

Abstract Submitted
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Voltage Effects on a Commercial Plasma Globe¹ G.G. SIMMONS, L. SAUCEDO, M.J. BURIN, CSUSM, A. NAGY, S.J. ZWEBEN, PPPL — Filamentary structures have been observed in both atmospheric and industrial dielectric barrier discharges, yet various physical aspects of filament formation remain unclear. An example of filament formation can be found in commercial plasma globes. These globes typically contain Neon/Xenon at a pressure near 740 Torr, and are supplied with high voltage (5-10kV) near 25 kHz. The reason why these conditions are optimal for filamentary structures is unknown. This work analyzes the effects of voltage amplitude and frequency on a plasma globe using a programmable high voltage supply. We find that increasing voltage amplitude generally increases the drawn current and the number of filaments, but does not significantly affect filament structure. Changing the AC voltage frequency on the other hand significantly affects filament structure, with higher frequencies generally resulting in more focused (smaller average diameter) filaments. These trends are discussed along with their physics and possible applications.

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