Existence and Non-existence of Half-Geodesics on $S^2$.

In this talk we will discuss $1/k$-geodesics, those closed geodesics that minimize on any subinterval of length $l(\gamma)/k$. Christina Sormani has shown that the $1/k$-geodesics persist under the Gromov-Hausdorff convergence of Riemannian manifolds. We use her result to construct manifolds diffeomorphic to $S^2$ that admit exactly $n$ half-geodesics ($1/2$-geodesics) for each nonnegative integer $n$. Additionally, we construct a sequence of manifolds, each of which is diffeomorphic to $S^2$ and admits no half-geodesics, yet which converge in the Gromov-Hausdorff sense to a limit space admitting infinitely many half-geodesics. (Received September 03, 2014)