

Abstract Submitted  
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**Vibrations and stress relaxation in two-dimensional granular solids** THIBAUT BERTRAND, CHRISTOPHER MACMINN, COREY S. O'HERN, JOHN WETTLAUFER, Yale University, MARK D. SHATTUCK, City College of New York, ERIC DUFRESNE, Yale University — Wave propagation in granular solids remains poorly understood. The highly non-harmonic vibrational behavior of these systems can lead to events such as large scale rearrangements, fracture, and aging. Extensive studies have been performed to understand the role of non-harmonicity in the melting process and strain weakening of crystalline solids; here, we try to extend these concepts to particulate solids undergoing mechanical excitations that can show stress release through avalanches. We use experiments and numerical simulations to study the onset of non-harmonicity in two-dimensional systems composed of soft particles undergoing uniaxial mechanical excitation. This model system allows us to follow particle trajectories and overall compaction of the packing under uniaxial compression and vibration to disentangle the relation between the loss of harmonicity and the weakening of these 2D granular solids.

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