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Jamming transition in granular systems of regular polygons CACEY STEVENS BESTER, YIQIU ZHAO, Department of Physics, Duke University, JONATHAN BARS, Montpellier University, YUANYUAN XU, Department of Physics, Duke University, MEREDITH COX, Columbia University, ROBERT BEHRINGER, Department of Physics, Duke University — The study of the onset of mechanical stability, known as the jamming transition, of granular systems provides key insights into properties of amorphous materials. A fundamental challenge to understanding this transition is to determine the influence of particle properties. Here, we investigate how nontrivial particle shapes affect the jamming transition as controlled by the packing fraction. Our experiments are performed by compression of two-dimensional arrangements of photoelastic particles, allowing us to visualize force information. To explore the role of particle shape, we systematically change the number of sides of polygonal particles used in the experiments and compare the force chain network, contact number and pressure evolution of compressed systems of polygons to the well-studied systems of disks. We also explore the influence of geometric features, such as face-face contacts and ordering within packings, in connection with the jamming transition.

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