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The new shower system of the Tien Shan mountain station and the goals of future cosmic ray investigations

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The results of the test data collection run held at the new shower installation of the Tien Shan mountain cosmic ray station are discussed. At time, the system consists of ~ 100 detector points built on the basis of plastic scintillator plates with sensitive area of 0.25 m^2 and 1 m^2 . In the core region these detectors form two rather dense carpets with the $3 \text{ m} \times 4 \text{ m}$ uniform spatial step between them; the recommission of a set of peripheral detectors spread at the distances within 40-200 m around the core is anticipated during the 2015 summer season. The dynamic range of scintillation amplitude measurements now is about $(3 - 7) \cdot 10^4$ with the perspective of its being extended up to $\sim 10^6$ in nearest future. The full stack of data acquisition, detector calibration, and shower parameters restoration procedures is now completed and the shower size spectrum newly obtained in the range of $N_e = 10^5 - 10^7$ occurs in agreement with conventional data. The results of correlation study between the EAS characteristics and the events registered with the underground neutron detectors are presented. The following investigations in the range of 10^{14} - 10^{18} eV cosmic ray physics are supposed to be carried out at Tien Shan in the nearest years: the study of angular distribution and anisotropy of EAS directions at knee region; the search for the fine structure of cosmic ray spectrum, various "exotics", and the possible traces of the dark matter interaction; the structure of the EAS particles flows immediately in its core region; investigation of the EAS hadrons and particularly of its low-energy neutron component.

Collaboration

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