

Abstract Submitted
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A short pulse, high rep-rate microdischarge VUV source¹ JACOB STEPHENS, ANDREW FIERRO, JAMES DICKENS, ANDREAS NEUBER, Texas Tech University, CENTER FOR PULSED POWER AND POWER ELECTRONICS TEAM — A MOSFET based high voltage pulser is utilized to excite a microdischarge (MD), or microdischarge array (MDA) with pulsed voltages of up to 1 kV, with risetime and FWHM on the order of 10 ns and 30 ns, respectively. Additionally, the pulser is capable of pulsing at rep-rates in excess of 35 MHz. However, for these experiments the rep-rate was set on the order of 1 MHz, so as to limit excess energy deposition into the background gas and optimize the energy efficiency of VUV generation. Using VUV capable spectral diagnostics, the VUV emission of the MDs for various pressures (50-800+ Torr) and gases, focused on argon, argon-hydrogen mixtures, and neon-hydrogen mixtures (all of which provide strong emission at $\lambda < 130$ nm) is studied, for pulsed, MHz rep-rated excitation. Using a photomultiplier tube the time dependent behavior of the VUV emission is characterized and compared to results from transient fluid modeling of the MDA. For instance, the MDA turn-on time is recorded to be about 15 ns, which matches the full plasma development time in the model, and the MDA self- capacitance largely determines the turn-off behavior.

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