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Magnetically Collimated Plasma Jets From Radial Foil Z-Pinch ELEANOR TUBMAN, SERGEY LEBEDEV, LEE SUTTLE, DANIEL RUSSELL, JACK HARE, SIMON BLAND, SAM EARDLEY, JACK HALLIDAY, GEORGE ROWLAND, ROLAND SMITH, NICK STUART, VICENTE VALENZUELA VIL-LASECA, FRANCISCO SUZUKI-VIDAL, Imperial College London — Abstract. Collimated plasma jets are produced under numerous conditions within astrophysical environments. Experiments within the laboratory can be used to investigate the acceleration of such jets as well as dynamics when the jets are perturbed by obstacles to the flows. We create plasma jets by ablation of an Al foil driven by a 1 MA, 250 ns current pulse [1,2]. In this presentation we will show recent results collected using the MAGPIE pulsed power generator at Imperial College, London to drive a plasma from a radial foil. The JxB force directs the plasma onto the central axis of the foil, and a collimated jet propagates outwards. The highly collimated formation is created from radial magnetic fields preventing the plasma from expanding outwards. Larger opening angles would be expected from these jets (M=5) if they were freely expanding [3]. Further downstream, in the jet, obstacles can be placed both directly into the flow and to block the flow completely, causing a pile-up of the plasma, and shocks to be formed. Diagnostics including Thomson scattering, laser interferometry, Faraday imaging and schlieren imaging are used to help characterise the flows and magnetic fields created. [1] F. Suzuki-Vidal et al., Astrophys. Space Sci. 322, 19 (2009) [2] F. Suzuki-Vidal et al., HEDP, 9, 141 (2013) [3] F. Suzuki-Vidal et al., PoP, 19, 022708 (2012).

> Eleanor Tubman Imperial College London

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