Abstract Submitted
for the GEC17 Meeting of
The American Physical Society

Numerical modeling of microwave driven surface discharge induced by resonantly exciting spoof surface plasmon polariton. YUNHO KIM, LAXMINARAYAN RAJA, Univ of Texas, Austin — Spoof Surface Plasmon Polariton (SSPP) is an electromagnetic wave strongly confined near the surface of a corrugated metal surface (meta-surface) filled with dielectric materials. Strong resonances from each corrugated structure couple with one another to produce highly localized wave structures with wavelength much lesser than the incident wave. The electric field amplification of the microwave at the interface of the meta-surface is used to initiate the plasma breakdown of pure argon gas at 10 Torr. A self-consistent model for the description of plasma coupled with Maxwell's equations is used in this numerical study. By carefully choosing the dimensions of each periodic structure with the use of the dispersion relations for SSPP, a uniformly elongated argon plasma is obtained near the meta-surface where electron number density reaches around $1.0*10^{19}m^{-3}$. It is found that the nature of SSPP strongly depends on the dimensions of the meta-surface, the dielectric permittivity, and frequency which therefore determine the plasma profile.

Yunho Kim
Univ of Texas, Austin

Date submitted: 02 Jun 2017 Electronic form version 1.4