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Pairwaise Interaction Extended Point-Particle (PIEP) model for Compressible Multiphase problem SMYTHER HSIAO, University of Florida, KAMBIZ SALARI, Lawrence Livermore National Laboratory, S. BALACHANDAR, University of Florida — An efficient means to compute multiphase flow problems is to utilize the Euler-Lagrange simulation method. Previously, various developments have been made for the case in the incompressible regime. However, due to the complex nature of compressible multiphase flows, details of the model are re-examined. With a steady compressible inflow, the forces experienced by a particle is expressed as functions of the surface averaged flow properties perturbed by a neighboring particle, such as density, Mach number, pressure gradient, etc. Furthermore, the shock phenomenon is considered by using the experimental drag coefficient. Comparison is made between the modeled force and that from a particle-resolved 2-sphere simulation at Mach number 3. It is observed that around the wake region of an upstream neighboring particle, subsonic communication can occur which slows the down local flow, causing a further reduction in the modeled drag coefficient compared to the simulation.

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