September 19: "Goldie ranks of primitive ideals and indexes of equivariant Azumaya algebras."

We are interested in two numerical invariants of primitive ideals (=the annihilators of irreducible modules) in the universal enveloping algebras. The first invariant, the Goldie rank, is classical, it measures how many zero divisors the quotient by the ideal has. The second invariant, the dimension of the finite dimensional irreducible representation of a W-algebra corresponding to the primitive ideal, is more recent. It is expected (and is known in many important cases) that the latter invariant is computable via a Kazhdan-Lusztig type formula. Also the two invariants are known to be very closely related thanks to the work of Premet and the speaker.

In this talk we discuss the joint work with Ivan Panin, `arXiv:1802.05651`, where we find a lower bound on the ratio of the dimension of the W-algebra module by the Goldie rank. This lower bound is the index of a suitable equivariant Azumaya algebra on a cover of the nilpotent orbit corresponding to the ideal. We explain how to compute the index in the elementary representation theoretic terms. We hope that our lower bound is exact at least for the classical Lie algebras. No prior knowledge of primitive ideals, W-algebras or Azumaya algebras is required.