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The TeV gamma-ray source population of the Milky-Way.

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In this work we perform a population study of the H.E.S.S. Galactic Plane Survey (HGPS) catalogue. Namely, we analyze the flux, latitude and longitude distributions of gamma-ray sources detected by H.E.S.S. with the goal of inferring the main properties of galactic TeV source population.
We show that the total Milky Way luminosity in the 1-100 TeV energy range is relatively well constrained by H.E.S.S. data, obtaining $L_{\rm MW} = 1.7^{+0.5}_{-0.4} \times 10^{37} {\rm erg\,s^{-1}}$, and that the total Galactic flux in the H.E.S.S. observational window is $\Phi_{\rm tot} = 3.8^{+1.0}_{-1.0} \times 10^{-10} {\rm cm^{-2}\,s^{-1}}$.
The above results allows us to estimate the flux produced by sources not resolved by H.E.S.S.. These sources, which are too faint (or too extended) to be detected by H.E.S.S., contribute to the large-scale diffuse signal observed at the TeV range. We show that unresolved source contribution is not negligible (about 60% of the resolved signal measured by H.E.S.S.) and potentially responsible for a large fraction of the diffuse-large scale gamma-ray signal observed by H.E.S.S. and other experiments in the TeV domain.
Finally, in the hypothesis that the majority of bright sources detected by H.E.S.S. are powered by pulsar activity, like e.g. Pulsar Wind Nebulae or TeV halos, we estimate the main properties of the pulsar population: we obtain a constrain on the fading time τ, the initial period P_0 and the magnetic field B.

Keywords

High energy astrophysics; Gamma-ray sources; PWN.

Collaboration

other Collaboration

Subcategory

Theoretical Results

Primary authors: Dr CATALDO, Maddalena (FAU); PAGLIAROLI, Giulia (GSSI); VECCHIOTTI, Vittoria (GSSI); VILLANTE, Francesco Lorenzo (Università degli studi dell'Aquila)

Presenter: VECCHIOTTI, Vittoria (GSSI)

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