

Percolation on hyperbolic Poisson-Voronoi tessellations

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Abstract

I will discuss percolation on the Voronoi tessellation generated by a homogeneous Poisson point process on the hyperbolic plane. That is, we colour each cell of the hyperbolic Poisson-Voronoi tessellation black with probability p and white with probability $1 - p$, independently of the colours of all other cells. We say that percolation occurs if there is an infinite connected cluster of black cells.

Hyperbolic Poisson-Voronoi percolation was first studied by Benjamini and Schramm about twenty years ago. Their results show that there are spectacular differences with the corresponding model in the Euclidean plane.

I will sketch joint work with the recently graduated doctoral student Ben Hansen that resolves a conjecture and an open question, posed by Benjamini and Schramm, on the behaviour of the “critical probability for percolation” as a function of the intensity parameter of the underlying Poisson process. (Unlike in Euclidean Poisson-Voronoi percolation, this critical value depends on the intensity of the Poisson process.)

Based on joint work with Benjamin Hansen.