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Study of the melting of the square ordered phase in a thin vibrated granular layer[1] FRANCISCO VEGA REYES, Departamento de Fisica, Universidad de Extremadura, JEFFREY URBACH, Department of Physics, Georgetown University — We present an experimental and computational study of a vibrating thin, dense granular layer of identical metal spheres. In a recent study, experiments and molecular dynamics simulations have shown that for high enough vibration amplitude there is a transition from an ordered phase of square symmetry to a disordered liquid-like phase, and that this transition occurs earlier in more inelastic materials. We investigate now the mechanisms causing this melting, as a function of input acceleration, inelasticity, and geometry of the system. In order to look for similarities/differences with the equilibrium-analogues of this transition, we investigate the mean square displacement of the particles in the ordered phase. Preliminary results indicate that this magnitude increases close to crystal melting, as in equilibrium melting. We also analyze the role of the system size in the melting transition, showing that for small enough system the square phase is absent.

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