1035-20-970 **Enrico Jabara** and **Peter Mayr*** (peter.mayr@jku.at), Institut für Algebra, Johannes Kepler Universität Linz, Altenbergerstr. 69, 4040 Linz, Austria. *Frobenius complements of exponent dividing* $2^m \cdot 9$.

A group G of automorphisms on a group V acts freely (also called fixed-point-freely or regularly) if no non-trivial element in G fixes a non-trivial element in V. The finite groups that act freely on an abelian group are exactly those that occur as Frobenius complements in some finite Frobenius groups. Infinite groups with a free action are less well understood: Every structural result for these groups that we know of requires some kind of finiteness assumption.

We show that every group of exponent $2^m \cdot 3^n$ for natural numbers m, n with $n \leq 2$ that acts freely on an abelian group is in fact finite. The proof involves some general facts on locally finite groups and a result on regular automorphisms of order 3 by A. Zhurtov. Using some elementary number theory we then obtain the corollary that every near-field whose multiplicative group has exponent $2^m \cdot 3^n$ with $n \leq 2$ is either a finite field of prime order or one of finitely many finite exceptions. (Received September 17, 2007)