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Steady-State Properties of Low Pressure Anode Spots BRETT SCHEINER, SCOTT BAALRUD, Univ of Iowa, EDWARD BARNAT, MATTHEW HOPKINS, BENJAMIN YEE, Sandia National Laboratories — When a small electrode is biased sufficiently above the plasma potential, the electron impact ionization of neutral species near the electrode becomes significant. At neutral gas pressures of 1-100 mTorr, 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 to describe the steady-state properties of anode spots. In the model, an analysis of current loss, power balance, and particle balance leads to a prediction of the anode spot size, double layer potential, and form of the sheath at the electrode. These steady-state properties are related by and vary with the energy dependence of the electron impact ionization cross section, a feature absent in prior descriptions of the anode spot.

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