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Very high energy gamma-ray emission of close metagalactic sources Mkn421, Mkn 501 and NGC 1275.

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Abstract content

Exploration of the galactic and metagalactic objects in which the acceleration of protons and nuclei is accompanying with generation of gamma-quanta and neutrinos is of great current interest for astroparticle physics because the gammas and neutrinos do not dissipate energy after propagation through the magnetic fields of the Universe providing a unique probe into these cosmic accelerators. These gamma-astronomical researches are carrying out with SHALON mirror telescope at the Tien-Shan high-mountain observatory. During the period 1992 – 2007, SHALON has been used for observations of the metagalactic sources Mkn421, Mkn501, NGC1275, 3c454.3, 1739+522 and galactic sources Crab Nebula, Cygnus X-3, Tycho's SNR, Geminga, 2129+47XR. The observation results of two type of metagalactic sources: BLLacs Mkn 421 ($z = 0.031$), Mkn 501 ($z = 0.034$) and Seyfert galaxy NGC 1275 ($z=0.0179$) are presented. The integral average gamma-ray fluxes of Mkn 421 and Mkn 501 were estimated as $(0.63 \pm 0.14) \times 10^{-12} \text{cm}^{-2} \text{s}^{-1}$ and $(0.86 \pm 0.13) \times 10^{-12} \text{cm}^{-2} \text{s}^{-1}$ respectively. NGC 1275 is being intensively studied by SHALON and gamma-ray flux are found to be $(0.78 \pm 0.13) \times 10^{-12} \text{cm}^{-2} \text{s}^{-1}$. The integral spectra of events from source - k_{on} and background events, observing simultaneously with source's events - k_{off} , and source image are presented. The increase of the flux over the average value was detected in 1997 and 2004 observations of Mkn 421 by SHALON and estimated to be $(1.01 \pm 0.25) \times 10^{-12} \text{cm}^{-2} \text{s}^{-1}$ and $(0.96 \pm 0.2) \times 10^{-12} \text{cm}^{-2} \text{s}^{-1}$, respectively. The significant increase of Mkn501 flux was detected in 1997 with the VHE ground telescopes all over the world. The ray flux by SHALON telescope was estimated as $(1.21 \pm 0.13) \times 10^{-12} \text{cm}^{-2} \text{s}^{-1}$ that is comparable with flux of powerful galactic source Crab Nebula. The research of extragalactic and galactic sources of very-high energy gamma-quanta by methods, including ones using mirror Cherenkov telescopes concerns, rather than delicate problem of the cosmic ray nature and the role of our Galaxy and Extragalaxy in their generation.

If this papers is presented for a collaboration, please specify the collaboration

Summary

Reference

Proceedings of the 30th International Cosmic Ray Conference; Rogelio Caballero, Juan Carlos D'Olivo, Gustavo Medina-Tanco, Lukas Nellen, Federico A. Sánchez, José F. Valdés-Galicia (eds.);

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