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Very-High-Energy Observations of Pulsar Wind Nebulae and Supernova Remnants

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The High Energy Stereoscopic System (H.E.S.S.) has conducted a survey of the Milky Way, discovering 78 sources of very-high-energy (VHE, E > 100 GeV) gamma-ray emission. A total of 28 sources are firmly identified as being Pulsar Wind Nebulae (PWNe), Supernova Remnants (SNRs) or composite SNRs. Correlating the H.E.S.S. sources with other catalogues shows that 21 objects are firmly or plausibly associated with SNRs, 20 with composites and 16 with PWNe. This makes SNRs and PWNe the largest population of Galactic VHE sources.

PWNe and SNRs are powered by the remains of stellar explosions. The rotational energy of the stellar core fuels, in the form of a pulsar, a nebula of relativistic electrons. The material ejected in the supernova explosion shocks the interstellar medium and accelerates protons and electrons. Protons may escape the SNR and interact in nearby molecular clouds. Ground-based observations of VHE gamma rays probe the electron population in the sources through inverse Compton scattering and the proton population through inelastic proton-proton scattering and subsequent gamma-ray production in pion decay. The good angular resolution of the instruments allow detailed morphological studies of the sources.

In this talk I present the current status of VHE observations of PWNe and SNRs. The results are put into context with the proposed emission mechanisms. I will show how the particle transport in PWNe can be measured with gamma-ray observations and why SNRs are very good candidates for Cosmic-Ray acceleration. I will conclude with an outlook on future observations.

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