

## Abstract

Let  $p$  be a prime. In this paper we investigate finite  $\mathcal{K}_{\{2,p\}}$ -groups  $G$  which have a subgroup  $H \leq G$  such that  $K \leq H = N_G(K) \leq \text{Aut}(K)$  for  $K$  a simple group of Lie type in characteristic  $p$ , and  $|G : H|$  is coprime to  $p$ . If  $G$  is of local characteristic  $p$ , then  $G$  is called almost of Lie type in characteristic  $p$ . Here  $G$  is of local characteristic  $p$  means that for all nontrivial  $p$ -subgroups  $P$  of  $G$ , and  $Q$  the largest normal  $p$ -subgroup in  $N_G(P)$  we have the containment  $C_G(Q) \leq Q$ . We determine details of the structure of groups which are almost of Lie type in characteristic  $p$ . In particular, in the case that the rank of  $K$  is at least 3 we prove that  $G = H$ . If  $H$  has rank 2 and  $K$  is not  $\text{PSL}_3(p)$  we determine all the examples where  $G \neq H$ . We further investigate the situation above in which  $G$  is of parabolic characteristic  $p$ . This is a weaker assumption than local characteristic  $p$ . In this case, especially when  $p \in \{2, 3\}$ , many more examples appear.

In the appendices we compile a catalogue of results about the simple groups with proofs. These results may be of independent interest.