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Plasma-Wall Interaction and Electron Temperature Saturation in Hall Thrusters ARTEM SMIRNOV, YEVGENY RAITSES, DAVID STAACK, NATHANIEL FISCH, Princeton University Plasma Physics Laboratory (PPPL) — Existing Hall thruster models predict that secondary electron emission from the channel walls is significant and that the near-wall sheaths are space charge saturated. The plasma-wall interaction and its dependence on the discharge voltage and channel width were studied through the measurements of the electron temperature, plasma potential, and plasma density in a 2 kW Hall thruster [1,2]. The experimental electron-wall collision frequency is computed using the measured plasma parameters. For high discharge voltages, the deduced electron-wall collision frequency is much lower than the theoretical value obtained for the space charge saturated sheath regime, but larger than the wall recombination frequency. The observed electron temperature saturation appears to be directly associated with a decrease of the Joule heating, rather than with the enhancement of the electron energy loss at the walls due to a strong secondary electron emission. The channel width is shown to have a more significant effect on the axial distribution of the plasma potential than the discharge voltage. 1. Y. Raitses, D. Staack, M. Keidar, and N.J. Fisch, Phys. Plasmas **12**, 057104 (2005). 2. Y. Raitses, D. Staack, A. Smirnov, and N.J. Fisch, Phys. Plasmas **12**, 073507 (2005).

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