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Future GLAST observations of Supernova remnants and Pulsar wind nebulae

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Abstract content

Shell-type Supernova remnants (SNRs) have long been known to harbour a population of ultra-relativistic particles, accelerated in the Supernova shock wave by the mechanism of Diffusive shock acceleration. Experimental evidence for the existence of electrons up to energies of ˜100 TeV was first provided by the detection of hard X-ray synchrotron emission as e.g. in the shell of the young SNR SN1006. Furthermore using theoretical arguments shell-type Supernova remnants have long been considered as the main accelerator of protons - Cosmic rays - in the Galaxy; definite proof of this process is however still missing. Pulsar Wind Nebulae (PWN) - diffuse structures surrounding young pulsars - are another class of objects known to be a site of particle acceleration in the Galaxy, again through the detection of hard synchrotron X-rays such as in the Crab Nebula. Gamma-rays above 100 MeV provide a direct access to acceleration processes. Ultra-relativistic electrons emit gamma-radiation through Inverse Compton scattering in ubiquitous photon fields (such as CMBR, star light and dust emission or local synchrotron radiation), protons emit gamma-radiation through the decay of pi0s, generated in proton-proton interactions with Interstellar material such as gas clouds. Recent advances in ground-based gamma-ray astronomy e.g. made by Cherenkov Telescopes above an energy threshold of 100 GeV have shown, that both shell-type SNRs and PWN are classes of gamma-ray emitting objects in the Galaxy. The upcoming GLAST Large Area Telescope (LAT) will be operating in the energy range between 30 MeV and 300 GeV and will provide excellent sensitivity, angular and energy resolution in a poorly investigated energy band. Shell-type SNRs as well as PWN provide natural targets for GLAST observations and detections. We will describe prospects for the investigation of these Galactic particle accelerators with GLAST.

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

for the GLAST-LAT 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.); Universidad Nacional Autónoma de México, Mexico City, Mexico, 2008; Vol. 2 (OG part 1), pages 609-612

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