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Detection of TeV emission from the Crab Nebula using the first two IACTs in TAIGA in stand-alone and stereo modes of observation

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Two installations currently operating as part of the TAIGA Astrophysical Complex [1]: TAIGA-HiSCORE [2] -120 wide-angle Cherenkov stations on an area of 1 km^2 and TAIGA-IACT[3] - 3 IACTs, are playing the most important role in research in the field of very high-energy gamma-ray astronomy. The large area and unique methodological capabilities of the complex allow us to hope for new and interesting results.

The report focuses on the analysis of data of the Crab Nebula observation in stand-alone and stereo modes of observation. The techniques for selecting gamma-like events and approaches for the energy reconstruction in these modes of observation are discussed.

Based on the data of the first IACT, for 150 hours of observation, the excess of gamma-rays at the significance level of 12σ (618 events) was obtained. From 36 hours of operation of two telescopes in stereo mode excess of gamma rays at the significance level 5σ was obtained. The energy spectra of gamma-rays in the energy range 4-80 TeV reconstructed both by stand-alone and stereo modes are presented.

1. L. A. Kuzmichev et al. Cosmic ray study at the astrophysical complex TAIGA: Results and plans // Physics of Atomic Nuclei. — 2021. — Vol. 84, no. 6. — P. 966–974.
2. O. A. Gress et al. The wide-aperture gamma-ray telescope TAIGA-HiSCORE in the Tunka Valley: Design, composition and commissioning, Nucl. Instrum. Meth. A 845 (2017) 367.
3. N. B. Lubsandorzhev Camera of the first TAIGA-IACT: construction and calibration, PoS ICRC2017. 757

Primary author(s) : VOLCHUGOV, Pavel (SINP MSU); Dr. SVESHNIKOVA, Lubov (SINP MSU); POSTNIKOV, Evgeny (SINP MSU); TAIGA COLLABORATION

Presenter(s) : VOLCHUGOV, Pavel (SINP MSU)

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