUS, Salzburg; 2025-02-23 - 2025-02-28, BLG25
Stücker Jens, U of Vienna; 2025-09-22 - 2025-09-26, UHR25
Stump Christian, Ruhr U, Bochum; 2025-02-16 - 2025-02-21, EMV25
Stuward Salvatore, U degli Studi di Milano; 2025-11-10 - 2025-11-14, RSV25
Styliaris Georgios, MPI of Quantum Optics, Garching; 2025-05-18 - 2025-05-28, BPS25
Sun Binyong, IASM, Zhejiang U; 2025-09-01 - 2025-09-05, SGH25
Sun Zhiqian, UC, Berkeley; 2025-01-08 - 2025-02-28, RIT25
Suo Ziao, BORG Wien 3; 2025-06-30 - 2025-07-04, 2025-10-27 - 2025-10-31, IMO25
Surace Federica Maria, CalTech; 2025-06-01 - 2025-06-07, 2025-05-16 - 2025-05-23, BPS25
Surer Paul, Boku Vienna; 2025-04-22 - 2025-04-25, TFB25
Suri Ali, U of Paderborn; 2025-01-17 - 2025-01-22, LTV25
Svela Erling, NTNU, Trondheim; 2025-05-04 - 2025-05-10, FLF25
Szendroi Balazs, U of Vienna; 2025-05-17 - 2025-06-25, RIT25
Szłufik Patryk, U Warsaw; 2025-07-27 - 2025-08-09, AGW25
Szwagier Tom, INRIA at U Côte d'Azur; 2025-02-02 - 2025-02-15, LTV25
Tagliabue Andrea, U Genova; 2025-09-07 - 2025-09-12, LKS25
Tagliacozzo Luca, IFF-CSIC, Madrid; 2025-06-09 - 2025-06-13, BPS25
Tapia Nikolas, WIAS, Berlin; 2025-02-16 - 2025-02-21, EMV25
Tapia García Sebastián, TU Vienna; 2025-03-17 - 2025-03-21, AFS25
Tarnowsky Annika, MPI for Mathematics, Bonn; 2025-01-13 - 2025-01-17, LTV25
Tenenblat Ketí, U of Brazilia; 2025-01-18 - 2025-02-09, LTV25
Tersteegen Jennifer, Aalto U; 2025-09-07 - 2025-09-12, LKS25
Testorf Johannes, NTNU, Trondheim; 2025-05-04 - 2025-05-10, FLF25
Teufel Stefan, U Tübingen; 2025-11-24 - 2025-11-28, HSC25
Thimm Daylen, U of Innsbruck; 2025-03-16 - 2025-03-21, AFS25

Thompson Jack, UWA, Perth; 2025-09-26 - 2025-10-04, RSV25
Thuswaldner Jörg, MontanU Leoben; 2025-04-21 - 2025-04-25, TFB25
Tichy Robert, TU Graz; 2025-04-22 - 2025-04-25, TFB25
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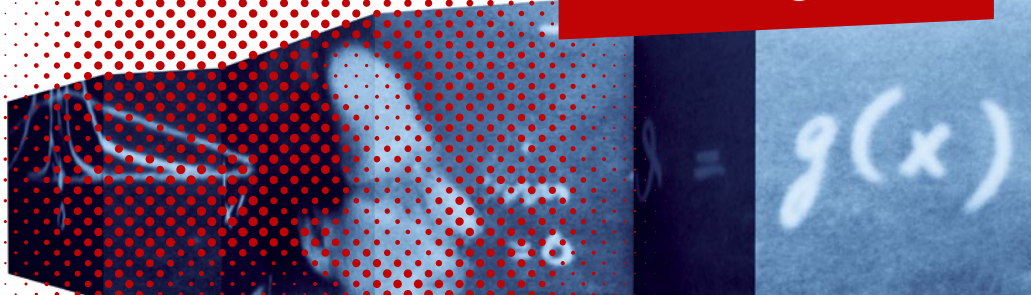


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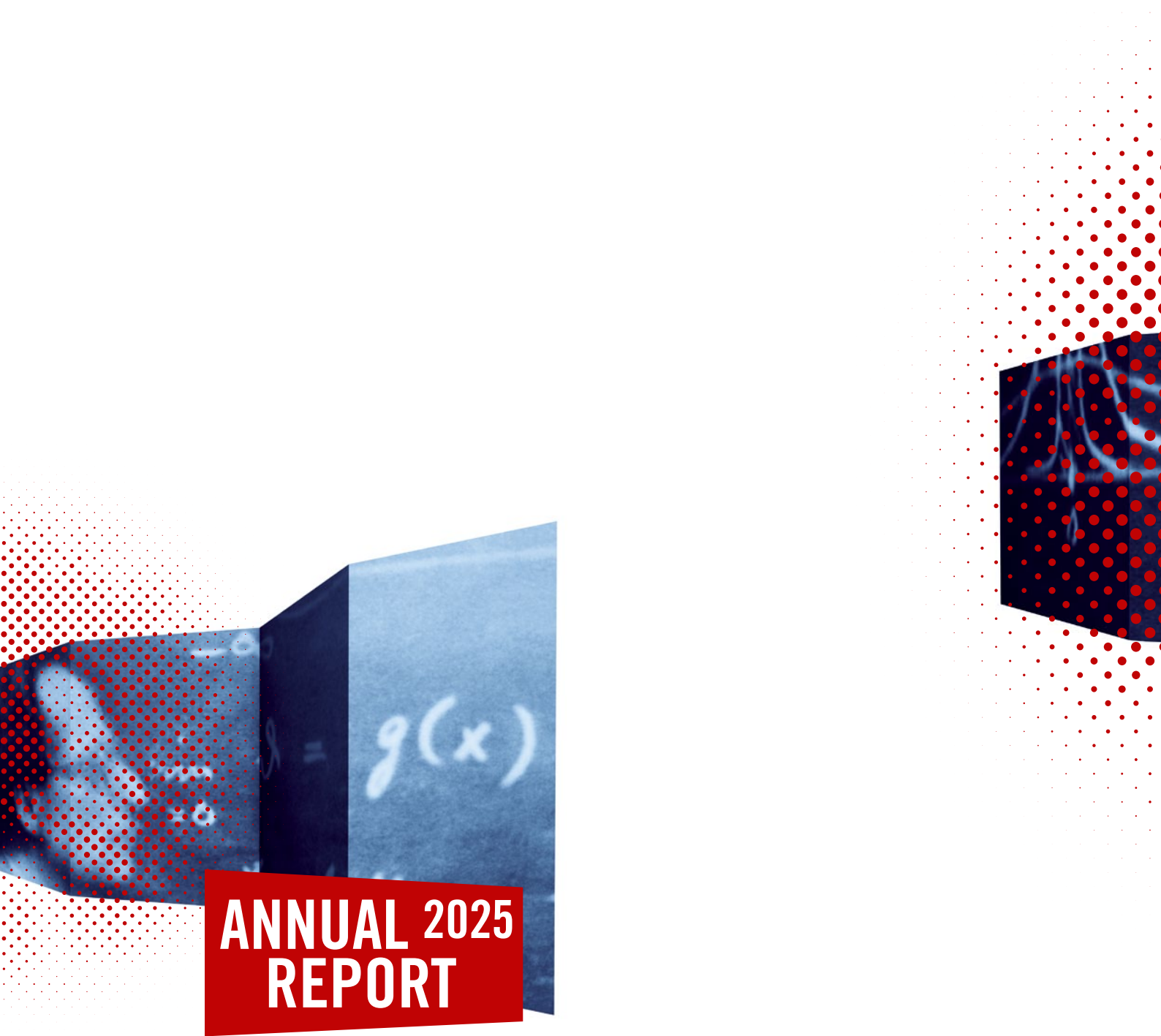
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