An upper bound for the nonsolvable length of a finite group in terms of its shortest law

Orazio Puglisi
Università di Firenze

Every finite group G has a normal series each of whose factors is either a solvable group or a direct product of non-abelian simple groups. The minimum number of nonsolvable factors, attained on all possible such series in G, is called the *nonsolvable length* $\lambda(G)$ of G. In recent years several authors have investigated this invariant and its relation to other relevant parameters. E.g. it has been conjectured by Khukhro and Shumyatsky (as a particular case of a more general conjecture about non-p-solvable length) and Larsen that, if $\nu(G)$ is the length of the shortest law holding in the finite group G, the nonsolvable length of G can be bounded above by some function of $\nu(G)$. In a joint work with Francesco Fumagalli and Felix Leinen we have confirmed this conjecture proving that the inequality $\lambda(G) < \nu(G)$ holds in every finite group G. This result is obtained as a consequence of a result about permutation representations of finite groups of fixed nonsolvable length. In this talk I will outline the main ideas behind the proof of our result.