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**High Resolution Simulations of Particle Acceleration in Shock-Driven Multiphase Flows** WILLIAM MAXON, Self, TANNER NIELSEN, Collaborator, NICHOLAS DENISSEN, JONATHAN REGELE, Mentor, JACOB MCFARLAND, Advisor, UNIVERSITY OF MISSOURI-COLUMBIA TEAM, LOS ALAMOS NATIONAL LABORATORY TEAM — Particle drag models, which capture macro viscous and pressure effects, have been developed over the years for various flow regimes to enable cost effective simulations of particle-laden flows. The relatively recent derivation by Maxey and Riley has provided an exact equation of motion for spherical particles in a flow field based on the continuum assumption. Many models that have been simplified from these equations have provided reasonable approximations; however, the sensitivity of the shock-driven multiphase instability to particle drag requires a very accurate model to simulate. To develop such a model, 2D axisymmetric and 3D Cartesian Navier-Stokes DNS of a single particle in a transient, shock-driven flow field were conducted in the hydrocode FLAG. FLAG's capability to run arbitrary Lagrangian-Eulerian (ALE) hydrodynamics coupled with solid mechanic models in solids makes it an ideal code to capture the physics of the flow field around the particle as it is shock-accelerated – a challenging regime to study. Preliminary results have shown higher drag than the current models predict. Simulation results will be used to create a new drag model for multiphase particle-in-cell methods.

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