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Characterisation of Sub-Millimetre Plasmas J. GREENAN, C.M.O. MAHONY, P.D. MAGUIRE, NIBEC University of Ulster, D. MARIC, Belgrade, Institute of Physics — High pressure molecular gas hollow cathode (HC) plasmas have potential biomedical applications[1,2]. Issues however remain with geometries presented by realistic applications. Here we investigate the electrical & optical characteristics of such a geometry, a 2 mm diameter HC with a variable precisely positioned anode cathode gap. We present HC electrical measurements including static IV, Paschen curves & other derived scaling characteristics eg j/p^2[3] for various gases (inert and molecular), pressures (>100mTorr) & gaps (<1 mm). Analysis of these discharge characteristics sheds light on the HC effect in our sub-mm geometries, including instabilities, oscillations & self-pulsing. Investigations of electron distribution & gas temperature via optical emission spectroscopy are under way; plasma density may also be attainable. Other studies include molecular gas dissociation and detection of NxOy & other molecular gases via FTIR spectroscopy using optics developed for point source plasma measurement.

[1] McLaughlin et al 2008 *Diamond & Related Mat* **17** 873
[2] Mariotti et al 2004 *PSST* **13** 207
[3] Petrovic et al 2008 *J Phys D* **41** 194002

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