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Experimental Study of Episodic Magnetically Driven Radiatively Cooled Plasma Jets F. SUZUKI-VIDAL, S.V. LEBEDEV, S.N. BLAND, J.P. CHITTENDEN, G.N. HALL, A. HARVEY-THOMPSON, A. MAROCCHINO, Imperial College London, A. CIARDI, C. STEHLE, Observatoire de Paris, S.C. BOTT, University of California, San Diego, A. FRANK, E.G. BLACKMAN, University of Rochester, T. RAY, Dublin Institute for Advanced Studies — Previous experiments on the 1MA MAGPIE generator have successfully showed the formation of magnetically driven radiatively cooled plasma jets which are relevant to the launching of astrophysical jets. The jets in these experiments are driven by the pressure of the toroidal magnetic field produced by the current, which leads to the formation of a "magnetic tower" structure. This scenario is characterized by the formation of a magnetic "bubble" surrounding a collimated plasma jet on axis. A modification of this experimental configuration, in which radial wire array is replaced by radial metallic foil, results in the formation of episodic magnetic tower outflows which emerge periodically on timescales of ∼30ns. The subsequent magnetic bubbles propagate with higher velocities (increasing from ∼100km/s to ∼300km/s) and interacting with previous eruptions leading to the formation of shocks. This experimental setup also allows the study of the interaction of episodic outflows with an ambient medium. This research was supported by the EU JETSET network and the NNSA under DOE Cooperative Agreement DE-FC03-02NA00057.

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