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Jamming transition in hierarchical networks[1] XIANG CHENG, STEFAN BOETTCHER[2], Department of Physics, Emory University — Jamming transitions arise in disordered granular materials where the systems fall out of equilibrium due to an increase in the packing density. A kinetically constrained lattice gas model due to Biroli and Mezard (BM) has connected the jamming transition to an equilibrium phase transition.[3] In this description, before this equilibrium transition can be reached, any experiment or simulation would fall out of equilibrium at a Kauzmann transition. However, this analysis is based on a mean-field calculation which, for disordered systems, may have limited relevance in finite dimensions. We study the BM-model on a lattice-like network,[4] which mixes geometric and mean-field features, to reproduce such a phase transition. Computationally, we use the Wang-Landau algorithm which should be less affected by the jamming near the phase transition. The algorithm produces the density of states and, hence, the entropy directly, in addition to many critical properties, such as packing fraction, compressibility, etc. Also, lattice-like hierarchical networks conveniently allow exact or approximate renormalization group treatments, extending analytical results to the thermodynamic limit.

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[2]http://www.physics.emory.edu/faculty/boettcher/
[3]F. Krzakala *et al.*, Phys. Rev. Lett. **101**, 165702 (2008).
[4]S. Boettcher and A. K. Hartmann, Phys. Rev. E **84**, 011108 (2011).

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