Abstract Submitted
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Progress on understanding electron-beam driven plasma chemistry at the US Naval Research Laboratory[1] A. S. RICHARDSON, S. L. JACKSON, S. B. SWANEKAMP, TZ. B. PETROVA, J. L. GIULIANI, P. E. ADAMSON, D. D. HINSHELWOOD, J. W. SCHUMER, United States Naval Research Laboratory — There has recently been a renewed interest at the US Naval Research Laboratory (NRL) in better understanding the physics of the breakdown of air by a high-current, fast, pulsed electron beam. This poster describes recent progress in experiments and modeling that are underway at NRL. An electron beam is produced in vacuum using a Febetron pulsed-power generator modified to produce a peak voltage of 80 kV, a peak current of 4 kA, and a pulse width of 100 ns. The beam then passes through thin anode and pressure barrier foils into a cavity filled with low-pressure dry air. Visible and near-ultraviolet spectral lines are used to diagnose the presence of excited and ionized states induced as the beam transits the air. The time dependence of these excited states at different pressures is compared with the electron density and current within the cavity, as well as framing camera images of the visible emission. Experimental results are compared to several simplified models of the plasma breakdown, demonstrating regions of drive-current/gas-density parameter space in which these models can be accurately applied.

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