Topics in inhomogeneous Bernoulli percolation

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Propositions accompanying the PhD thesis

Topics in Inhomogeneous Bernoulli Percolation

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1. For inhomogeneous Bernoulli percolation on ladder graphs, there can be infinitely many columnar inhomogeneities and the critical curve is still a continuous function.

2. For inhomogeneous Bernoulli percolation on ladder graphs, if the cylinders of inhomogeneities are well-spaced and of limited diameter, there exists a coupling such that an increase of one percolation parameter compensates the decrease of the other.

3. For inhomogeneous Bernoulli percolation on $\mathbb{Z}^d$ with a plane of defects, there is a unique infinite cluster in the supercritical phase.

4. The invariance of the percolation measure on $\mathbb{Z}^d$ with respect to the translations parallel to the plane of defects is sufficient to ensure uniqueness.

5. For any supercritical pair of parameters close to the critical curve, giving a small extra chance for every edge to be open creates an infinite cluster contained in the slab $\mathbb{Z}^2 \times \{-N, \dots, N\}^{d-2}$, for some large $N \in \mathbb{N}$.

6. The critical curve for inhomogeneous percolation on $\mathbb{Z}^d$ can be approximated, in certain directions, by the critical curve of inhomogeneous percolation on slabs.

7. Whereof one cannot speak, thereof one must be silent.
   —Wittgenstein, Tractatus Logico-Philosophicus