Abstract Submitted
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Low-Pressure Microwave Excited Microplasmas as Sources of VUV Photons and Metastable Excited Atoms: Modeling[1] MARK KUSHNER, University of Michigan, JAMES COOLEY, JUN XUE, RANDALL URDHAL, Agilent Technologies — Low pressure plasmas sustained in rare gases and rare gas mixtures can be efficient sources of VUV light from resonant optical transitions. Many applications would benefit from having small, inexpensive sources of plasma produced VUV light. To address this need, microwave wave excited microplasma sources in rare gases operating at pressures of < 10 Torr are being developed. The microplasmas are sustained in ceramic cavities having cross sectional dimensions of ≤ 1 mm, excited by a split-ring resonator antenna operated at 2.45 GHz. Power deposition is a few W. Hybrid computer modeling of microplasmas sustained in Ar has been performed to develop scaling laws for increasing the efficiency of VUV light production. The model includes a Monte Carlo simulation for the electron energy distribution and for radiation transport. Results from those studies will be discussed for plasma densities, electron energy distributions, VUV light production and excited state densities as a function of power, pressure and aspect ratio of the microplasma cavities. Modeling results will be compared to laser absorption spectroscopy of Ar excited state densities.

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