

The Galactic TeV sky: sources or diffuse emission?

Gamma-ray observations have recently shifted the focus to higher and higher energies, with capable ground-based instruments enabling measurements in the TeV to PeV domain. While a clear prevalence of diffuse emission is observed in the GeV sky, energy-dependent cosmic-ray transport suggests a reversal of this hierarchy at higher energies. Measurements, however, are at strife regarding this question. While imaging atmospheric Cherenkov telescopes (IACTs) see a source-dominated Galactic plane, air-shower particle detectors (ASPDs) report a dominance of diffuse emission. Reconciling these claims requires a closer look at the involved instrument limitations: IACTs have a small field of view, resulting in poorer performance for large-scale emission due to the applied background subtraction technique. ASPDs have reduced resolution capabilities, resulting in unresolved sources contributing to the measurable diffuse emission signal.

Here we shed light on this controversy by investigating the amount of unresolved sources in current TeV measurements in a population synthesis approach and discuss the unique capabilities for high-resolution diffuse-emission measurements with IACTs and their possibilities for overcoming their background limitations.

Primary authors: EGBERTS, Kathrin (University of Potsdam); Dr STEPPA, Constantin (Postdam University); KAROL, Peters (University of Potsdam)

Presenter: EGBERTS, Kathrin (University of Potsdam)

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