Abstract Submitted
for the GEC10 Meeting of
The American Physical Society

Application of short, cold cathode dc discharges as gas analytical sensors[1] VLADIMIR DEMIDOV, West Virginia University, STEVEN ADAMS, AFRL, IGOR KAGANOVICH, PPPL, MARK KOEPKE, West Virginia University, JAMES WILLIAMSON, UES, inc — A novel approach, leading to the development of a gas analytical sensor, based on measurements of the energetic part of the electron energy distribution function (EEDF) in the near-cathode plasma is reported here. A cold cathode, short DC discharge with conducting walls was used to measure the EEDF during the discharge as opposed to previous work in the afterglow [1]. EEDF measurements during the discharge are technically simpler and have dramatically better sensitivity than in the afterglow since temporal resolution is not required. Instead of the more common cylindrical Langmuir probe, the conducting wall is used as the electric probe resulting in a dramatic increase in probe sensitivity. The wall probe being almost flat also greatly reduces the ion current contribution to the measurements. Along with the experimental results, modeling of the discharge has also been performed. This research allows the possibility of developing a micro-analytical gas sensor operational up to atmospheric pressure.

[1] V. I. Demidov *et al.*, *RSI*, **73**, 3409 (2002); *Sov. Phys. Tech. Phys.*, **28**, 583 (1983).

[1]This work was supported by the Department of Energy Office of Fusion Energy Science Contract DE-SC0001939 and AFOSR.

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Date submitted: 08 Jun 2010 Electronic form version 1.4