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Investigation of the EAS Neutron Component with the URAN Array

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One of the most important directions in the research of extensive air showers (EAS) is the study of its hadronic component. It is the main component of the EAS, which forms the characteristics of the shower. Registration of neutrons produced in interactions of EAS hadrons with the environment is one of the new methods for studying EAS hadronic component. The URAN array was created in the Scientific and Educational Center NEVOD (MEPhI) in collaboration with INR RAS. The URAN facility was designed to register neutrons that accompany EAS in the region of the primary cosmic ray spectrum break ('knee region'). It includes 72 detectors based on a thin inorganic scintillator for registration of the charged and neutron components of the EAS. The total area of the facility is ~ 103 m2; scintillation detectors are located on the roofs of the laboratory buildings of the Unique Scientific Facility NEVOD. For the correct interpretation of the experimental data of the URAN, the response of the URAN facility to the passage of EAS was simulated using the CORSIKA7.6900 program and Geant4.10.5 software package. The report presents the results of studying the parameters of EAS registered by the URAN array in 2019. It includes the LDF of charged particles, the dependence of the number of neutrons on the parameters of EAS, the EAS distribution in the number of neutrons. A comparison of the experimental data with model calculations is presented.

Primary author(s): BOGDANOV, Fedor

Co-author(s) : BOGDANOV, Aleksei (National Research Nuclear University MEPhI (Moscow Engineering Physics Institute)); GROMUSHKIN, Dmitry (MEPhI); Mrs. IZHBULYAKOVA, Zarina (National Research Nuclear University MEPhI (Moscow Engineering Physics Institute)); Dr. STENKIN, Yuri (INR RAS); YURIN, Konstantin (National Research Nuclear University MEPhI (Moscow Engineering Physics Institute))

Presenter(s): BOGDANOV, Fedor

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