

VACANT SET OF RANDOM WALK ON FINITE GRAPHS

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Consider a random walk on a finite graph, like e.g. a discrete torus. We investigate percolative properties of the vacant set of this walk, that is of the set of vertices not visited by this walk before certain fixed time. It is conjectured, and supported by simulations, that the vacant set exhibits a phase transition similar to usual Bernoulli percolation on finite graphs. For the torus, however, there is no proof of this fact at present.

In this talk, I explain that the phase transition can be proved on other graphs, like large-girth expanders, or random regular graphs, where it is even possible to investigate the critical window around the phase transition threshold. The results are based on the connection with the ‘infinite volume limit’ of the problem, the Random Interlacement percolation.

Keywords: random walk, percolation, random interlacement, random regular graph, phase transition, critical window

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