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Formation of Magnetically Driven Radiatively Cooled Plasma Jets in the Laboratory F. SUZUKI-VIDAL, S.V. LEBEDEV, S.N. BLAND, J.P. CHITTENDEN, G. HALL, A. HARVEY-THOMPSON, A. MAROCCHINO, C. NING, Imperial College, A. CIARDI, C. STEHLE, Observatoire de Paris, A. FRANK, E.G. BLACKMAN, University of Rochester, S.C. BOTT, University of California, San Diego, T. RAY, Dublin Institute for Advanced Studies — Previous experiments 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 MAGPIE generator 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 velocities reaching ∼300km/s and interacting with previous eruptions leading to the formation of shocks. This research was supported by the European Community's Marie Curie JETSET network (contract MRTN-CT-2004 005592) and the SSAA program of the NNSA (DOE Cooperative Agreement DE-FC03-02NA00057).

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