

On Deformational Spectral Rigidity of Convex Symmetric Planar Domains

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Resumo/Abstract:

One can associate to a planar convex domain $\Omega \subset R^2$ two types of spectra: the Laplace spectrum consisting of eigenvalues of a Dirichlet problem and the length spectrum consisting of perimeters of all periodic orbits of a billiard problem inside Ω . The Laplace and length spectra are closely related, generically the first determines the second. M. Kac asked if the Laplace spectrum determines a domain Ω . There are counterexamples. During the talk we show that a planar axis symmetric domain close to the circle can't be smoothly deformed preserving the length spectrum unless the deformation is a rigid motion. This gives a partial answer to a question of P. Sarnak. This is a joint work with J. De Simoi and Q. Wei. In a different direction we show that generically the minimal length spectrum determines eigenvalues of minimal periodic orbits. This is a joint work with G. Huang and A. Sorrentino.