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A stable arithmetic regularity lemma in finite abelian groups

The arithmetic regularity lemma for \mathbb{F}_p^n (first proved by Green in 2005) states that given $A \subseteq \mathbb{F}_p^n$, there exists $H \leq \mathbb{F}_p^n$ of bounded index such that A is Fourier-uniform with respect to almost all cosets of H . In general, the growth of the index of H is required to be of tower type depending on the degree of uniformity, and must also allow for a small number of non-uniform elements. Previously, in joint work with Wolf, we showed that under a natural model theoretic assumption, called stability, the bad bounds and non-uniform elements are not necessary. In this talk, we present results extending this work to stable subsets of arbitrary finite abelian groups. This is joint work with Julia Wolf.