1023-20-1001 **Geir T. Helleloid*** (geir@math.stanford.edu), Dept. of Math., Bldg. 380, 450 Serra Mall, Stanford, CA 94305-2125, and **Ursula Martin**. *The Automorphism Group of a Finite p-Group is Almost Always a p-Group.*

Many common finite p-groups admit automorphisms of order coprime to p, and when p is odd, it is reasonably difficult to find finite p-groups whose automorphism group is a p-group. It turns out, however, that the automorphism group of a finite p-group is almost always a p-group. The asymptotics in the theorem involve fixing any two of the following parameters and letting the third go to infinity: the Frattini length, the number of generators, and p. The proof of this theorem depends on a variety of topics: counting subgroups of a p-group, analyzing the Frattini series of a free group via its connection with the free Lie algebra, counting submodules of a module via Hall polynomials, and using numerical estimates on Gaussian coefficients. (Received September 24, 2006)