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The shape of jams to come: hidden geometric symmetries of jamming PETER MORSE, ERIC CORWIN, University of Oregon — The mechanical vacuum of systems below jamming is surprisingly rich in structure. Using geometric quantities derived from the Voronoi tessellation we report on the discovery of a new phase transition preceding the mechanical jamming transition. This phase transition corresponds to the appearance of a new kind of symmetry hidden in the shape of the Voronoi cells. We characterize this symmetry by looking at properties related to the maximum inscribed sphere in each cell, moments of the volume distribution of cells, and the aspect ratios of cells. Each contains a very different signature of the jamming transition with various scaling laws. We offer several possible routes towards renormalization of this system and discuss whether a field theory could be made to explain the various phases.

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