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Modeling of Mode Transition Behavior in Argon Microhollow Cathode Discharges THOMAS DECONINCK, LAXMINARAYAN RAJA, The University of Texas at Austin — Microhollow cathode discharges (MHCD) can be generated in a simple geometry comprising a cathode/dielectric/anode sandwich structure into which a blind or through hole is drilled. These microdischarges operate at a relatively high pressure of ∼10s-100s Torr with a hole dimension of ∼10s-100s μm. In this study, a fluid model with an argon chemistry is used to help clarify physical mechanisms occurring in a MHCD. The plasma is described using a self-consistent, multi-species, multi-temperature formulation. A variable secondary emission coefficient that depends on the local value of the electric field at the solid surface is used in our model. Computational results are compared to experiments performed in a similar set-up [1]. At low currents ($I < \sim 0.3$ mA), the discharge operates in the abnormal regime and is localized within the cylindrical hollow cathode. At higher current, the discharge expands over the outer surface of the cathode and operates in the normal regime. The differential resistivity of the discharge in this normal regime depends critically on the variable secondary electron emission model used in this study. [1] X. Aubert et al, *Plasma Sources Sci. Technol.*, 16 (2007), 23-32.

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