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First results of the HiSCORE timing array

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The very high energy gamma-ray regime is the key to several questions in high energy astrophysics, the most prominent being the search for the origin of cosmic rays. Observations of gamma rays up to several 100 TeV are particularly important to spectrally resolve the cutoff regime of the long-sought Pevatrons, the accelerators of PeV cosmic rays.

The HiSCORE timing array is part of the international TAIGA collaboration. HiSCORE currently consists of 28 air Cherenkov timing stations distributed on an area of 0.25 km^2 . A HiSCORE station consists of 4 Photomultiplier tubes (PMT), each equipped with a light collector (Winston Cone), resulting in a light collection area of 0.5 m^2 per station and a field of view with a half opening angle of 30 deg. The signals of the four PMTs are sampled in the GHz regime. The analog sum of all four PMT channels is used for triggering. Air shower events are reconstructed using the signal amplitudes and their timing. A relative time synchronization of the array is performed in the sub-ns regime.

Other detector components of TAIGA (imaging air Cherenkov Telescopes and scintillation muon counters) are not part of this presentation.

Here, the status and first results of the HiSCORE timing array will be presented.

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