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Brian Parshall* (bjp8w@virginia.edu), Dept. of Mathematics, University of Virginia, Charlottesville, VA 22903. *Support varieties and complexity for algebraic, finite, and quantum groups*. Preliminary report.

We first describe the computation of support varieties of *all* irreducible modules for small quantum groups $u_\zeta(\mathfrak{g})$, at an ℓ -th root of unity, $\ell > h$, the Coxeter number. A similar calculation holds, replacing $u_\zeta(\mathfrak{g})$ by the restricted enveloping algebra $u(\mathfrak{g})$ of a simple, simply-connected algebraic group G over an algebraically closed field of characteristic $p > 0$. This result assumes that $p \geq h$ and that the Lusztig character formula holds for all restricted dominant weights. Thus, it holds for p sufficiently large, as well as some notable other cases. This part of the talk is joint work with Chris Drupieski and Dan Nakano.

The complexity of a finite dimensional module M for a finite group H is the growth rate of $\dim \text{Ext}_H^n(M, \bigoplus_{L \text{ irred}} L)$. It is closely related to support variety theory. We propose a complexity theory for the *big* quantum group U_ζ , and describe applications to Kazhdan-Lusztig polynomials. These ideas are related to Koszul structures associated to the full Ext-algebra of U_ζ . This part of the talk is joint work with Leonard Scott. (Received September 18, 2009)