

Special Colloquium

Homology spheres, knots, and cobordisms

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Abstract: Homology 3-spheres, i.e. 3-dimensional manifolds with the same homology groups as the standard 3-sphere, play a central role in topology. Their study was initiated by Poincare in 1904, who constructed the first nontrivial example of a homology 3-sphere, and conjectured that the standard sphere is the only simply connected example. A century later, Poincare's conjecture was finally resolved by Perelman, but we are still far from understanding the general classification of homology 3-spheres.

This classification problem can be packaged in terms of the homology cobordism group, which is an abelian group formed by the set of all homology 3-spheres modulo a cobordism relation. I will survey what is known about this group, as well as discuss a closely related group classifying knots in the 3-sphere, including recent results joint with Irving Dai, Jennifer Hom, and Matthew Stoffregen.

Wednesday, January 22 at 3:00 PM in 636 SEO
