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Scrutinizing the Diffuse Gamma-Ray Emission in the Inner Galaxy

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The recently discovered gamma-ray excess in the inner galaxy has important implications either for astrophysics or dark matter. Regardless of its origin, studies on the anomalous emission suffer from poor astrophysical modeling and large uncertainties in background emission in the region of interest. Therefore understanding of the gamma-ray background components in the inner galaxy is essential for scrutinizing the excess and determining its origin. Towards this purpose, using the CTBCORE core cuts that improve the PSF of the Fermi-LAT telescope, the two dominant diffuse gamma-ray components in the region of interest are scrutinized. By spectral restriction of the Bremsstrahlung and the pion-decay components, a better assessment of their morphologies can be made. A refined diffuse emission model can be helpful in distinguishing a dark matter annihilation signal from emission due to an unresolved population of MSPs in the inner galaxy.

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