

Unified Gas-Kinetic Scheme for Gas-Particle Flow in Shock-Induced Fluidization of Particles Bed

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Abstract : In this paper, a unified-gas kinetic scheme (UGKS) for the gas-particle flow is constructed. UGKS is a direct modeling method for both continuum and rarefied flow computations. The dynamics of particle and gas are described as rarefied and continuum flow, respectively. Therefore, we use the Bhatnagar-Gross-Krook (BGK) equation for the particle distribution function. For the gas phase, the gas kinetic scheme for Navier-Stokes equation is solved. The momentum transfer between gas and particle is achieved by the acceleration term added to the BGK equation. The new scheme is tested by a 2cm-in-thickness dense bed comprised of glass particles with 1.5mm in diameter, and reasonable agreement is achieved.

Keywords : gas-particle flow, unified gas-kinetic scheme, momentum transfer, shock-induced fluidization

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