Abstract Submitted
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Dynamics and pattern transition in a two-dimensional vibrofluidized granular bed[1] MOHAMMED ISTAFAUL HAQUE ANSARI, Indian Institute of Technology, Kanpur, MEHEBOOB ALAM, Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore, India — Experiments are conducted in a two-dimensional monolayer vibrofluidized bed of glass beads, with an aim to study the dynamics and the transition scenario in different patterned states. At small shaking accelerations ($\Gamma = A\omega^2/g < 1$, where A and $\omega = 2\pi f$ are the amplitude and angular frequency of shaking and g is the gravitational acceleration), the particles remain attached to the base of the vibrating container; this is known as the solid bed (SB). With increasing Γ (at large enough shaking amplitude A/d) and/or with increasing A/d (at large enough Γ), the sequence of transitions/bifurcations unfolds as follows: SB (solid bed) to BB (bouncing bed) to LS (Leidenfrost state) to 2-roll convection to 1-roll convection and finally to a gas-like state. For a given length of the container, the coarsening of multiple convection rolls leading to the genesis of a single-roll structure (dubbed the "multiroll transition") and its subsequent transition to a granular gas are two findings of this work. We show that the critical shaking intensity Γ_{BB}^{LS} for the $BB \rightarrow LS$ transition has a power-law dependence on the particle loading (F) and the shaking amplitude (A/d).

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