

On the interpretation of the latest AMS-02 cosmic ray electron spectrum

Thursday 15 July 2021 19:00 (12 minutes)

The latest AMS-02 data on cosmic ray electrons show a break in the energy spectrum around 40 GeV, with a change in the slope of about 0.1. We perform a combined fit to the newest AMS-02 positron and electron flux data using a model which includes production of pairs from pulsar wind nebulae (PWNe), electrons from supernova remnants (SNRs) and both species from spallation of hadronic cosmic rays with interstellar medium atoms. We demonstrate that the change of slope in the AMS-02 electron data is well explained by the interplay between the flux contributions from SNRs and from PWNe. In fact, the relative contribution to the data of these two populations changes by a factor of about 13 from 10 to 1000 GeV. The PWN contribution has a significance of at least 4σ , depending on the model used for the propagation, interstellar radiation field and energy losses. The effect of the energy losses alone, when the inverse Compton scattering is properly computed within a fully numerical treatment of the Klein-Nishina cross section, cannot explain the break in the e^- flux data, as recently proposed in the literature.

Keywords

Collaboration

other Collaboration

Subcategory

Theoretical Results

Primary authors: DONATO, Fiorenza (Torino University); DI MAURO, Mattia (INFN); MANCONI, Silvia (RWTH Aachen University)

Presenter: DONATO, Fiorenza (Torino University)

Session Classification: Discussion

Track Classification: Scientific Field: CRD | Cosmic Ray Direct