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The status of the TAIGA project

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Gamma-ray astronomy has had a major breakthrough in the last years with the impressive results obtained using ground- and space-based gamma-ray detectors. While it was not possible to pinpoint the highest energy accelerators within our Galaxy, cosmic rays must be accelerated up to energies of 1 PeV or higher. The new TAIGA project is proposed to solve a number of fundamental problems of high energy gamma-astronomy, cosmic ray and particle physics. The array will be located in the Tunka valley at the site of the Tunka-133 array. The array will consist of wide-angle (˜0.6 sr Field of View) non-imaging Cherenkov optical detectors (HiSCORE station) covering an area of up to 5 km^2, and few (4 -16) IACT (Imaging Atmospheric Cherenkov Telescope) detectors based on ˜9 m^2 mirrors and muon detectors with total area 1000 m^2. The information of the shower-front sampling array, e.g., the impact point of the shower axis will be combined with the imaging analysis to improve the sensitivity of the detector. This hybrid event reconstruction is a new approach that can be tested in the proposed setup. With such detectors the high angle resolution will be kept down to 30 TeV that allows essentially to improve the sensitivity at this energy range.

The aims of TAIGA are grouped into three main themes:
- Gamma-ray astronomy - one of the most intriguing questions in high-energy astroparticle physics is a search for objects for acceleration of particles up to PeV-energies
- Charged cosmic ray physics –the energy spectrum and mass composition measurements from 10^{14} to 10^{18} eV.
- Particle physics - axion/photon conversion; pp cross-section measurement; search for quark-gluon plasma phenomena.

Main TAIGA array parameters: area will be increased step by step from currently 0.25 to 5 km^2, energy threshold ˜20 TeV, general FOV ˜ 1 sr . According to preliminary timetable, a 0.6 km^2 stage is planned for 2017, subsequently increasing the area to the aimed 5 km^2 in the following years.
The status of the TAIGA experiment in 2016 will be presented.

Presentation type

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