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## <sup>(</sup>HADRON-55<sup>(</sup>COMPLEX SETUP FOR STUDY OF HADRON INTERACTIONS WITHIN THE CENTRAL PART OF COSMIC RAY EAS CORES

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The project of a new experiment is proposed in order to obtain direct data on the value of production cross section of charmed particles in interactions of cosmic ray hadrons on lead nuclei at energy  $E \sim 75$  TeV in the forward kinematic cone and to determine a contribution of prompt muons to the overall flow of superhigh energy muons within EAS at mountain altitudes. The proposed experiment, which will be carried out at the Tien Shan Mountain Scientific Station (TShMSS) located at an altitude of 3340 m above sea level, will clarify the nature of weakly absorbed hadronic component of cosmic rays, i.e., the nature of the so-called long-flying cosmic ray component which was previously observed in a number of nuclear physics experiments with cosmic rays including those performed at the TShMSS. Besides, anomalies and nearby sources of superhigh energy PCR will be searched within the experiment by scanning the celestial sphere and applying a high-sensitive difference method.

To achieve these objectives, a new 'HADRON-55' hybrid setup representing a two-storey coordinate calorimeter of 55  $m^2$  in area is planned to assemble on the basis of the previous 'HADRON-44' hybrid calorimeter and 2-storey X-ray emulsion chamber (XREC). The setup consists of two blocks spaced vertically by 2.2 meters. The upper unit contains a standard  $\Gamma$ -block of an XREC with two underlying layers of ionization chambers arranged in mutually perpendicular directions. Beneath them, a sufficiently thick lead target block is located in which the cosmic ray hadrons interact effectively with lead nuclei. The lower unit represents the XRECs and the underlying ionization calorimeter 1050  $g/cm^2$  thick, which consists of the iron absorber with gaps designed for placing of ionization chambers, Geiger and neutron counters. The hybrid calorimeter and the adjacent territory is covered with an array of scintillation detectors of  $0.5 \times 0.5 m^2$  of size with total area of  $350 m^2$ . The specific features of the 'HADRON-55' complex setup make it possible to measure the coordinates of EAS core particle tracks with an accuracy of  $\Delta x, y \sim 100$  microns and to determine the primary energy and that of individual particles with an accuracy of  $\sigma E/E \sim 25\%$ .

It is further assumed that HADRON-55 setup will operate as a part of the TShMSS shower array representing a network of scintillation detectors located on an area of about 2  $km^2$ .

The detailed study of EAS cores and their fine structure with the 'HADRON-55' setup will allow us to clarify characteristics of hadronic interactions at wide energy range  $E_0 = 10^{14} \div 10^{18}$  eV in the forward (fragmentation) kinematic region.

## Collaboration

- not specified -

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