

ALEXANDER PREMÉT

MODULAR REPRESENTATIONS OF REDUCTIVE LIE ALGEBRAS

My lectures are aimed at giving an overview of representation theory of restricted Lie algebras. The emphasis will be made on reductive Lie algebras, i.e. Lie algebras of reductive algebraic groups.

The related notions of a p -character and a reduced enveloping algebra will be introduced and the Kac-Weisfeiler conjectures will be formulated. The reduction to the so-called nilpotent case will be discussed. A geometric proof of the KW2 conjecture will be outlined. A recently discovered link with quantum W algebras and generalised Gelfand-Graev representations will be explained. As an example the W algebra associated with the minimal nilpotent orbit will be considered and its relationship with the Joseph ideal will be discussed.

Recent advances on Lusztig's conjecture relating simple modules in blocks of reduced enveloping algebras with ℓ -adic cohomology of Springer fibres will be discussed. Support varieties of blocks of reduced enveloping algebras will be touched if time permits.