

Abstract Submitted  
for the GEC11 Meeting of  
The American Physical Society

**A parametric study of DC-RF Penning-type plasma discharge<sup>1</sup>**  
YEVGENY RAITSES, PIERRE BAELE, Princeton Plasma Physics Laboratory,  
Princeton, NJ, VINCENT DONNELLY, University of Houston, Houston, TX — A  
plasma cathode that utilizes electron extraction from a rf-plasma (2 MHz, 30-100 W)  
is shown to sustain a high current (1-5 A) operation of a low pressure (0.1-1 mtorr)  
dc discharge with applied magnetic field (0.01-1 kGauss) in the discharge voltage  
range of 20-100 V. Probe measurements of plasma potential, electron temperature  
and density revealed a strong effect of the magnetic field on plasma properties of  
this discharge. For example, at the discharge voltage of 50 V, the voltage potential  
drop in the magnetized part of the discharge increases from a few volts to about  
20 V as the magnetic field increases from 35 to 160 Gauss. It is shown that the  
electron cross-field current in the Penning discharge is anomalously high and cannot  
be explained by classical collisional mechanism.

<sup>1</sup>Work supported by the US DOE.

Yevgeny Raitses  
Princeton Plasma Physics Laboratory, Princeton, NJ 08543

Date submitted: 20 Jul 2011

Electronic form version 1.4