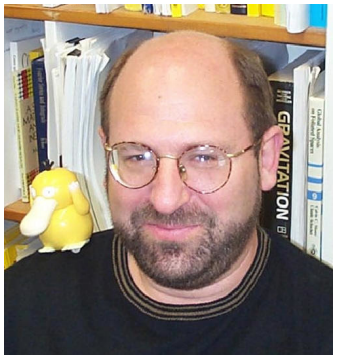
Stony Brook University

Simons Lectures in Mathematics

Fall, 2014



Steve Zelditch

(Northwestern University)

Planck's constant, time and stationary states in quantum mechanics

Quantum mechanics solved the problem of how a particle can move and be stationary at the same time. It did this by replacing geometry (classical mechanics) by linear algebra (eigenfunctions, eigenvalues and spectral theory). But intuition asks for a geometric picture of the time evolution of quantum states and the topography of eigenfunctions. As Planck's constant h approaches 0, quantum mechanical objects have asymptotic relations to classical mechanical objects and provide the best picture possible.

My talks will concentrate on topography of eigenfunctions of the Laplacian on Riemannian manifolds (M,g): their sizes and shapes as measured by their zero sets, sup norms, and L_p norms. One theme is to describe the (M, g) possessing extremal eigenfunctions. Another is the real and complex geometry of zero sets. The methods come from microlocal analysis and complex geometry. No prior knowledge of quantum mechanics or PDE is assumed.

Lecture 1

Tuesday, September 30, 2014 – 4:00 pm, SCGP 102

Lecture 2

Wednesday, October 1, 2014 – 4:00 pm, SCGP 102

Lecture 3

Thursday, October 2, 2014 – 4:00 pm, SCGP 102