Geometry of highly excited quantum states

Steven Zelditch, The Johns Hopkins University

By highly excited quantum states, I mean the eigenfunctions of a Laplacian or Schrodinger operator correspoinding to a large eigenvalue E^2. It is when a physical system is in an excited state that the (semi-) classical approximation is valid. My main purpose is to survey a series of new results (joint work with B. Shiffman, C. Sogge and J.Toth) about the geometry of such states: how their size (sup-norms and L^p-norms) reflects the underlying geometry, and how the zeros and critical points are distributed in typical cases. I will also present some slides (made by physicist) of actual excited states in various systems of physical and mathematical interest.