STEREO SC/B Magnetosheath Observations

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S/C B During February, 2007

Solar Wind Pressure = 2.1 nPa  IMF BZ = 0.0 nT
Mass - Mass per Charge Matrices
All Energies (<80 keV)

Feb 10

Feb 11

Feb 12

Feb 13
Mass - Mass per Charge Matrices
Feb 13, 2007
Individual Energies

79 keV/e

59 keV/e

40 keV/e

29 keV/e
S/CA H+ (SW)

S/C B H+ (Magnetosheath)

S/C A Priority 3 (SW)

S/C B Priority 3 (M-Sheath)

S/CA Priority 3 (1-hr averages)

S/C B Priority 3 (1-hr averages) (this is the O+)

Feb 10  Feb 21
S/CA H+ (SW)

S/C B H+ (Magnetosheath)

S/C A Priority 3 (SW)

S/C B Priority 3 (M-Sheath)

S/CA Priority 3 (1-hr averages)

S/C B Priority 3 (1-hr averages)

Feb 1 Mar 1
Summary

• In the dusk-side magnetosheath, we observe bursts of energetic (30-80 keV) O+
• The O+ correlates with times of high solar wind velocity.
• It is observed as far as 300 Re down the tail.
Cassini Earth Swingby Trajectory

phi = (LT-12)*360/24
BS and MP from Howe and Binsack, 1972

August 1999

plotted: 7/13/00

From Doug Hamilton
CASSINI/CHEMS Magnetosheath Data

Step 23-29 (73-167 keV/e)
Triple coincidence events only

1999 (UT)
230:00:00:00
Aug. 18

231:00:00:00
Aug. 19

232:00:00:00
Aug. 20

Cassini
MIMI/CHEMS
Earth Flyby

M/Q - Tel 1
M/Q - Tel 2
M/Q - Tel 3
C/A, MP

mass/charge (amu/e)

X (gse) 31.7  -70.6  -169  -268  -368
Y(gse)  5.2   -33.0  -79.3 -124  -167
Z(gse)  1.2   -2.3   -5.4  -8.4  -11.5

O$^+$
N$^+$
O$^{++}$
He$^+$
He$^{++}$
H$^+$

plotted: 12/13/00

From Doug Hamilton
Cassini/MIMI/CHEMS  
Dawn Tail Sheath

Day 230, 1999  
1200-2400

$E/Q \text{ (keV/e)}$

$H^+$

$O^+$

$x_{GSE} = -71 \, R_E$ to $-169 \, R_E$

Differential Flux ($1/\text{cm}^2 \cdot \text{s} \cdot \text{keV/e}$)

plot: 12/13/00

From Doug Hamilton
Possible Sources

- Earth’s Ring Current
  - Energetic O+ exits the magnetosphere at the dayside magnetopause, and then gets swept up in the sheath flow
- Upflowing O+ ions from the cusp.
  - Would they get accelerated enough
- CLUSTER is located at front-side magnetopause/bow-shock - maybe it can see the source - stay tuned ...