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The Internal Structure and Velocity Distribution of a Granular Shock JOHN PEREZ, GREG VOTH, Wesleyan University — Shock wave formation and propagation in granular materials is a complex phenomenon that is only partially understood. For the most part, the *internal* structure of a granular shock is unknown. This talk explores this issue in the context of an experimental vertically driven quasi-2-D granular gas for which we have measured the single particle velocity distribution as a function of space and time to a very high resolution. Average density, momentum and temperature fields as functions of space and time are an immediate by-product of our methodology. Our statistics are robust. These experimentally determined fields reveal that under steady sinusoidal driving the formation and propagation of shocks in this simple system is surprisingly complex. The data clearly shows a striated substructure in the shocks on the scale of a particle diameter. This substructure is the result of an intriguing interaction between collisional and ballistic momentum transport which registers in the mean fields as a punctuated deviation from a continuum shock profile on the scale of a particle diameter. We discuss whether shock propagation speed and other aspects of these shocks are similar to weak shocks in molecular gasses or whether they depend essentially on the mesoscopic and dissipative nature of granular gasses.

John Perez
Wesleyan University

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