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Geometric Fock Space Representations of Affine sl(n) and gl(n)

Fock space has a basis naturally enumerated by Young diagrams. There exists a well-known combinatorial representation of affine sl(n) on Fock space, where the Chevalley generators act by adding and removing boxes. This can be extended to an action of affine gl(n), resulting in a combinatorial realization of the so-called basic representation. In this talk, we describe a geometric realization of Fock space using the equivariant cohomology of Hilbert schemes and Nakajima quiver varieties. In particular, we show how to geometrically describe the action of affine sl(n) and gl(n) using "geometric operators" arising from the top nonvanishing Chern classes of certain equivariant vector bundles. Our description, which is more general than those previously appearing in the literature, yields a geometric realization of all the vertex operator realizations of the basic representation.