Contribution ID: **201**   Type: **Parallel talk**

The Galactic population of high-energy gamma-ray sources and the contribution of its unresolved component to the diffuse gamma and neutrino emissions

Thursday 31 August 2023 16:15 (15 minutes)

We provide a phenomenological description of the population
of galactic TeV Pulsar Wind Nebulae (PWNe) based on suitable assumptions for their space and luminosity distribution.
We constrain the general features of this population by
assuming that it accounts for the majority of bright sources
observed by H.E.S.S. Namely, we determine the maximal luminosity and fading time of PWNe by fitting the flux, longitude and
latitude distribution of bright sources in the Hess Galactic Plane Survey. This allows us to estimate the total luminosity and flux produced by galactic TeV PWNe. This also permits us to evaluate the cumulative emission from PWNe that cannot be resolved by H.E.S.S, showing that this contribution can be as alrge as $\sim 40\%$ of the total flux from resolved sources.
We argue that this is also relevant in the GeV domain providing a relevant contribution to the large-scale diffuse emission in the inner
Galaxy. Finally, the same result is obtained at PeV energy where the sum of the diffuse component due to unresolved PWNe and the truly diffuse emission well saturates the recent Tibet; data, without the need to introduce a progressive hardening of the cosmic-ray spectrum toward the Galactic center.

Submitted on behalf of a Collaboration?

No

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Session Classification: High-energy astrophysics and cosmic rays

Track Classification: High-energy astrophysics and cosmic rays