On finite groups isospectral to simple groups

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The set of element orders of a finite group G is called the spectrum of G. Finite groups are said to be isospectral if their spectra coincide. The topic we discuss is the structure of an arbitrary finite group G isospectral to a given finite simple group L. Victor Mazurov conjectured that for most of non-abelian simple groups L, the group G should be squeezed between L and its automorphism group, that is $L \leqslant G \leqslant \mathrm{Aut}(L)$. We are going to show that, in a certain precise sense, this conjecture is true.