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Modelling of the CHAMP satellite plasma observations within the space environment RICHARD MARCHAND, University of Alberta, CLAUDIA STOLLE, Technical University of Denmark, MARCIN PILINSKI, Atmospheric & Space Technology Research Associates, LLC — The interaction of CHAMP with ionospheric plasma is modelled using a particle in cell (PIC) simulation code, with a particular focus on Langmuir probe measurements. CHAMP was launched in 2000 with the mission to measure long time variations in a number of geophysical variables. It had several scientific instruments, including magnetometers, ion drift meters, an accelerometer and a large rectangular Planar Langmuir Probe (PLP). Measurements made with the PLP over the years show systematic anomalies in the estimated electron temperature at certain latitudes. A possible explanation might come from an interplay between the orientation of the magnetic field in the satellite rest frame, and wake effects from certain components of the spacecraft. This hypothesis is tested using PTetra, which uses an unstructured tetrahedral mesh, while treating all species fully kinetically, with physical charges and masses. The model accounts for satellite charging, for the possibility of relative biasing between different components and, when the satellite is exposed to solar radiation, for photoelectron emission. Simulations are carried out for a number of representative positions in orbit, and computed characteristics for the PLP are compared directly with measurements.

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