

Abstract Submitted
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**Stability of Granular Packings Jammed under Gravity:
Avalanches and Unjamming**¹ CARL MERRIGAN, Brandeis University ,
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BUL CHAKRABORTY, Brandeis University — Granular avalanches indicate the
sudden destabilization of a jammed state due to a perturbation. We propose that the
perturbation needed depends on the entire force network of the jammed configura-
tion. Some networks are stable, while others are fragile, leading to the unpredictabil-
ity of avalanches. To test this claim, we simulated an ensemble of jammed states in
a hopper using LAMMPS. These simulations were motivated by experiments with
vibrated hoppers where the unjamming times followed power-law distributions². We
compare the force networks for these simulated states with respect to their overall
stability. The states are classified by how long they remain stable when subject to
continuous vibrations. We characterize the force networks through both their real
space geometry and representations in the associated force-tile space ³, extending
this tool to jammed states with body forces.

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²Lozano, C., Zuriguel, I., Garcimartn, A. (2015). Stability of clogging arches in a
silo submitted to vertical vibrations. *Physical Review E*, 91(6), 062203.

³Sarkar, S., Bi, D., Zhang, J., Behringer, R. P., Chakraborty, B. (2013). Origin of
rigidity in dry granular solids. *Physical review letters*, 111(6), 068301.

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