

Recent progress in solar modulation modeling in light of new cosmic-ray data from AMS-02

Monday, 8 April 2019 19:02 (1 minute)

After the entering into the heliosphere, Galactic cosmic rays (CRs) are influenced by magnetic turbulence and Solar wind disturbances, which cause the so-called “solar modulation” effect. Understanding the relationship between the Sun’s variability and the CR modulation effect is essential for the investigation of the physical processes of CR transport in the heliosphere, as well as for the establishment of predictive models of CR radiation in the interplanetary space. In the study of this phenomenon, the key ingredients are the knowledge of the CR interstellar spectrum and the detailed understanding of how this spectrum is modulated inside the heliosphere. For this purpose, we present a newly developed model of solar modulation where the key parameters describing the CR physics processes are constrained by the new monthly-resolved data of AMS-02. The comparison between model calculations and CR data is presented at various energies and epochs of the solar cycle. Calculations of the propagation times of CRs, their energy losses, and their trajectories through the heliosphere are also presented and discussed.

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Session Classification: Poster

Track Classification: Poster