[https://doi.org/10.69646/aob250922]
[Abstract]

Mini-neutron monitor ROZHEN: technical parameters and capabilities

Vergil Yotov[1*], Tsvetan Tsvetkov[1], Alexander Mishev[2], Stepan Poluianov[2], Nikola Petrov[1]

[1]Institute of Astronomy and National Astronomical Observatory, Bulgarian Academy of Sciences
[2]University of Oulu, Finland

[*]Correspondence: vyotov@nao-rozhen.org

Abstract: Since neutron monitors were first developed in the 1960s, their fundamental design principles have remained largely unchanged. However, in the past two decades, there has been increasing deployment of smaller, lighter versions of standard neutron monitors—mini-neutron monitors (MNMs). This paper presents a compact and cost-effective MNM deployed at Rozhen Observatory. We describe our new mini-neutron detector (MNM-ROZH), which utilizes gas-filled proportional counters (LND2043 BF_3). These detectors serve as effective cosmic ray monitors by measuring the secondary neutron flux produced by cosmic ray interactions in the atmosphere. We present the technical specifications of the MNM design, electronics systems, and software implementation, along with background measurements and initial results. The system is purposed for long-term cosmic ray monitoring and investigation of correlations between cosmic ray variations and solar activity.

Keywords: Neutron monitor; Cosmic rays; Space Weather;

Acknowledgement

This work was funded by the National Science Fund of Bulgaria with contracts KP-06-H64/3.