PLASMA CHARACTERISTIC DETERMINATION DURING THE CORONAL MASS EJECTION ASSOCIATED WITH THE JANUARY 27, 2012 SOLAR STORM

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ABSTRACT

On January 27, 2012, an X-class flare was launched from the Sun at 18:15 UT. The X-class flare generated a high-energy particle stream flowing along this interplanetary Magnetic Field (IMF) which arrived at Mars in about 38 hours, with the concurrent Coronal Mass Ejection (CME) arriving at Mars several days later. Between 21:15 UT and 00:10 UT on January 28, 2012, this event produced the speed of the IMF associated with the flares. The speed information is used to estimate the CME arrival time at Mars, and the time timing information is used to determine the mass of material launched by the event. In this paper, we study the effects of the CME on the magnetosphere of Mars using the ENL, an inner heliospheric propagation model and observers from the Electron Spectrometer (ELS), the Electron and Proton Analyzer (EPA) and the Anti-solar Plane Electron Spectrometer (APES) on the Mars Odyssey spacecraft. The electron spatial measurements were obtained in the Mars magnetosphere before and during the CME encounter. These spatial data indicate the CME structure within the Earth’s magnetosphere. A precise interplanetary model of a Mars-directed flaring event was developed to test the extent to which the CME has modified Mars’s magnetosphere.

Determining Electron Plasma Parameters

To determine the plasma parameters we obtained the following distribution from a 3D model of a cryogenic plasma using the magnetic field direction and sampled by a simulation (ELS) that is consistent with the CME and ENL. Figure 3 shows the plasma parameters measured during the CME encounter. The electron distribution function was determined from the data obtained during the CME encounter. The electron energy density, the speed of sound, and the speed of light varies between 300 km/s and 1,000 km/s, with a distribution that is consistent with the data obtained during the CME encounter.

Determination of Electron Plasma Parameters

The plasma parameters were determined from the data obtained during the CME encounter. The electron distribution function was determined from the data obtained during the CME encounter. The electron energy density, the speed of sound, and the speed of light varies between 300 km/s and 1,000 km/s, with a distribution that is consistent with the data obtained during the CME encounter.

Figures 3 and 4 show the electron parameters measured during the CME encounter. The electron distribution function was determined from the data obtained during the CME encounter. The electron energy density, the speed of sound, and the speed of light varies between 300 km/s and 1,000 km/s, with a distribution that is consistent with the data obtained during the CME encounter.

Figures 5 and 6 show the electron parameters measured during the CME encounter. The electron distribution function was determined from the data obtained during the CME encounter. The electron energy density, the speed of sound, and the speed of light varies between 300 km/s and 1,000 km/s, with a distribution that is consistent with the data obtained during the CME encounter.

Figures 7 and 8 show the electron parameters measured during the CME encounter. The electron distribution function was determined from the data obtained during the CME encounter. The electron energy density, the speed of sound, and the speed of light varies between 300 km/s and 1,000 km/s, with a distribution that is consistent with the data obtained during the CME encounter.

Figures 9 and 10 show the electron parameters measured during the CME encounter. The electron distribution function was determined from the data obtained during the CME encounter. The electron energy density, the speed of sound, and the speed of light varies between 300 km/s and 1,000 km/s, with a distribution that is consistent with the data obtained during the CME encounter.

Figures 11 and 12 show the electron parameters measured during the CME encounter. The electron distribution function was determined from the data obtained during the CME encounter. The electron energy density, the speed of sound, and the speed of light varies between 300 km/s and 1,000 km/s, with a distribution that is consistent with the data obtained during the CME encounter.

Figures 13 and 14 show the electron parameters measured during the CME encounter. The electron distribution function was determined from the data obtained during the CME encounter. The electron energy density, the speed of sound, and the speed of light varies between 300 km/s and 1,000 km/s, with a distribution that is consistent with the data obtained during the CME encounter.