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Effect of Anode-Cathode Gap on Microhollow Cathode Discharges J. GREENAN, C.M.O. MAHONY, P.D. MAGUIRE, D. MARIOTTI, NIBEC University of Ulster — A high pressure hollow cathode (HC) plasma source was designed and fabricated for thin film deposition of bio-compatible coatings on coronary artery stent interiors. We investigate the electrical & optical characteristics of a 10 mm long solid-wall hollow cylinder (∼2 mm ID), as a stent substitute, with precision control of the anode – cathode (cylinder) gap dimension (to 12 micron). We present VI, Paschen curves and other derived scaling characteristics while OES was employed to determine the effective electron temperature via a collisional-radiative model [1]. An analytical radial sheath model is used to estimate the sheath width and electron density within the cylinder. We observe in the VI characteristics, a number of modes not associated with expansion over the cathode exterior but indicating current-dependent discharge progression along the interior of the cathode cylinder. We also observe deviation from standard pd and j/p^2 scaling.

[1] Mariotti D et. al., *J. Appl. Phys* **101** (2007) 013307

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