

Parker's Solar Wind Model

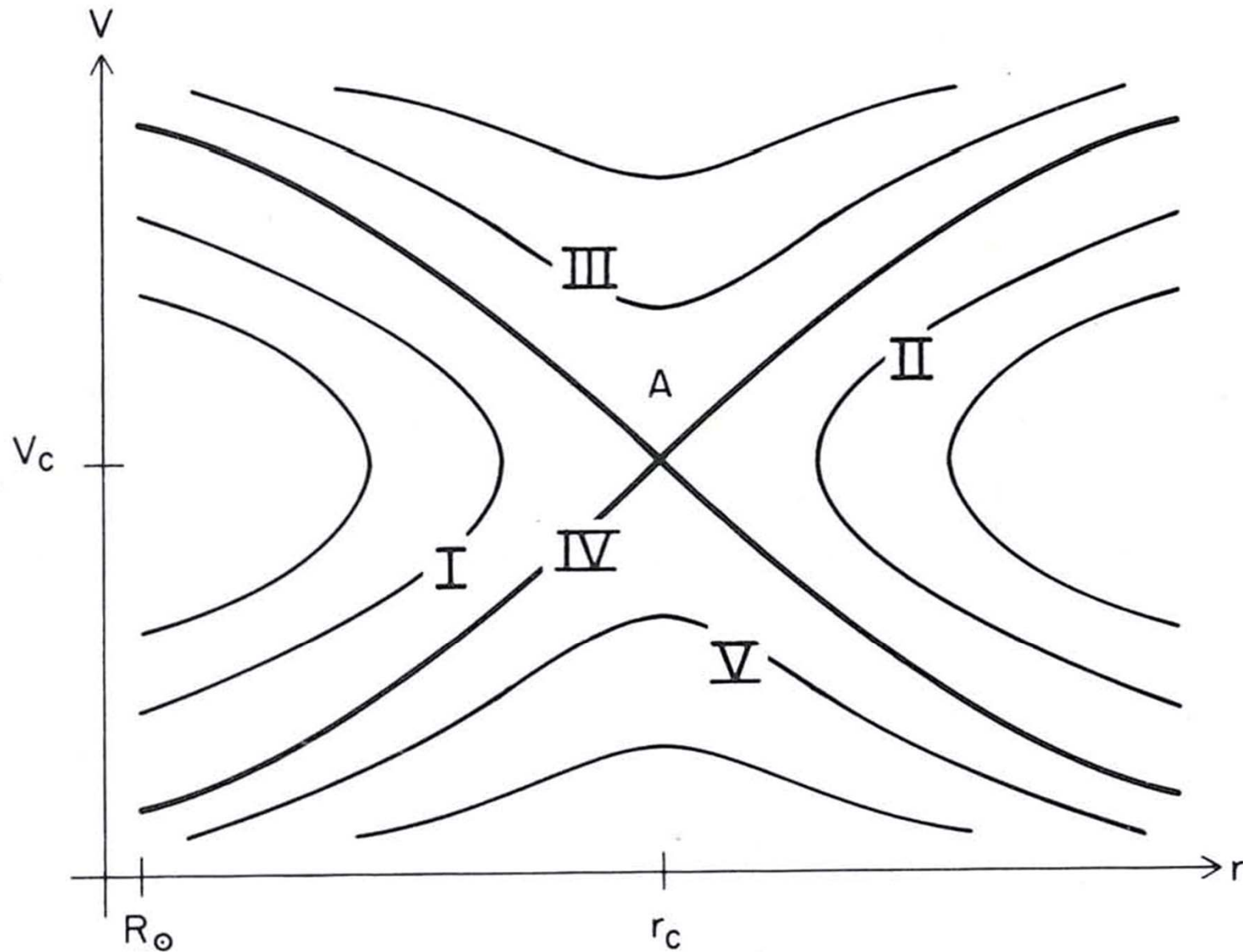


Fig. 12.1 in Priest

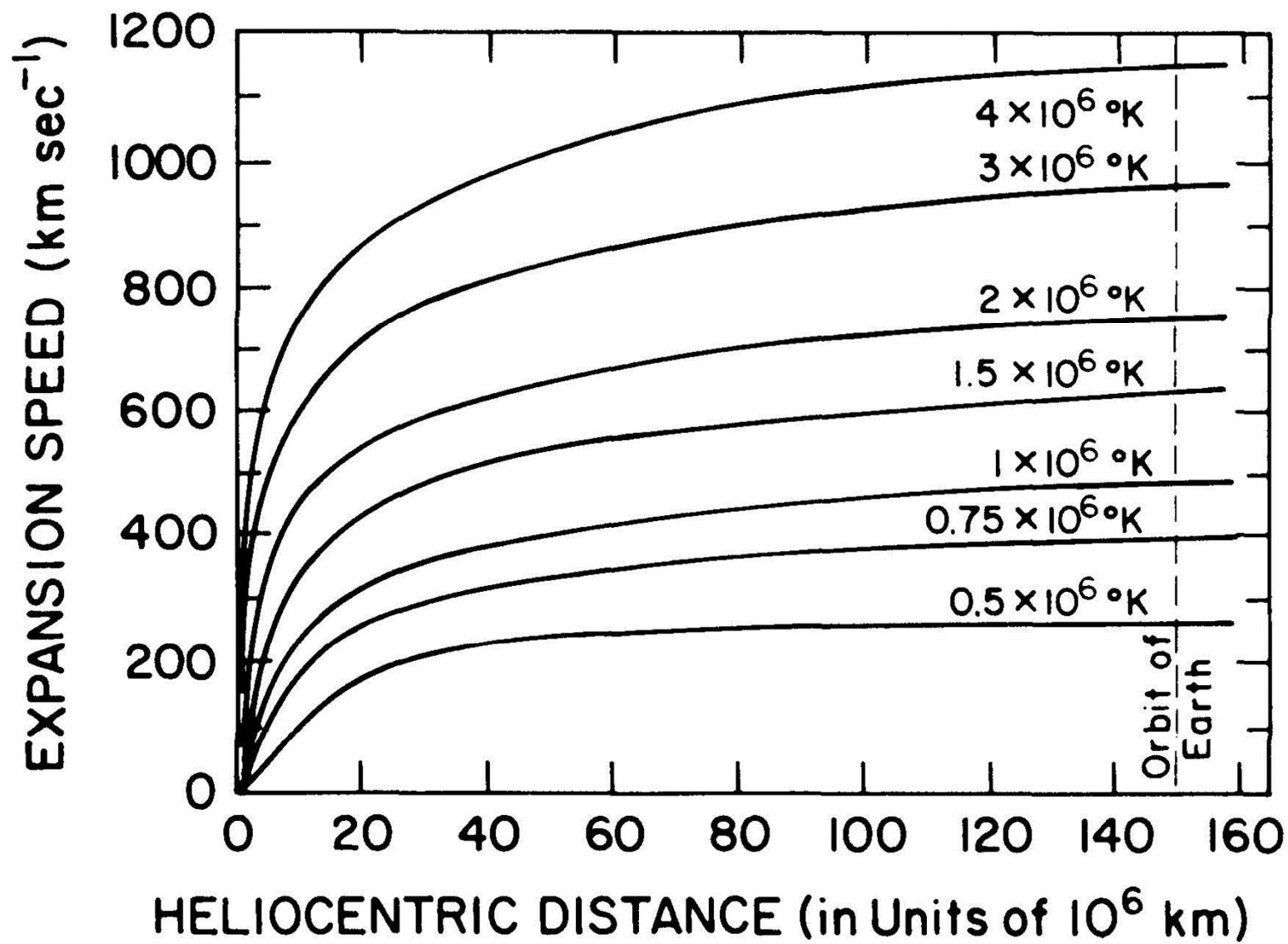


Fig. 4.3 in Kivelson & Russell

Parker Spiral

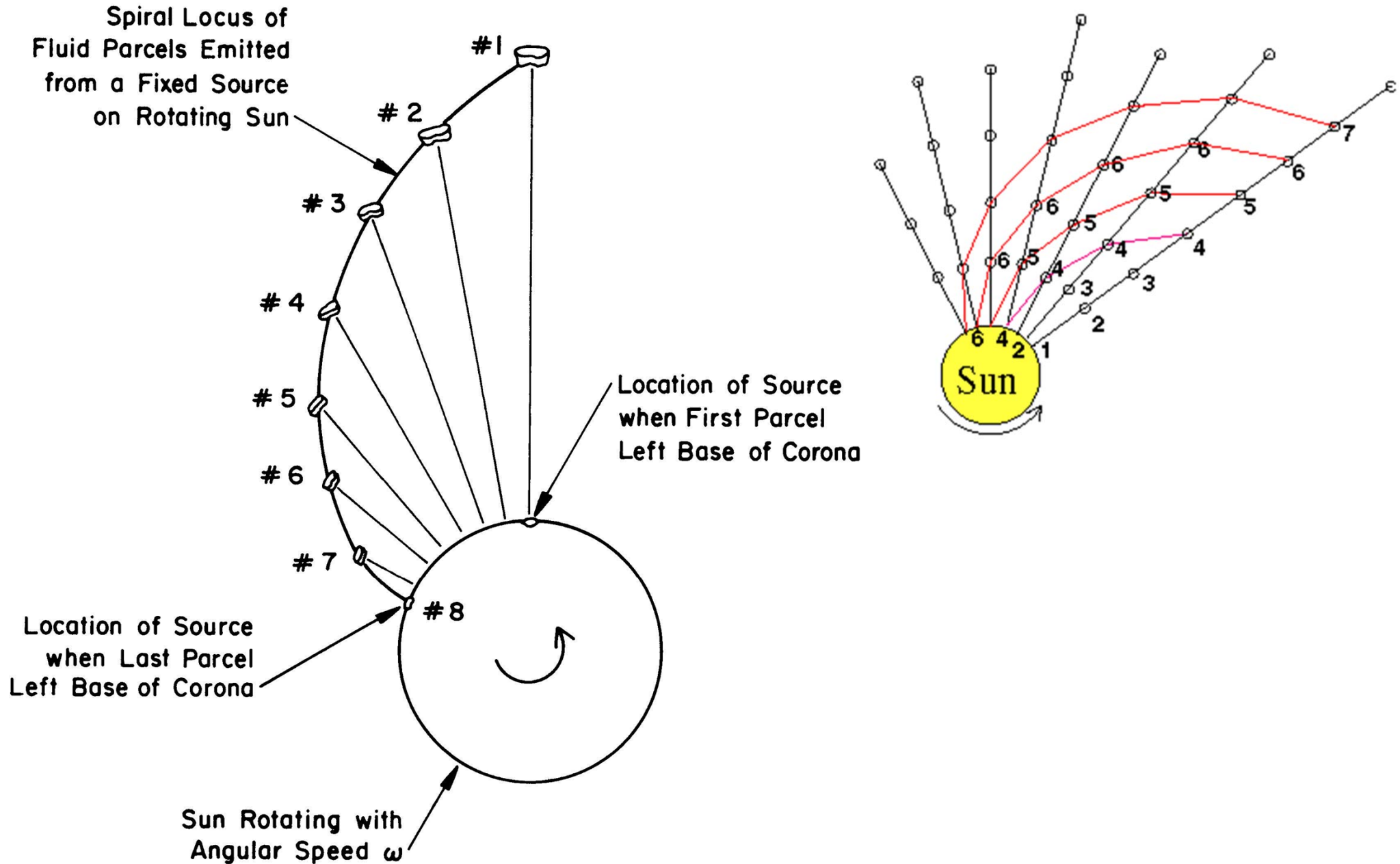


Fig. 4.5 in Kivelson & Russell

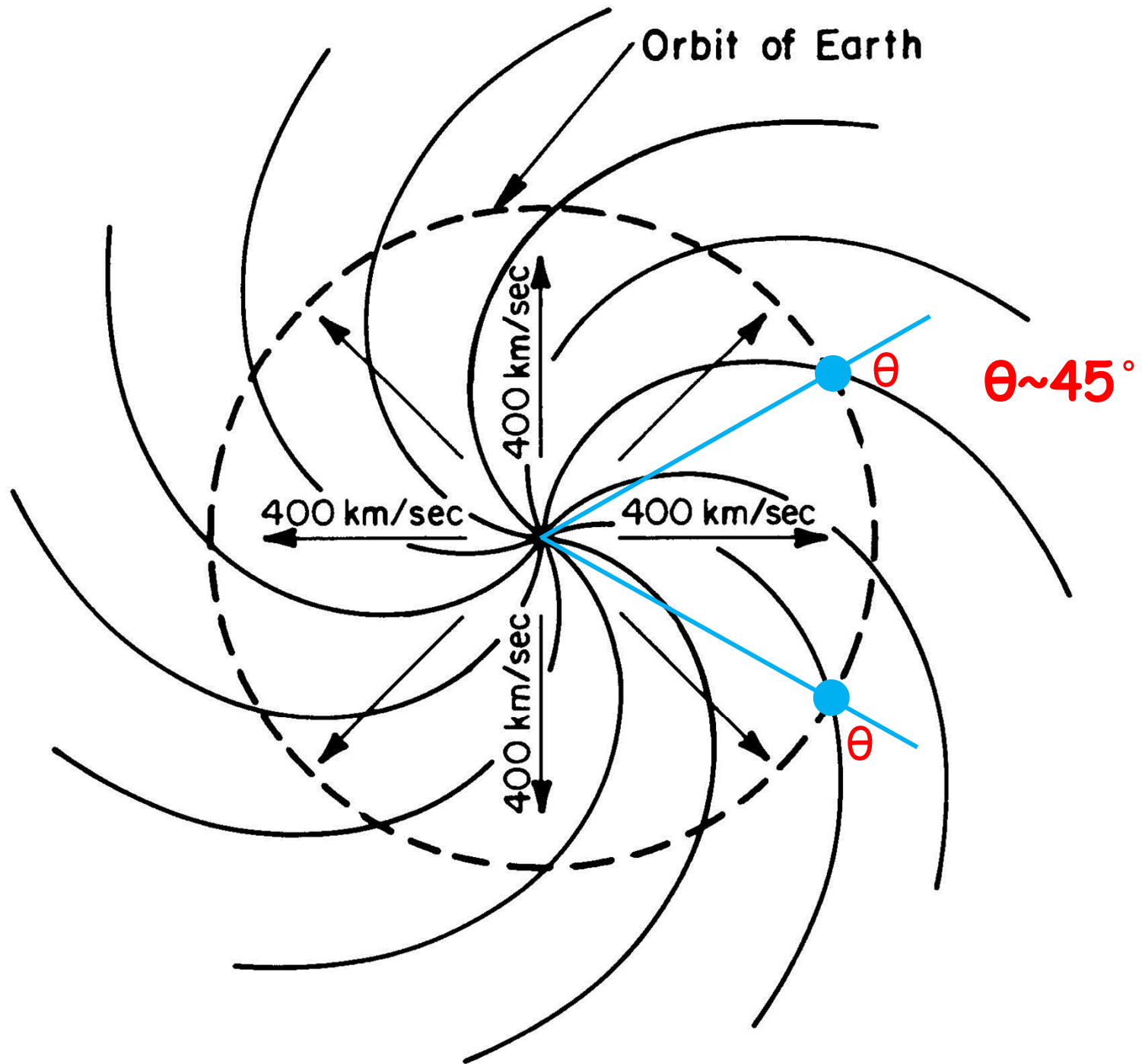
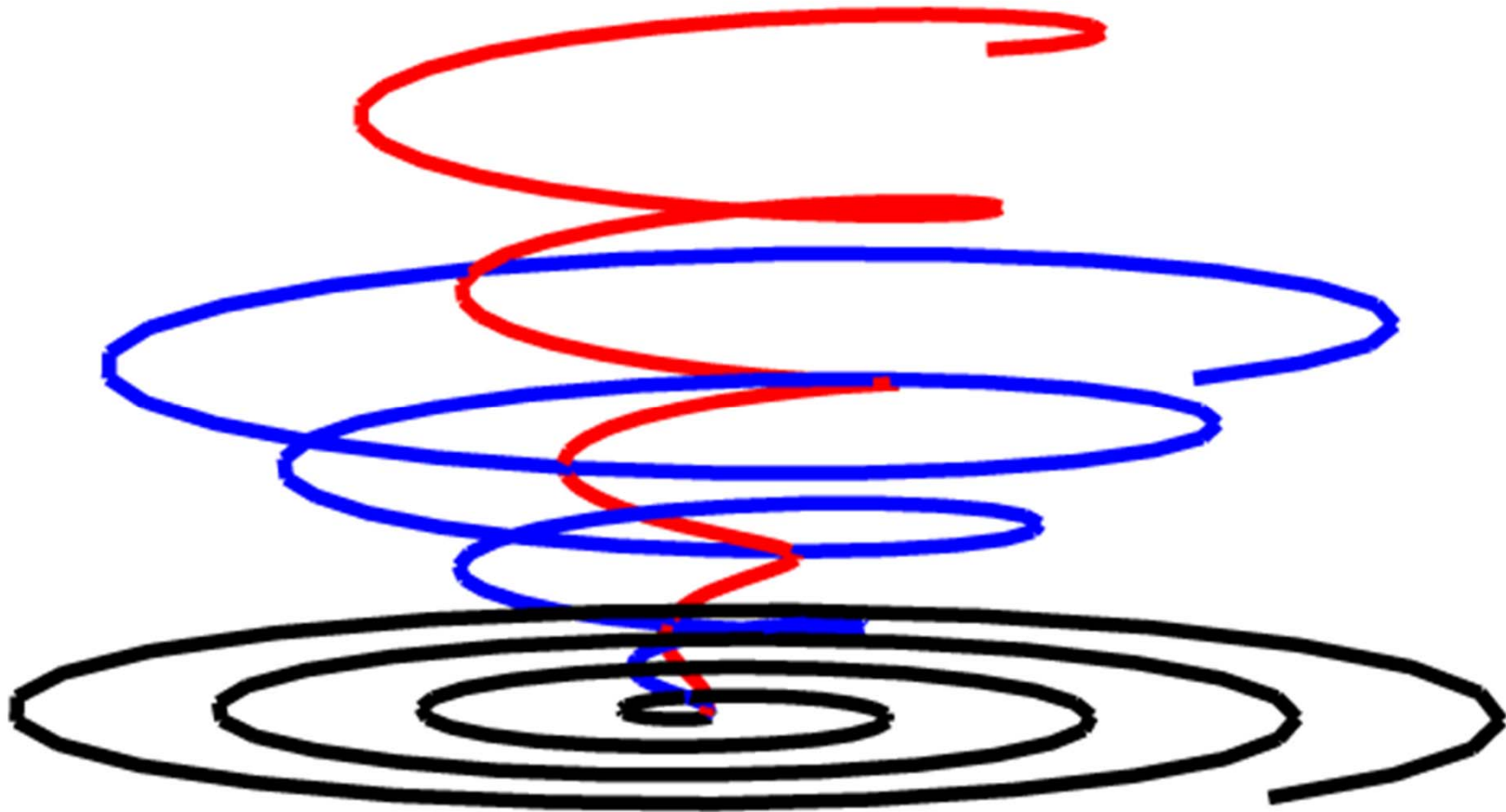
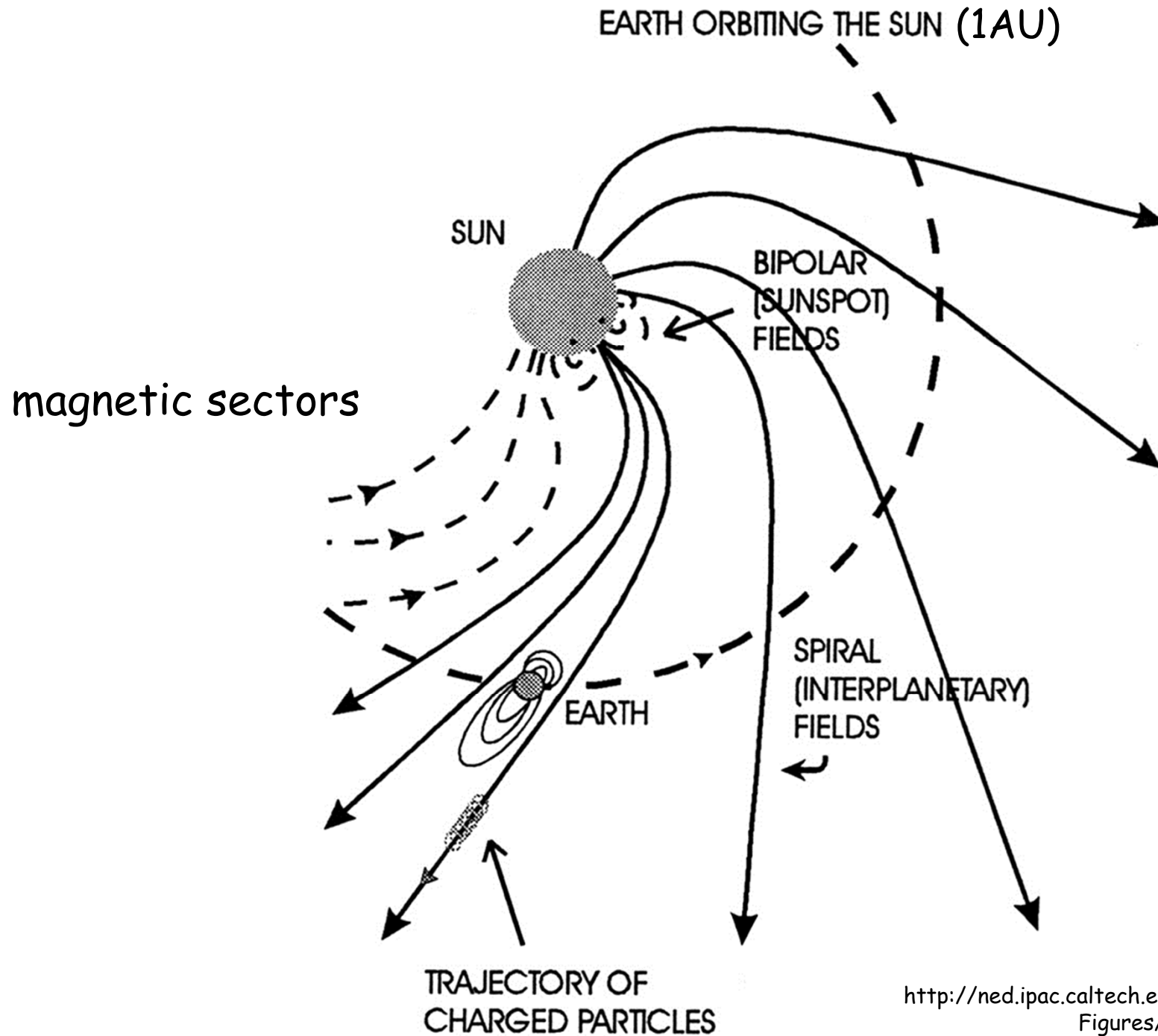


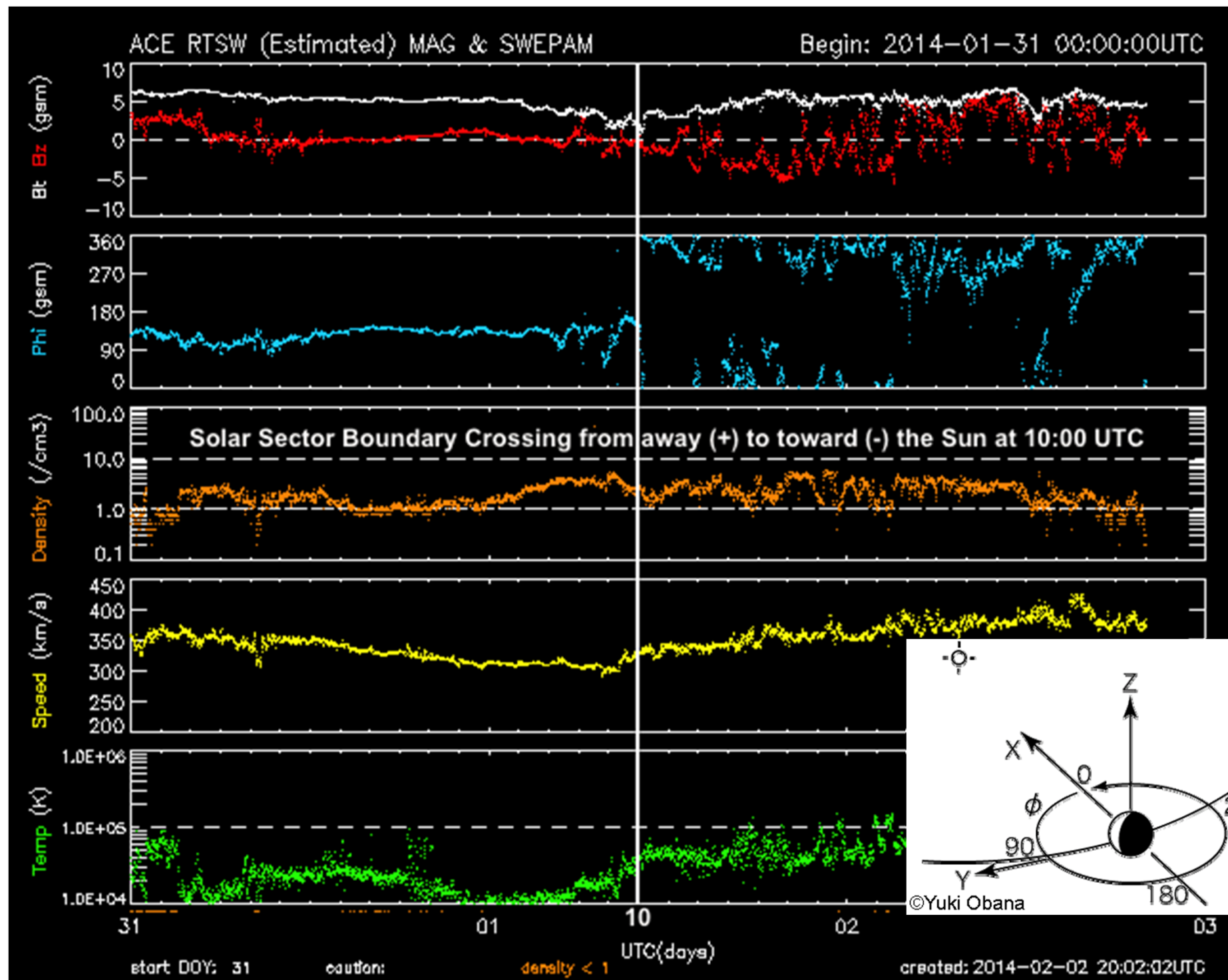
Fig. 4.6 in Kivelson & Russell

Ideal Parker spiral magnetic field lines between 0 and 25 AU for a solar wind speed of 450 km s^{-1} . Black, blue, and red lines show heliographic latitudes of 0, 30, and 60 degrees, respectively.

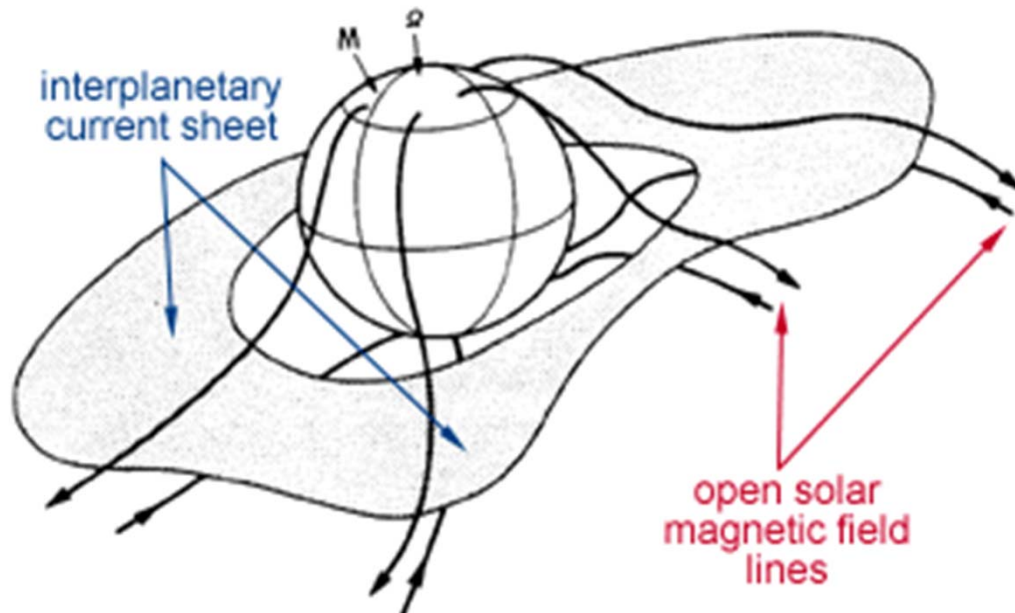
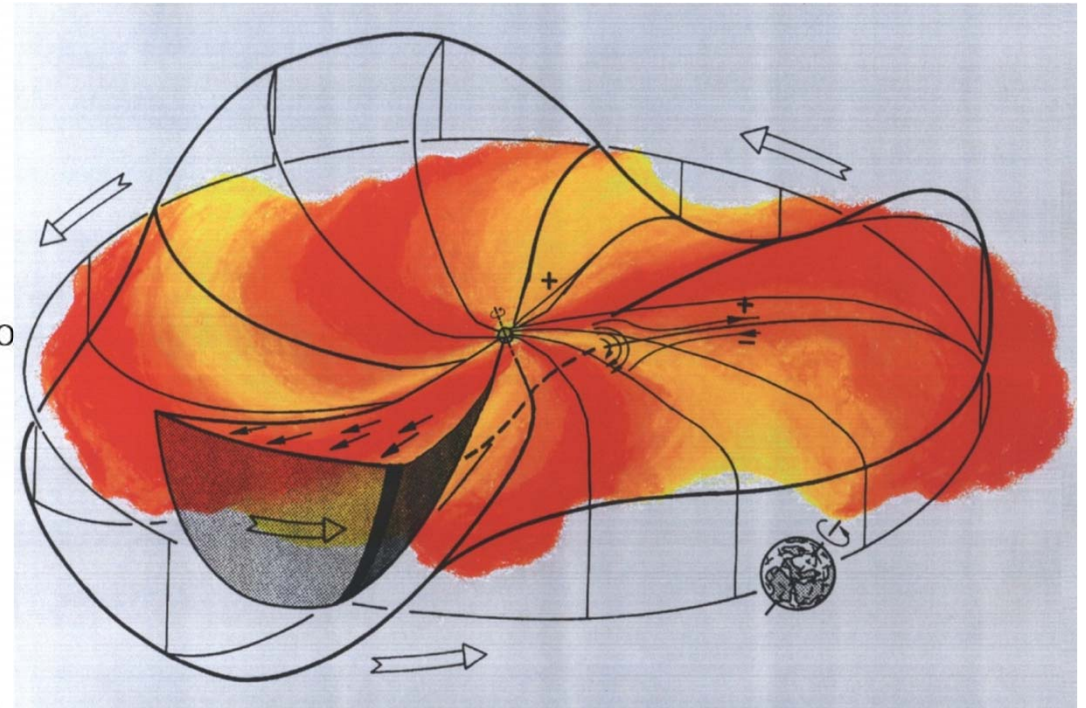
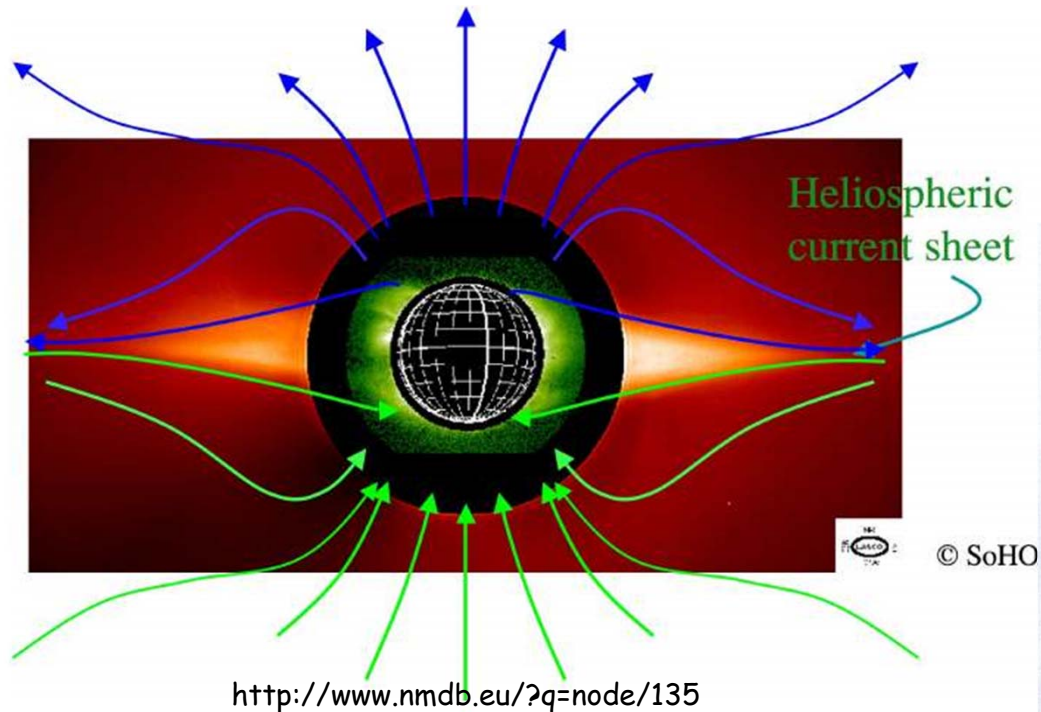


Magnetic Sector Structure





Heliospheric Current Sheet



"ballerina skirt"

Table 1. Statistical Properties of the Solar Wind at 1 AU

Parameter	Mean	STD	Most Probable	Median	5-95% Range
n (/cm ³)	8.7	6.6	5.0	6.9	3.0 – 20.0
V_{sw} (km/s)	468	116	375	442	320 – 710
B (nT)	6.2	2.9	5.1	5.6	2.2 – 9.9
$A(He)$	0.047	0.019	0.048	0.047	0.017 – 0.078
T_p (x10 ⁵ K)	1.2	0.9	0.5	0.95	0.1 – 3.0
T_e (x10 ⁵ K)	1.4	0.4	1.2	1.33	0.9 – 2.0
T_α (x10 ⁵ K)	5.8	5.0	1.2	4.5	0.6 – 15.5
T_e/T_p	1.9	1.6	0.7	1.5	0.37 – 5.0
T_α/T_p	4.9	1.8	4.8	4.7	2.3 – 7.5
nV_{sw} (x10 ⁸ /cm ² s)	3.8	2.4	2.6	3.1	1.5 – 7.8
C_s (km/s)	63	15	59	61	41 – 91
C_A (km/s)	50	24	50	46	30 - 100

n is proton density, V_{sw} is solar wind speed, B is magnetic field strength, $A(He)$ is He^{++}/H^+ ratio, T_p is proton temperature, T_e is electron temperature, T_α is alpha particle temperature, C_s is sound speed, C_A is Alfven speed.

The Sun yearly loses $\sim 6.8 \times 10^{19}$ g to the solar wind, a very small fraction of the total solar mass of $\sim 2 \times 10^{33}$ g.

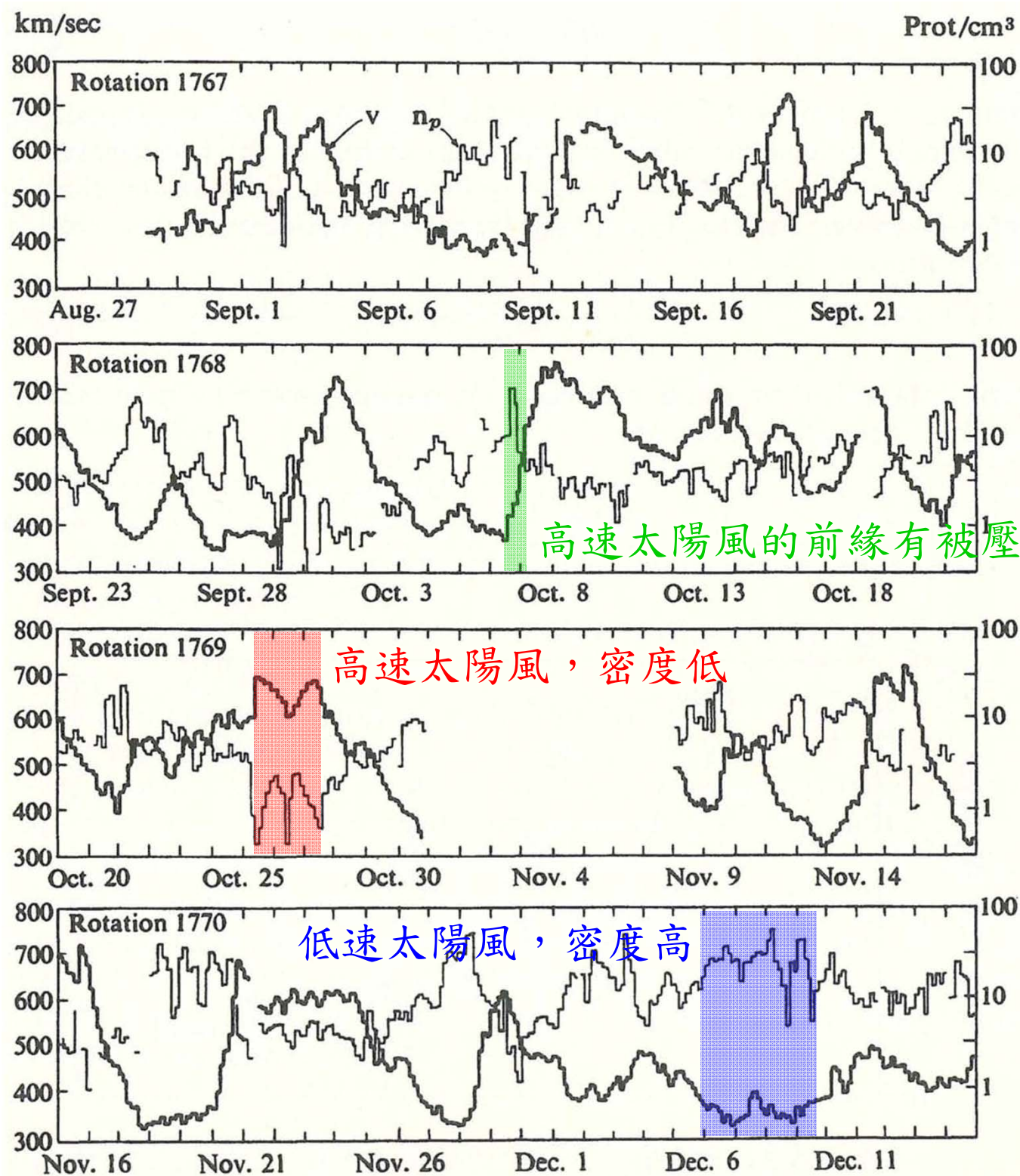
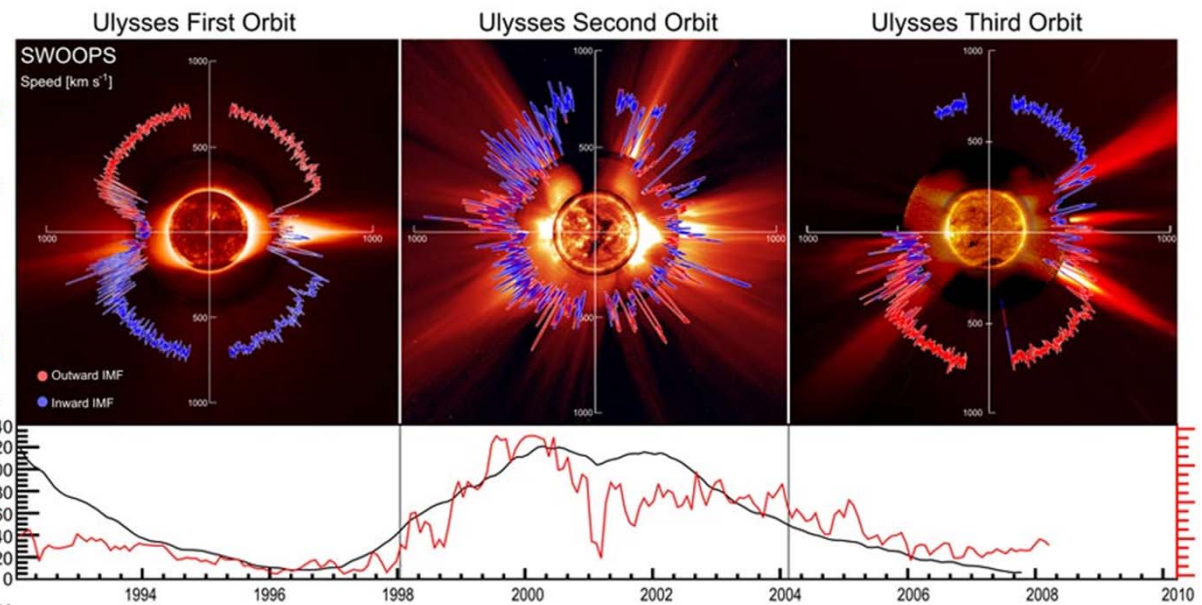
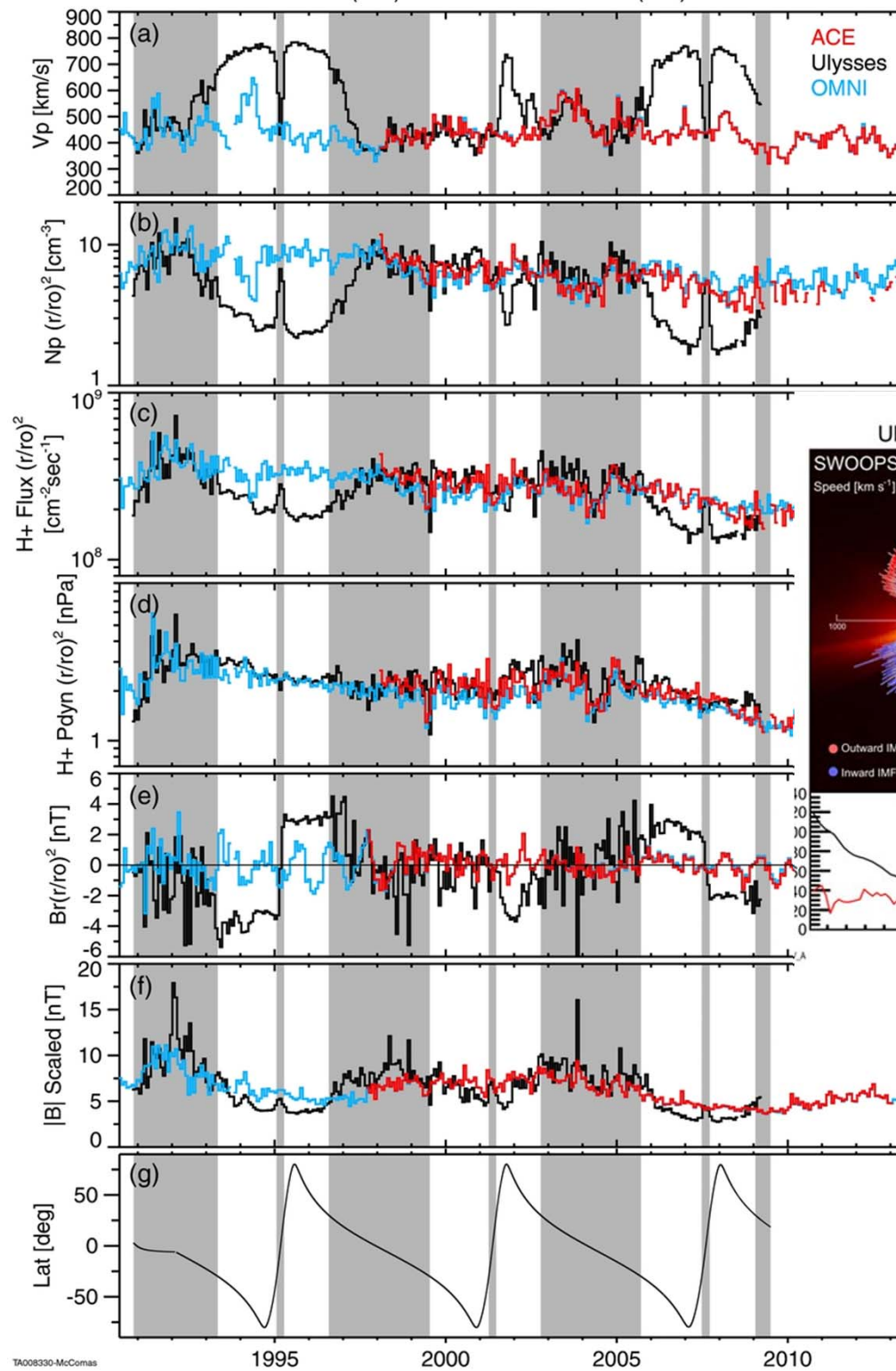


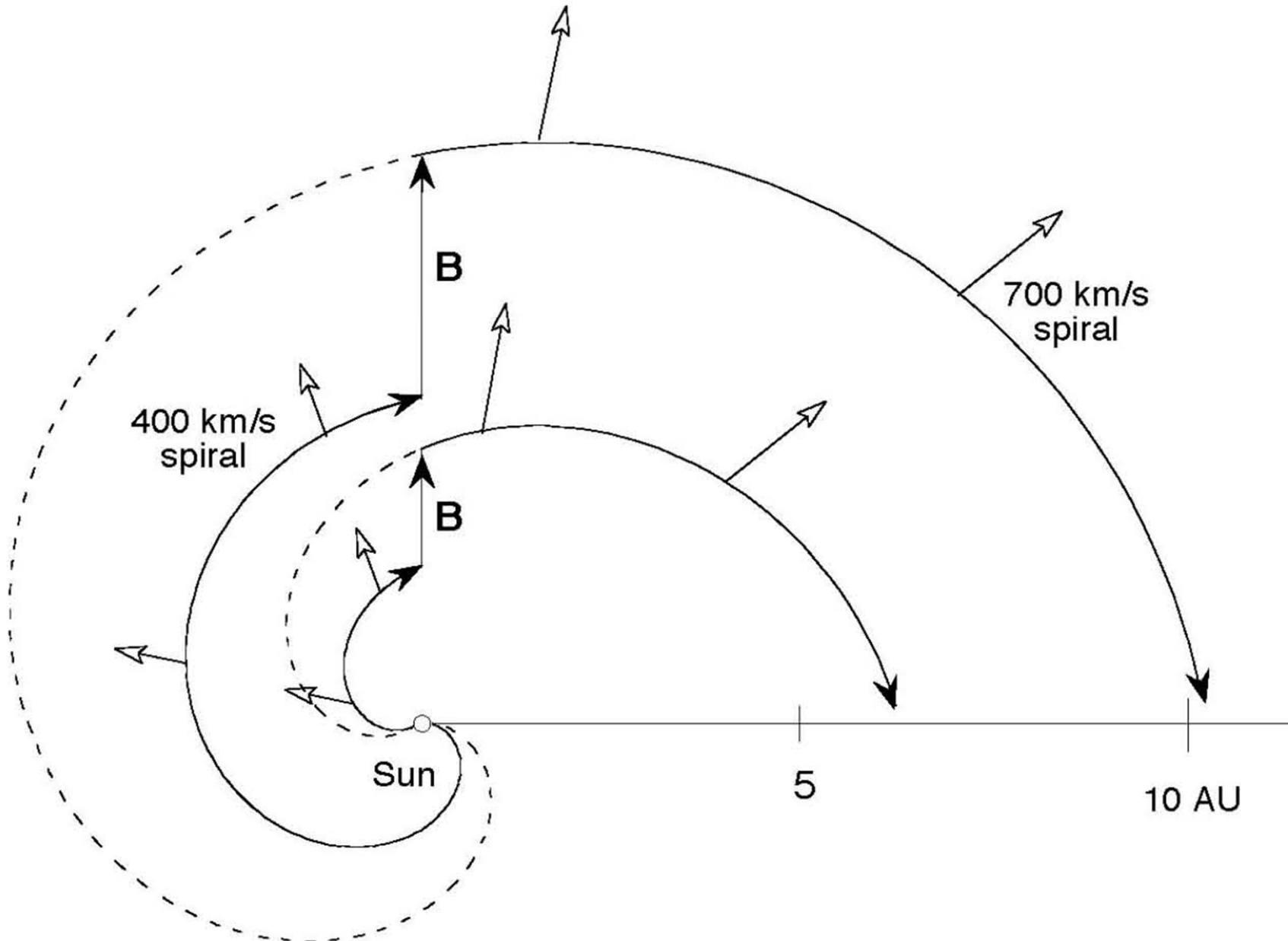
Fig. 6.8 in Parks

06/19/1990(170) 00:00 UT to 05/30/2013(150) 00:00 UT

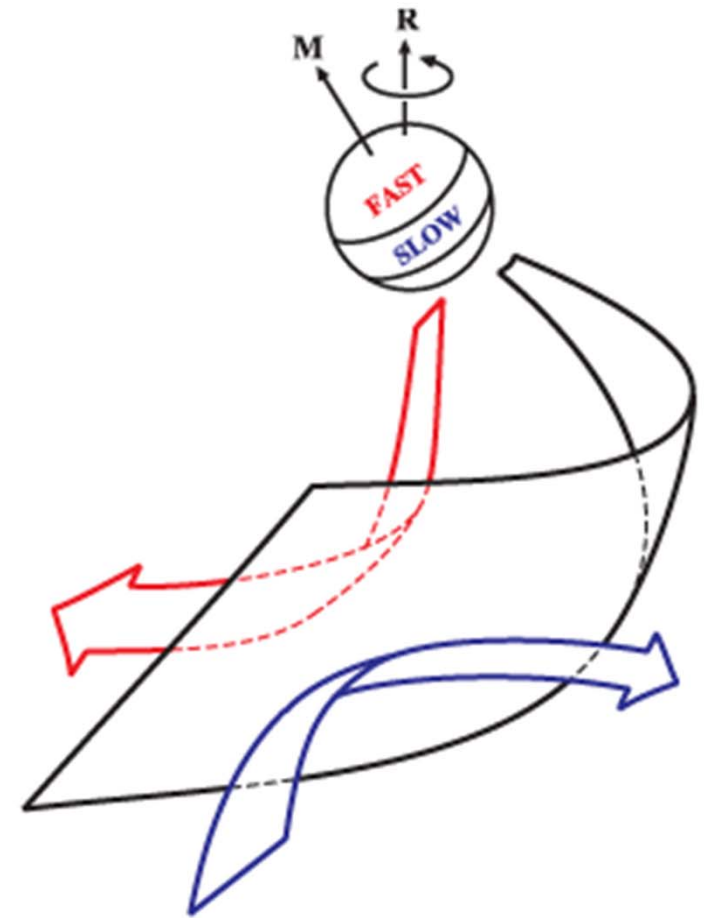
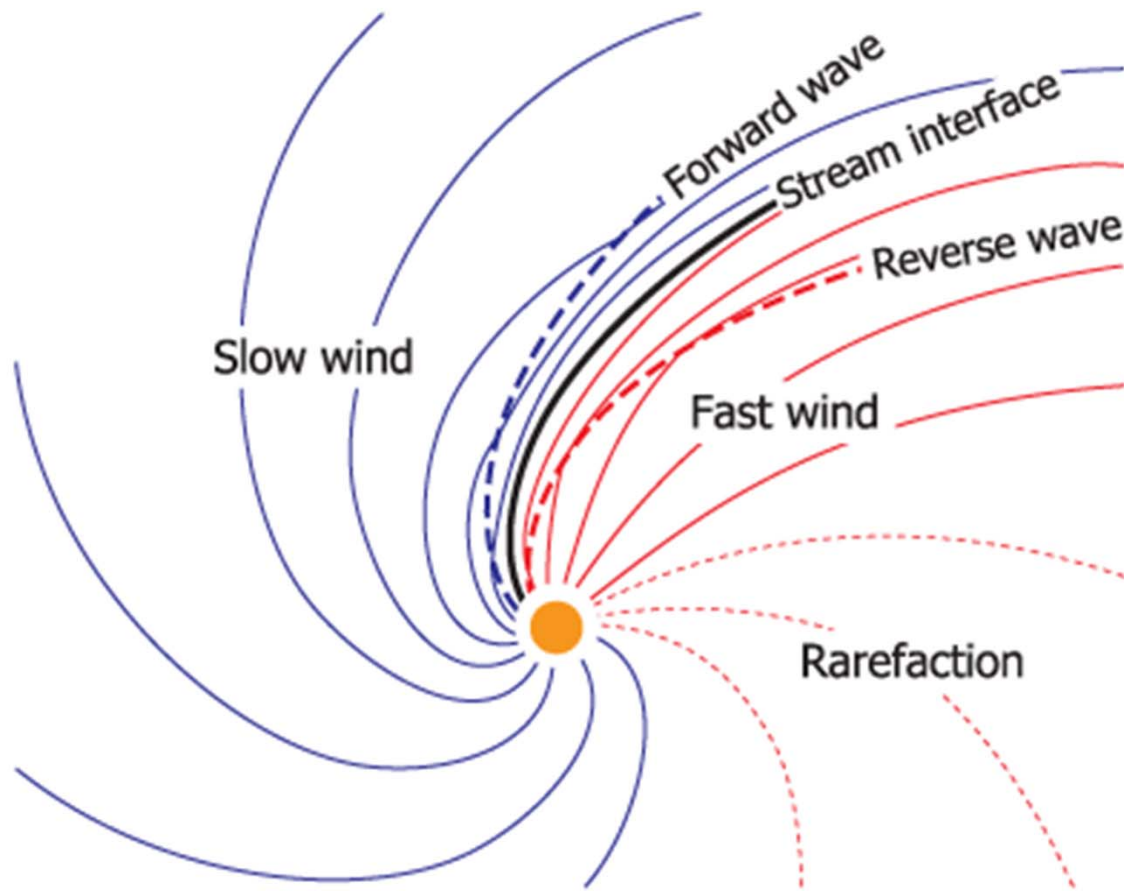


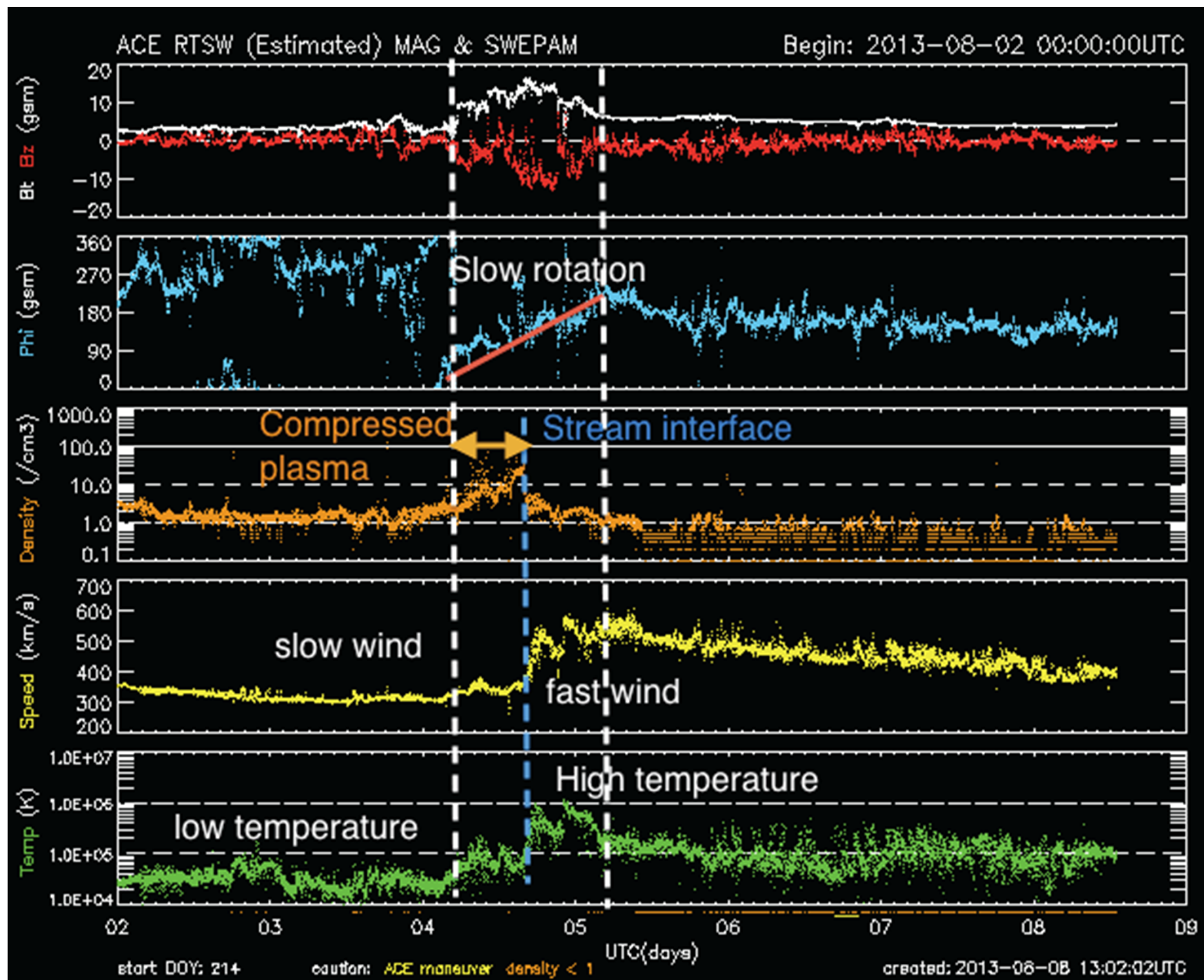
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Radial IMF



Co-rotating Interaction Region (CIR)





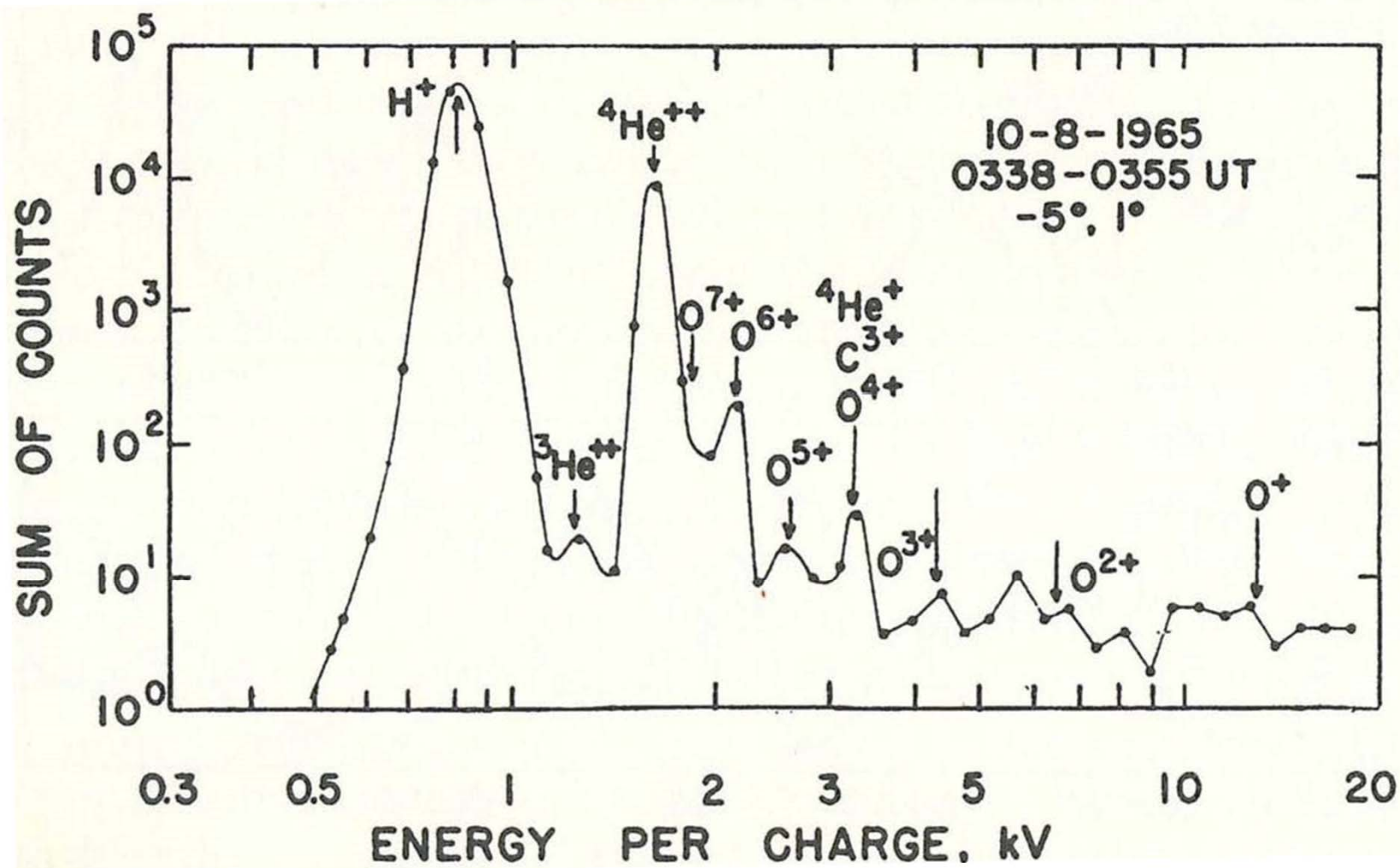
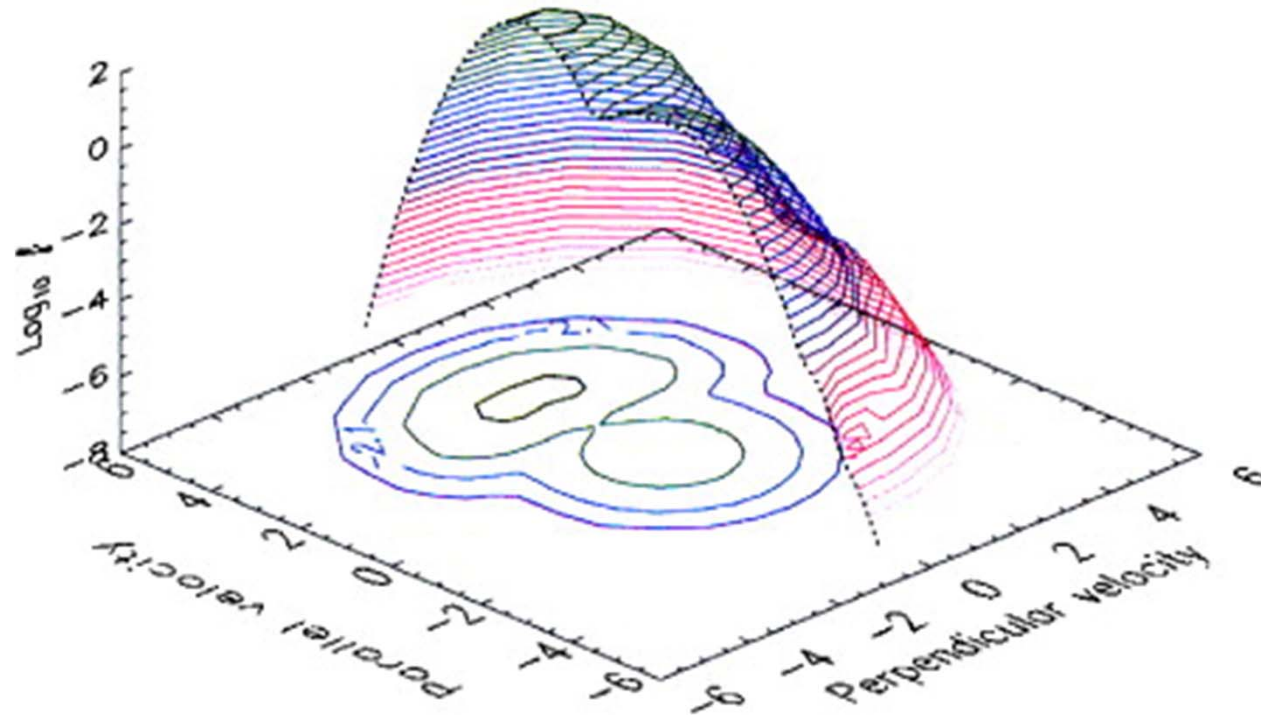
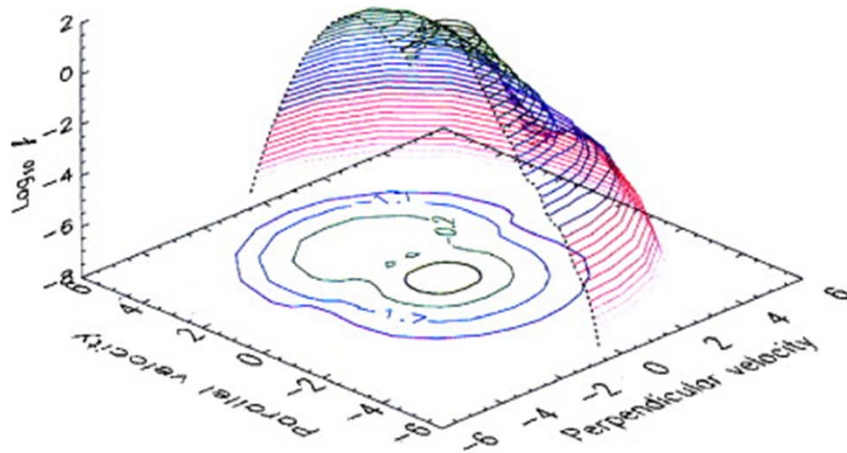


Fig. 6.9 in Parks

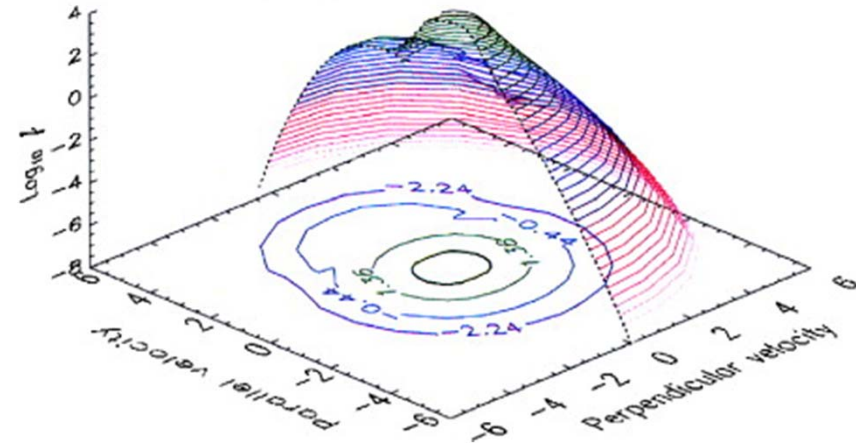
Velocity distribution function at 2000 km



Velocity distribution function at 1250 km

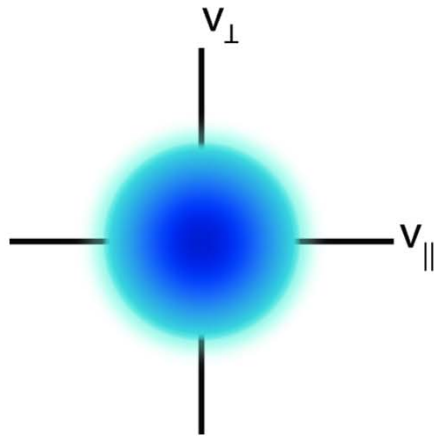


Velocity distribution function at 1000 km



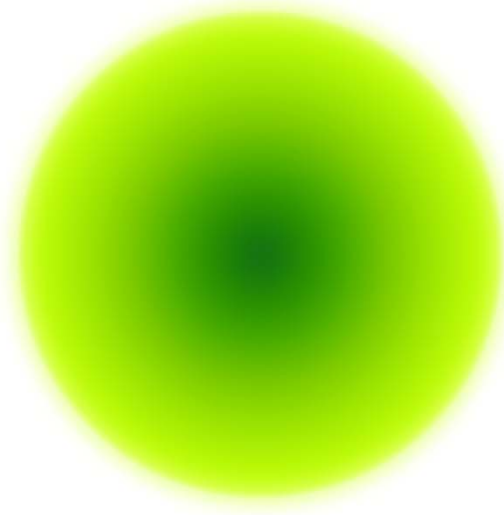
Core

Maxwellian



Halo

Kappa



Strahl

Field Aligned
Beam

