

**Spring Dynamical Systems Session  
Jagiellonian University in Kraków  
April 13, 2018**

<http://www.etds.im.uj.edu.pl/springsession/>

## **Abstracts of talks**

### **Standard and anomalous diffusion of energy in chains of coupled oscillators**

**Marielle Simon**

Over the last few years, anomalous behaviors have been observed for one-dimensional chains of oscillators. The rigorous derivation of such behaviors from deterministic systems of Newtonian particles is very challenging, due to the existence of conservation laws, which impose very poor ergodic properties to the dynamical system. A possible way out of this lack of ergodicity is to introduce stochastic models, in such a way that the qualitative behaviour of the system is not modified. One starts with a chain of oscillators with a Hamiltonian dynamics, and then adds a stochastic which keeps the fundamental conservation laws (energy, momentum and stretch, usually). For the unpinned harmonic chain where the velocities of particles can randomly change sign (and therefore the only conserved quantities of the dynamics are the energy and the stretch), it is known that, under a diffusive space-time scaling, the energy profile evolves following a non-linear diffusive equation involving the stretch. Recently it has been shown that in the case of one-dimensional harmonic oscillators with noise that preserves the momentum, the scaling limit of the energy fluctuations is ruled by the fractional heat equation.

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### **Smoothing singular group actions on manifolds**

**Michele Triestino**

Motivated by the recent results around Zimmers program, we study group actions on manifolds, with singular regularity (we require that every element is differentiable at all but countably many points). The groups under considerations have a fixed point property, named FW, which generalizes Kazhdans property (T) (in particular we can consider actions of lattices in higher-rank simple Lie groups). The main result is that if a group  $G$  has property FW, any singular action of  $G$  on a closed manifold 1) either has a finite orbit, 2) or is conjugate to a differentiable action, up to changing the differentiable structure of the manifold.

This is a joint work with Yash Lodha and Nicolas Matte Bon.

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### **The Franks-Misiurewicz conjecture: context and recent advances**

**Alejandro Passeggi**

In this talk we will introduce the rotation theory of the two dimensional torus. We will focus on the Franks-Misiurewicz conjecture and the related recent advances.

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# Isomorphisms between the left uniform compactification of locally compact groups

Safoura Zadeh

Abstract: For a locally compact group  $G$ , let  $C_b(G)$  be the space of all complex-valued, continuous and bounded functions on  $G$  equipped with the sup-norm, and  $LUC(G)$  be the subspace of  $C_b(G)$  consisting of all functions  $f$  such that the map  $G \rightarrow C_b(G); x \mapsto l_x f$  is continuous, where  $l_x f$  is the function defined by  $l_x f(y) = f(xy)$ , for each  $y \in G$ . The subspace  $LUC(G)$  forms a unital commutative  $C^*$ -algebra. We can induce a multiplication on the Gelfand spectrum of  $LUC(G)$ ,  $G^{LUC}$ , with which  $G^{LUC}$  forms a semigroup. When  $G$  is discrete,  $G^{LUC}$  is in fact the Stone-Ćech compactification of  $G$ . In this talk, I study some properties of  $G^{LUC}$ , the so called right topological semigroup compactification of  $G$ . I also discuss the question of when the corona,  $G^{LUC} \setminus G$ , determines the underlying topological group  $G$ .

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