

Abstract Submitted
for the GEC08 Meeting of
The American Physical Society

Electron-Beam Generated Air Plasma: Microwave I/Q Detection of Plasma Properties and Optical Measurements of Nitrogen and Ozone to Quantify Plasma Spatial Distribution¹ ROBERT VIDMAR, CHRIS RAMSAYER, University of Nevada, Reno, KENNETH STALDER, Stalder Technologies and Research — Microwave and optical measurements are used to quantify the electron number density, the electron momentum transfer collision rate, nitrogen emissions, and ozone production. The plasma is produced by an electron beam source that generates 10-ms pulses of approximately 5 mA at 100 keV into a 400 liter test cell through a 12.7 μm aluminum transmission window. The target gas is laboratory air with measurements at pressures from 1 mTorr to 636 Torr. Details relating to the 10 GHz microwave In-phase and Quadrature detector are presented as well as representative measurements and the procedure to convert raw data to values of electron number density and electron momentum transfer collision rate. Detection of nitrogen emissions at 337.1 nm and ozone absorption at 254 nm are used to estimate the spatial volumetric ionization rate on the optical plane of observation and the spatial distribution across the optical plane.

¹This material is based on research sponsored by the Air Force Research Laboratory, under agreement numbers FA9550-05-1-0087 and FA9550-07-1-0021.

Robert Vidmar
University of Nevada, Reno

Date submitted: 10 Jun 2008

Electronic form version 1.4