



universität
wien

Fakultät für Mathematik

Mathematisches Kolloquium

Mittwoch, 1. März 2023

Sky Lounge

EINLADUNG

Vadim Kaloshin

(IST Austria)

„Can you hear the shape of a drum? and deformational spectral rigidity“

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Abstract:

M. Kac popularized the following question "Can one hear the shape of a drum?" Mathematically, consider a bounded planar domain $\Omega \subseteq \mathbb{R}^2$ with a smooth boundary and the associated Dirichlet problem

$$\Delta u + \lambda u = 0, u|_{\partial\Omega} = 0.$$

The set of λ 's for which this equation has a solution is called the Laplace spectrum of Ω . Does the Laplace spectrum determine Ω up to isometry? In general, the answer is negative. Consider the billiard problem inside Ω . Call the length spectrum the closure of the set of perimeters of all periodic orbits of the billiard inside Ω . Due to deep properties of the wave trace function, generically, the Laplace spectrum determines the length spectrum. Jointly with J. De Simoi and Q. Wei show that an axially symmetric domain close to the circle is dynamically spectrally rigid, i.e. cannot be deformed without changing the length spectrum. This partially answers a question of P. Sarnak.

14.45 Uhr: Kaffeejause

15.15 Uhr: Vortrag

Kleines Buffet im Anschluss

Anton Mellit
José Luis Romero
Radu Ioan Boț