# Harmonic analysis and additive combinatorics on fractal sets

A recurring theme in Euclidean harmonic analysis is the connection between Fourier-analytic properties of measures and geometric characteristics of their supports. The best known classical results of this type concern estimates on singular and oscillatory integrals associated with surface measures on smooth manifolds. The behaviour of such integrals depends on geometric considerations such as dimension and curvature.

We will discuss analogous results for fractal measures. It turns out that the right analogue of curvature in this context is provided by the additive-combinatorial notion of pseudorandomness, roughly meaning the absence of arithmetic structure. We will discuss several results of this type, including restriction estimates, maximal and differentiation theorems, and Szemerédi-type results.