



Update on the Mars Express ASPERA-3 Observations of Neutral Atom Streams in the Interplanetary Medium

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The Analyzer of Space Plasmas and Energetic Atoms, ASPERA-3, onboard the Mars Express mission carries a neutral particle detector, NPD, measuring energetic neutral atom flux in the energy range 0.1 - 10 keV, resolving velocity and mass (H and O). Two NPD heads have total field of view is $10 \text{ deg} \times 180 \text{ deg}$ divided into 6 pixels. The angular response in each pixel has a FWHM (Full Width at Half Maximum) of $5 \text{ deg} \times 30 \text{ deg}$. The total efficiency is 1 - 15 % depending on energy. The ENA detection technique is based on the atom - surface interaction. During the cruise phase as well as at Mars NPD detected flux of neutrals with a peak energy of 800 eV and spreading of 100% (FWHM) obtained from time-of-flight spectrum assuming hydrogen. The number flux is of the order of $10^4 \text{ cm}^{-2} \text{ s}^{-1} \text{ sr}^{-1}$ but highly variable between different observations. Each observation covered up to one hour on selected days. During the period from the first NPD switch-on in July 2003 and up to the end of 2004, the NPD field of view covered the entire range of heliospheric longitudes being mostly within 15 deg about the ecliptic plane. For a particular observation date the stream angular spreading exceeds one NPD pixel in agreement with the spread in energy assuming it is thermal. No preferential direction of the flux has been so far identified through the entire period of observations. Since the NPD sensor becomes "blind" as soon as the Sun is within its field of view, the neutral component of the solar wind can be fully ruled out. Moreover, the signal is seeing even in the Marian eclipse that rules out the possibility of somehow neutralized solar wind protons reaching the sensor. We provide the latest update of the observations using the data up to January 2005.