## Mirkovic–Vilonen polytopes and cluster algebras

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Friday, February 18, 2005 150 Moore Hall, 4:10 pm (Tea 3:30 pm Math Lounge)

## Abstract

I will give an introduction to a certain collection of polytopes associated to a semisimple algebraic group, such as  $SL_3(C)$ . The combinatorics of these polytopes is related to the representation theory of the group: weight multiplicities and tensor product multiplicities may be calculated by counting the number of polytopes fitting in a certain region. Recent joint work with Misha Kogan describes all the polytopes for  $SL_n(C)$ , and ongoing work explores the relation to the cluster algebras of Fomin and Zelevinsky. (The polytopes are defined as moment map images, for a torus action, of the Mirkovic–Vilonen semi-canonical basis of algebraic cycles in the affine Grassmannian. But I am not going to discuss this, since it is easier to give an introductory talk from the point of view of convex geometry and representation theory than from algebraic geometry and topology.)

This talk should be accessible to graduate students.