Abstract Submitted
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Microscopic origins of shear jamming[1] ROBERT BEHRINGER, DONG WANG, Duke University — Granular materials exhibit novel jamming phenomena in response to applied shear. In this talk, we will explore the jamming of a system of frictional disks with inter-particle friction coefficient of 0.7. In the experiments, the system is subject to simple shear at constant density, starting from a force-free state. In response to shear, force chains/force networks emerge and are a key feature of the shear jamming process. We explore the nature and mechanics of the force chain evolution during this process. We use simple measures to characterize the appearance of the force network by tracking groups of three particles, or trimers. Force chains can be described in terms of collections of trimers, as well as other structures, such as branches, where force chains merge/split. Small changes in select trimers and branches are at the heart of the shear jamming process. We describe these processes and present statistical data to show how these small scale structures influence the shear jamming process.

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