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Shock Interaction with Random Spherical Particle Beds[1] CHRIS NEAL, YASH MEHTA, Univ of Florida - Gainesville, KAMBIZ SALARI, Lawrence Livermore National Lab, THOMAS L. JACKSON, S. "BALA" BALACHANDAR, SIDDHARTH THAKUR, Univ of Florida - Gainesville — In this talk we present results on fully resolved simulations of shock interaction with randomly distributed bed of particles. Multiple simulations were carried out by varying the number of particles to isolate the effect of volume fraction. Major focus of these simulations was to understand 1) the effect of the shockwave and volume fraction on the forces experienced by the particles, 2) the effect of particles on the shock wave, and 3) fluid mediated particle-particle interactions. Peak drag force for particles at different volume fractions show a downward trend as the depth of the bed increased. This can be attributed to dissipation of energy as the shockwave travels through the bed of particles. One of the fascinating observations from these simulations was the fluctuations in different quantities due to presence of multiple particles and their random distribution. These are large simulations with hundreds of particles resulting in large amount of data. We present statistical analysis of the data and make relevant observations. Average pressure in the computational domain is computed to characterize the strengths of the reflected and transmitted waves. We also present flow field contour plots to support our observations.

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