

Nucleation and growth on Z^2

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Abstract:

Consider a dynamical process on a graph G , in which vertices are infected (randomly) at a rate which depends (in a monotone way) on the number of their neighbours which are already infected. This model includes bootstrap percolation and first-passage percolation as its extreme points. In this talk I will give a very precise description of the evolution of this process on the graph Z^2 , which significantly sharpens a result of Dehghanpour and Schonmann. In particular, I will show how to determine the typical infection time up to a constant factor for almost all natural values of the parameters, and in a large range how to obtain a stronger, sharp threshold. I will also discuss some of the many open problems in higher dimensions.

This is joint work with Béla Bollobás, Simon Griffiths, Leo Rolla and Paul Smith.