Abstract Submitted
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Bidimensional particle-in-cell simulations : Impact of dielectric walls on electron drift instability in Hall effect thrusters[1] ANTOINE TAVANT, VIVIEN CROES, LPP / Safran Aircraft Engines, TREVOR LAFLEUR, LPP/ CNES, ANNE BOURDON, PASCAL CHARBERT, LPP / CNRS, PLASMAS FROIDS TEAM — Hall effect thrusters (HET) are one of the main technology used and studied for spacecraft electrical propulsion. Grid-less, they present net advantages. However, their operation characteristics are not understood yet, resulting in an increasing need for predictive models, and a better understanding of the plasma discharge complex behavior. HETs consist of an $\mathbf{E}\times\mathbf{B}$ discharge in an annular ceramic channel. One of the main characteristic of the thruster is its lifetime, limited by the ceramic channel eroded by the plasma. A better understanding of wall erosion is necessary, however long experiments are costly, and erosion diagnostics and measurements are difficult to perform. A bidimensional $r-\theta$ particle-in-cell simulation is therefore developed to investigate the plasma interaction with the ceramic walls. The dielectric aspect is emphasized: studies are done with metallic walls as well as dielectrics with various geometries and characteristics. Moreover impact and use of parietal capacitive probes is studied. Then secondary electron emissions are implemented to better understand the material effects.

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