

Heliospheric latitudinal and Solar Cycle Variations of Fractal Properties of the Interplanetary Magnetic Field

Jinyoung Park^{1,3}, Jin Sug Kim¹, Yu Yi¹, and James A. Wanliss²

¹Dept. of Astronomy and Space Science, Chungnam National University

²Dept. of Physical Sciences, Embry-Riddle Aeronautical University

³Korea Astronomy and Space Science Institute

Ulysses is the first and unique mission exploring over the polar region of the heliosphere. Thus, it is fortunate that we could analyze the Ulysses magnetometer data in order to figure out the fractal structure of the interplanetary magnetic field in the three dimensional heliosphere. We calculated the fractal dimensions of the time series of the interplanetary magnetic field (IMF) magnitude and components over the various heliospheric latitudes. Since Ulysses has encircled the Sun two times, one in the solar minimum and the other in the solar maximum, we could also investigated the solar cycle change of the fractal properties of the IMF in the different latitudes. The results of the deterministic and chaotic dynamics in the solar wind turbulence may hint us to dynamics of the solar wind driver on solar source surface in the three dimensional view and its solar cycle variation.