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The Galactic gamma-ray club

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Abstract content

The exclusive Galactic gamma-ray club rallies new members. Supernova remnants, pulsar wind nebulae, and binary systems hosting a compact object have recently joined the young pulsars as firmly established sources of gamma rays in the Milky Way. The first examples of these gamma-ray emitters had been suspected in the early eighties with COS-B, many more in the nineties with EGRET, but only the fine imaging recently obtained at TeV energies could identify and resolve specific sources. The samples are sparse, but raise exciting questions. The jet and/or pulsar-wind origin of the emission in binaries is hotly debated. The nature of the radiation in shock accelerators is questioned: do nuclei contribute a lot, a little, or not to the gamma rays and what energy do they carry away from the shock budget? The magnetic field distribution in all these systems is a key, but poorly constrained information to understand the multi-wavelength data, particle transport and electron ageing. These questions must be solved before efficiently probing the acceleration mechanisms. The rapidly growing samples expected from GLAST and the Cherenkov telescopes should bring new valuable test cases as well as shed statistical light on the evolution of these accelerators with age (an important constraint for pulsar magnetosphere and wind models), surrounding medium (to probe different shock speeds and loading), binary companions and orbital phases (to probe the soft radiation field and wind confinement versus jet activity), and viewing geometry (to probe beamed radiation from pulsars and jets). The Galactic club may also soon add new members since young stellar clusters are on the waiting list to join. We will briefly review these exciting times and perspectives.

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

Summary

Reference

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