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Constraint percolation on hyperbolic lattices JORGE LOPEZ, J.M. SCHWARZ, Physics Department, Syracuse University — Constraint percolation models include constraints on the occupation of sites to, for example, better understand the onset of glassiness in glass-forming liquids. The dynamical glass transition in the Fredrickson-Andersen model simplifies to the study of the percolation transition in k-core percolation where every occupied site must have at least k occupied neighbors. Other constraint percolation models, such as force-balance percolation, have been introduced to begin to account for mechanical equilibrium on each particle arising during the onset of jamming. To study a mean-field-like version of force-balance percolation in which the directionality of forces becomes important, we consider clusters with occupied particles satisfying the $k = 3$-core condition and lying inside a triangle determined by three of its occupied neighbors. The model is constructed on a tessellation of the Poincaré disk, thus, bearing a hyperbolic structure. Models on such spaces exhibit mean-field-like behavior and also play an important role in generating geometric frustration in glassy systems. We analytically investigate the conditions under which there exists a transition as well as the underlying nature of the transition. We also present numerical results to compare with our analytical results.

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