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## The energy spectra of distant metagalactic sources: 1739+522 and 3c454.3

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### Abstract content

The understanding of mechanisms in active galactic nuclei requires the detection of a large sample of very high energy gamma-ray objects at varying redshifts. The gamma-astronomical researches are carrying out with SHALON mirror telescope at the Tien-Shan high-mountain observatory since 1992. The redshifts of SHALON very high energy gamma-ray sources range from  $z=0.0183$  to  $z=1.375$ . The most distant object 1739+522 (with redshift  $z=1.375$ ), seen in TeV energy, is also the most powerful: its integral gamma-ray flux is found to be  $(0.5 \pm 0.10) \times 10^{-12} \text{ cm}^{-2} \text{ s}^{-1}$  at energies of  $> 0.8 \text{ TeV}$ . The integral gamma-ray flux of 3c454 ( $z = 0.859$ ) was estimated as  $(0.43 \pm 0.13) \times 10^{-12} \text{ cm}^{-2} \text{ s}^{-1}$ . It is consistent with the upper limit  $0.84 \times 10^{-11} \text{ cm}^{-2} \text{ s}^{-1}$  obtained by Whipple telescope at energy more than 0.5 TeV. The gamma-ray spectra and fluxes of known blazars Mkn421, Mkn501 as the spectrum of NGC1275 and distant flat-spectrum radio quasars 1739+522 and 3c454.3 are presented: for: NGC 1275 ( $z=0.0183$ )  $k_{\gamma} = -2.26 \pm 0.10$ ,  $k_{\text{on}} = -2.05 \pm 0.10$ ,  $k_{\text{off}} = -1.75 \pm 0.08$ ; for: Mkn 421 ( $z=0.031$ )  $k_{\gamma} = -1.53 \pm 0.41$ ,  $k_{\text{on}} = -1.46 \pm 0.06$ ,  $k_{\text{off}} = -1.75 \pm 0.06$ ; for: Mkn 501 ( $z=0.034$ )  $k_{\gamma} = -1.89 \pm 0.11$ ,  $k_{\text{on}} = -1.83 \pm 0.06$ ,  $k_{\text{off}} = -1.72 \pm 0.06$ ; for: 3c454.3 ( $z=0.859$ )  $k_{\gamma} = -0.95 \pm 0.10$ ,  $k_{\text{on}} = -1.03 \pm 0.06$ ,  $k_{\text{off}} = -1.71 \pm 0.06$ ; for: 1739+522 ( $z=1.375$ )  $k_{\gamma} = -1.09 \pm 0.06$ ,  $k_{\text{on}} = -1.12 \pm 0.06$ ,  $k_{\text{off}} = -1.75 \pm 0.05$ . So, the energy spectrum of metagalactic sources Mkn421, Mkn501, NGC 1275 at range  $10^{12} - 10^{13}$  eV differs from spectra of distant quasars 1739+522 and 3c454.3 that don't contradict to united energy spectrum  $F(>E_{\gamma}) \sim E_{\gamma}^{-1.2 \pm 0.1}$ . The most distant currently known source 1739+522 is about  $10^{11}$  times more powerful than the full emission from all known sources of the Galaxy. Thus, the modern gamma-astronomical observations put forward the question: what mechanisms might be responsible for the currently observed gamma-ray fluxes from the remote metagalactic sources?

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'Olivio, Gustavo Medina-Tanco, Lukas Nellen, Federico A. Sánchez, José F. Valdés-Galicia (eds.); Universidad Nacional Autónoma de México, Mexico City, Mexico, 2008; Vol. 3 (OG part 2), pages 877-880

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