



Where is the Ballerina Bashful: HCS Properties in the Inner and Outer Heliosphere

K. Mursula (1), I.I. Virtanen (1) and T. Hiltula (1)

(1) University of Oulu, Physics Dept, Oulu, Finland (kalevi.mursula@oulu.fi)

The global magnetic field of the Sun has recently been shown to be systematically asymmetric for a few years in the declining to minimum phase of the solar cycle. The area of magnetic regions dominating in the northern heliographic hemisphere is larger than the area of the opposite polarity fields dominating in the southern heliographic hemisphere, and the magnetic equator, the so called heliospheric current sheet (HCS), dividing the two magnetic hemispheres is shifted southwards at these times. Since the magnetic equator in the heliosphere has traditionally been called the ballerina skirt, the Sun with this new feature has correspondingly been named the bashful ballerina. While this basic pattern was found using observations of the heliospheric magnetic field (HMF) at the Earth's orbit, the same phenomenon was verified for the last two solar minima using direct observations of the solar photospheric field and a related potential model to estimate the open field. Also, the daily HMF sector polarities calculated from the ground-based magnetic field observations have been used to show that this behaviour already took place during all the available measurements, i.e., at least as early as since the 1920s. Here we use the observations of the heliospheric magnetic field and the solar wind by several satellites in the inner and outer heliosphere to study the properties of the HCS in the different distances from the Sun and the occurrence of the bashful ballerina. We compare the results from the heliospheric satellites with the simultaneous measurements of the HMF at 1 AU and of the solar photospheric magnetic field.