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Implementation of Key Capabilities to Study Unsteady Drag of Shock-Accelerated Particles with an Arbitrary Lagrangian-Eulerian Code TANNER NIELSEN, Los Alamos National Laboratory, W. CURTIS MAXON, University of Missouri, NICK DENISSEN, Los Alamos National Laboratory — The dynamic drag coefficient on particles due to shock-acceleration has been observed, experimentally and computationally, to significantly increase during the passage of the shock over the particle. The later times, after the passage of the shock during which the particle is accelerated to the post-shock conditions, have not been as thoroughly studied nor are there models that accurately capture drag effects in this unsteady regime. This work details key capabilities that have recently been added to FLAG, an arbitrary Lagrangian-Eulerian (ALE) code developed at Los Alamos National Laboratory, to enable to the study of shock-accelerated particles. This unique simulation tool allows high-resolution studies of a single particle from rest to post-shock acceleration. The ALE framework permits the particle to move freely within the computational domain based on the pressure and viscous forces. Details will be given regarding the implementation of the viscous terms in FLAG to enable the solution of the Navier-Stokes equations for the air surrounding the particle. The drag calculation is done in a way that allows the integration of the forces on the particle as it moves freely through the domain.

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