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Effects of Initial Particle Distribution on an Energetic Dispersal of Particles[1] BERTRAND ROLLIN, Embry-Riddle Aero. Univ, FREDERICK OUELLET, RAHUL KONERU, JOSHUA GARNO, BRADFORD DURANT, CCMT - Univ. Florida — Accurate predictions of the late time solid particle cloud distribution ensuing an explosive dispersal of particles is an extremely challenging problem for compressible multiphase flow simulations. The source of this difficulty is twofold: (i) The complex sequence of events taking place. Indeed, as the blast wave crosses the surrounding layer of particles, compaction occurs shortly before particles disperse radially at high speed. Then, during the dispersion phase, complex multiphase interactions occurs between particles and detonation products. (ii) Precise characterization of the explosive and particle distribution is virtually impossible. In this numerical experiment, we focus on the sensitivity of late time particle cloud distributions relative to carefully designed initial distributions, assuming the explosive is well described. Using point particle simulations, we study the case of a bed of glass particles surrounding an explosive. Constraining our simulations to relatively low initial volume fractions to prevent reaching of the close packing limit, we seek to describe qualitatively and quantitatively the late time dependency of a solid particle cloud on its distribution before the energy release of an explosive.

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