



Contribution ID : 764

Type : Oral talk

## Intensity of muon bundles according to the NEVOD-DECOR cosmic ray experiment

*Tuesday, 6 October 2020 11:30 (15)*

Data of NEVOD-DECOR experiment on investigations of inclined cosmic ray muon bundles for a long time period (May 2012 – May 2020) are presented. Their comparison with the results of calculations based on simulations of extensive air shower hadron and muon components in the framework of an approach of local muon density spectra allows one to study the energy spectrum and mass composition of primary cosmic rays and/or to check the validity of hadron interaction models in a wide energy range from about  $10^{16}$  to  $10^{18}$  eV. The analysis showed that the observed intensity of muon bundles at primary particle energies of about  $10^{18}$  eV and higher can be compatible with the expectation only under the assumption of an extremely heavy (iron nuclei) mass composition of cosmic rays. This conclusion is consistent with data on multi-muon events obtained in a number of other experiments. At the same time, measurements of the depth of the shower maximum in the atmosphere in the experiments using air fluorescence technique (Pierre Auger Observatory and Telescope Array), on the contrary, favor a light (predominantly proton) mass composition of primary cosmic rays at these energies. Unlikely such a contradiction can be resolved without serious changes of the existing hadron interaction models.

**Primary author(s)** : BOGDANOV, Aleksei (National Research Nuclear University MEPhI (Moscow Engineering Physics Institute)); KOKOULIN, Rostislav (National Research Nuclear University MEPhI)

**Co-author(s)** : BARBASHINA, Natalia (National Research Nuclear University MEPhI (Moscow Engineering Physics Institute)); CHERNOV, Dmitry (National Research Nuclear University MEPhI); KHOKHLOV, Semyon (National Research Nuclear University MEPhI); KINDIN, Victor (National Research Nuclear University MEPhI (Moscow Engineering Physics Institute)); KOMPANIETS, Konstantin (MEPhI); MANNOCCHI, Giampaolo (Osservatorio Astrofisico di Torino); PETRUKHIN, Anatoly (National Research Nuclear University MEPhI); TRINCHERO, Giancarlo (Osservatorio Astrofisico di Torino); SHUTENKO, Victor (National Research Nuclear University (MEPhI)); YASHIN, Igor (National Research Nuclear University MEPhI); YURINA, Ekaterina (National Research Nuclear University MEPhI); ZADEBA, Egor (National Research Nuclear University MEPhI)

**Presenter(s)** : BOGDANOV, Aleksei (National Research Nuclear University MEPhI (Moscow Engineering Physics Institute)); KOKOULIN, Rostislav (National Research Nuclear University MEPhI)

**Session Classification** : Astroparticle Physics

**Track Classification** : Astroparticle physics