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Hydrodynamic Fluctuations Near the Onset of Patterns in Oscillated Granular Layers J. BOUGIE, Loyola University Chicago — We study the effects of noisy fluctuations near the onset of patterns in simulations of vertically oscillated granular layers. Above a critical acceleration of the cell, standing waves form stripe patterns. We study the onset of these patterns using continuum simulations of frictionless dissipative particles to Navier-Stokes order. The patterns formed in the continuum simulations reproduce wavelengths found in previous MD simulations and experiments for a range of oscillation frequencies. However, the critical acceleration for ordered standing waves in previous MD simulations is approximately 10% higher than that found in our continuum simulations. These results are consistent with the presence of noise in the system. Adding Landau-Lifshitz hydrodynamic fluctuations to the continuum simulations raises the critical acceleration to a value consistent with the critical acceleration found in MD simulations. We compare the amplitude of patterns in continuum simulations with noisy fluctuations to patterns formed in the absence of such noise, and examine the effects of fluctuations on hysteresis exhibited near onset.

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