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On the local construction of jamming graphs JORGE LOPEZ, Syracuse University, LIANG CAO, None, JENNIFER SCHWARZ, Syracuse University — We extend the concept of minimal rigidity to particulate systems, or nonbonded networks, in two-dimensions with the introduction of the jamming graph. The jamming graph is a planar Laman graph with each vertex satisfying the Hilbert local stability requirement. In other words, the jamming graph contains both property of global and local mechanical stability at the onset of rigidity for the model system of frictionless, repulsive soft spheres. We demonstrate how such graphs can be constructed using purely local moves interestingly enough. To make comparisons with the model system, we first associate springs with the edges of the graph and then associate shapes with each vertex and determine various mechanical properties as the spring density, or particle packing fraction, is increased. The jamming graph not only provides for a rigorous starting point for the onset of rigidity, the local rules used to construct it can be easily modified to account for friction and/or particle shapes beyond spheres so that a more general framework for the onset of rigidity in particulate systems may ultimately be established.

Jorge Lopez
Syracuse University

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