Anisotropies in the Diffuse Gamma-ray Background from Galactic Dark Matter Substructure

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The majority of the gamma-ray emission from Galactic dark matter annihilation is likely to be detected as a contribution to the diffuse gamma-ray background. Simulations of structure formation in a $\Lambda$CDM cosmology find that galaxy-sized dark matter halos are rich in substructure, typically hosting at least several hundred dark matter subhalos. The presence of dark matter substructure in the Milky Way will induce characteristic anisotropies in the measured diffuse gamma-ray emission, which may offer a unique method for extracting the dark matter signal. Furthermore, since the intrinsic properties of the assumed dark matter particle influence the small-scale distribution of dark matter, a measurement of anisotropies in the gamma-ray background has the potential to place strong constraints on viable dark matter models. I will discuss angular features in the Galactic diffuse emission arising from the small-scale clumping of cold dark matter, and the detectability of these signatures with current and upcoming instruments.