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*Ambient prime geodesic theorems on compact hyperbolic 3-manifolds*

The study of hyperbolic 3-manifolds draws deep connections between number theory, geometry, topology, and quantum mechanics. Specifically, the closed geodesics on a manifold are intrinsically related to the eigenvalues of Maass forms via the Selberg trace formula and are parametrized by their length and holonomy. The trace formula for spherical Maass forms can be used to prove the Prime Geodesic Theorem, which provides an asymptotic count of geodesics up to a certain length. In 1999, Sarnak and Wakayama established a count of geodesics by both length and holonomy that shows that holonomies of geodesics of increasing lengths become equidistributed throughout the circle. In this talk, I will present new results including a count of geodesics in shrinking intervals of length and holonomy, which implies effective equidistribution of holonomy.