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Let T be a subset of \mathbb{R}^n , and let S and B be two subsets in \mathbb{R}^n such that for any x in S , there exists an $r > 0$ for which $x + rT$ is a subset of B . How small (in measure) can B be if we know the size of S ?

Stein proved that if n is greater than or equal to 3 and T is a sphere centered at origin, then S having positive measure implies that B has positive measure. He showed this by using the spherical maximal operator. Later, Bourgain and Marstrand independently proved the result for $n = 2$.

However if $n = 1$ then the result is not true. We will show this by constructing a counterexample that involves the 1/3-Cantor set. (Received February 09, 2017)