

Abstract Submitted
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Plasma sheath in presence of secondary electron emission in Hall Effect Thrusters¹ ANTOINE TAVANT, VIVIEN CROES, LPP, Ecole Polytechnique Safran Aircraft Engines, ROMAIN LUCKEN, ANNE BOURDON, PASCAL CHARBERT, LPP, Ecole Polytechnique — The plasma sheath is a recurrent problem in the study of plasma discharges. Indeed, it controls the particle and heat fluxes to the wall, which control in return the plasma density and temperature. Even though it has been studied since Langmuir in the 1900's, it is not well understood yet. In addition, the role of the wall material on plasma discharges is known to be important in Hall Effect Thrusters (HET) [Goebel-08]. The main phenomena proposed to explain the role of the wall in HET is the secondary electron emission (SEE).

In this study, we use a bi-dimensional particle in cell simulation code to investigate the plasma sheath in presence of SEE. We perform a parametric study on the SEE rate in order to better understand the sheath behaviour, using the SEE model of Barral (2003). The mean SEE rate mainly depends on the electron energy flux to the wall, and we show that this energy flux is not correctly described by an isothermal sheath model. New insights from the simulations are presented, and a new description of an non-isothermal sheath is proposed.

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