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Magnetised shock reflection in laboratory plasmas[1] DANNY R RUSSELL, Blackett Laboratory, Imperial College, London, SW7 2AZ, UK, GUY C BURDIAK, THOMAS CLAYSON, First Light Fusion Ltd, Oxford, OX5 1QU, UK, JACK W D HALLIDAY, JACK D HARE, LEE G SUTTLE, SAVVA THEOCHAROUS, SERGEY V LEBEDEV, Blackett Laboratory, Imperial College, London, SW7 2AZ, UK, ERIC BLACKMAN, ADAM FRANK, University of Rochester, Rochester, NY 14627-0171, USA — Shock reflections are common features in astrophysical systems, for example in the internal structure of protostellar jets. We present experimental results from a laboratory study of oblique shock reflection in magnetised, high density plasmas. Shocks are produced by placing multiple obstacles into the supersonic, super-Alfvénic outflow from an ablating wire array z-pinch on the MAGPIE pulsed power facility. Magnetic field pile-up can be controlled by altering the obstacle material and orientation with respect to the magnetic field. We compare experiments both with and without magnetic field pile-up and discuss the differences in shock reflection geometry. In the presence of magnetic field pile-up, the compression ratio is determined by the strong (5T) advected magnetic field. The temperature of the shocked flow is consistent with an adiabatic compression of both the ions and electrons across the shock, which is caused by two fluid effects at the shock front.

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