Investigating Jamming percolation using renormalization group methods

SAMUEL SCHOENHOLZ, AMY BUG, Swarthmore College, ANDREA LIU, University of Pennsylvania — We develop renormalization group-based methods to determine the percolation threshold and exponents for jamming-percolation models. Such models exhibit mixed phase transitions in finite dimensions, with a discontinuous jump in the order parameter and an exponentially diverging length scale: $\xi \approx \exp(|p - p_\infty^c|^\mu)$, where $p_\infty^c$ marks the percolation transition for the infinite system. To extract $p_\infty^c$ we use a Monte-Carlo scheme to find $p_c(L)$ for increasing $L$ and extrapolate to $L \to \infty$. We investigate several models in two dimensions to test for universality of the exponent $\mu$. 