

Cosmic Ray Modulation Observed by the Princess Sirindhorn Neutron Monitor at High Rigidity Cutoff

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Neutron monitors (NMs) are the premier instruments for precisely tracking time variations in the Galactic cosmic ray (GCR) flux at the GV-range. The worldwide NM network has provided continuous measurements of the solar induced variations of the GCR flux impinging Earth and the data cover about six 11-year solar cycles. The recent rise of space exploration, with PAMELA and AMS-02 spacecraft, brings new energy sensitive measurements of GCR fluxes. Moreover since late 2007, the range of sensitivity of the worldwide NM network has been increased with the installation of the Princess Sirindhorn Neutron Monitor (PSNM), at the summit of Doi Inthanon, Thailand. PSNM records the GCR flux with the world's highest vertical rigidity cutoff for a fixed station, 16.8 GV. PSNM data now cover the last solar minimum and maximum, and the last solar magnetic polarity reversal. This gives us the opportunity to study the solar modulation and its polarity dependence at such high rigidity for the first time. We present here the observations of PSNM. We compare measurements with those from NMs located at low rigidity cutoff. The solar modulations at high and low rigidity cutoff are linearly related during the periods of low solar activity. The observed dependence on the solar magnetic polarity is in agreement with previous measurements and is not predicted by the force field model. Observations are consistent with a crossover in spectra measured around the polarity reversal. During the negative polarity, the solar modulation is partially but not fully explained by the tilt angle as expected by the drift explanation.

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