universität innsbruck

Department of
Mathematics

Inn'formal Probability Seminar

Alberto Chiarini
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"Hard wall repulsion for the supercritical Gaussian free field in random environment"

Abstract:

The discrete Gaussian Free Field (also known as the harmonic crystal) can be interpreted as a microscopic model describing fluctuations in a homogeneous crystal at non-zero temperatures. In this talk, we examine the impact of impurities by investigating the maximum fluctuations of the field with random conductances and its behaviour in the presence of a macroscopic hard wall. We will restrict to the supercritical case, that is dimension bigger or equal to three. First, we derive exact quenched large deviation asymptotics for the hard wall event. These will involve on the one hand the homogenized capacity of a random walk in an environment with random conductances, and on the other hand the essential supremum of the (random) variances of the field. Then, we demonstrate that, conditioned on the presence of the hard wall, the field experiences everywhere an entropic push away from zero. Finally, we characterize the pathwise behavior of the field in the presence of the hard wall. This work is a collaboration with E. Pasqui (Università degli Studi di Padova).

Friday | 9.01.2026 | 14.30
HSB 2 | Civil Engineering Building