

Pulsar-wind Nebulae as a Dominant Population of Galactic VHE Sources

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During the past decade TeV gamma-ray observatories have revealed a large number of very-high energy (VHE) sources. We will review the TeV and X-ray properties of the population of Galactic VHE sources focusing on pulsar wind-nebulae associations and unidentified TeV sources. Pulsar-wind nebulae (PWNe), shell-type supernova remnants (SNRs), and microquasar-type high-mass X-ray binaries (HMXBs) appear to be firmly established sources of the leptonic cosmic rays in our Galaxy. They account for 48% of the total number (~90) of Galactic VHE sources, with 28 PWNe, 10 SNRs and 5 HMXBs. There is also a large number of extended TeV sources positionally coincident with young energetic pulsars; in most cases they can be considered as TeV PWN candidates. In addition, there remains a sizable fraction of unidentified VHE sources (~20). For some of these sources, multi-wavelength observations suggest a possible counterpart (such as an SNR interacting with a molecular cloud, or a star-forming region), but most of these associations are still uncertain because at least some of these sources still could be powered by offset pulsars whose PWNe are too faint in X-rays. Finally, there are “dark” VHE sources, for which neither radio nor X-ray images reveal any plausible counterparts. This work was partially supported by NASA grants NNX09AC84G and NNX09AC81G.

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