

Multicomponent EAS studies involving the hardware and software system for storing and analyzing large volumes of the Experimental complex NEVOD data

Tuesday, 24 June 2025 11:30 (30 minutes)

The Experimental Complex (EC) NEVOD includes a set of scientific facilities for studying extensive air showers (EAS): the Cherenkov water detector NEVOD, the calibration telescope system CTS, the coordinate detectors DECOR and TREK, the arrays of scintillation detectors URAN, PRISMA, NEVOD-EAS which measure different EAS components. In order to develop multicomponent EAS studies, the hardware and software system (HSS) for storing and analyzing large amount of the EC NEVOD facilities data is being created.

The HSS hardware part is a set of network attached storages and high-performance servers for storing and analyzing data. The software part is based on the database management system MongoDB, as well as on the specialized software developed with the Python programming language.

The report presents the results of the analysis joint events obtained with HSS, which demonstrates the possibility of the multicomponent EAS studies with the EC NEVOD facilities. The results of EAS parameters reconstruction for modeled and experimental joint events in the NEVOD-EAS, CTS, DECOR are shown. The lateral distribution function of the EAS muon component is measured based on the CTS data in joint events with the NEVOD-EAS. The possibility of reconstructing the number of EAS muons based on the CTS data is experimentally assessed. The PCR energies, reconstructed with the LMDS method and with the traditional methods by the EAS electron-photon component, in joint events of the DECOR and NEVOD-EAS facilities are compared.

Primary author: KHOMCHUK, Evgeniy (MEPhI)

Co-authors: AMELCHAKOV, Mikhail (MEPhI); GROMUSHKIN, Dmitry (National Research Nuclear University MEPhI (Moscow Engineering Physics Institute)); ZHEZHERA, Svetlana (MEPhI); Mrs KONOVALOVA, Alena (National Research Nuclear University MEPhI); Dr KHOKHLOV, Semyon (National Research Nuclear University MEPhI); SHULZHENKO, Ivan (National Research Nuclear University MEPhI); YUZHAKOVA, Elena (MEPhI)

Presenter: KHOMCHUK, Evgeniy (MEPhI)

Session Classification: Coffee Break + Poster Session

Track Classification: Cosmic rays (nuclei, gammas, neutrinos) of very high energies (> 100 TeV)