Abstract *(paper not available)*

Simulation of the Electrostatic Environment of the Magnetospheric Multiscale Mission using the Active Spacecraft Potential Control System

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The Magnetospheric Multiscale Mission, launched in March 2015, consists in a set of four Earth orbiting spacecrafts primarily designed to provide a 3D characterization of magnetic reconnection regions in the Earth magnetosphere. Among a full suite of particles and fields sensors, the Spin-plane Double Probe (4 spherical probes located at the end of ~60m wires booms for orthogonal spline plane electric fields components) and the Axial Double Probe (2 probes located at the end of ~15m booms along the spin axis) are able to provide DC and AC Electric Field vectors, with a sensitivity better than 0.1mV/m. While the spacecraft potential in sunlight, driven by photoemission, can reach values in excess of 10V positive with respect to the surrounding plasma, emission of ions using the Active Spacecraft POtential Control system (ASPOC) is used to lower and stabilise the potential to a level close to 4V.

In this paper we have built a 3D model of the spacecraft and have used the Spacecraft Plasma Interaction Software to study perturbations due to the ASPOC system, operated in environments representative of the Solar Wind and magnetospheric tail lobes encountered by the MMS spacecrafts during operation of the SDP and ADP probes, on the electrostatic environment of the probes. Among other effects, we show that asymmetries arise between spin-plane DC Electric Field orthogonal components, which are qualitatively comparable with observations.

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