

Ben Davison

Title: Fermionizing Yangians via central extensions of preprojective algebras

Abstract: The Hall algebra \mathcal{A}_Q built out of the Borel-Moore homology of the stack of representations of a preprojective algebra Π_Q contains one half of the Kac-Moody Lie algebra \mathfrak{g}_Q associated to Q , and indeed one half of the Yangian of Q . Moreover, this BM homology is entirely situated in even cohomological degrees, and can be shown to contain the universal enveloping algebra of the BPS Lie algebra associated to Q , a cohomologically graded Lie algebra, concentrated entirely in even degrees, which recovers all of the Kac polynomials of Q via the taking of characteristic polynomials.

In this talk I will introduce a construction of partially fermionized versions of the above algebras. These new algebras also arise as cohomological Hall algebras, this time built out of the vanishing cycle cohomology of certain central extensions of Π_Q considered by Etingof and Rains. These central extensions are determined by a parameter in the Cartan algebra of \mathfrak{g}_Q , which also determines the extent of fermionization that the new algebra exhibits, when compared to \mathcal{A}_Q .

I'll explain all these results, as well as how to calculate the Borel-Moore homology of stacks of representations of deformed preprojective algebras via the above techniques.