Geophysical Research Abstracts
Vol. 17, EGU2015-4203-1, 2015
EGU General Assembly 2015

Magnetic Field Rotations at Kinetic Scales in the Solar Wind

Christopher Chen (1), Lorenzo Matteini (1), David Burgess (2), and Timothy Horbury (1)

(1) Department of Physics, Imperial College London, London SW7 2AZ, UK (christopher.chen@imperial.ac.uk), (2) Astronomy Unit, Queen Mary University of London, London E1 4NS, UK

The distribution of spatial angle changes in the solar wind magnetic field is usually attributed to a mixture of turbulence and other structures. Recent results have suggested that in the MHD inertial range this distribution may be scale invariant, generated by the turbulence, and consist mainly of field rotations. Here, we examine the distribution of magnetic field rotations in the smaller scale kinetic range (from ion to electron scales), where the turbulence is thought to be dissipated, using combined fluxgate/search-coil magnetometer data from Cluster. The degree of self-similarity is measured and the spatial distribution of the fluctuations at different scales is compared. At ion scales, the energy in angle rotations larger than α drops exponentially with α with e-folding $\sim 10^{\circ}$, and at electron scales with e-folding $<1^{\circ}$, showing that by electron scales, large angle rotations are energetically insignificant. This places important constraints on possible dissipation mechanisms of solar wind turbulence at ion and electron scales.