Site-diluted Ising Model in Two Dimensions – Towards Long-range Correlated Defects
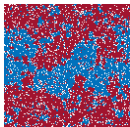
Site-diluted Ising Model

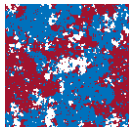$$\mathscr{H} = -J \sum_{\langle ij \rangle} \epsilon_i \epsilon_j s_i s_j$$

$\epsilon_i = 1/0$ for occupied/empty site i

- $\epsilon = 0$ with probability p_d
- long-range defect correlation

$$\langle \epsilon_i \epsilon_j \rangle \propto \frac{1}{d^a}$$

(a) uncorrelated   (b) correlated

Objectives

- critical exponents
- critical temperature
- universality class changes
- phase diagrams for a and p_d dependence
- behavior near the percolation threshold
- cluster properties
- ...

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