Contribution ID: **57** Type: **not specified**

New Models of the Coherent Galactic Magnetic Field

Friday 31 May 2024 11:30 (1 hour)

Galaxies are known to be permeated by large-scale magnetic fields with energy densities comparable to the turbulent and thermal energy densities of the interstellar medium. A good knowledge of the global structure of these fields is important to understand their origin and to infer their effect on galactic dynamics and the propagation of charged particles in galaxies. In this talk I will present new studies of the global structure of the magnetic field of our Galaxy based on the analysis of recent new full-sky data of extragalactic rotation measures and the final polarized intensity maps from WMAP and Planck. The analysis employs the latest models for the thermal electron density tuned to the dispersion measures of Galactic pulsars and state-of-the-art cosmic-ray electrons models, needed to predict the rotation measures and synchrotron emission from the Galaxy, respectively. As a result, I will present a major revision of the widely-used Jannson-Farrar 2012 model of the magnetic field of the Galaxy. In addition to a fiducial magnetic field model, a suite of alternative models was studied that fit the data with similar quality, but use different model assumption. This suite of models is then used to place a lower limit on the model uncertainties. As an application, I will discuss the uncertainties of the predicted deflection of ultrahigh-energy cosmic rays in the Galaxy, in particular the origin of the extremely energetic “Amaterasu particle” recently reported by the Telescope Array Collaboration.

Primary author: UNGER, Michael (Karlsruhe Institute for Technology)

Presenter: UNGER, Michael (Karlsruhe Institute for Technology)