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The GeV Galactic Center Excess Uncertainties in the Measured Spectrum and Morphology and Dark Matter Implications ANDREA ALBERT, Los Alamos National Laboratory, DMITRY MALYSHEV, Erlangen Center for Astroparticle Physics, ANNA FRANCKOWIAK, DESY, LUIGI TILBALDO, MPI – Heidelberg, MATTIA DI MAURO, SLAC National Lab, FERMI LAT COLLABORATION — Gamma-ray emission from dark matter (DM) annihilation is expected to peak toward the Galactic center (GC), which shines in gamma rays due to interactions of cosmic rays with interstellar gas and radiation in the Galaxy, and many energetic objects along the line of sight. Many groups have found an excess in the Fermi Large Area Telescope (LAT) data toward the GC peaking around a few GeV. Morphological and spectral arguments have been made to support both DM and more standard astrophysical interpretations. We assess the uncertainties on the morphology and spectrum of the excess related to modeling the various components of gamma-ray emission in that region, using 6.5 years of LAT data. We consider uncertainties in the distribution of interstellar gas along the line of sight, in the low-latitude emission from the Fermi bubbles, and in the abundance of cosmic-ray sources in the innermost Galaxy. The excess persists in all the models considered, though the spectrum varies significantly. To test the robustness of a DM interpretation, we search for DM-like excesses along the Galactic plane. We find no significant detection of DM and set upper limits that assume the DM is centrally peaking in the inner Galaxy. Our limits are competitive with limits from dwarf galaxies and other targets.

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