

Cosmic-Ray Diffusion in the Heliosphere

Dr. Robert C. Tautz/Technische Universität Berlin

Abstract: The problem of Cosmic-Ray scattering in the turbulent electromagnetic fields of the Solar wind is of great importance due to the variety of applications of the resulting diffusion coefficients. Examples are diffusive shock acceleration and the propagation of coronal mass ejections. The simple diffusive propagation that had been assumed for decades has been shown to be in disagreement with numerical and observational results. In the talk, therefore, the problem of high-energy particle propagation will be addressed using both a Monte-Carlo simulation code and non-linear transport theories. The formulation of an anisotropic turbulence model will be presented that agrees with Solar wind measurement. Further complications will be discussed that arise from additional effects such as the large-scale magnetic field geometry and electric fields. Results for parallel and perpendicular transport parameters will be compared both to numerical simulations and to Solar wind observations.