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Io's Interaction with the Plasma Torus: Multi-Species Hybrid Simulations

Ondřej Šebek (1), Pavel Trávníček (2,1), Raymond Walker (3), and Petr Hellinger (1)

(1) Astronomical Inst. & Inst. of Atmospheric Physics, CAS, Prague, Czech Republic, (2) Space Sciences Laboratory, UCB, Berkeley, CA, USA, (3) Department of Earth and Space Sciences, UCLA, Los Angeles, CA, USA

We present analysis of global 3-dimensional multi-species hybrid simulations of Io's interaction with Jovian magnetospheric plasma. In the multi-species simulations we assume five species, plasma torus is composed of O+, S+ and S++ ions and ions of SO+, SO_2+ are created around Io by ionization of its neutral atmosphere. We consider several ionization processes, namely, charge exchange ionization and photoionization/electron impact ionization. We compare our results to data acquired in situ by the Galileo spacecraft. Our results are in a good qualitative agreement with the in situ magnetic field measurements made during Galileo's flybys around Io.