

粒子天体物理与宇宙学

Perspective of Galactic dark matter subhalo detection on Fermi from the EGRET observation

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摘要

The perspective of the detectability of Galactic dark matter subhaloes on the Fermi satellite is investigated in this work. Under the assumptions that dark matter annihilation accounts for the “GeV excess” of the Galactic diffuse γ -rays discovered by EGRET and the γ -ray flux is dominated by the contribution from subhaloes of dark matter, we calculate the expected number of dark matter subhaloes that Fermi may detect. We show that Fermi may detect a few tens to several hundred subhaloes in a 1-year all-sky survey. Since EGRET observation is taken as a normalization, this prediction is independent of the particle physics property of dark matter. The uncertainties of the prediction are discussed in detail. We find that the major uncertainty comes from the mass function of subhaloes, i.e., whether the subhaloes are “point like” (high-mass rich) or “diffuse like” (low-mass rich). Other uncertainties like the background estimation and the observational errors will contribute a factor of 2—3.

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