

## Groups and ergodic theory session - IMU meeting 2022

### Talk schedule

14:10 - 14:50 : Izhar Oppenheim

15:00 - 15:40 : Ilya Gekhtman

15:40 - 16:00 : Break

16:00 - 16:40 : Ariel Rapaport

16:50 - 17:30 : René Rühr

### Titles and abstracts

#### **Izhar Oppenheim (BGU)**

Title: Banach property (T) for  $SL(3, \mathbb{Z})$

We introduce a new (very elementary) technique for showing that the unitriangular group in  $SL(3, \mathbb{Z})$  has relative (Banach) property (T). Coupled with a bounded generation argument, this implies Banach property (T) for  $SL(3, \mathbb{Z})$  with respect to all uniformly convex Banach spaces.

Consequences of this result are: First, settling a conjecture by Margulis and showing that the Margulis expanders are super-expanders. Second, proving that for every  $n > 3$ , the group  $SL(n, \mathbb{R})$  and all its lattices has the fixed point property with respect to every uniformly convex Banach space.

#### **Ilya Gekhtman (Technion)**

Title: Abundance of hyperbolic directions in certain non-hyperbolic spaces

Many geodesic metric spaces, while not being Gromov hyperbolic themselves, have directions which behave like directions in Gromov hyperbolic spaces. These include rank 1 CAT(0) spaces, Teichmüller spaces, and word metrics of relatively hyperbolic groups and mapping class groups. I will discuss a quasi-isometry invariant notion of boundary associated with these directions, called the "sublinearly Morse boundary," consisting of asymptotic equivalence classes of geodesics with sufficient hyperbolic behavior. I will provide a criterion for a geodesic to be sublinearly Morse, and use some ergodic theory to show that for many spaces admitting non elementary actions with strongly contracting elements (like the examples described above), "almost every" geodesic has this hyperbolic-like property with respect to random walks as well as with respect to counting in balls.

The main philosophy is that many arguments in the setting of Gromov hyperbolic spaces can be carried out in a more general setting with sub-linear error terms instead of uniform.

All terms will be defined during the talk. This is joint work with Yulan Qing (Fudan University) and Kasra Rafi (University of Toronto).

**Ariel Rapaport (Technion)**

Title: Dimension of self-affine measures and their projections

A self-affine measure is a stationary measure for a random walk on  $\mathbb{R}^d$  which is generated by finitely many contracting affine maps. Self-affine measures are among the most studied and well-known fractal objects. When  $d = 1$  or  $2$  their dimension theory is relatively well understood. When  $d \geq 3$  much less is known. I will present new results in higher dimensions.

**René Rühr (Weizmann)**

Title: Effective Intrinsic Ergodicity for Countable Markov shifts

We estimate how far an invariant probability measure on a Markov shift is from the unique measure of maximal entropy in terms of its entropy. The required property for the Markov shift is to be strongly positive recurrent and to have finite entropy. This is joint work with Omri Sarig.