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Mapping Correlation of a Simulated Dark Matter Source and a Point Source in the Gamma-Ray Sky

General Abstract

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In my research, I analyzed how two gamma-ray source models interact with one another when optimizing to fit data. This is important because it becomes hard to distinguish between the two point sources when they are close together or looking at low energy photons. The reason for the first is obvious, the reason why they become harder to distinguish at lower photon energies is the resolving power of the Fermi Gamma-Ray Space Telescope gets worse at lower energies. When the two point sources are highly correlated (hard to distinguish between), we need to change our method of statistical analysis. What I did was show that highly correlated sources have larger uncertainties associated with them, caused by an optimizer not knowing which point source's parameters to optimize. I also mapped out where their is high correlation for 2 different theoretical mass dark matter point sources so that people analyzing them in the future knew where they had to use more sophisticated statistical analysis.

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