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**John T. Griesmer\*** (jtgriesmer@gmail.com). *Rigidity, Recurrence, and Popular Differences.*

A sequence  $(a_n)_{n \in \mathbb{N}}$  is a *rigidity sequence* for a probability measure preserving system  $(X, \mu, T)$  if  $\lim_{n \rightarrow \infty} \mu(A \Delta T^{a_n} A) = 0$  for every measurable  $A \subseteq X$ . If  $(a_n)_{n \in \mathbb{N}}$  is a rigidity sequence for a weak mixing system, then the set of values  $\{a_n : n \in \mathbb{N}\}$  has upper Banach density 0, so rigidity sequences for weak mixing systems are small in the sense of density.

We construct some rigidity sequences which are large in several other ways and we deduce some classical results in ergodic Ramsey theory and harmonic analysis as corollaries. In particular, we reprove a result of A. Forrest: there is a set of recurrence which is not a set of strong recurrence. (Received August 22, 2015)