

PLANCK-SCALE MASS EQUIDISTRIBUTION OF TORAL LAPLACE EIGENFUNCTIONS

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ABSTRACT: This talk is based on a joint work with Andrew Granville.

We study the small scale distribution of the L^2 -mass of eigenfunctions of the Laplacian on the two-dimensional flat torus. Given an orthonormal basis of eigenfunctions, Lester and Rudnick showed the existence of a density one subsequence whose L^2 -mass equidistributes more-or-less down to the Planck scale. We give a more precise version of their result showing equidistribution holds down to a small power of log above Planck scale, and also showing that the L^2 -mass fails to equidistribute at a slightly smaller power of log above the Planck scale. Our results rest on a number of results about the proximity of lattice points on circles, much of it based on foundational work of Javier Cilleruelo.