Varieties for modules and quantum complete intersections

Karin Erdmann

This is based on joint work with D. Benson and M. Holloway.

Let k be an algebraically closed field. We develop a rank variety for finite-dimensional modules over a class of finite-dimensional local symmetric k-algebras, $A^n_{q,m}$, which are 'quantum complete intersections' as introduced by Avramov. Included in this class are the truncated polynomial algebras $k[X_1, \ldots, X_m]/(X_i^n)$ with k of arbitrary characteristic. These varieties generalize Carlson's rank varieties for group algebras. They characterize projectivity (that is, answer when $M \cong 0$ in the stable module category). Furthermore, they show that the algebra has 'enough periodic modules'. As a consequence, the possible tree classes of the stable Auslander-Reiten quiver are either Dynkin, or Euclidean, or one of the infinite trees A_∞, A_∞^∞, or D_∞.