Abstract Submitted
for the GEC11 Meeting of
The American Physical Society

Design and characterization of a novel coaxial VHF plasma source for air plasma formation[1] BRANDON BYRNS, DANIEL WOOTEN, STEVEN SHANNON, North Carolina State University — A key challenge in the expansion of atmospheric plasma applicators into new markets is the effective surface area that these systems can efficiently treat. To this end, a large area atmospheric air glow discharge, with approximately 9.5cm^2 cross sectional area, is obtained using a simple coaxial structure. The room air plasma is driven by a 162MHz generator at powers ranging from 300W – 1000W. The VHF drive appears to produce a steady state glow void of streamers or arcs typically found in atmospheric air systems. Electrical measurements coupled with a global plasma model and transmission line theory allow for the calculation of electron density. Densities calculated for 400W are approximately 10^{11}cm^{-3}. Spectroscopy data shows dominant emissions consist of OH, N_2, and N_2^+, along with a continuum indicating neutral bremsstrahlung radiation; this is used for electron density calculations and model validation. In this presentation, source design, plasma characterization, and preliminary surface treatments of HDPE will be presented.

[1]This work is supported by generous gifts from Applied Materials and Advanced Energy Inc.

Brandon Byrns
North Carolina State University

Date submitted: 15 Jul 2011 Electronic form version 1.4