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Electron and Positron Fluxes in Primary Cosmic Rays Measured with the Alpha Magnetic Spectrometer on the International SpaceStation

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Precision measurements by the Alpha Magnetic Spectrometer on the International Space Station of the primary cosmic-ray electron flux in the range 0.5 to 700 GeV and the positron flux in the range 0.5 to 500 GeV are presented. The electron flux and the positron flux each require a description beyond a single power-law spectrum. Both the electron flux and the positron flux change their behavior at ~30 GeV but the fluxes are significantly different in their magnitude and energy dependence. Between 20 and 200 GeV the positron spectral index is significantly harder than the electron spectral index. The results show, for the first time, that neither e^+ nor e^- can be described by a single power law above 27.2 and 52.3 GeV, respectively. The determination of the differing behavior of the spectral indices versus energy is a new observation and provides important information on the origins of cosmic-ray electrons and positrons. The dependence of the electron and positron fluxes on time will also be discussed.

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