1086-03-447 **Rodney Downey*** (rod.downey@vuw.ac.nz), PO Box 600, Wellington, 6140, New Zealand, and **Alexander Melnikov**, 50 Nanyang Avenue, Singapore, 639798, Singapore. *Effectively Categorical Torsion Free Abelian Groups.*

The effectiveness of the theory of abelian groups has been long studied beginning with the work of Mal'cev in the 60's. Nevertheless many problems remain. In this lecture I will discuss ongoing work on questions of effectiveness of categoricity for computable torsion-free abelian groups. The general problem is impossible; for example Downey and Montalbán showed that the isomorphism problem is Σ^1_1-complete. The principle difficulty lies in the lack of invariants. However, where there are some invariants there we can salvage some effectiveness. The groups we look at are the completely decomposable ones, which have decompositions of the form $\oplus_{i\in\omega} G_i$ with G_i a subgroup of the additive group of the rationals. Such groups are called homogeneous if $G_i = H$ for all i. Alexander Melnikov and the author have shown that homogeneous computable completely decomposable groups are always Δ^0_3 categorical, this bound is sharp, and have classified when the groups are Δ^0_2 categorical in terms of what are called *semilow* sets. In more recent work, we have shown that every computable completely decomposable group is Δ^0_5 categorical and that this bound is sharp. (Received September 02, 2012)