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Modeling solar modulation of cosmic rays in light of new data from AMS-02 and PAMELA

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When traveling inside the heliosphere, cosmic rays are influenced by magnetic turbulence and solar wind disturbances, which result in the so-called solar modulation effect. Understanding solar modulation is essential for studying the origin and the propagation processes of Galactic cosmic rays, as well as for establishing of predictive models of energetic radiation in space. In this talk, we present our efforts in the development of a comprehensive model for the time- and energy-dependent solar modulation effect. In particular, we present our numerical description of the structure of the heliosphere, our simulations for the transport of charged particles and antiparticles in the interplanetary space. We discuss the role of the most recent data from space experiments such as AMS-02 or PAMELA in constraining the model parameters and revealing new important details of the solar modulation phenomenon.

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