

Eisenbud Lectures 2014

Speaker: Peter Sarnak, Institute for Advanced Study and Princeton University

The following lectures were held December 2 – December 4 at Brandeis University:

Lecture 1: December 2, 2014

Title: *"The topology of random real hypersurfaces and percolation."*

Abstract : The topologies of the connected components of the zero sets of random real projective hypersurfaces of high degree follow a universal law of distribution. We explain this (and a more general phenomenon for random band limited functions), its source and some possible connections to percolation.

Lecture 2: December 3, 2014

Title: *"Nodal domains for Maass (modular) forms."*

Abstract : The eigenstates of the quantization of a classically chaotic hamiltonian are expected to behave like random monochromatic waves .We discuss this in the context of the eigenfunctions on the modular surface-ie "Maass Forms ", and especially what can be proved about their nodal domains.

Lecture 3: December 4, 2014

Title: *"Families of zeta functions, their symmetries and applications."*

Abstract: The local statistical laws for the distribution of the zeros of the Riemann Zeta function and more generally of families of zeta functions ,follow one of 4 of the 10 universal random matrix ensembles. We review some this phenomenon ,especially in connection with applications.