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Microscale Simulations of Shock Interaction with Large Assembly of Particles for Developing Point-Particle Models SIDDHARTH THAKUR, CHRIS NEAL, YASH MEHTA, PRASHANTH SRIDHARAN, TOM JACKSON, S. BALACHANDAR, University of Florida, UNIVERSITY OF FLORIDA TEAM
— Micrsoscale simulations are being conducted for developing point-particle models that are needed for macroscale simulations of explosive dispersal of particles. These particle models are required to compute instantaneous force and heat transfer between particles and surroundings. A strategy for a sequence of microscale simulations has been devised for systematic development of hybrid surrogate models that are applicable at conditions representative of explosive dispersal. The microscale simulations examine particle force dependence on: Mach number, Reynolds number, and volume fraction (particle arrangements such as cubic, face-centered cubic, body-centered cubic and random). Future plans include investigation of sequences of fully-resolved microscale simulations consisting of an array of particles subjected to more realistic time-dependent flows that progressively better approximate the problem of explosive dispersal. Additionally, effects of particle shape, size, and number as well as the transient particle deformation dependence on parameters including: (a) particle material, (b) medium material, (c) multiple particles, (d) incoming shock pressure and speed, (e) medium to particle impedance ratio, (f) particle shape and orientation to shock, etc. are being investigated.

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