

J. Bourgain, P. Sarnak and T. Ziegler proved P. Sarnak's Möbius orthogonality property for horocycle map.

Motivated by this work, El Abdalaoui, Lemańczyk and de la Rue, in order to widen the class of topological dynamical systems enjoying the Möbius orthogonality property, defined a measure theoretical invariant of a topological dynamical system relating on the study of the joinings of distinct powers of the system. Recently Kanigowski, Lemańczyk and Ulcigrai proved that, if distinct powers of a time-change have a non-trivial joining, then the time change function is cohomologous to a function coming from a harmonic form. Their result is a consequence of a more general disjointness criterion based on the so-called Ratner property.

In this talk we shall see that if distinct powers of a time-change have a non-trivial joining, then the time change function is cohomologous to a constant. This is a joint work with Giovanni Forni which follows easily from Ratner classification of joinings of times changes of horocycles flows and the characterization of coboundaries given by Forni and the speaker.