

Abstract Submitted
for the DPP09 Meeting of
The American Physical Society

Formation and Radial Propagation of Filaments in a Plasma Ball

MICHAEL CAMPANELL, S. VASQUEZ, PPPL, C. CZARNOCKI, M. BURIN, CSSM, S.J. ZWEBEN, PPPL — High speed photography was used to analyze the formation and propagation of the filaments in a commercial plasma ball. Videos made at up to 500,000 frames/sec show that the filaments propagate radially at about 10,000 m/s during each cycle at the 25 kHz driving frequency and follow the same path in consecutive cycles. Just after the initial switching on of the voltage, the filaments develop out of a diffuse glow and self-organize into their final form over about 1 msec. It is also found that the number of filaments varies with applied voltage frequency and the radial length of filaments varies with voltage amplitude. A custom plasma ball apparatus has been built to analyze the dependence of the filamentary behavior on gas composition, pressure, applied voltage waveform and electrode geometry. Initial results will be presented.

Michael Campanell
PPPL

Date submitted: 16 Jul 2009

Electronic form version 1.4