Abstract Submitted
for the GEC12 Meeting of
The American Physical Society

**Simulation of an Atmospheric Pressure Plasma Jet in a Stagnation Flow** DOUG BREDEN, LAXMINARAYAN RAJA, University of Texas at Austin — Pulsed atmospheric pressure plasma jets (APPJs) have generated significant interest for their ability to generate non-thermal plasma in open air gaps without the risk of arcing. The plasma typically forms due to a sequence of fast ionization waves which propagate within a noble gas jet exhausting into ambient air. The resulting luminous plasma plume is safe to touch due to the non-equilibrium nature of the plasma and low gas temperatures. At the same time, high energy electrons in the ionizing head can generate reactive radical species (N and O) in addition to ions and UV radiation, which may be beneficial for biomedical applications. In order to gauge the effectiveness of these jets for treating surfaces, it is desirable to know how the plasma jet interacts with a surface and the flux of reactive species to that surface. In this work, the propagation of a single ionization wave in the stagnation flow of a helium jet impinging on a solid surface is modeled. The plasma discharge dynamics are modeled using a self-consistent, two temperature plasma solver with finite rate chemistry. The helium-jet stagnation flow is modeled using a compressible, multiple species Navier-Stokes solver. The primary objective is to determine the net delivery of reactive species to the surface and the role of parameters such as dielectric thickness.

Doug Breden
University of Texas at Austin

Date submitted: 15 Jun 2012 Electronic form version 1.4