DEHN FILLING IN SEMISIMPLE LIE GROUPS

Theodore Weisman

Abstract

Thurston's Hyperbolic Dehn Filling Theorem is a seminal result in the theory of 3-manifolds. Given a single noncompact finite-volume hyperbolic 3-manifold M, the theorem provides a construction for a countably infinite family of closed hyperbolic 3-manifolds converging to M in a geometric sense. The theorem is a major source of examples of 3-manifolds admitting hyperbolic structures, and closely connects the topology of a 3-manifold to the analysis of the $\mathrm{PSL}(2,\mathbb{C})$ character variety of its fundamental group. I will discuss some analogs and generalizations of Thurston's theorem in the context of general (arbitrary-rank) semisimple Lie groups. I will explain how these results provide a way to construct new examples of Anosov and relatively Anosov representations into higher-rank Lie groups; time permitting, I will also discuss upcoming joint work with Jeff Danciger, which applies the results towards exotic new examples of convex cocompact and geometrically finite groups acting on complex hyperbolic 3-space.