



The secondary stream of interstellar neutral flow

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Many independent observations for both interplanetary hydrogen and helium have strongly supported that the large scale structure of the heliosphere is stably symmetric with respect to 74/254 ecliptic longitude axis [Gloeckler et al., 2004; Witte, 2004; Valerga et al., 2004; Quemerais et al., 1999] although Lallement et al. (2005) suggested slightly deflection toward north latitude by only 4 degree.

On the other hand, a number of different data sets pertaining to the neutral environment are presented and discussed. Surprisingly, these data sets are centered between 262 and 292 ecliptic longitude, $\sim 10 - 40$ higher longitude from the upstream interstellar neutral flow direction [Collier et al., 2004]. They call this another population "secondary stream".

In respect to interplanetary hydrogen, Voyager spacecraft detected a secondary stream-like component which does not follow the simple axial symmetry in the outer heliosphere [Quemerais et al., 1996], while SOHO/SWAN located L1 point showed mostly symmetry with respect to simple primary flow [Lallement et al., 2005]. Discussion has still gotten tangled.

We show the newly evidence of the asymmetry component of interplanetary hydrogen from interplanetary Lyman alpha emission in the inner heliosphere. Interplanetary neutral hydrogen flow was found to be deflected relative to the well-established primary flow by about $-20 - +27$ degree in ecliptic longitude. Asymmetry component was more variable than what we expect.

In this presentation, we also plan to make a multi-experiment analysis of the simultaneous data obtained by Nozomi/UVS, Nozomi/XUV, and Nozomi/ISA to investigate the neutral hydrogen and helium flow.