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On the dimension of observable sets for the heat equation

Let Ω be a bounded C^1 domain in $\mathbb{R}^n$. If $\omega \subset \Omega$ is an open set, it is today well-known that the heat equation is null-controllable (or equivalently observable) from ω . In this talk, I will show that this result still holds when ω is any measurable set with Hausdorff dimension strictly greater than $n - 1$. Even if this observability result is sharp with respect to the scale of Hausdorff dimension, we will see how to construct observable sets with codimension greater than 1 and how they are related to nodal sets of Laplace eigenfunctions. Joint work with A.W. Green, K. Le Balc'h and J. Martin.