



Contribution ID: 127

Type: **Parallel Talk**

Towards Understanding the Origin of Cosmic-Ray Electrons

Thursday, 11 August 2022 16:50 (20 minutes)

Precision results on cosmic-ray electrons are presented in the energy range from 0.5 GeV to 2.0 TeV based on 50 million electrons collected by the Alpha Magnetic Spectrometer on the International Space Station. In the entire energy range the electron and positron spectra have distinctly different magnitudes and energy dependences. At medium energies, the electron flux exhibits a significant excess starting from 49.5 GeV compared to the lower energy trends, but the nature of this excess is different from the positron flux excess above 24.2 GeV. At high energies, our data show that the electron spectrum can be best described by the sum of two power law components and a positron source term. This is the first indication of the existence of identical charge symmetric source term both in the positron and in the electron spectra and, as a consequence, the existence of new physics.

Collaboration name

AMS-02 collaboration

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Session Classification: Dark Matter

Track Classification: Dark Matter