

A skein theoretic $A_{q,t}$ algebra

The $A_{q,t}$ algebra first arose in connection to the celebrated proof of the shuffle theorem given by Carlsson and Mellit. This algebra is given as an extension of two copies of the affine Hecke algebra by certain raising and lowering operators. Its polynomial representation, which played a critical role in the proof given by Carlsson and Mellit, was later realized geometrically by Carlsson-Mellit and Gorsky in the context of parabolic flag Hilbert schemes. In this talk I will present a skein theoretic formulation of this representation given by certain skein-Heisenberg diagrams on a punctured annulus. This formulation recovers the original algebraic description of Carlsson and Mellit, but given the simplicity of the diagrams allows many computations to be more straightforward and intuitive. More interestingly, this diagrammatic presentation is primed for a direct categorification via the category of Soergel bimodules. This is joint work with Matt Hogancamp.