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Sheath structure transition controlled by secondary electron emission at low gas pressure IRINA SCHWEIGERT, George Washington University Washington, D.C. 20052 USA, SAMUEL J. LANGENDORF, Georgia Institute of Technology Atlanta, GA 30332 USA, MICHAEL KEIDAR, George Washington University Washington, D.C. 20052 USA, MITCHELL L.R. WALKER, Georgia Institute of Technology Atlanta, GA 30332 USA — Previously the experiments [1] demonstrated that the growth of the electron temperature with power in the Hall thruster is restricted by plasma-wall interaction if the wall has an enhanced secondary electron emission (SEE) yield. It is known that the plasma and wall is separated by the sheath potential drop to provide the condition of zero - current on the surface with floating potential. The rearrangement of the sheath structure near the plate with enhanced SEE is the subject of our experimental and theoretical study. The experiment was carried out in multidipole plasma device, where plasma is maintained by the negatively-biased emissive filament. The plate with sapphire surface is placed 50 cm apart from the filament. The plasma parameters were measured for different negative biases U_b and discharge currents J at P=10^{-4} Torr. In our PIC simulations the plasma was calculated for the experimental conditions. We solved self-consistently the Boltzmann equations for the electron and ion distribution functions and Poisson equation for electrical field. Both in the experiment and simulation we found non-monotonic change in sheath structure near the plate depending on U_b and J. The kinetic simulations allowed us to describe the sheath rearrangement in terms of the electron energy distribution function.

[1] Raitses, Y., et al. *Physics of Plasmas* 13 (2006): 014502.

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