Contribution ID: **250** Type: **Poster**

Direct Determination of a Bare Neutron Counter Yield Function

Friday 16 July 2021 19:18 (12 minutes)

Ground-based neutron counters are a standard tool for detecting atmospheric showers from GeV range primary cosmic rays of either solar or galactic origin. Bare neutron counters, a type of lead-free neutron monitor, function much like standard neutron monitors but have different yield functions primarily because they are more sensitive to neutrons of lower energy. When operated together with standard monitors, the different yield functions allow estimates to be made of the energy spectrum of galactic or solar particles. In 2010 a new array of 12 bare neutron detectors was installed at the South Pole to operate together with the neutron monitor there. Prior to installation, two of the detectors were operated on a ship that traveled from Sweden to Antarctica and back from November 2009 to April 2010. The purpose of this latitude survey was to use Earth's magnetic field, which blocks cosmic rays below the local cutoff rigidity (momentum per unit charge), as a spectrometer allowing the response function versus rigidity of these bare counters to be determined. By comparing the measured response function to direct measurements of the cosmic ray spectrum taken by the PAMELA spacecraft, we were able to make a direct determination of the yield function for the bare counters.

Keywords

neutron monitor; bare neutron detector; primary cosmic ray spectrum; solar modulation; yield function; latitude survey

Collaboration

other Collaboration

Subcategory

Experimental Methods & Instrumentation

Primary author: Dr NUNTIYAKUL, Waraporn (Chiang Mai University)

Co-authors: MANGEARD, Pierre-Simon (University of Delaware); RUFFOLO, David (Mahidol University); EVENSON, Paul (University of Delaware); Prof. BIEBER, John; Prof. CLEM, John; Prof. HALLGREN, Allan; Prof. MADSEN, James; Dr PYLE, Roger; Dr SÁIZ, Alejandro (Mahidol University); Dr TILAV, Serap

Presenter: Dr NUNTIYAKUL, Waraporn (Chiang Mai University)

Session Classification: Discussion

Track Classification: Scientific Field: SH | Solar & Heliospheric