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Shiwen Zhang* (zhangshiwen@math.msu.edu). *The exact Power Law for Buffon's needle landing near some Random Cantor Sets.*

In this talk, we study the Favard length of some random Cantor sets of Hausdorff dimension 1. We start with a unit disk in the plane and replace the unit disk by 4 disjoint subdisks (with equal distance to each other) of radius $1/4$ inside and tangent to the unit disk. By repeating this operation in a self-similar manner and adding a random rotation in each step, we can generate a random Cantor set $\mathcal{D}(\omega)$. Let \mathcal{D}_n be the n -th generation in the construction, which is comparable to the 4^{-n} -neighborhood of \mathcal{D} . We are interested in the decay rate of the Favard length of these sets \mathcal{D}_n as $n \rightarrow \infty$, which is the likelihood (up to a constant) that “Buffon’s needle” dropped randomly will fall into the 4^{-n} -neighborhood of \mathcal{D} . It is well known that the lower bound of the Favard length of $\mathcal{D}_n(\omega)$ is constant multiple of n^{-1} . We show that the upper bound of the Favard length of $\mathcal{D}_n(\omega)$ is Cn^{-1} for some $C > 0$ in the average sense. (Received January 30, 2018)