Prescribing the nodal set of an eigenfunction.

Alberto Enciso (ICMAT, Madrid)

Classical results in spectral geometry show that, while the high-energy behavior of the eigenvalues of, say, the Laplacian on a compact Riemannian manifold is very rigid and determined by Weyl's law, the low-lying eigenvalues are very flexible: indeed, by carefully choosing the metric on the manifold one can exactly prescribe the first N eigenvalues of the Laplacian, where N is finite abut arbitrary. In this talk we will explore an analogous flexibility/rigidity phenomenon in the subtler context of nodal sets of eigenfunctions, addressing in particular a 1993 problem of Yau. We will also see how variations of the underlying ideas have found applications in seemingly unrelated contexts. The talk is based in joint work with David Hartley, Daniel Peralta-Salas and Stefan Steinerberger.