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Tricking Non-Poissonian Template Fitting: Dark Matter Hiding at the Galactic Center?

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The Galactic Center GeV excess is firmly detected. While there is statistical evidence suggesting the excess originates largely from point sources, its interpretation as a signal of annihilating dark matter has not been conclusively ruled out. We examine the degree to which assumptions about the diffuse modeling and source populations could affect non-Poissonian template fitting methods that indicate a point-source origin for the excess. We find a proof-of principle example where a simulated dark matter signal can instead be attributed to point sources by the NPTF, in a simulation including unmodeled sources in the Fermi Bubbles. We confirm this effect is possible in the real Fermi data, finding that an injected dark matter signal is misattributed to point sources.

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