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A NEW SEMI-ANALYTICAL MODEL FOR PRELIMINARY ESTIMATION OF ION NUMBER
DENSITY IN ELECTRIC THRUSTER PLUME

Abstract

Plume impingement evaluation is a crucial analysis in satellite system design and platform configuration. The use of non-traditional propulsion systems, such as electric propulsion, requires the study of new types of plume and their main parameters. In this context, a new semi-analytical model for preliminary estimation of ion number density in Hall-effect stationary plasma thruster is presented. The analytical part of the model has its validity domain in the far field region and evaluates ion number density as a combination of axial and angular density distribution. The angular distribution function contains experimental parameters for a customized analysis and more accurate results. Solutions obtained are compared with in-vacuum measurements of a commercial Hall thruster.