Lens spaces surgeries: from diagrams to 4-manifolds and back again

Jacob Caudell

Boston College

In classifying which lens spaces are realized as integer surgery on a knot in the three-sphere, Greene combined input from Heegaard-Floer homology and Donaldson's Diagonalization Theorem to show that the intersection form of a sharp 4-manifold with L-space boundary that arises as integer surgery on a knot in the 3-sphere (e.g. certain double covers of the four-ball branched along a pushed-in Seifert surface of an alternating knot) embeds in the diagonal, unimodular, negative-definite lattice as the orthogonal complement to a changemaker vector. In this talk, I will present my efforts to produce an algorithm that takes as input a changemaker vector and constructs, in the same breath, both a twist-positive braid closure and a 4-manifold whose intersection form is equivalent to the orthogonal complement to said changemaker vector and whose boundary is surgery on said knot, as well as some consequences of this construction.

In Special Session 31 on Structures of Submanifolds in Low Dimensional Topology at the Mathematical Congress of the Americas 2025.

MCA 2025 internal code: SS31-T03