1077-68-1157 **László Babai** and **Youming Qiao*** (jimmyqiao86@gmail.com), Room 4-609 FIT Building,Tsinghua University, Beijing, Beijing 100084, Peoples Rep of China. *Polynomial-time isomorphism test for groups with abelian Sylow towers.* Preliminary report.

We consider the complexity of testing isomorphism of groups of order n given by Cayley tables. While this can trivially be accomplished in $n^{\log n}$ time, no polynomial-time algorithm is known. Solvable groups appear to present the hardest cases. We present a polynomial-time algorithm for the largest class of solvable groups to-date, namely, for groups with abelian Sylow towers, defined as follows. A *Sylow tower* in a group G is a normal chain where each quotient is isomorphic to a Sylow subgroup of G. A Sylow tower is *abelian* if all Sylow subgroups are abelian. To achieve polynomial time, we reduce isomorphism testing to certain representation-theoretic problems, and further to a parameterized setwise stabilizer problem. The latter can be solved adapting Luks's dynamic programming technique for hypergraph isomorphism. Furthermore, a detailed analysis of p'-automorphisms of abelian p-groups, both theoretically (by M. E. Harris) and algorithmically (by A. Ranum), is required. We build on prior work by F. Le Gall and by Y. Qiao, J. M. N. Sarma, and B. Tang. (Received September 20, 2011)