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Graded quantum vertex coalgebras

A vertex algebra can be thought of as a commutative algebra whose multiplication map need not be globally defined and can have certain singularities. Starting from this, the concept of a quantum vertex algebra is obtained by relaxing the requirement that the algebra is commutative and instead imposing only the weaker hypothesis that its product and opposite product are intertwined by a solution of the quantum Yang-Baxter equation. At the turn of the century, Etingof and Kazhdan formalized this concept and constructed a quantum vertex algebra structure on the vacuum module of the Yangian double of the special linear algebra at some fixed level k. This example provides a deformation of the standard level k affine vertex algebra and to this day remains one of the most important and well understood examples of a quantum vertex algebra. In this talk, I will explain how to uniformly generalize this construction starting from the notion of a graded quantum vertex coalgebra, which naturally captures certain key properties exhibited by quantum groups like Yangians. This is based on joint work with Alex Weekes and Matt Rupert.