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A Population of TeV Pulsar Wind Nebulae in the H.E.S.S. Galactic Plane Survey

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The H.E.S.S. Galactic Plane Survey (HGPS) constitutes the deepest scan of the inner Milky Way in TeV gamma rays to date. The dominant class of objects in this 10-year survey are Galactic pulsar wind nebulae (PWNe). Aside from a uniform reassessment of the observational parameters of PWNe already found in the past years, the HGPS for the first time allows for the extraction of flux upper limits in regions around pulsars without a detected TeV PWN. Including these limits, we systematically investigate the evolution of quantities such as the TeV luminosity and extension over over $\sim 10^5$ years after the birth of the pulsar. We find that there are trends in their evolution, but also large variations around the average behaviour. This is likely due to the diversity of the surrounding medium and intrinsic starting conditions of the systems. To put the results into context, we present a time-dependent modeling that reproduces both the general trends and the scatter found in the available data of this population.

Collaboration

H.E.S.S.

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