Random waves in a vibrated 2D granular.

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Using a 2D out-of-equilibrium system of magnetized and vibrated granular particles, a transition from a granular gas towards a hexagonal crystal has been reported, when magnetic field is increased at constant agitation [1]. By extracting the longitudinal and transverse current correlations in dynamical regime [2], the spectrum of excitations can be measured to characterize how energy is distributed through the scales. Dispersion relations are obtained, showing propagation of longitudinal waves and of transverse waves (in the crystal phase only), which are analogous to phonons in solid state physics. This analysis provide insights on the mechanical and thermodynamic properties of this system.

Références

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2. G. Castillo, Order and density fluctuations in the vicinity of a granular solid-liquid-like phase transition, Phd Thesis, Universidad de Chile (2013).