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Shocks and Patterns in Continuum Simulations of Oscillated Granular Layers J. BOUGIE, K. DUCKERT, Physics Department, Loyola University Chicago — We study interactions between shocks and standing wave patterns in continuum simulations of vertically oscillated granular layers. Layers of grains atop a plate with sinusoidal oscillations in the vertical direction leave the plate at some time during the cycle if the accelerational amplitude of oscillation is greater than the acceleration of gravity. Above a critical acceleration, standing waves form stripe patterns. In these same shaken layers, shocks are produced when layers collide with the plate after leaving the plate earlier in the cycle. We simulate vertically shaken layers using numerical solutions of continuum equations to Navier-Stokes order to find number density, average velocity, and granular temperature as functions of time and location within the cell. We compare shocks and standing waves coexisting in this system; pressure gradients produced by shocks play a significant role in the formation of standing wave patterns.

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