Theoretical Statistics and Mathematics Unit, Kolkata
INDIAN STATISTICAL INSTITUTE

Seminar

Date: May 16, 2025
Time: 4:15 PM

VENUE:

L-infinity

(5th Floor, A.N. Kolmogorov Bhavan), ISI Kolkata

TITLE:

Absence of L^p eigenfunctions for diffusion operators in regions with cavities

SPEAKER:

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ABSTRACT:

In his seminal 1943 paper F. Rellich proved that, in the complement of a cavity $\Omega = \{x \in \mathbb{R}^n \mid |x| > R_0\}$, there exist no nontrivial solution f of the Helmholtz equation $\Delta f = -\lambda f$, when $\lambda > 0$, such that $\int_\Omega |f|^2 dx < \infty$. It turns out quite remarkably that from an estimate in that same paper of Rellich, it follows that there are no L^p eigenfunctions for all $p \in (0, \frac{2n}{n-1}]$. This result is sharp since for any $p > \frac{2n}{n-1}$, L^p eigenfunctions do exist in Ω. In this talk, I plan to describe the original proof of Rellich based on spherical harmonics and then present an alternate approach which extends to a class of variable coefficient diffusion operators. This is based on some recent joint works with Nicola Garofalo.

ALL ARE CORDIALLY INVITED