Joint Mathematics Colloquium ICMAT-UAM-UC3M-UCM

Spectral sets, weak tiling and Fuglede's conjecture

Máté Matolcsi

(Alfréd Rényi Institute of Mathematics)

12 November 2024

12:00

Aula Azul, ICMAT

youtube.com/@ICMATactivities/live

A bounded measurable set X in a d-dimensional Euclidean space is called spectral if the function space L^2(X) admits an orthogonal basis of exponentials. The easiest example is the unit cube, where elementary Fourier analysis tells you that complex exponentials with integer frequencies form an orthogonal basis.

Fuglede's conjecture stated that a set X is spectral if and only if it tiles the space by translation. The conjecture was recently proved for all convex bodies in all dimensions in a joint work of Nir Lev and Mate Matolcsi. We will review the proof, which includes the notion of weak tiling as a key ingredient. Other results and open problems related to weak tiling will also be mentioned.

Grant CEX2023-001347-S funded by: