962-17-762   **James E. Humphreys*** (`jeh@math.umass.edu`), Dept. of Mathematics & Statistics, LGRT, University of Massachusetts, Amherst, MA 01003-9305. *Nilpotent blocks of reduced enveloping algebras: problems and conjectures.* Preliminary report.

Let $\mathfrak{g}$ be the Lie algebra of a simply connected semisimple group G over an algebraically closed field of characteristic $p > 0$. To determine the irreducible representations of $\mathfrak{g}$, one mainly has to understand those belonging to the blocks of reduced enveloping algebras corresponding to "nilpotent" elements of $\mathfrak{g}^*$. Following recent work of Brown–Gordon, Jantzen, Lusztig, Mirkovic–Rumynin, Premet, and others, we can formulate more precisely some of the main unsolved problems: e.g., (1) determine the number of nonisomorphic simple modules in each nilpotent block; (2) specify the largest power of p dividing all dimensions of simple modules in each block; (3) relate dimension formulas to affine hyperplanes, such as those bounding the 2-sided cell of the affine Weyl group which corresponds to a given nilpotent element; (4) find direct connections between the representations and the geometry of Springer fibres. (Received September 25, 2000)