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Shear jamming of bumpy grains JOHN TREADO, ABRAM CLARK, Yale University, THIBAULT BERTRAND, Universite Pierre et Marie Curie, COREY O'HERN, Yale University, MARK SHATTUCK, City College of New York — Packings of frictional disks are known to jam under isotropic compression at a well defined volume fraction $\phi_J(\mu)$ in the large system limit, where μ is the static friction coefficient. Recent experiments have suggested that jammed disk packings can be generated below $\phi_J(\mu)$ using applied shear at constant volume. Using molecular dynamics simulations, we compress and shear bidisperse frictional disks. Friction is modeled using geometrical asperities (i.e. bumps) on the grain surface. We start with unjammed configurations at $\phi < \phi_J(\mu)$, apply athermal quasi-static shear, and measure the strain at which each system jams. We find that the average shear strain at jamming onset increases with system size and the difference in packing fraction from $\phi_J(\mu)$, in agreement with our recent studies of frictionless grains. Our results suggest that jamming of frictional and frictionless disk packings can be described using a single framework, and that shear jamming at $\phi < \phi_J$ disappears in the large system limit.

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