

Abstract Submitted
for the DPP06 Meeting of
The American Physical Society

Development of a Plasma Cathode Electron (PCE) source for use in a plasma thruster MAX LIGHT, TSITSI MADZIWA-NUSSINOV, PAT COLESTOCK, RON KASHUBA, RICK FAEHL, Los Alamos National Laboratory — At Los Alamos National laboratory, we are in the process of developing a new plasma thruster system that employs a Plasma Cathode Electron (PCE) source. By biasing an ECR source chamber to high voltages, we can drive out a highly energetic electron beam that ionizes a propellant in a downstream chamber. This is a more efficient ionization mechanism than conventional electric propulsion concepts since we do not have lifetime issues that normally come with the presence of grids as in other plasma thruster systems. In this presentation we outline the thruster concept, in particular, the generation of the electron beam in a Plasma Cathode Electron (PCE) source. Our PCE source was created using 1.5kW of microwave power at 2.45GHz delivered in a static magnetic field of 875Gauss. We were able to drive electron beams of greater than 100A in our source with very high beam efficiencies by biasing the ECR source chamber to -120V. work was funded by DARPA.

Tsitsi Madziwa-Nussinov
ISR-6, Los Alamos National Laboratory

Date submitted: 25 Jul 2006

Electronic form version 1.4