

# On strongly associative group algebras

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An associative unital algebra  $A$  is called strongly associative if for any group  $G$  and every partial action  $\alpha$  of  $G$  over  $A$  the crossed product  $A *_{\alpha} G$  is associative. The problem of the associativity of crossed products by partial actions was studied in a recent paper by M. Dokuchaev and R. Exel (M. Dokuchaev and R. Exel, Associativity of crossed products by partial actions, enveloping actions and partial representations, *Trans. Amer. Math. Soc.*, to appear.), in which, among other results, they proved that a semi-prime algebra is necessarily strongly associative. On the other hand, the authors gave a partial action  $\alpha$  of the cyclic group  $G$  of order 2 on the modular group algebra  $KH$  of the Klein four-group  $H$  over a field of characteristic 2, such that  $(KH) *_{\alpha} G$  is not associative. They also posed the problem of describing the strongly associative group algebras. In this direction we prove that given a finite nilpotent group  $H$  and a field whose characteristic divides  $|H|$ , the group algebra  $KH$  is strongly associative if and only if  $|H| = 2$  or  $|H| = 3$ .