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Group gradings on Lie algebras of Cartan type

We are interested in describing all group gradings on simple Lie algebras over an algebraically closed field F, i.e., vector space decompositions of the form $L = \bigoplus_{g \in G} L_g$ where G is a group and $[L_g, L_h] \subset L_{gh}$. In the case $\operatorname{char} F = 0$, all gradings on the classical simple Lie algebras (except of type D_4) have been described in the works of J. Patera, H. Zassenhaus, M. Havlíček, E. Pelantová and Yu. Bahturin, M. Zaicev, I. Shestakov. It turns out that the description given by the latter group of authors is also valid in the case $\operatorname{char} F = p > 0$, $p \neq 2$, as shown by Yu. Bahturin, S. Montgomery and the speaker. In this talk we will discuss recent progress in the classification of group gradings on Lie algebras of Cartan type in characteristic p.

The results are joint work with Yu. Bahturin and J. McGraw.