



Contribution ID: 1402

Type: Talk

New Global Spline Fit - data-driven model of the cosmic-ray flux and mass composition from 1 GeV to 10^{11} GeV

Friday 18 July 2025 16:35 (15 minutes)

The Global Spline Fit (GSF) is a data-driven parameterization of cosmic-ray flux and mass composition. It combines direct and indirect measurements of the cosmic-ray flux of individual elements from 1 GeV to 10^{11} GeV, considering their uncertainties. At lower energies, the fluxes are corrected to the local interstellar spectra using the individual data-taking periods of the experiments. The systematic energy scale uncertainty for each experiment is treated as a nuisance parameter and minimized jointly with other model parameters, thus matching the flux from indirect measurements above the knee to direct measurements below the knee region. Since the original work was presented in 2017, many new measurements have been published by both direct and indirect cosmic-ray experiments. This presentation shows an updated GSF, including datasets from the last eight years. We assess the mutual compatibility and demonstrate the impact of the newly added data on the all-particle flux and mass composition over 11 decades in energy.

Collaboration(s)

Authors: FUJISUE, Kozo; Dr DEMBINSKI, Hans Peter (TU Dortmund); ENGEL, Ralph Richard (KIT - Karlsruhe Institute of Technology (DE)); FEDYNITCH, Anatoli (Institute of Physics, Academia Sinica)

Presenter: ENGEL, Ralph Richard (KIT - Karlsruhe Institute of Technology (DE))

Session Classification: CRI

Track Classification: Cosmic-Ray Indirect