Contribution ID: **284** Type: **Oral**

Temporal Structures in Electron and Positron Spectra and Charge Sign Effects in Galactic Cosmic Rays

Wednesday 27 August 2025 14:00 (20 minutes)

We present the precision measurements of daily cosmic electron fluxes in the rigidity range from 1.00 to 41.9 GV with 13.5 years data collected with the Alpha Magnetic Spectrometer (AMS) aboard the International Space Station from May 2011 to November 2024. The electron fluxes exhibit variations on multiple time scales. Recurrent electron flux variations with periods of 27 days, 13.5 days, and 9 days are observed. We found that the electron fluxes show distinctly different time variations from the proton fluxes. Remarkably, complex hysteresis between the electron flux and the proton flux is observed. Furthermore, significant structures in the electron-proton hysteresis are observed corresponding to sharp structures in both fluxes.

The positron fluxes show distinctly different time variations from the electron fluxes at short and long time scales. A hysteresis between the electron flux and the positron flux is observed. Unexpectedly, on the long-term time scale positron fluxes are modulated more than proton fluxes.

Collaboration you are representing

AMS

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Session Classification: High-Energy Astrophysics and Cosmic Rays

Track Classification: High-Energy Astrophysics and Cosmic Rays