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**Proposed Mechanism for Shock-Driven Stripe Patterns in Vertically Oscillated Granular Systems**[1] ALEX GILMAN, STEFANIE MOERTL, JON BOUGIE, Loyola University Chicago — We investigate vertically shaken granular systems using numerical solutions of continuum equations to Navier-Stokes order for uniform, frictionless, inelastic spheres. When layers of particles are oscillated at accelerational amplitudes greater than that of gravity, the layers leave the plate, and shocks are created upon re-established contact with the plate. Additionally, standing-wave patterns form when the accelerational amplitude exceeds a critical value. We demonstrate relationships between properties associated with shocks and properties associated with standing wave patterns, and propose a mechanism by which a non-uniform shock front drives standing-wave configurations. For a given layer depth and accelerational amplitude, varying driving frequency alters the shock strength as well as pattern wavelength; increasing layer depth produces stronger shocks and longer wavelengths for a given frequency. We use non-dimensional versions of the Navier-Stokes equations to mathematically derive relationships between these variables. We compare these mathematical relationships to those found empirically through simulations conducted at various layer depths and frequencies.

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