

Thanks

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**Anode Spot Formation in Low Pressure and Temperature He Plasma**<sup>1</sup> BRETT SCHEINER, Univ of Iowa, EDWARD BARNAT, MATTHEW HOPKINS, Sandia National Laboratories, SCOTT BAALRUD, Univ of Iowa, BENJAMIN YEE, Sandia National Laboratories — When a small electrode is biased sufficiently above the plasma potential in a low temperature plasma, the electron impact ionization of neutral species near the electrode becomes significant. At neutral gas pressures of  $\sim 1$ -100mTorr, it has been previously observed that if this ionization rate is sufficiently high, a double layer may form near the electrode. In some cases the double layer will move outward, separating a high potential plasma attached to the electrode surface from the bulk plasma. This phenomenon is known as an anode spot. A model has been developed describing the formation of anode spots based on observations from 2D particle-in-cell simulations. In this model ionization leads to the buildup of an ion rich region adjacent to the electrode, which modifies the potential structure in a way that traps electrons near the electrode surface. This leads to the formation of a quasineutral plasma near the electrode surface. When the density of this plasma is large enough, the double layer expands due to a pressure imbalance. Observations from PIC simulations were found to be consistent with time resolved measurements of the electron density from laser collision induced fluorescence, and with plasma emission measurements.

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