

**SPEAKER:** Zeev Rudnick (Tel Aviv & IAS)

**TITLE:** Lattice points on circles and spheres and nodal sets of eigenfunctions of the Laplacian

**ABSTRACT:** I will describe some recent results on the fine structure of eigenfunctions of the Laplacian on flat tori in two and three dimensions. The results concern the structure of the nodal sets (i.e. the locus of points where the function vanishes) and  $\mathcal{L}^2$  bounds for the restriction of the eigenfunctions to curves. I will describe how these issues connect with purely arithmetic problems on the representations of integers as sums of two and three squares and the distribution of the corresponding lattice points on arcs of circles and caps on spheres. Several of these lattice point problems are still open. (Joint works with Jean Bourgain and with Peter Sarnak).