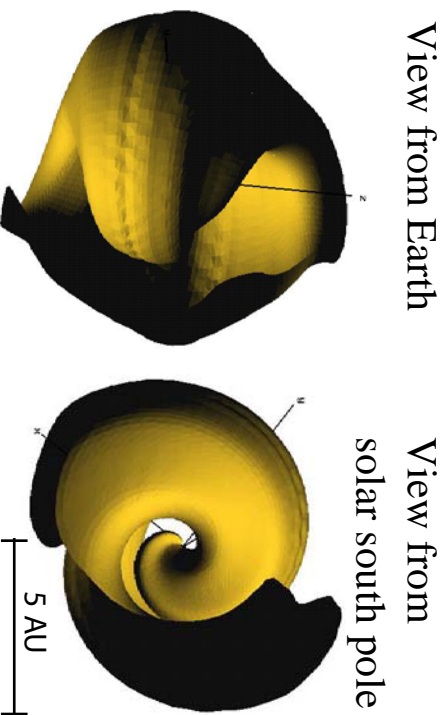


Ulysses Measures Unique Heliospheric Current Sheet Topology

Researchers at Science Applications International Corporation in San Diego have used global heliospheric MHD simulations to interpret Ulysses in situ magnetic field observations, showing that for the time period surrounding Carrington rotation 1961 (March 23 – April 19, 2000), the large-scale structure of the heliospheric current sheet departed significantly from its typical “ballerina skirt” topology, resembling more of a conch shell.



The heliospheric current sheet is a surface that separates regions of opposite magnetic polarity. It is the largest coherent structure in the heliosphere and is intimately related to the large-scale dynamical flow of the solar wind. Its shape plays an important role in the modulation of galactic cosmic rays.

The underlying cause for this unusual topology can be traced to the distribution of magnetic flux in the photosphere. Usually one polar region has one magnetic polarity, while the other has the opposite polarity. During the interval surrounding Carrington rotation 1961 both poles were of the same sign.

While the simulations suggest such a topology, it required Ulysses magnetic field observations to confirm the results. Indeed, the often-close correlation between the model results and observations has led to a symbiotic relationship. On one hand the observations provide validation of the model results, and on the other, the model provides a global context for interpreting Ulysses observations.

