IST AUSTRIA
Institute of Science and Technology

Mathematics and CS Seminar

Percolation Phase Transition via the Gaussian Free Field

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Host: M. Beiglböck, N. Berestycki, L. Erdös, J. Maas

Let G be a bounded-degree infinite graph, and p_c be the critical parameter of bond percolation on G. That is p_c is the infimum of values of p that you have an infinite cluster almost surely.

In this talk, we prove that if the isoperimetric dimension of G is higher than 4, then $p_c(G)<1$. The theorem settles affirmatively two conjectures of Benjamini and Schramm. Notably, if G is a transitive graph with super-linear growth, then $p_c(G) <1$. In particular, it implies that if G is a Cayley graph of a finitely generated group without a finite index cyclic subgroup, then $p_c(G)<1$.

The proof of the theorem starts with the existence of an infinite cluster for percolation in a certain in-homogeneous random environment governed by the Gaussian free field. Then, by the help of a multiscale decomposition of GFF, we relate the existence of an infinite cluster in percolation in the random environment to that of percolation with a fix parameter $p<1$.

This talk is based on a joint work with H. Duminil-Copin, S. Goswami, F. Severo, and A. Yadin.

Tuesday, May 21, 2019 05:30pm - 06:30pm

IST Austria Campus Big Seminar room Ground floor / Office Bldg West (I21.EG.101)

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