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Cooling of a Tapped Granular Column[1] ANTHONY ROSATO, LUO ZUO, New Jersey Institute of Technology - Granular Science Laboratory, DENIS BLACKMORE, New Jersey Institute of Technology - Mathematical Sciences Dept.
— We present the results of a discrete element investigation of the cooling of a tapped column of uniform, inelastic spherical particles (d) as it evolves to a state of zero kinetic energy. A linear loading-unloading soft contact model is employed, while tapping is simulated by applying a half-sine pulse of amplitude a/d and frequency f to a rigid floor supporting the column. For sufficiently energetic taps, the column dilates and then contracts over a time scale t_s, which depends on the number of particles N, restitution coefficient e, as well as tap parameters (a/d, f). Simulation data for ($1 \leq N \leq 50$) with other parameters being held constant suggested that a time-averaged collision frequency f_c scaled with N. Values of t_s, determined by identifying the instant when the kinetic energy thereafter remained less than *0.001%* of its maximum value, were well-correlated with the form $\alpha(e)N^{-1} + \beta(e)$. Lastly, simulations were in good agreement with physical considerations, suggesting that t_s should scale with $(1 - e^2)^{-1}$ and inversely with f_c.

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