



Contribution ID: 445

Type: **not specified**

Assessing the Impact of Likelihood-Based Inference Techniques on Galactic Center Excess Studies

Thursday 16 May 2024 17:00 (15 minutes)

A significant excess of gamma-rays has been detected by the Fermi-LAT space telescope in the direction of the Galactic center, yet its origin remains uncertain. The Galactic center excess (GCE) can be explained as a signal of annihilating dark matter or emissions from point sources such as unresolved millisecond pulsars. In principle, these hypotheses can be distinguished with likelihood based inference techniques that characterize dim point sources. A previous study has suggested that the standard approach, known as the Non-Poissonian Template Fit (NPTF), has shortcomings and biases in its adopted approach. In this work, we study the impact both of those issues can have on inferences of the GCE, both by testing the impact of the assumed priors on the dark matter and point source models, and further by testing the impact of moving to the new Compound Poisson Generator (CPG) which resolves many of the shortcomings of the NPTF.

Mini Symposia (Invited Talks Only)

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Session Classification: Astro-particle Physics

Track Classification: Astro-particle Physics