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# Particle Jetting Induced by the Explosive Dispersal

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**Abstract :** Jetting structures are widely found in particle rings or shells dispersed by the central explosion. In contrast, some explosive dispersal of particles only results in a dispersed cloud without distinctive structures. Employing the coupling method of the compressible computational fluid mechanics and discrete element method (CCFD-DEM), we reveal the underlying physics governing the formation of the jetting structure, which is related to the competition between the shock compaction and gas infiltration, two major processes during the shock interaction with the granular media. If the shock compaction exceeds the gas infiltration, the discernable jetting structures are expected, precipitated by the agglomerates of fast-moving particles induced by the heterogenous network of force chains. Otherwise, particles are uniformly accelerated by the interstitial flows, and no distinguishable jetting structures are formed. We proceed to devise the phase map of the jetting formation in the space defined by two dimensionless parameters which characterize the timescales of the shock compaction and the gas infiltration, respectively.

**Keywords :** compressible multiphase flows, DEM, granular jetting, pattern formation
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