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Effect of initial cloud shape and orientation on particle dispersion in the accelerated flow behind a shock SEAN DAVIS, GUSTAAF JACOBS, San Diego State University — We discuss the particle-laden flow development of a cloud of particles with varying initial shapes in the accelerated flow behind a normal moving shock. The effect of initial aspect ratio of a rectangular and elliptical cloud shape as well as the cloud's angle of attack with respect to the carrier flow are considered. Computations are performed with an in-house high order weighted essentially non-oscillatory (WENO-Z) finite difference scheme based Eulerian-Lagrangian solver. Streamlined elliptical shaped clouds produce less particle dispersion in the cross stream as compared to blunt rectangular shaped clouds. Averaged and root mean square statistics of the particle coordinates versus time show that the cloud disperses less with decreasing aspect ratio. The global cloud statistics are comparable for an initially rectangular cloud rotated at 45 degrees as compared to an initially triangular cloud. From observations and statistics we conclude that a particle cloud behaves like a solid body obstruction in the flow at early times, while at later times the particles convect on their inertia.

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