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First-order phase transition in a 2D granular fluid ROHIT INGALE, Benjamin Levich Institute, City College of City University of New York, MARK SHATTUCK — We experimentally examine first-order freezing/melting phase transition in a non-equilibrium system — a vertically oscillated two-dimensional isobaric granular fluid. The steady state transition occurs between a gas and a crystal and is characterized by discontinuous change in both density and temperature. The phase transition also shows rate dependent hysteresis. The hysteresis disappears for sufficiently slow heating rate producing a reversible transition characterized by single curve as in a first order phase transition in ordinary fluids. We also study the effect of pressure variation and number of particles on the phase transition and hysteresis. We further probe the system in the vicinity of the transition point to study the coexistence between the low temperature crystal and a high temperature gas and subsequent transition between the two states. The results obtained provide better understanding of the specifics of phase transition in granular fluids.

Mark Shattuck
Benjamin Levich Institute and Physics Department
City College of City University of New York

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