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New Instability Mode in A Driven Granular Gas: Athermal and Thermal Convection PRIYANKA SHUKLA, IIT Chennai, MEHEBOOB ALAM, Jawaharlal Nehru Centre, Bangalore — For a thermally-driven granular gas confined between two plates under gravity, we report a new instability mode which is found to be active at very small values of the heat-loss parameter. We show that the origin of this new mode is tied to the "thermal" mode of the well-studied Rayleigh-Benard convection. This is dubbed *purely elastic instability* since it survives even for perfectly elastic collisions ($e_n = 1$). The distinction of this new instability mode from its dissipative/athermal counterpart is clarified for the first time. Furthermore, a weakly nonlinear analysis using Stuart-Landau equation has been carried out for both instability modes, and the underlying bifurcation scenario (supercritical/subcritical) from each mode is elucidated. The resulting linear and nonlinear patterns with respect to inelasticity and gravity are compared.

Meheboob Alam
Jawaharlal Nehru Centre

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