Abstract Submitted
for the DPP08 Meeting of
The American Physical Society

Effects of sheath instability on properties of a Hall thruster[1]
DMYTRO SYDORENKO, University of Alberta, Edmonton, Canada, IGOR D. KAGANOVICH, YEVGENY RAITSES, Princeton Plasma Physics Laboratory, Princeton, NJ, USA, ANDREI SMOLYAKOV, University of Saskatchewan, Saskatoon, SK, Canada — The sheath near the electron-emitting surface may become unstable if it is characterized by the negative volt-ampere characteristics, which occurs in presence of strong secondary electron emission. A 1d3v particle-in-cell code is applied to study the sheath instability effects on plasma-wall interaction in Hall thrusters. It is found that in stable stationary plasma state the final phase of cyclotron rotation of secondary electrons emitted from the thruster walls is not arbitrary but belongs to the discrete set of stability intervals [Sydorenko et al., Phys. Plasmas **15**, 053506 (2008); Kaganovich et al., Phys. Plasmas **14**, 057104 (2007)]. In the limit of high discharge voltages, a new regime with relaxation oscillations is identified. In this regime, the plasma constantly switches between a state with non-space charge limited emission and a state with a space charge limited emission.

[1]This work was supported by the AFOSR.

Igor D. Kaganovich
PPPL

Date submitted: 17 Jul 2008 Electronic form version 1.4