Geophysical Research Abstracts, Vol. 9, 10226, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-10226

Voyager 1 in the Heliosheath, Voyager 2 in the Termination Foreshock: An Update

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Voyager 1 (V1; 101.5 AU, N34.2 deg. lat., 173 deg. long.) and Voyager 2 (V2; 81.7 AU, S27.1 deg. lat., 216 deg. long.) remain in the post- and pre-shock regions of the termination shock (TS), respectively, as of 2007.04. We use data from the V1 and V2 LECP instruments to review recent observations, and also compare low-energy ion and electron intensities and anisotropies in the termination foreshock (TFS) measured by V1 during 2002.53-2004.96 with those measured by V2 from 2005 onward. During 2005-2006.16, the energy spectrum at V2 of TFS ions rolled over below about 0.2 MeV, in contrast to the V1 TFS ion spectra that extended down to at least 0.04 MeV. On 2006.16 a strong transient shock ahead of a merged interaction region passed V2, causing the ion spectrum to unroll and extend down to at least 0.03 MeV until about 2006.4. Since then the TFS ion spectrum at V2 again rolls over below about 0.2 MeV, i.e., as before the transient shock passage, indicating that access to V2 of lower energy TS ions remains inhibited. Also, the recent V2 data show that ion anisotropies are again directed mainly in the +T-direction, similar to those measured at V2 during 2005-2006.16, but opposite to those observed by V1 in the TFS, and consistent with model predictions for an asymmetric heliosphere. Since V1 entered the heliosheath (HSH) on 2004 day 351, average intensities of low-energy ions 0.04-0.05, 0.14-0.22, and 2.0-4.0 MeV are about 400, 40, and 0.5 ions/cmˆ2-s-sr-MeV, respectively, having varied about these by values by no more than a factor of two. For HSH ions 0.04-2.0 MeV, the intensity continues to be reasonably well fit by a single power-law in energy with logarithmic slope -1.5 +/- 0.2. From mid-2005 onward, the plasma flow velocity V in the HSH, estimated by analysis of low-energy ion angular distributions, has shown mean speed of about 70 km/s and direction angle of about -35 deg. to the radial, i.e., V has on average a positive R-component and a negative T-component.