Abstract Submitted
for the GEC15 Meeting of
The American Physical Society

Operating modes of field emission assisted microplasmas in the microwave regime ARGHAVAN ALAMATSAZ, AYYASWAMY VENKATTRAMAN, University of California, Merced — Field-induced electron emission from the cathode and its interaction with microdischarges has gained significant attention in the last few years particularly in the context of microscale gas breakdown. Recent advances in nanofabrication have led to the development of novel cathodes that demonstrate impressive field emission properties with turn-on fields as low as 1 V/μm and field enhancement factors as high as 1000 implying that field emission could play an important role in microplasmas as large as 500 μm. Recent studies on direct current microplasmas have shown that field emission triggers the transition from an abnormal glow mode to an arc-like mode with negative differential resistance. This talk will extend the results obtained for DC field emission assisted (FEA) microplasmas to the high frequency regime with specific emphasis on radio frequency and microwave excitations. Particle-in-cell with Monte Carlo collisions (PIC-MCC) simulations are used to determine the current-voltage characteristics and microplasma properties including number density, electron temperature, electron energy distribution function and power density. Apart from quantifying the influence of excitation frequency, the role of field emission on transition to γ-modewill also be discussed.

Venkattraman Ayyaswamy
University of California, Merced

Date submitted: 19 Jun 2015 Electronic form version 1.4