

Abstract Submitted
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Effect of friction on shear jamming¹ DONG WANG, JONATHAN BARES, Duke University, JOSHUA DIJKSMAN, Wageningen University, JIE REN, Merck Co, HU ZHENG, Hohai University, ROBERT BEHRINGER, Duke University — Shear jamming of granular materials was first found for systems of frictional disks, with a static friction coefficient $\mu \approx 0.6$ (Bi et al. Nature (2011)). Jamming by shear is obtained by starting from a zero-stress state with a packing fraction ϕ between ϕ_J (isotropic jamming) and a lowest ϕ_S for shear jamming. This phenomenon is associated with strong anisotropy in stress and the contact network in the form of force chains, which are stabilized and/or enhanced by the presence of friction. Whether shear jamming occurs for frictionless particles is under debate. The issue we address experimentally is how changing friction affects shear jamming. By applying a homogeneous simple shear, we study the effect of friction by using photoelastic disks either wrapped with Teflon to reduce friction or with fine teeth on the edge to increase friction. Shear jamming is still observed; however, the difference $\phi_J - \phi_S$ is smaller with lower friction. We also observe larger fluctuations due to initial configurations both at the lowest and the highest friction systems studied. Ongoing work is to use particles made of gelatin to reduce the friction coefficient to the order of 0.01.

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Dong Wang
Duke University

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