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Lagrangian Simulations of Shock-Wave Diffraction at a Right-Angled Corner in a Particle-Laden Gas[1] ANDREAS HASELBACHER, University of Florida, FADY NAJJAR, University of Illinois, S. BALACHANDAR, YUE LING, University of Florida — The interaction between shock waves and particles is studied numerically using an Eulerian approach for the gas and a Lagrangian approach for the particles. Two examples of shock waves interacting with particles are studied. In the first, the interaction of a shock wave with a gas-particle interface and its subsequent deceleration to equilibrium conditions are investigated. Comparisons are made both to experimental data as well as theoretical predictions for the equilibrium conditions for the shock-wave Mach number as a function of position and spatial profiles in the relaxation region. Excellent agreement is found. The second example studied is the diffraction of a shock wave at a right-angled corner. Particular attention is focused on the flow field near the gas-particle interface. It is observed that vortical structures are formed at the gas-particle interfaces similar those found in shear-layer flows.

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