

Delocalization for integer-valued height functions in the presence of a random disorder

Tuesday, July 29, 2025 11:00 AM (1 hour)

In this talk, we will discuss the properties of a model of random interfaces known as the integer-valued Gaussian free field. One of the fundamental features of this model is the existence of a localisation/delocalisation phase transition in two dimensions. From a mathematical perspective, this result was first established by Fröhlich and Spencer in 1981 and has recently been the subject of renewed activity following the works of Lammers, van Engelenburg and Lis, and Aizenman, Harel, Peled and Shapiro. We will present the model and some of its properties. We will then address the following question: does the phase transition persist when the integer-valued Gaussian free field is subject to a random disorder? Specifically, is it observed when the following random constraint is incorporated to the model: we sample a supercritical Bernoulli bond percolation on \mathbb{Z}^2 and, for each closed edge of the percolation configuration, we constrain the integer-valued Gaussian free field to take the same values on both ends of the edge?

This is joint work with Diederik van Engelenburg and Christophe Garban.

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