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Faraday rotation measurements of magnetic field pile-up in a reverse shock formed by the stagnation of a supersonic magnetized plasma jet with a conducting obstacle G.F. SWADLING[1], S.V. LEBEDEV, N.H. STEWART, G.C. BURDIAK, J.D. HARE, L. SUTTLE, G.N. HALL[2], L. PICKWORTH[3], S. PATANKAR, R.A. SMITH, F. SUZUKI-VIDAL, T. CLAYSON, S.N. BLAND, Imperial College, J. WU, Xi'an Jiaotong University, Q. YANG, Institute of Fluid Physics, CAEP — We present measurements of the magnetic field distribution formed by the stagnation of a magnetized plasma with a conducting obstacle. This jet is formed by plasma flows produced using radial foil or wire array z-pinch configurations driven by 1.4MA, 250ns current pulse on the MAGPIE generator at Imperial College. The jets typically have internal Mach numbers of 3-20, Reynolds numbers of $>10^5$ and densities of $\sim 10^{18}$-10^{19}cm^{-3}. The structure of the reverse shock was investigated using laser interferometry and Thompson scattering diagnostics, which provide spatially resolved measurements of the flow velocity and plasma temperature in the shock front. Faraday rotation measurements, carried out using a 1053 nm probe, were combined with interferometric measurements of electron density distribution in order to measure the distribution of magnetic field in the plasma. These measurements show that the magnetic field accumulated in the post-shock region plays a dynamically significant role, balancing the ram pressure of the plasma flow.

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