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Topics in inhomogeneous Bernoulli percolation

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Propositions accompanying the PhD thesis
Topics in Inhomogeneous Bernoulli Percolation

Humberto Carelos Sanna

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

