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Results of NEVOD-DECOR experiment and evidences of quark-gluon plasma in cosmic rays

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A distinctive feature of the NEVOD-DECOR experiment is the investigation of muon component in inclined EAS. A rapid growth of the distance between the observation point and muon generation region, and as a consequence a large lateral spread of EAS muons at large zenith angles allow us to detect showers in a wide energy interval from 1015 up to about 1019 eV by means of relatively small-size experimental setup. Measurements of local muon density spectra (LMDS) were conducted during about 20 thousand hours. The main features of UHE cosmic ray spectrum –the knee, the second knee and the increase of the spectrum slope – were observed. The comparison of the experimental data with results of CORSIKA-based simulations showed that the muon density in inclined EAS increases with the energy of primary particles more rapidly than it can be expected even for pure iron composition of cosmic rays. Further experimental plans are connected with measurements of the energy deposit of muon component in Cherenkov water detector. These measurements will give a possibility to check some ideas about changes of hadron interaction characteristics at energies above the knee.

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