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The very high energy characteristics of shell-type SNRs at different ages

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The investigation of VHE gamma-ray sources by any methods, including mirror Cherenkov telescopes, touches on the problem of the cosmic ray origin and, accordingly, the role of the Galaxy in their generation. The SHALON observations have yielded the results on Galactic supernova remnants (SNR) of different ages. Among them are: the shell-type SNRs Tycho's SNR (1572y), Cas A (1680y), IC 443 (age ˜ (3 - 30)×10^3 y), γCygni SNR (age ˜(5 - 7)×10^3 y) and classical nova GK Per (Nova 1901). For each of SNRs the observation results are presented with spectral energy distribution by SHALON in comparison with other experiment data and images by SHALON in together with data from X-ray by Chandra and radio-data by CGPS. The collected experimental data have confirmed the prediction of the theory about the hadronic generation mechanism of very high energy 800 GeV - 100 TeV gamma-rays in Tycho's SNR, Cas A and IC443. Recently, unique data on GK Per TeV gamma-ray emission were obtained with SHALON experiment. The X-ray data shows that, the nova remnant of GK Per could be a younger remnant that will resemble older SNRs (like IC 443) which interact with molecular clouds. GK Per is supposed to be a candidate for TeV gamma-ray emission due to the accelerated particles in the reverse shock region. The analysis of SHALON observation data revealed the main TeV-emission region coinciding with the position of central source of GK Per and the weak emission of shell, that is also observed in X-ray by Chandra.

Collaboration

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