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*Arithmetic progressions in sets of fractional dimension*

Let $E \subset \mathbb{R}$ be a closed set of Hausdorff dimension $\alpha$. We prove that if $\alpha$ is sufficiently close to 1, and if $E$ supports a probabilistic measure obeying appropriate dimensionality and Fourier decay conditions, then $E$ contains non-trivial 3-term arithmetic progressions.