

The proton distribution in the interaction region between the solar wind and the Martian ionosphere

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The ionospheric plasma of the Mars without the strong dipole magnetic field directly interacts with the solar wind plasma. The motional electric field induced by the solar wind, $E = -V \times B$, makes the ion gyration motion asymmetric. The Larmor radius of the oxygen ions, the main component of the Martian ionosphere, is 1000km and is as large as the planetary radii. The motional electric field effects on the global proton distribution thorough the asymmetric gyration motion.

Recently Mars Express (MEX) and Mars Global Surveyor (MGS) successfully observed the solar wind - Mars ionosphere interaction region including some boundaries such as bowshock, magnetic pileup boundary and the ion boundary. We searched ion density data observed by Ion Mass Analyzer of ASPERA-3 on MEX from Jun.7 2004 to Mar.13 2006. The clock angle of the interplanetary magnetic field (IMF) is calculated by using the magnetic field data simultaneously observed by MGS. The distribution of the ion densities is plotted on the plane including the electric field and the solar wind velocity.

In this paper, we discuss the effect of the electric field induced by the solar wind on the Martian plasma environment.