Contribution ID: **258** Type: **Oral presentaion**

Neutron detector response to cosmic rays during latitude surveys

Wednesday, June 8, 2016 2:00 PM (15 minutes)

The study of the flux, spectrum, and directional distribution of cosmic rays arriving to Earth provides unique information in the fields of Astrophysics and Space Physics. At energies above $\sim$ 1 GeV, the best way to study cosmic rays is by detecting, at ground level, the secondary particles produced by cosmic rays in the atmosphere, including neutrons. One standard type of neutron detector to measure cosmic ray flux and its variations is the neutron monitor, a large instrument composed of gas-filled proportional counters surrounded by a neutron-producing material (such as lead) and neutron moderating/reflecting components (e.g., polyethylene). A network of neutron monitors around the world can provide cosmic ray directional information as well as a measure of the spectrum, thanks to the differences in the Earth's magnetic field acting as a magnet spectrometer. However, difficulties are still found in combining data from different neutron monitors due to local environmental effects and inherent differences in the detector setup. Other ways to study the cosmic ray spectrum include the detailed analysis of distributions of time delays between consecutive neutron counts in a neutron monitor, and the simultaneous detection of neutrons using two kinds of detectors with different energy response at the same location, e.g., a neutron monitor and neutron bare counters (with no lead or polyethylene). These techniques also require callibration nevertheless. In this presentation we discuss results of the operation of a mobile neutron monitor (capable of producing time delay distributions) and neutron bare counters on board a ship during a series of latitude surveys that carried the detectors from the West coast of the USA to the coast of Anctartica and back, thus providing with measurements of cosmic ray flux in a consistent way from near the Earth's magnetic pole to the magnetic equator.

Primary author: SAIZ, Alejandro (Mahidol University)

Co-authors: RUFFOLO, David (Mahidol University); BIEBER, John (University of Delaware); CLEM, John (University of Delaware); HUMBLE, John (University of Tasmania); DULDIG, Marc (University of Tasmania); EVENSON, Paul (University of Delaware); MANGEARD, Pierre-Simon; PYLE, Roger (University of Delaware); NUNTIYAKUL, Waraporn (Chandrakasem Rajabhat University)

Presenter: SAIZ, Alejandro (Mahidol University)

Session Classification: Session VII

Track Classification: Astronomy, Astrophysics and Cosmology