



Probability Seminar

Fourier decay of Gaussian multiplicative chaos and boundary geometry

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Abstract

The Fourier coefficients of multiplicative chaos measures appear naturally in the study of random matrices, QFTs, and even number theory. The harmonic analysis of the canonical GMC measure on the unit circle allowed Garban and Vargas to show that the associated Fourier coefficients tend to 0. The next step is to ask how fast this decay occurs, which corresponds to the Fourier dimension studied in fractal analysis.

We determine the Fourier dimension of these random measures on tori for every smooth log-correlated covariance and in every dimension, and prove sharp bounds and exact formulas for chaos on natural classes of bounded sets and hypersurfaces in Euclidean space. These results highlight how boundary geometry and multifractal concentration jointly govern Fourier decay, including regimes in which the boundary strictly reduces the Fourier dimension. In the circle setting, this gives a substantially simpler new proof of a conjecture of Garban and Vargas.

Date:	October 6, 2026 (Tuesday)
Time:	2:30 pm – 3:30 pm
Venue:	Room 210, Run Run Shaw Building HKU