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Phase diagram of vibrated granular media confined between two parallel plates PAUL MELBY, FRANCISCO VEGA REYES, DAVID A. EGOLF, JEFFREY S. URBACH, Department of Physics, Georgetown University, Washington, DC 20057 — We present the results from simulations and experiments of vibrated granular media which are confined between two parallel plates. Depending on the density and gap spacing, we see solid phases with hexagonal or square symmetry, or zig-zag 'buckled' phases. This phase behavior is remarkably similar to the phase behavior of similarly confined hard-sphere colloidal suspensions in equilibrium. In the case of colloids, the phase diagram is determined through entropy maximization and depends only on the gap between the confining plates and the density of colloidal particles. For the granular system, however, there are modifications of the phase diagram which are caused by the presence of forcing and dissipation in the system. In particular, we find that the solid-liquid coexistence region in the granular system is much larger than in the equilibrium system. This difference is a direct consequence of the lack of equipartition between the coexisting phases.

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