

Abstract Submitted  
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**Spectroscopic investigation of species separation in opening switch plasmas**<sup>1</sup> S.L. JACKSON, D.G. PHIPPS, A.S. RICHARDSON, R.J. COMMISSO, D.D. HINSELWOOD, D.P. MURPHY, J.W. SCHUMER, B.V. WEBER, Plasma Physics Division, Naval Research Laboratory, C.N. BOYER, Engility Corporation, R. DORON, S. BISWAS, Y. MARON, Weizmann Institute of Science — Interactions between magnetic fields and current-carrying plasmas that lead to the separation of plasma species in multi-species plasmas are being studied in a plasma opening switch geometry. Several Marshall guns are used to inject single or multi-species plasmas between coaxial conductors connected to the output of the Naval Research Laboratory's Hawk pulsed-power generator. Following injection of the plasma, the generator is used at roughly half power to apply an electrical pulse with a peak current of 450 kA, a peak voltage of 400 kV, and a rise time of 1.2  $\mu$ s. The resulting magnetic field interacts with the plasma through a combination of field penetration and magnetohydrodynamic (MHD) pushing that is not well understood but can lead to the separation of plasma species in multi-species plasmas. An ICCD-coupled spectrometer has been used in combination with magnetic probes, a ribbon-beam interferometer, and particle-in-cell (PIC) modeling to diagnose and understand conditions in the plasma from the time it is injected until the end of the conduction phase of the opening switch.

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