

## Geomagnetic cutoff rigidity in neutron monitors locations

*Thursday, 26 June 2025 13:15 (15 minutes)*

One of the detectors for long-term observations of cosmic rays are neutron monitors (NM) which are located at different points on the planet, allowing for studies of the time, energy and angular characteristics of galactic and solar particle fluxes. Since NMs are located inside the Earth's magnetosphere, their response depends on their location on the planet's surface which can be characterized by the geomagnetic cutoff rigidity. Its calculation depends on the magnetic field model used, the date, and even the numerical methods used. The paper presents calculated values of geomagnetic cutoff rigidities at the locations of some neutron monitors, and compares the cutoff values with the results of other calculations, including a comparison of the time dynamics over the past decade. We show that the geomagnetic cutoff values obtained for 2020 using the IGRF-14 model differ from those in IGRF-13, however, for 2015 the difference between the models is negligible. We demonstrate the geomagnetic cutoff tendency to decrease over time, especially at mid-latitudes. As a result of comparing the obtained cutoff rigidity values with the results of other authors, it is shown that in most cases the difference does not exceed 0.2 GV. Such discrepancies are significant only in the circumpolar region, where particles are mostly shielded not by the geomagnetic field, but by the Earth's atmosphere instead. We show that the accuracy of the algorithm used is comparable to that of other existing instruments and is sufficient for correct operation with ground-based cosmic ray detectors.

**Primary author:** KRUCHININ, Pavel (Национальный исследовательский ядерный университет "МИФИ")

**Co-author:** Mr SIRUK, Stepan (National Research Nuclear University MEPhI)

**Presenter:** KRUCHININ, Pavel (Национальный исследовательский ядерный университет "МИФИ")

**Session Classification:** Cosmo- and geophysical aspects of cosmic rays at the ground level

**Track Classification:** Cosmo- and geophysical aspects of cosmic rays at the ground level