Institute for Applied Mathematics, Bonn University

Oberseminar Stochastik

Thursday, 10 December 2026, 16:30
Lipschitz-Saal (LWK 1.016)

Alexander Van Werde

University of Münster

Can one hear the shape of a (typical) graph?

A classical question in spectral graph theory asks which graphs are determined up to isomorphism by their adjacency spectrum. Both positive and negative examples are known. But, what happens in the "typical case" of an ErdősRényi random graph?

Haemers' conjecture posits that the probability that the graph is determined by its spectrum should tend to one as the number of vertices tends to infinity. While this conjecture remains open, I will discuss recent progress that connects the question to techniques from algebraic number theory and combinatorial random matrix theory.

Specifically, we will study generalized notions of cospectrality and how their probabilistic study leads one to consider random algebraic objects. These objects are abelian groups and $\mathbb{Z}[x]$-modules arising from the cokernels of random integer matrices. This is partially based on joint work with N. Lvov.