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Supernova remnants and pulsar wind nebulae at high and very-high energies

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Supernova remnants (SNRs) and pulsar wind nebulae (PWNe) have long been considered potential sources of Galactic cosmic rays. Radiating from the radio band to gamma rays, these objects are ideal to study the acceleration of cosmic rays. In particular, understanding the nature of the gamma-ray emission allows probing the population of high-energy particles (leptons or hadrons) and inferring the highest energy limits achieved via their acceleration process. At TeV energies, the H.E.S.S. Galactic Plane Survey (HGPS) has recently revealed several unidentified sources, often dark in other wavelengths, challenging our understanding on the origin of the emission. I will highlight our current knowledge on SNRs and PWNe and in particular stress what we may learn about them from an observational point of view. I will also present a method to constrain the nature of the unidentified TeV HGPS sources using a multi-wavelength approach, aiming to be applied on the next generation gamma-ray observatory (CTA, Cherenkov Telescope Array) which is expected to reveal several hundreds of TeV sources along the Galactic plane.

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