Lattice actions and recent progress in the Zimmer program

Abstract:
The Zimmer Program is a collection of conjectures and questions regarding actions of lattices in higher-rank simple Lie groups on compact manifolds. For instance, it is conjectured that all non-trivial volume-preserving actions are built from algebraic examples using standard constructions. In particular, on manifolds whose dimension is below the dimension of all algebraic examples, Zimmer’s conjecture asserts that every action is finite.

I will present some background, motivation, and selected previous results in the Zimmer program. I will then explain two of my own results within the Zimmer program: (1) a solution to Zimmer’s conjecture for actions of cocompact lattices in $SL(n, R), n \geq 3$ (joint with D. Fisher and S. Hurtado); (2) a classification (up to topological semiconjugacy) of lattice actions on tori whose induced action on homology satisfies certain criteria (joint with F. Rodriguez Hertz and Z. Wang).

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