

Experimental Study of Shock Interaction with a Dense Obstacle embedded in Foam Target

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Shock–cloud interactions are a fundamental process in astrophysics, governing whether interstellar clouds collapse to form stars or are disrupted and dispersed into the surrounding medium. Laboratory astrophysics experiments provide a controlled platform to investigate the complex hydrodynamics involved in these interactions. In a experiment at the LULI2000 laser facility, we generated a strong shock wave in a low-density plastic foam containing an embedded aluminum-oxide sphere, designed to represent a dense interstellar cloud embedded in the diffuse interstellar medium. Time-resolved, high-resolution X-ray radiography was employed to track the shock propagation and the subsequent deformation and destruction of the sphere. Experimental results are then quantitatively compared with radiation-hydrodynamic simulations performed with FLASH and discussed in the astrophysical context.

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