

# Can you hear the shape of a curve?

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## Abstract

In 1966, Mark Kac asked if one can determine the shape of a drum from the sound it makes. It turned out that this is in general not possible. In this talk, we approach a slightly twitched problem: can we determine a curve over a finite field (up to isomorphism) from its number of points? Continuing the striking similarity between both questions, the answer is again no; we call curves with the same point count isogenous. Instead we study 'doubly isogenous' curves, which are even more alike than isogenous curves. A natural question arises: are two doubly isogenous curves necessarily isomorphic? We treat this question in great detail for a family of curves with prescribed automorphism groups.

This summarises a joint paper (<https://arxiv.org/abs/2102.11419>) with Vishal Arul, Jeremy Booher, Everett Howe, Wanlin Li, Vlad Matei, Rachel Pries and Caleb Springer.

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**Location:** B3.02

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