

Abstract Submitted
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The onset of geometric rigidity in granular systems below jamming PETER MORSE, ERIC CORWIN, University of Oregon — We report on a new purely geometric phase transition in soft athermal spheres which occurs significantly below the jamming density. This state is characterized by the onset of local rigidity as evidenced by changes in the symmetry of the local Voronoi cell. We relate this local rigidity onset to the eventual mechanical jamming transition through a rigidity percolation picture. We present a functional transformation mapping a minimized packing to a new packing by replacing every particle with the maximum inscribed sphere in its Voronoi cell. We demonstrate that there exists a line of fixed points between the onset of local rigidity and the jamming point under this transformation. Surprisingly, this transformation has a second attractor to systems with mean contact number of $d + 1$. We identify these as random loose packings in polydisperse systems.

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