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Instability in shocked granular gases NICK SIRMAS, MATEI RADULESCU, University of Ottawa — Shocks in granular media, such as vertically oscillated beds, have been shown to develop instabilities. Similar jet formation has been observed in explosively dispersed granular media. In the current study, we investigate the origin of this instability. Both particle dynamics and continuum based simulations of the hydrodynamics of granular gases are investigated in the presence of shock compression. The shock waves are found to be unstable in the presence of dissipative collisions in the particle bed. The instability manifests itself as distinctive high density non-uniformities and convective rolls on the shock surface. The characteristic spacing of the non-uniformities is found to be well approximated by the characteristic relaxation length scale, which is controlled by both the shock strength and amount of energy dissipation in particle collisions. By studying the time evolution of the material undergoing the shock wave compression and further relaxation, we found that the gas develops the instability on the same time scales as the clustering instability in homogeneous gases. This confirms that the clustering instability is the dominant mechanism.

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