Abstract Submitted
for the DPP12 Meeting of
The American Physical Society

Sensitivity of RF-Driven Plasma Filaments to Trace Gases in Neon M.J. BURIN, L. SAUCEDO, D.R. WILSON, CSU San Marcos, S.J. ZWEBEN, A. ZWICKER, C. BRUNKHORST, PPPL — Filamentary structures have been observed in many types of plasma discharges in both natural and industrial systems (e.g. upper-atmospheric discharge phenomena and dielectric barrier discharges). Various aspects of their physics remain unclear. A common example can be found within a toy plasma globe (or plasma ball), wherein a primarily Neon gas mixture in a spherical glass vessel near atmospheric pressure ($\sim$ 740 Torr) clearly and aesthetically displays filamentation. Recent work has provided the first characterization of these plasma globe filaments [Campanell *et al*, Physics of Plasmas 2010], where it was noticed that discharges of pure gases tend *not* to produce filaments. We have extended this initial work to quantify the dependence on trace gases and absolute pressure on filament properties (e.g. average number, thickness). These initial results using a custom globe apparatus are here presented along with some preliminary discussion of the effects possible with a programmable high voltage supply. Ultimately, high-speed photography and in-situ probes will be used to characterize filament dynamics, allowing for a more detailed comparison with theory and simulations.

Michael Burin
CSU San Marcos

Date submitted: 18 Jul 2012 Electronic form version 1.4