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Characterizing Pattern Formation in Microdischarges with an Inert Gas Background[1] ROXANNE PINSKY, ANIL BANSAL, JOHN FOSTER, University of Michigan, HAYDEN WALKER, New Mexico Institute of Mining and Technology — Self-organized plasma attachment patterns occurring on the surface of the cathode in DC microdischarges have been reported by several groups. It is theorized that patterns occur due to mechanisms in the near-cathode space-charge sheath [1]. In this work, the pattern formation and evolution of such patterns are mapped along the IV characteristic of the discharge. The sensitivity of the occurrence of the pattern or change in pattern spatial morphology in response to pressure changes is characterized. Changes in optical emission are quantified at the bifurcations points where the pattern first appears due to a differential change in discharge current or pressure. A fast camera is used to track pattern evolution through time. This ongoing study will compare experimental findings with Benilov's model. This work aims to contribute to the validation of models based on the theory of self-organization in bistable nonlinear dissipative systems [1]. It has been reported that the appearance of such patterns is highly dependent on the presence of background gas contaminants. This effort will also explore the impact of trace gas species on pattern appearance. [1] M. S. Benilov, *Plasma Sources Sci.Technol.* 2014.

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