

Turbulence properties in the inner heliosphere

M. E. Ruiz ^{1*}, S. Dasso ^{1,2}, W. H. Matthaeus ³ & E. Marsch ⁴

¹ Instituto de Astronomía y Física del Espacio, CONICET-UBA, Buenos Aires, Argentina.

² Departamento de Física, FCEyN, UBA, Buenos Aires, Argentina.

³ Bartol Research Institute, Department of Physics and Astronomy, University of Delaware, Newark, DE, USA.

⁴ Max-Planck-Institut für Sonnensystemforschung, Max-Planck-Strasse 2, Katlenburg-Lindau, Germany.

* Fellow of Universidad de Buenos Aires

The dynamical evolution of solar and galactic cosmic rays in the heliosphere is significantly affected by the magnetic conditions of the medium. These effects arise mainly from a combination of (i) the large-scale magnetic field configuration (which just acts as a guide for charged particles) and (ii) the small-scale fluctuations (which cause abrupt changes in their energy and/or momentum, known as wave-particle interaction). Magnetic fluctuations developed in the system in a spatial range larger than the ion skin depth can be modeled using the framework of MHD turbulence. In this work, we present a study of the turbulent properties in the inner heliosphere (solar wind between 0.3 and 1 astronomical units) based on modeling 'in situ' plasma and magnetic observations collected by Helios 1 and Helios 2 spacecraft throughout one full eleven-year solar cycle. In particular we study the anisotropy properties in the inertial range. These results will help to refine models used to describe diffusion processes for solar energetic particles in the solar wind and also to improve the knowledge of the MHD turbulence theory.