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Cosmic-ray sun shadow observation beyond TeV with LHAASO

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The cosmic rays blocked by the Sun can create a deficit shadow when observed with ground-based observatories. This Sun shadow serves as a valuable tool for capturing the complete magnetic field information of solar activities, as well as the magnetic field information between the Sun and the Earth.
In this study, we will present observations of the Sun shadow using the Large High Altitude Air Shower Observatory (LHAASO) across an energy range from sub-TeV to PeV. We will analyze key observational characteristics of the Sun shadow, such as the deficit cosmic-ray event ratio, shadow extension, and energy-dependent morphology. Additionally, we will discuss the time variation of the deficit ratio with Sunspot activity, potential studies on the coronal magnetic field (CMF), and interplanetary magnetic field (IMF), which may be closely related to the puzzling high-energy gamma radiation observed from the Sun.

Collaboration you are representing

LHAASO

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