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Shear-Induced crystallization in jammed systems DANIEL LACKS, NATHAN DUFF, Case Western Reserve University — Simulations are used to address the effects of oscillating shear strain on jammed systems composed of spherical particles. The simulations show that shear oscillations with amplitudes of more than a few percent lead to substantial crystallization of the system. To ensure that the conclusions are independent of the simulation methodology, a range of simulations are carried out that use both molecular dynamics and athermal dynamics methods, soft and hard potentials, potentials with and without attractive forces, and systems with and without surrounding walls. The extent of crystallization is monitored primarily by the Q6 order parameter, but also in some simulations by the potential energy and the radial distribution function, and by direct visual inspection. A mechanism is proposed for shear-induced crystallization of jammed systems, based on fold catastrophes of the free energy landscape.

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