Quantum cluster algebra structures on quantum nilpotent algebras

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Cluster Algebras and their quantum counterparts play an important role in representation theory, combinatorics and topology. In relation to noncommutative algebra there are several open problems on the existence of cluster algebra structures on certain families of quantized coordinate rings.

We will describe a result that proves the existence of quantum cluster algebra structures on a very general axiomatically defined class of quantum nilpotent algebras.

Applications of this result settle several conjectures on cluster algebra structures on quantum unipotent groups, quantum double Bruhat cells, and others. The proofs are based on noncommutative unique factorization domains and a technique that generates quantum clusters via a generalized normal version of the Gelfand-Tsetlin construction. The talk is based on a joint work with Ken Goodearl (University of California, Santa Barbara).