

Abstract Submitted
for the GEC06 Meeting of
The American Physical Society

Wall Effects on Electron Beam Generated Plasmas.¹ DARRIN LEONHARDT, SCOTT WALTON, RICHARD FERNSLER, US Naval Research Laboratory, Plasma Physics Division — Electron beam generated plasmas have been shown to possess intriguing characteristics for plasma processing applications such as low electron temperatures, high plasma densities and the capability to ionize all gases uniformly and in proportion to their relative concentrations. In this work, we discuss the effects of large versus small ionization-to-chamber volume ratios; i.e. what happens to the steady-state plasma as the system volume is decreased around the electron beam? At first glance, the presence of walls appears inconsequential. However, even in a modulated system, the walls affect the electron temperature as well as the magnitude and distribution of the plasma densities. Time resolved data from in situ diagnostics (electrostatic probes and mass spectrometry) and theoretical expressions will be compared for various configurations of the chamber volume with fixed ionization regions.

¹This work is supported by the Office of Naval Research.

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Date submitted: 13 Jun 2006

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