DVR 0065528

Programme on

"Measured Group Theory"

January 18 - March 18, 2016

organized by

Miklos Abért (Hungarian Academy of Sciences, Budapest), Goulnara Arzhantseva (U Vienna), Damien Gaboriau (ENS Lyon), Thomas Schick (U Göttingen), Andreas Thom (TU Dresden)

Conference

February 15 – 19, 2016

- **Tuesday, February 16, 2016**

  09:30 – 10:30 **Nikolay Nikolov**
  Right angled lattices in simple Lie groups

  10:30 – 11:00 *coffee / tea break*

  11:00 – 12:00 **David Kerr**
  Tower decompositions for free actions of amenable groups

  12:00 – 14:00 *lunch break*

  14:00 – 15:00 **Harald Helfgott**
  Soficity, recurrence and short cycles of exponential maps (joint work with K. Juschenko)

  15:15 – 15:45 **Ben Hayes**
  A product formula for Pinsker Factors with application to completely positive entropy
  This parallel session takes place in the Boltzmann Lecture Hall

  15:15 – 15:45 **Vadim Alekseev**
  Property (T) of discrete measured groupoids and their von Neumann algebras
  This parallel session takes place in the Schrödinger Lecture Hall

  16:00 – 16:30 **László Tóth**
  Growth of rank, combinatorial cost and local-global convergence
  This parallel session takes place in the Boltzmann Lecture Hall

  16:00 – 16:30 **Felix Pogorzelski**
  Ihara's zeta function for measured graphs
  This parallel session takes place in the Schrödinger Lecture Hall

  16:45 – 17:15 **Mark Shusterman**
  Ranks of subgroups in boundedly generated groups
  This parallel session takes place in the Boltzmann Lecture Hall

  16:45 – 17:15 **Alessandro Carderi**
  An exotic group as a limit of finite special linear groups
  This parallel session takes place in the Schrödinger Lecture Hall

see Page 2 and 3 for venue and the abstracts of the talks

All talks take place at the ESI, Boltzmann Lecture Hall, except the parallel sessions in the afternoon, that will take place at the ESI, Schrödinger Lecture Hall!

Note: The talks for the following days will be announced each day before on the programme webpage http://www.uni-math.gwdg.de/schick/ESI16/esi16_7.html

Abstracts

Nikolay Nikolov
Right angled lattices in simple Lie groups

A group is said to be right angled if it can be generated by a finite sequence of elements of infinite order such that each consecutive pair commute. This class of group was first studied by Gaboriau who proved that right angled groups have fixed price one. In joint work with Miklos Abert and Tsachik Gelander we develop Elek's notion of combinatorial cost to prove explicit bounds for the growth of number of generators and torsion in (degree 1) homology for Farber chains of subgroups in right angled groups. The conclusions are especially strong in lattices in higher rank simple Lie groups in combination with the knowledge of their invariant random subgroups. We also provide the first examples of right angled cocompact lattices in $SL(n, R), n > 2$ and some other Lie groups.

David Kerr
Tower decompositions for free actions of amenable groups

Recently Downarowicz, Huczek, and Zhang proved that every discrete amenable group can be tiled by translates of finitely many Flner sets with prescribed approximate invariance. I will show how this can be used to strengthen the Rokhlin lemma of Ornstein and Weiss, with applications to topological dynamics and the classification program for simple separable nuclear C*-algebras..

Harald Helfgott
Soficity, recurrence and short cycles of exponential maps (joint work with K. Juschenko)

Let f be an exponentiation map mod p, or, more precisely, the map from $\{0, 1, ...p-1\}$ to itself defined by $f(x) \equiv 2^x \mod p$. It is easy to show that f and $f \circ f$ have few fixed points. Showing that $f \circ f \circ f$ has $o(p)$ fixed points is harder, and was open; we show how to prove it. What about $f \circ f \circ f \circ f$? There, the problem is still open; we show its connection to *sofic groups*. More precisely: if the Higman group issofic, then there is a map f that (a) behaves almost everywhere like an exponentially map, and (b) satisfies $f(f(f(f(x)))) = x$ for almost all x. The proof rests in part on an elementary proof of a special case of the uniqueness ofsofic representations of amenable groups.

Ben Hayes
A product formula for Pinsker Factors with application to completely positive entropy

We investigate structural properties of Pinsker factors for sofic entropy. The Pinsker factor is the largest zero entropy factor. In the nonamenable case, there is a modification of the Pinkser factor called the Outer Pinsker factor which is defined via extension entropy. Extension entropy turns out to fix many pathological monotonicity properties of entropy (namely increase of entropy under factors). We prove useful structural properties for Outer Pinsker factors. These properties imply that certain algebraic actions have completely positive entropy (which means that every factor has positive entropy). Our methods rely on a new property of actions called the independent microstate lifting property.

Vadim Alekseev
Property (T) of discrete measured groupoids and their von Neumann algebras

In this joint work with Rahel Brugger we investigate the question when a von Neumann algebra of a discrete measured groupoid has property (T). We use the framework of strong extensions of measured groupoids as a convenient tool to the connection between property (T) of groupoids and relative rigidity for naturally arising inclusions of von Neumann algebras.

László Tóth
Growth of rank, combinatorial cost and local-global convergence

The notion of combinatorial cost for sequences of graphs was introduced by Elek as an analogue of the cost of measure preserving equivalence relations. We show that if a graph sequence is local-global convergent, then its combinatorial cost equals the cost of the limit graphing. This in particular implies previous results of Elek on combinatorial cost, and gives an alternate proof of the Abert-Nikolov theroem that connects the rank gradient of a chain of subgroups to the cost of its profinite completion. It also provides a uniform vanishing result for the rank gradient for Farber sequences of subgroups in groups with fixed price 1.

Felix Pogorzelski
Ihara's zeta function for measured graphs

Ihara defined his zeta function in the 60s to count prime elements in finite groups. In recent years, people became interested in analogues for infinite objects. We define a corresponding notion for measured graphs which unifies many definitions of the literature. We mention some interesting properties such as approximation and a determinant formula. This joint work with Daniel Lenz and Marcel Schmidt.

Mark Shusterman
Ranks of subgroups in boundedly generated groups

We exhibit bounds on the number of generators of any finite index subgroup of a boundedly generated group. This establishes a variant of a conjecture of Lubotzky on the ranks of finite index subgroups of special linear groups over the integers, and proves a strong form of a conjecture of Abert, Jaikin-Zapirain, and Nikolov which asserts that the rank gradient of infinite boundedly generated residually finite groups is zero.

Alessandro Carderi
An exotic group as a limit of finite special linear groups

In a joint work with Andreas Thom, we consider a Polish group obtained as the rank-completion of an inductive limit of special linear groups over a fixed finite field. This Polish group is extremely amenable and has no non-trivial strongly continuous unitary representation on a Hilbert space.