Poincare-Birkhoff-Witt Theorems and group actions in positive characteristic

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Braverman and Gaitsgory gave necessary and sufficient conditions for a nonhomogeneous quadratic algebra to satisfy a Poincare-Birkhoff-Witt (PBW) Theorem. Their results were later extended to Koszul rings over semisimple subalgebras, such as finite group algebras in characteristic 0.

Applications include symplectic reflection algebras. In the nonsemisimple setting, such as characteristic p dividing the order of the acting group, other methods have been employed to prove PBW Theorems. In this talk we will begin with an overview of the theory of Braverman and Gaitsgory, and applications to symplectic reflection and related algebras. Then we will explain how to generalize their homological techniques to Koszul rings over nonsemisimple subalgebras, in particular group algebras in positive characteristic. This is joint work with Anne Shepler.