

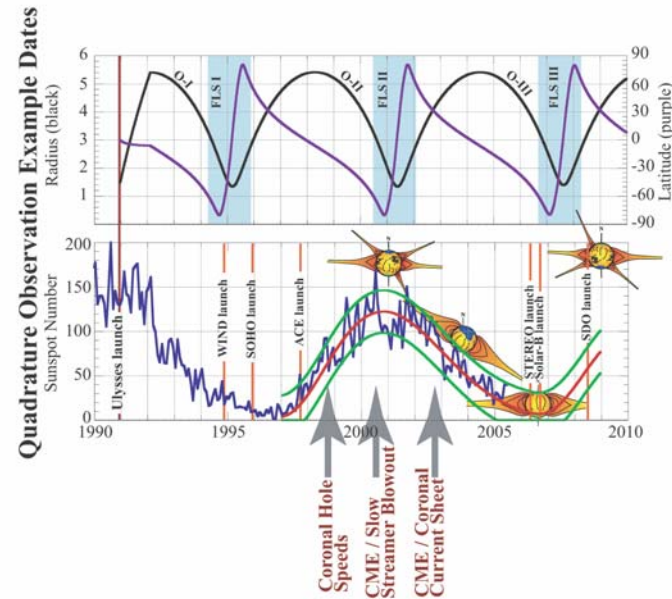
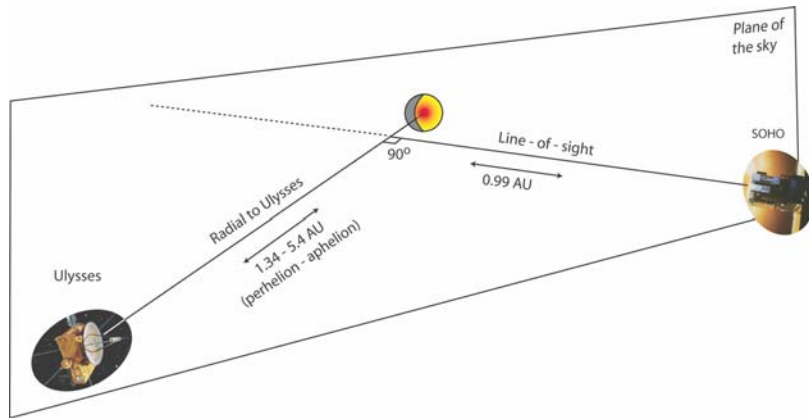
Lessons from SOHO-Ulysses Quadrature Observations

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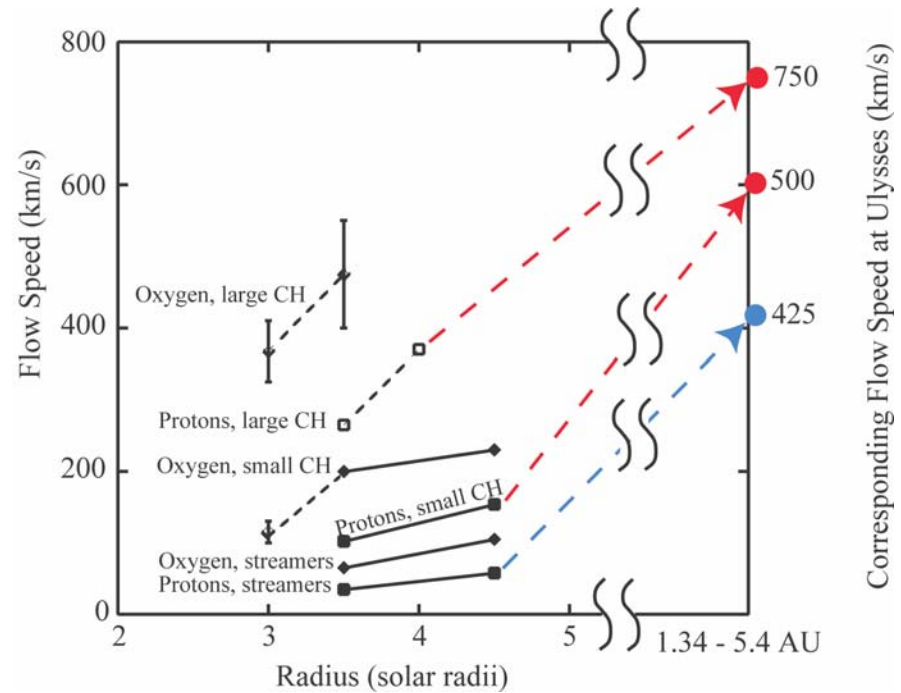
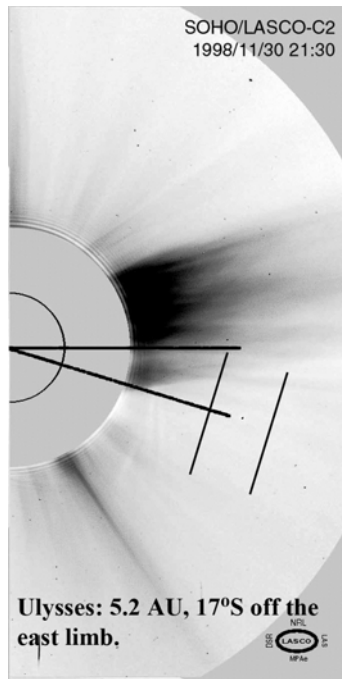


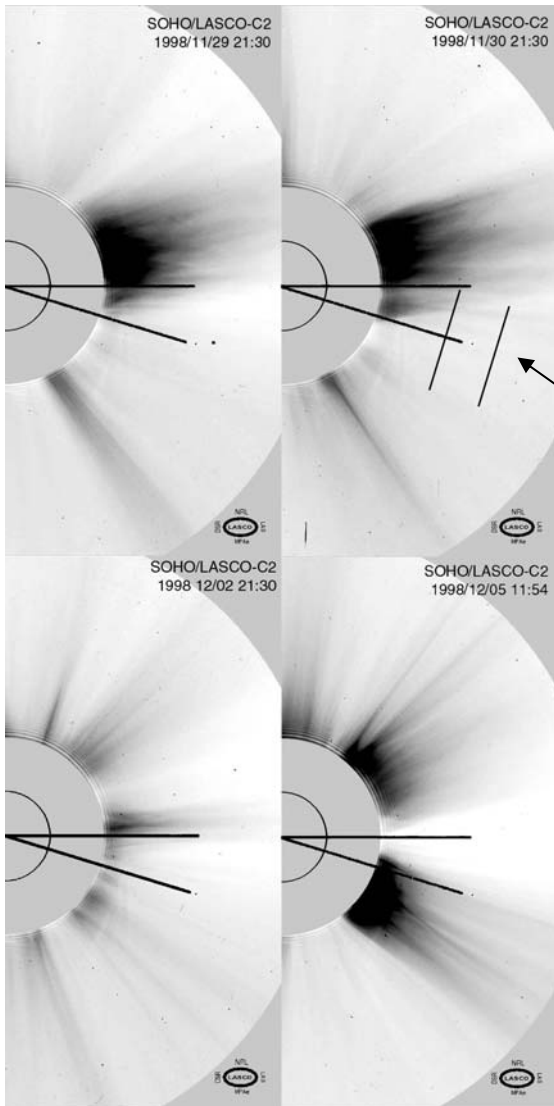
- Plasma is analyzed *remotely* at the Sun from SOHO. The *same plasma* is analyzed *in situ* at Ulysses.
- This is only possible at quadrature and when the plasma comes from the sub-Ulysses point.
- The advance with SOHO is the *spectroscopic data* and the advance with Ulysses is *ionization state and composition*, relative to the measurements made with P78-1 and Helios 1/2.
- Here, I will show results from the three (3) indicated quadratures.

Example 1: Flow speeds in large vs small coronal holes (CHs), for two species.

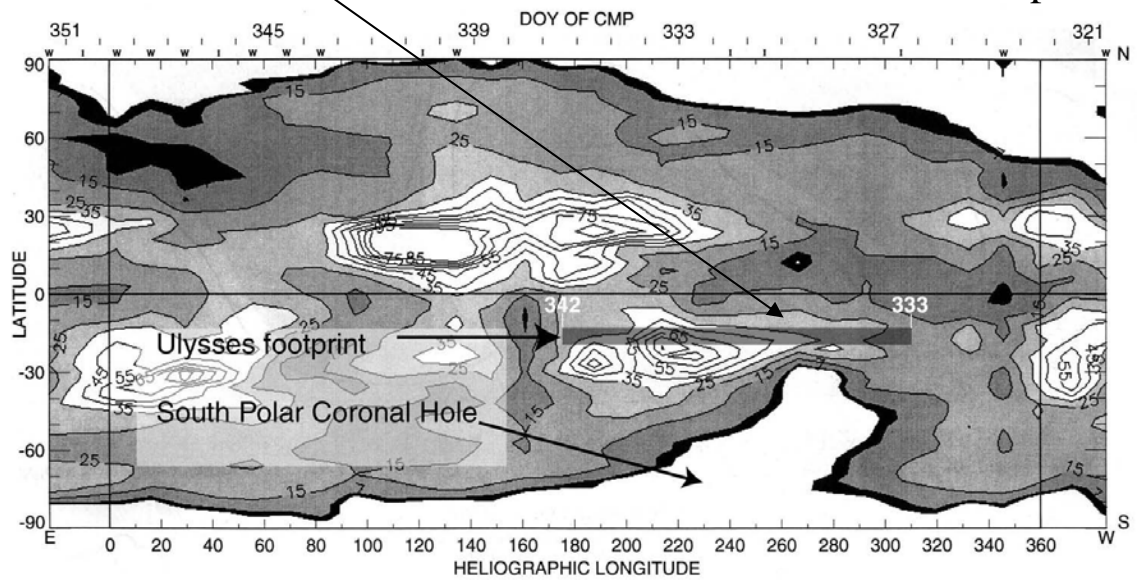
- ☞ Small CHs lead to smaller speeds at Ulysses
- ☞ Small CHs have a shallower speed gradient than large CHs
- ☞ Oxygen ions still move faster than protons in small CHs, as they do in large CHs

This study used Doppler dimming at two heights.



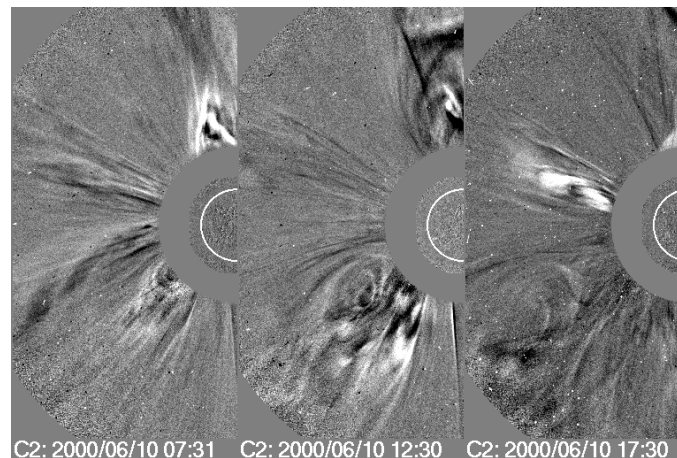
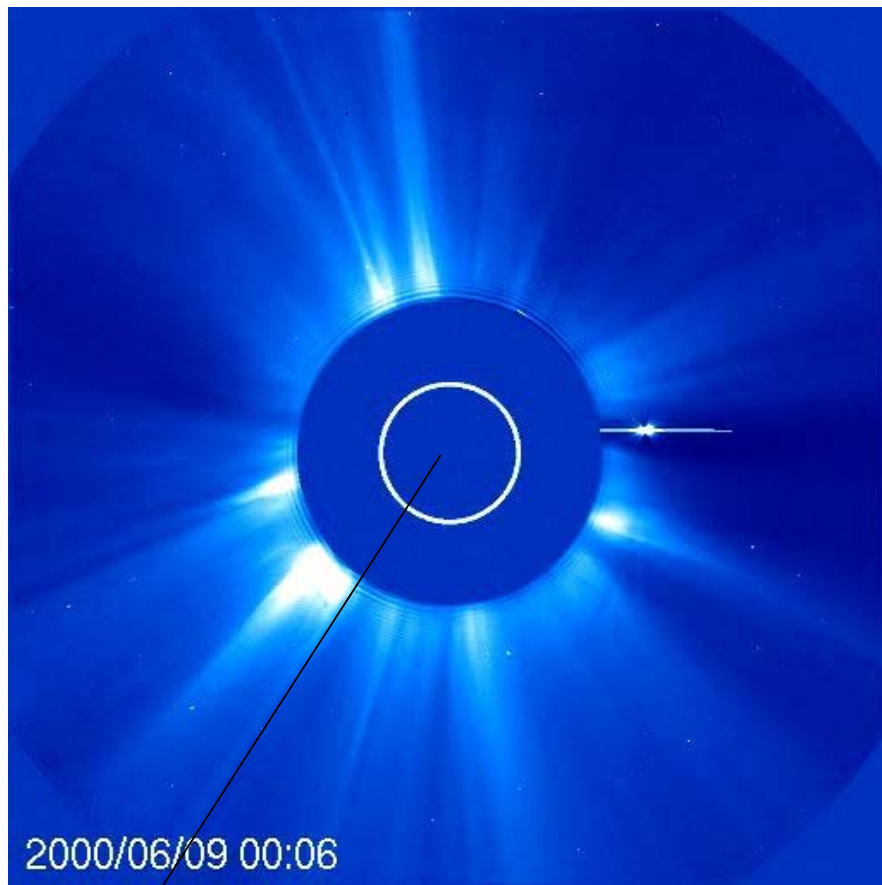


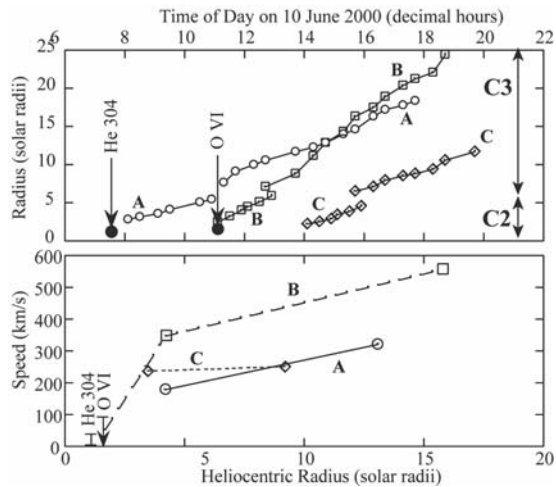
NSO/Sacramento Peak Fe XIV map



Example 2: A “slow streamer blowout” (Howard et al. 1985).

Ulysses was at 3.4 AU, 58° S off the East limb.



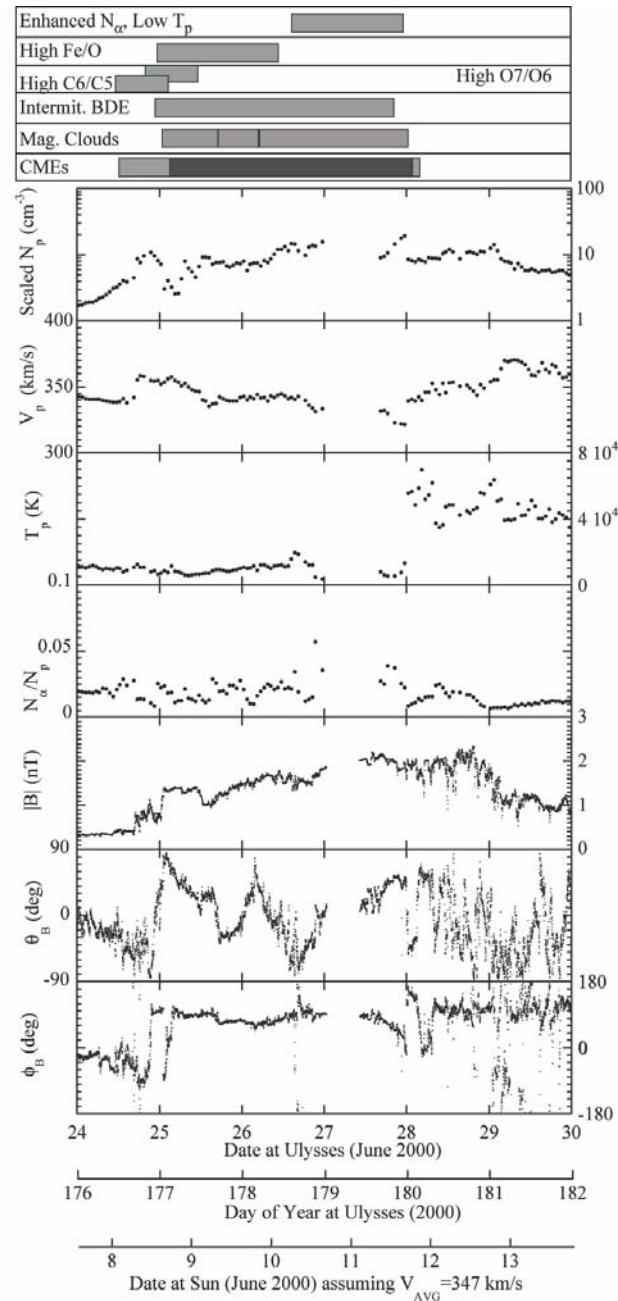


A “slow streamer blowout”

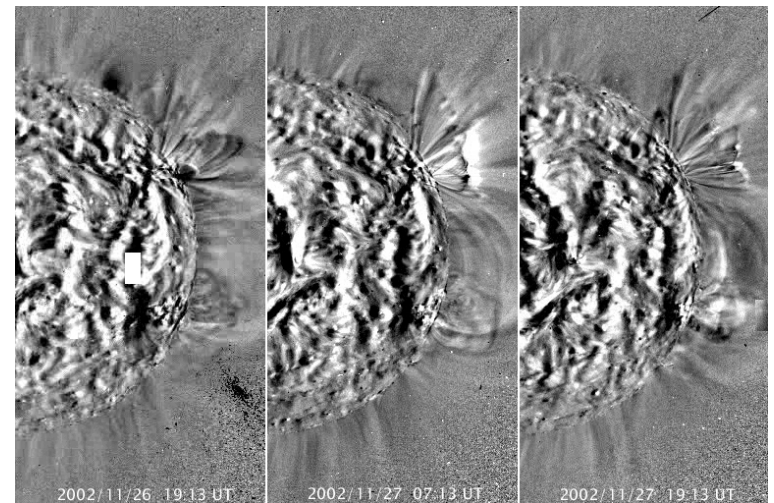
- ☞ The CME produced a classic ICME with multiple magnetic clouds, BDEs, and a composition / ionization state signature
- ☞ The ICME probably would have been **geoeffective** due to the strong southward turning of the IMF
- ☞ This slow eruption would not have produced a shock and would probably have been *invisible as a halo CME*

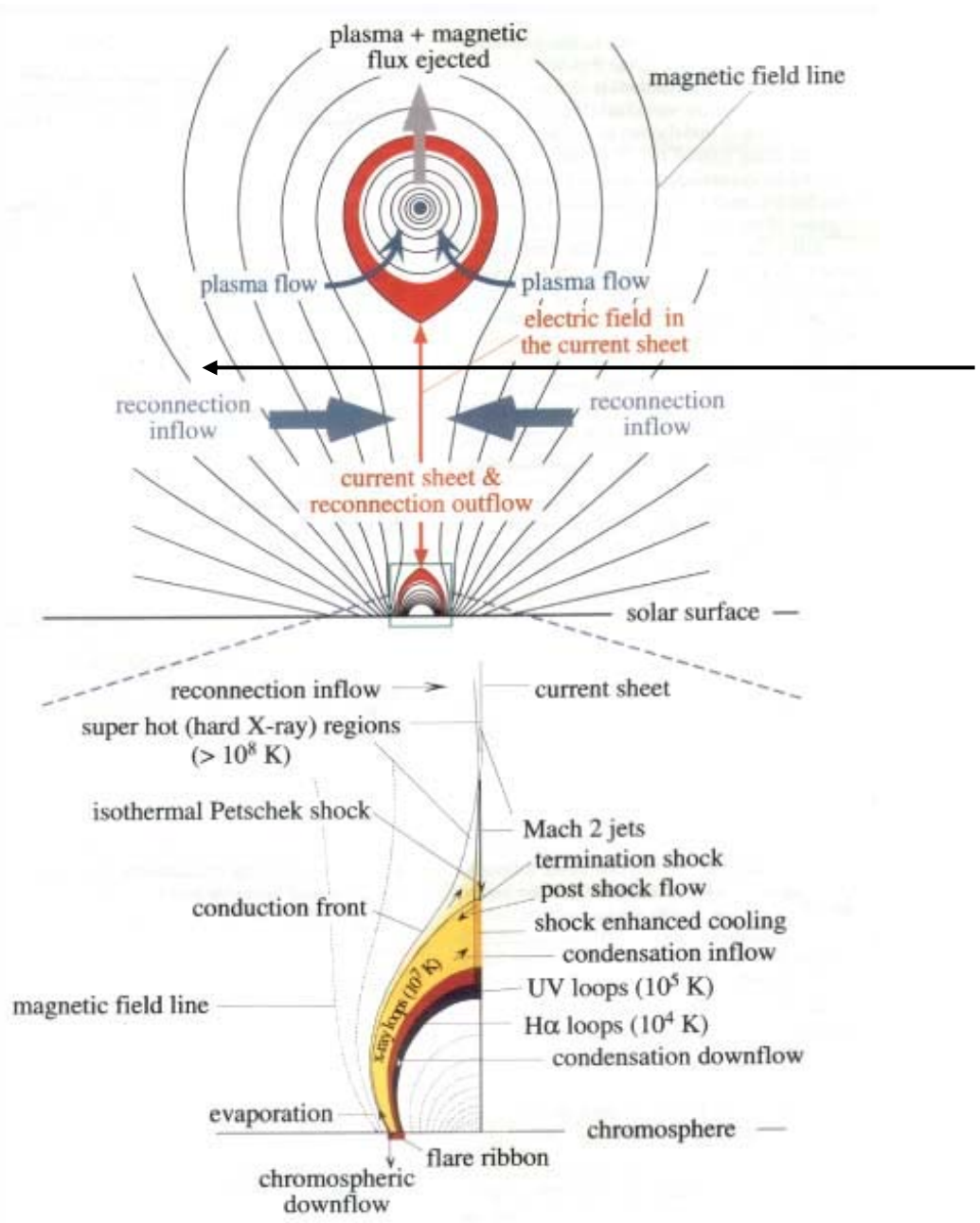
Ulysses was at 3.4 AU, 58° S off the East limb.

Ulysses: 3.4 AU & 58° south of equator off east limb



Example 3: A *reconnecting* current sheet (CS) at 1.7 R_{sun}, above post-flare loops following a CME, and the subsequent detection of the high ionization state Fe produced in the CR at Ulysses.

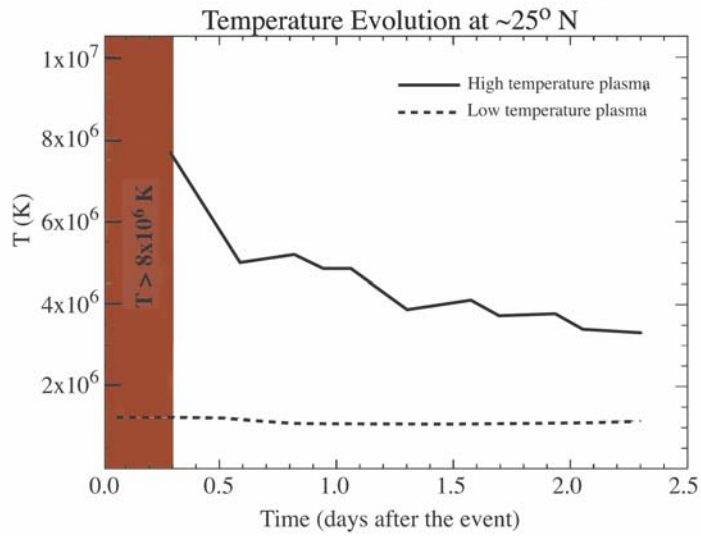




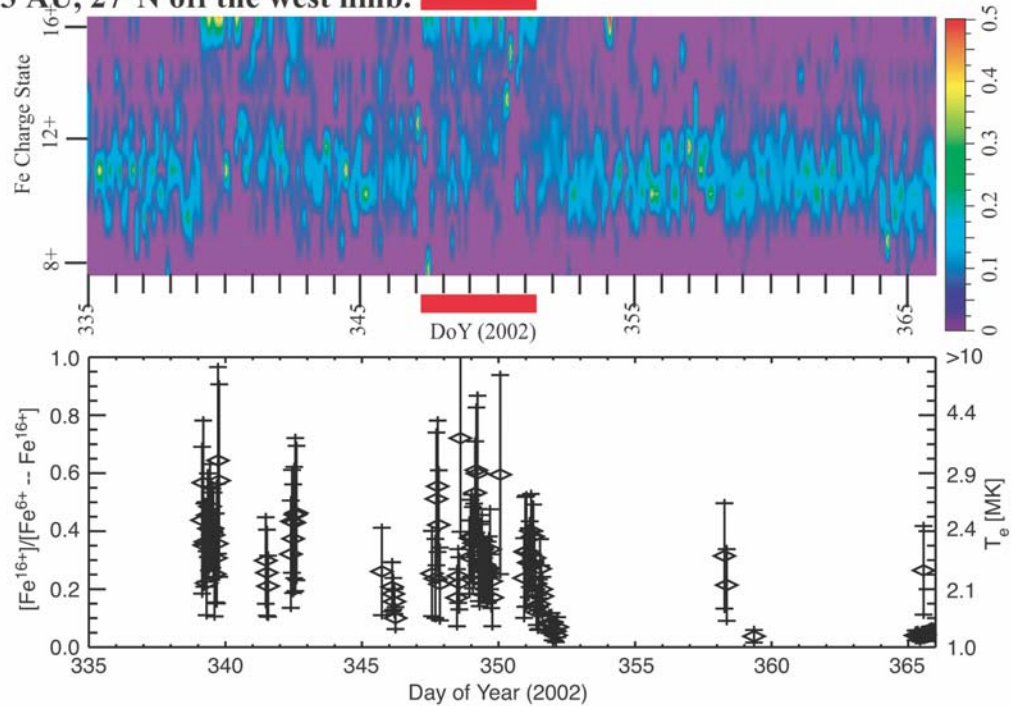
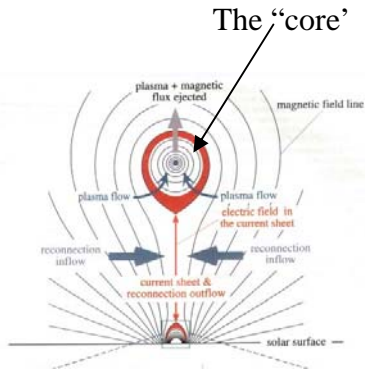
The UVCS viewing direction, *across* the CS

The “Lin-Forbes” model

The Fe emission temperature by UVCS, at 1.7 R_{sun}.



- and the CME passes Ulysses (along with an earlier CME), at 4.3 AU, 27°N off the west limb. ████████



Results

☞ $>8 \times 10^6$ K Fe seen in the corona

☞ $>4 \times 10^6$ Fe seen at Ulysses

☞ The lower temperatures at ~ 4.3 AU are attributed to fine spatio-temporal structure in the source

☞ The observations support the Lin-Forbes model, except that no core cavity in Fe^{16+} is seen.

Quadrature Observation Example Dates

