Open strings on knot complements

Sachin Chauhan

Using skein valued holomorphic curve counting techniques, we give a flow loop formula for the skein valued partition function of the Lagrangian knot complement of a fibered knot (of the A-model open topological strings with Lagrangian A-branes wrapping the complement) in the cotangent bundle of the three-sphere and in the resolved conifold. For torus knots we show that the partition function in the cotangent bundle localizes on finitely many holomorphic annuli and give a corresponding generalized quiver structure for the partition function in the resolved conifold.

The knot contact homology algebra of a knot is generated by Reeb chords of its Legendrian conormals and has differential given by holomorphic disks interpolating between words of Reeb chords. The augmentation curve is the representation variety of knot contact homology. It admits a quantization as a q-difference equation for the generating function of symmetrically colored HOMFLYPT-polynomials of the knot or, geometrically, for the $U(1)$-partition function of the knot conormal. For $(2,2p+1)$-torus knots we show that the partition function of the knot complement also satisfies this q-difference equation. This gives another geometrically defined coordinate chart for the D-module defined by the quantized augmentation polynomial.

This is based on the joint work with Tobias Ekholm and Pietro Longhi.