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Studies of Shock Wave Interaction with a Curtain of Massive Particles¹ SUMANTH REDDY LINGAMPALLY, PATRICK WAYNE, SEAN COOPER, Department of Mechanical Engineering, University of New Mexico, RICARDO GONZALEZ IZARD, Department of Fluid Mechanics, University of Valladolid, GUSTAAF JACOBS, Department of Aerospace Engineering, Sandiego State Univeristy, PETER VOROBIEFF, Department of Mechanical Engineering, University of New Mexico — Interaction of a shock wave with planar and perturbed curtain of massive particles is studied experimentally. To form the curtain, solid soda lime particles (30-50 micron diameter) are dropped from a hopper fitted with mesh sieves and vibrated with a motor. The curtain forms when the particles move through a rectangular slot in the top of the test section of the shock tube used in experiment. The curtain can be either planar or perturbed in the horizontal plane (parallel to the shock direction) based on the shape of the slot. This setup generates a particle curtain with a volume fraction varying between 2 and 8 percent along its vertical height. A laser illuminates the curtain in vertical and horizontal planes. When the diaphragm separating the driver and the driven section is ruptured, shock waves with Mach numbers ranging from 1 to 2, depending on the pressure, propagate down the driven section and into test section. The phenomena following the shock wave impingement on the particle curtain are captured using an Apogee Alta U42 camera.

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Sumanth Reddy Lingampally
Department of Mechanical Engineering, University of New Mexico

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