

Abstract Submitted
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Modeling of current characteristics of Segmented Langmuir Probe on DEMETER NADIA IMTIAZ, RICHARD MARCHAND, Department of Physics, University of Alberta, Edmonton AB, Canada, J. P. LEBRETON COLLABORATION — We model current characteristics of a Segmented Langmuir probe mounted on DEMETER satellite. The probe is used to measure electron density and temperature in the ionosphere on DEMETER at altitudes of 700 km. It also serves as a Mach probe and used to measure the plasma flow velocities in satellite frame of reference. The probe is partitioned into seven segments: six electrically insulated spherical caps and a Guard electrode (sphere). Comparisons are made between the model predictions and measurements for characteristics of various segments for actual ionospheric plasma conditions encountered along DEMETER orbit. Segment characteristics are computed numerically with PTetra, a 3 D PIC simulation code. The model accounts for several physical effects of importance in the interaction of spacecraft with the space environment e.g. satellite charging, photoelectron and secondary electron emission. The supersonic flow of plasma results in different characteristics for different segments of the probe. This anisotropy in turn can be used to infer the velocity of the background plasma. It is observed in that a positive bias can significantly modify plasma sheath region and wake formation around the probe. Computed characteristics and their angular anisotropy are compared with measurements.

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