



MAFIA - the seminar you can't refuse

Spectral Optimization in Exterior Domains: Robin and Steklov Problems

Lukas Bundrock

University of Alabama

September 23, 2025

12:00–13:00

in T212

Fakulta jaderná a fyzikálně inženýrská ČVUT, Trojanova 13, 12000 Praha

Abstract: The spectrum of the Laplace operator with Robin boundary conditions on bounded domains has been extensively studied, with deep connections to physical models such as heat flow and the behavior of branching Brownian motion. In contrast, the spectral theory on exterior domains - the complement of a compact set - is less well understood and exhibits new phenomena. We discuss in this talk how the geometry of the excluded domain affects the spectral properties: In two dimensions, we have isoperimetric inequalities for the first Robin and Steklov eigenvalue. Unlike that, while the ball is a local maximizer of the first eigenvalue, it is not always the optimal shape in higher dimensions.