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*Arithmetic progressions in sets of fractional dimension*

Let  $E \subset \mathbf{R}$  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.