

Galactic Science with the Southern Wide-field Gamma-ray Observatory

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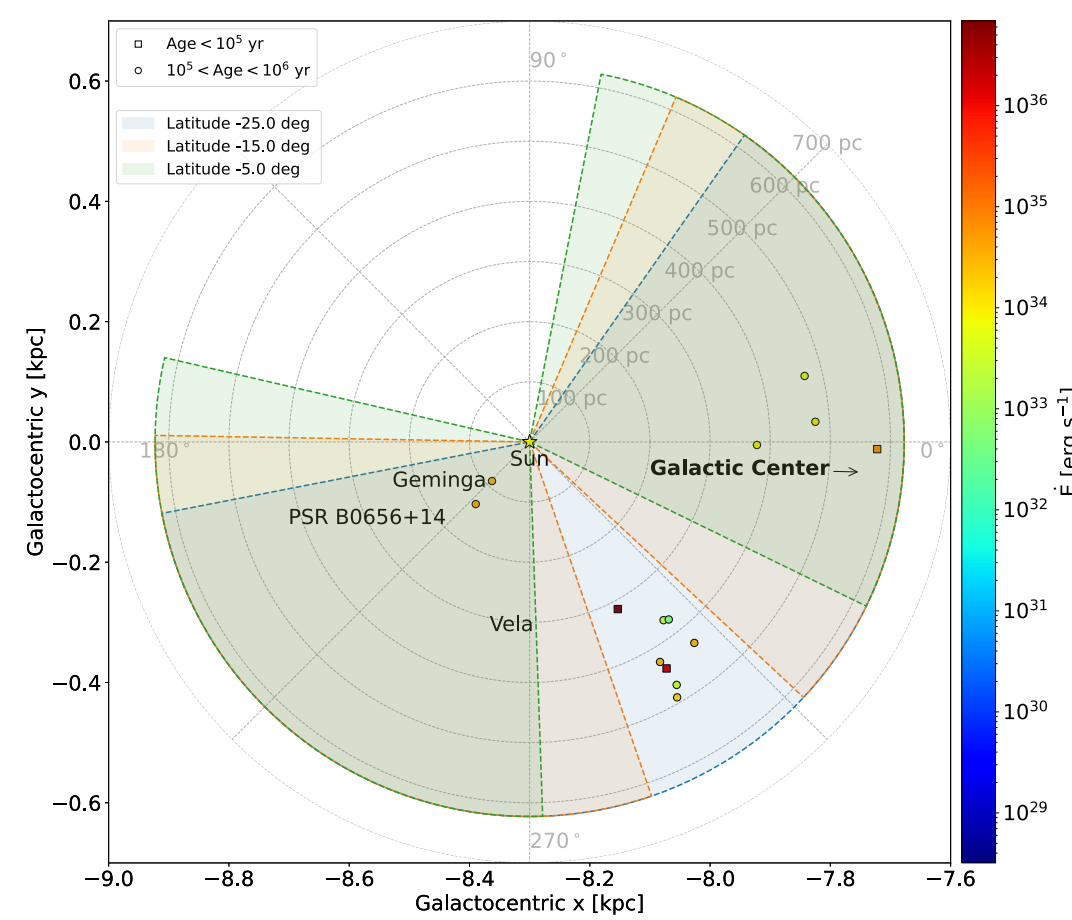
SWGO

- The Southern Wide-field Gamma-ray Observatory will be the next generation of ground-based gamma-ray facilities using the Extensive Air Shower particle detection technique
 - Located in the Southern Hemisphere to be complementary to instruments in the Northern Hemisphere like HAWC and LHAASO, and complementary to CTA South
 - Will be composed of a dense inner detector and a sparse outer one.
 - Currently in its design phase.

Gamma-ray halos

- Regions in which electrons and positrons generated in the pulsar magnetosphere propagate freely into the Interstellar Medium
 - New type of source gaining lots of attention from the community
 - Mainly studied by wide-field instruments due to their extension -> far away ones are less bright.
- SWGO can:
 - Characterize nearby ones through morphological measurements
 - Observe and detect further away ones -> need to have a good angular resolution to avoid source confusion.

Fig.1: Observability of pulsars within 500 pc



PeVatrons

- PeVatron detection can be done by spectral investigation.
 - Understand which spectral cutoff energies can be detected with SWGO.
 - Estimate number of PeVatron sources that can be detected / identified with SWGO.

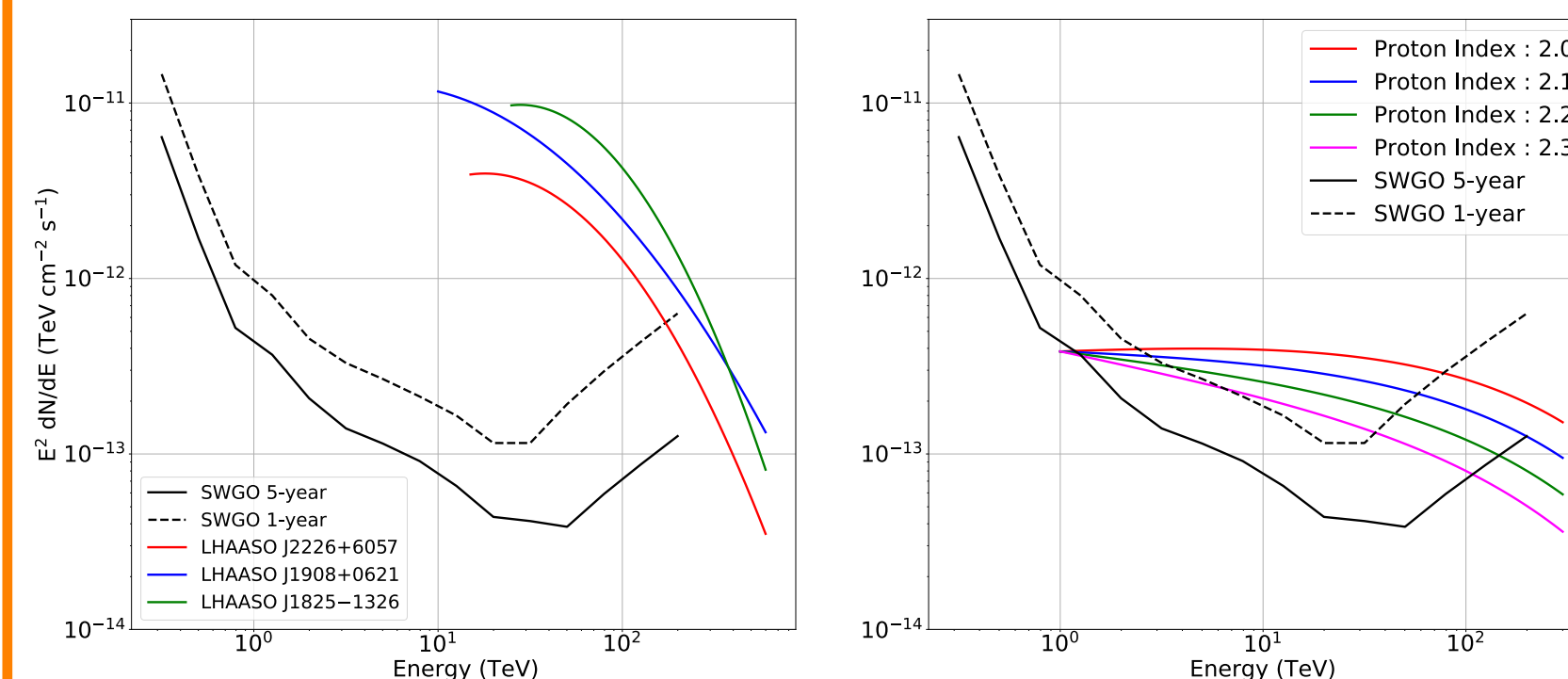


Fig.2: Left panel: LogParabola models obtained from LHAASO observations (see proceeding for details) Right panel: gamma-ray emission models from proton-proton interactions

Diffuse emission and Fermi Bubbles

- Diffuse emission from the Galactic Plane should extend up to PeV energies.
 - Wide-field instruments are optimal for the detection of very extended emission.
- The Fermi Bubbles are bubble-like structures seen in radio and gamma rays.
 - Their detectability will depend on the extension of their spectrum to TeV energies.

Acknowledgements: