



Contribution ID: 7

Type: not specified

Neutron Monitor Response Functions from the 2023–24 Latitude Survey aboard the Araon Icebreaker

Wednesday, 17 September 2025 09:00 (20 minutes)

Ground-based cosmic ray observations from polar regions are key to understanding the modulation of galactic cosmic rays and their interactions with Earth's magnetic environment. In this study, we present results from a latitude survey using the Changvan neutron monitor aboard the South Korean icebreaker Araon, which traversed from Antarctic to Arctic latitudes during its 2023–24 voyages. The survey provides unique data for characterizing geomagnetic effects on cosmic ray access across a broad range of cutoff rigidities.

The Changvan monitor is configured as a semi-leaded neutron detector comprising three proportional counters: a leaded BF_3 tube, an unleaded BP28 tube, and a leaded BP28 tube arranged linearly. The absence of lead rings around the center tube distinguishes the system from standard 3NM64 models. Using geomagnetic cutoff rigidities calculated via the IGRF-14 model, we derive the response functions of each tube type and assess their performance under varying polar conditions.

These observations from both the Antarctic and Arctic reinforce the role of mobile neutron monitors in advancing high-latitude cosmic ray studies and highlight their potential contributions to interdisciplinary Antarctic research. The results will serve as a baseline for future comparisons, including annual solar modulation effects. This project exemplifies international cooperation and the expanding utility of polar platforms in astroparticle physics.

Primary author: SERIPIENLERT, Achara

Co-authors: Prof. NUNTIYAKUL, Waraporn (Chiang Mai University); Dr PROMFU, Tatphicha (Chiang Mai University)

Presenter: SERIPIENLERT, Achara

Session Classification: High-Energy/Neutrino Science/IceCube