

Abstract Submitted
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Stability of the plasma sheath in the presence of secondary electrons emission¹ ROBERTO MARTORELLI, VIVIEN CROES, ROMAIN LUCKEN, ANTOINE TAVANT, TREVOR LAFLEUR, ANNE BOURDON, PASCAL CHABERT, Ecole Polytechnique, PLASMA FROIDS, LABORATOIRE DE PHYSIQUE DES PLASMAS (LPP) TEAM — We propose a systematic analysis of the structural stability of the sheath in the presence of secondary electron emission induced by energetic plasma electron impacting the wall. The analysis is performed using the Sagdeev potential, in a similar fashion as in the study of nonlinear ion-acoustic waves. In this context, the study of the Poisson's equation for the sheath potential is reduced to an initial value problem. Setting the proper initial conditions, corresponding to the electric field and the electrostatic potential at the wall, different possible solutions for the sheath potential can be obtained, from Bohm-like to oscillatory ones. The main characteristics of the classical monotonic sheath can be reproduced as well through this approach. The inclusion of the emitted electrons provides additional degrees of freedom to the system, specifically the density and the energy of the emitted electrons. We show that a transition between different types of solutions might be induced by changing the value of the parameters of the system. In particular we are able to reproduce a transition to a non-monotonic sheath for critical values of the parameters, in a similar fashion as in the space charge limited regime.

¹CHEOPS

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