

Workshop on
“Lensing and Wave Optics in Strong Gravity”

December 9 - 13, 2024

organized by

Pedro Cunha (UAVR), Marius A. Oancea (U of Vienna),
Miguel Zumalacárregui (MPIGP, Potsdam)

- **Monday, December 9th, 2024**

09:00 – 09:30 **Registration & Welcome**

09:30 – 10:30 **Luciano Rezzolla (Goethe U Frankfurt)**

M87 and Sgr A*: Imaging supermassive black holes*

10:45 – 11:15 **Coffee Break**

11:15 – 12:15 **Jose M. Ezquiaga (NBI, Copenhagen)**

Gravitational Wave Lensing: Current Searches and Future Prospects

12:30 – 14:30 **Lunch Break**

14:30 – 15:00 **Nezihe Uzun (CFT PAN)**

Gaussian beams and caustic avoidance

15:15 – 16:00 **Coffee Break**

16:00 – 16:30 **Felix Willenborg (ZARM, Bremen)**

Exact wave-optical imaging of black hole spacetimes

- **Tuesday, December 10th, 2024**

09:00 – 09:30 **Richard Brito (IST Lisboa)**

Black holes as laboratories: searching for ultralight fields

09:45 – 10:15 **Mikołaj Korzyński (CFT PAN)**

Bi-local approach to geometrical optics in GR

10:30 – 11:00 **Coffee Break**

11:00 – 11:30 **Giulia Cusin (IAP)**

Gravitational wave lensing in the deep wave-optics regime: results and future directions

11:45 – 12:15 **Alex Lupsasca (Vanderbilt U, Nashville)**

The Black Hole Photon Ring

12:30 – 14:30 **Lunch Break**

14:30 – 15:00 **Graham Smith (U of Birmingham)**

Multi-messenger gravitational lensing and the Vera C. Rubin Observatory

15:15 – 16:00 **Coffee Break**

16:00 – 16:30 **Oleg Tsupko (ZARM, Bremen)**

Analytical Studies of Higher-Order Photon Rings in the Images of Spherically Symmetric Black Holes

- **Wednesday, December 11th, 2024**

09:00 – 09:30 **Héctor Raúl Olivares Sánchez (UAVR)**

A simulation pipeline for nearly circular supermassive black hole binaries

09:45 – 10:15 (online) **Xian Chen (Peking U)**

Why are LIGO/Virgo Black Holes So Massive?

10:30 – 11:00 **Coffee Break**

11:00 – 11:30 **Hector Villarrubia-Rojo (U Complutense de Madrid)**

Efficient methods for wave-optics lensing

11:45 – 12:15 **João Novo (UAVR)**

Null and Timelike Circular Orbits: Insights from Effective 2D Metrics

12:30 – 14:30 **Lunch Break**

14:30 – 15:00 **Abraham Harte (Dublin City U)**

What is high-frequency approximation?

15:15 – 16:00 **Coffee Break**

Group photo at the start of the coffee break

16:00 – 16:30 **Johan Samsing (NBI, Copenhagen)**

Measuring Proper Motion of GW Sources with Strong Lensing Events

18:30 – **Conference dinner**

- **Thursday, December 12th, 2024**

09:00 – 09:30 **Volker Perlick (U Bremen)**

Gravitational lensing in the presence of a plasma

09:45 – 10:15 **Hayato Motohashi (Kogakuin U)**

Spin wave optics of gravitational waves

10:30 – 11:00 **Coffee Break**

11:00 – 11:30 **Dylan Jow (Stanford U)**

Measuring cosmic expansion with diffractive gravitational scintillation of nanoHertz gravitational waves

11:45 – 12:15 **Otto Hannuksela (CU Hong Kong)**

Gravitational-wave lensing challenges and opportunities

12:30 – 14:30 **Lunch Break**

14:30 – 15:00 **Han Gil Choi (IBS, Daejeon)**

Distinguishing the dressed black holes with gravitational wave diffraction

15:15 – 16:00 **Coffee Break**

16:00 – 16:30 **Tjonnie Li (KU Leuven)**

Using time series to identify strongly-lensed gravitational waves with deep learning

- **Friday, December 13th, 2024**

09:00 – 09:30 **Carlos A. R. Herdeiro (UAVR)**

Light ring topological theorems

09:45 – 10:15 **Galin Gyulchev (Sofia U)**

Images of a thin accretion disk around Kerr black holes with time dependent multiscalar hair

10:30 – 11:00 **Coffee Break**

11:00 – 11:30 **Pierre Fleury (CNRS, Montpellier)**

Line-of-sight effects in strong gravitational lensing

11:45 – 12:15 **Srashti Goyal (MPIGP, Potsdam)**

Prospects of probing dark & baryonic structures with gravitational-wave lensing

12:30 – 14:30 **Lunch Break**

14:30 – 15:00 **Parameswaran Ajith (ICTS)**

Cosmology using gravitationally lensed gravitational waves

15:15 – 15:34 **Coffee Break**

15:45– 16:15 **Helena Ubach (U of Barcelona)**

Interference signatures from gravitational lensing on gravitational waves

16:30 – 15:45 **Closing statements**

All talks take place at ESI Boltzmann Lecture Hall!