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On group rings of finite simple groups

It is well known that a finite simple group G is determined up to isomorphism by its ordinary character table and therefore by its integral group ring. But probably much weaker conditions suffice. The object of the talk are recent results of M. Nagl, M. Borgart and myself related to the following two conjectures.

Conjecture (Huppert 2000). Let G be a finite simple group and let H be a finite group. Assume that the set of the irreducible ordinary character degrees of G coïncides with that one of H. Then $H \cong G \times A$ with A abelian.

Note that the assumption in Huppert's conjecture is satisfied provided G and H have isomorphic complex group algebras. More general for an arbitrary field K the question whether a finite (almost) simple group G is determined by the group algebra KG will be considered. Huppert's conjecture is from the point of view of character tables dual to the following one.

Conjecture (Thompson 1988). Let G be a finite simple group and let H be a finite group with trivial centre. Assume that the set of the conjugacy class lengths of G concides with that one of H. Then $G \cong H$.