

Oklahoma State University

Topology Seminar

Title

Quantum invariants for links and 3-manifolds

Speaker: Haihan Wu, JHU

Date: Dec 3, 2024

Time: 4:00 PM

Room: MSCS 514

Abstract: The discovery of the Jones polynomial started the intermingling of quantum physics and low-dimensional topology. One way to define the Jones polynomial is by using the braiding in the Temperley-Lieb category, a category of planar matchings. We can use diagrams and graphical calculus in the Temperley-Lieb category to study the representation theory of quantum $\mathfrak{sl}(2)$, where the irreducible representations can be “visualized” as the Jones-Wenzl projectors, which can be used to compute colored Jones polynomial of a link or knot. When q is at a root of unity, 3-manifold invariants are also constructed via Dehn surgery (Witten-Reshetikhin-Turaev invariants) and triangulation (Turaev-Viro invariants). In this talk, I will review background materials on quantum invariants of links and 3-manifolds in the $\mathfrak{sl}(2)$ case. If time permits, I will also talk about generalizations of the diagrammatic category and highest weight projectors to the other Lie types.