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Kaave Hosseini* (kaave.hosseini@gmail.com), 3869 miramar st. 1912, la jolla, CA 92092, and **Shachar Lovett, Guy Moshkovitz and Asaf Shapira.** *An Improved Lower Bound for Arithmetic Regularity.*

The arithmetic regularity lemma due to Green [GAFA 2005] is an analogue of the famous Szemerédi regularity lemma in graph theory. It shows that for any abelian group G and any bounded function $f : G \rightarrow [0, 1]$, there exists a subgroup $H \leq G$ of bounded index such that, when restricted to most cosets of H , the function f is pseudorandom in the sense that all its nontrivial Fourier coefficients are small. Quantitatively, if one wishes to obtain that for $1 - \epsilon$ fraction of the cosets, the nontrivial Fourier coefficients are bounded by ϵ , then Green shows that $|G/H|$ is bounded by a tower of twos of height $1/\epsilon^3$. He also gives an example showing that a tower of height $\Omega(\log 1/\epsilon)$ is necessary. Here, we give an improved example, showing that a tower of height $\Omega(1/\epsilon)$ is necessary. (Received September 24, 2018)