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Laszlo Babai (laci@cs.uchicago.edu), **Paolo Codenotti*** (paoloc@cs.uchicago.edu) and **Youming Qiao** (jimmyqiao86@gmail.com). *On the Group Isomorphism problem*. Preliminary report.

The isomorphism problem for groups given by their multiplication tables has long been known to be solvable in time $n^{\log n}$, where n is the order of the group. The decades-old quest for a polynomial-time algorithm has focused on the very difficult case of class-2 nilpotent groups, with little success so far; J. B. Wilson has recently obtained significant new invariants for this class (J. Algebra, 2009). We consider the opposite end of the spectrum, groups without abelian normal subgroups. We work towards a polynomial time isomorphism test for this class.

We use the BB-filtration (Babai and Beals, Bath, 1999) to link our problem to permutational isomorphism of permutation groups and equivalence of (not necessarily linear) codes. (The BB-filtration was originally introduced as a framework for computation in matrix groups.) Our algorithm for code equivalence is obtained by generalizing Luks's algorithm for hypergraph isomorphism (FOCS, 1999).

This work builds on a previous joint paper with Joshua A. Grochow (SODA, 2011). (Received March 08, 2011)