

Multi-component study of extensive air showers at the Tien Shan mountain station of LPI and peculiarities of the particles flux behavior in the central region of the (1-100) PeV EAS

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New experimental complex of the Tien Shan mountain cosmic ray station incorporates a set of detector sub-systems for simultaneous investigation of different components of extensive air showers (EAS) which arise from interaction of the (1-100) PeV cosmic ray particles in atmosphere. Thus, a wide-spread system of the charged particles detectors is used for the measurement of local density of EAS electrons and for estimation by its spatial distribution of the main EAS parameters, while a set of radio-antennas provides an alternative way for investigation of the EAS charged component. The ionization-neutron calorimeter and the neutron monitor give information on EAS hadrons with the energy above 0.1 TeV, while the low-threshold neutron and gamma detectors can be applied for registration of the prolonged flux of thermalized neutrons after EAS passage. The underground muon detector is used for detection of the muonic component of cosmic rays in an exclusively wide range of muon energies, starting from 5 GeV and up to tens and thousands of TeV, and with estimation possibility of the energy of muon. The multi-component technique practiced now at Tien Shan permits to study effectively those aspects of high energy cosmic ray interaction which were never considered in former experiments. In particular, it is possible now to register the flow of EAS particles just around the region of EAS core which opens a real opportunity to solve the long standing problem of the 3 PeV knee in the energy spectrum of cosmic ray particles. Some examples of physical results gained lately at the Tien Shan detector complex are presented here for performance illustration of the newly elaborated methods of EAS investigation.

Primary author: SHEPETOV, Alexander (LPI RAS)

Presenter: SHEPETOV, Alexander (LPI RAS)

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