

Characterization of the energy bursts in vibrated shallow granular systems

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We study the recently reported energy bursts that take place in a granular system confined to a vertically vibrated shallow box containing two types of grains of equal size but different mass (Rivas in Phys Rev Lett 106:088001- 1-088001-4, 2011). In a quasi one dimensional configuration, it is possible to characterize the propagating fronts. The rapid expansion and the subsequent compression of the energy bursts take place at roughly constant velocities. The expansion velocity is 40 times larger than the compression velocity. Starting from an initially segregated configuration it is possible to determine the instants at which the energy bursts begin and the mechanisms that trigger them. Two mechanisms are identified: an oblique collision of a heavy grain with a light one in contact with one of the horizontal walls and a slow destabilization produced by light grains that are surrounded by heavy ones. © Springer-Verlag 2012.