Contribution ID: **147** Type: **Flashtalk with Poster**

Characterizing the Fermi-LAT high-latitude sky with simulation-based inference

Tuesday, 30 April 2024 14:50 (3 minutes)

The GeV gamma-ray sky, as observed by the Fermi Large Area Telescope (Fermi LAT), harbours a plethora of localised point-like sources. At high latitudes ($|b| > 30^\circ$), most of these sources are of extragalactic origin. The source-count distribution as a function of their flux, $\mathrm{d}N/\mathrm{d}S$, is a well-established quantity to summarise this population. We employ sequential simulation-based inference using the truncated marginal neural ratio estimation (TMNRE) algorithm on 15 years of Fermi LAT data to infer the $\mathrm{d}N/\mathrm{d}S$ distribution between 1 and 10 GeV in this part of the sky. While our approach allows us to cross-validate existing results in the literature, we demonstrate that we can go further than mere parameter inference. We derive a source catalogue of detected sources at high latitudes in terms of position and flux obtained from a self-consistently determined detection threshold based on the LAT's instrument response functions and utilised gamma-ray background models.

Primary authors: Dr WENIGER, Christoph (University of Amsterdam); ECKNER, Christopher (LAPP, CNRS); LIST, Florian (University of Vienna); CALORE, Francesca; ANAU MONTEL, Noemi (GRAPPA)

Presenter: ECKNER, Christopher (LAPP, CNRS)

Session Classification: 2.3 Simulation-based inference

Track Classification: Session A