Title: Counting closed orbits of Anosov flows in free homotopy classes

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There are Anosov and pseudo-Anosov flows so that some orbits are freely homotopic to infinitely many other orbits. An Anosov flow is R-covered if either the stable or unstable foliations lift to foliations in the universal cover with leaf space homeomorphic to the reals. These are extremely common. A free homotopy class is a maximal collection of closed orbits of the flow that are pairwise freely homotopic to each other. The first result is that if an R-covered Anosov flow has all free homotopy classes that are finite, then up to a finite cover the flow is topologically conjugate to either a suspension or a geodesic flow. This is a strong rigidity result that says that infinite free homotopy classes are extremely common amongst Anosov flows in 3-manifolds. We also mention other examples with infinite free homotopy classes.

The second part of the talk is about analysing growth of length of orbits in a fixed infinite free homotopy class. We analyse the interaction of such a free homotopy class with the torus decomposition of the manifold: for examples whether all orbits in the infinite free homotopy classes are contained in a Seifert piece or atoroidal piece. There is a natural ordering of an infinite subset of such a collection, indexed as (gamma_i). We analyse the growth of the length of gamma_i as a function of i. We obtain several inequalities: for example if the manifold is hyperbolic then the growth of length of gamma_i is exponential. These inequalities have consequences for the ergodic theory of the Anosov flow.