Poster Abstract
Neutrino 08 Conference

Conservative Constraints on Dark Matter Annihilation into Gamma Rays

Thomas D. Jacques
Gregory D. Mack, John F. Beacom, Nicole F. Bell, Hasan Yüksel

Abstract
Using gamma-ray data from the Milky Way, Andromeda, and the cosmic background, we calculate conservative upper limits on the dark matter self-annihilation cross section into monoenergetic gamma rays, $\langle \sigma_A v \rangle_{\gamma \gamma}$, over a wide range of dark matter masses. If $Br(\gamma \gamma)$ were known, then $\langle \sigma_A v \rangle_{\gamma \gamma}/Br(\gamma \gamma)$ would define an upper limit on the total cross section; in the absence of this knowledge, we conservatively assume $Br(\gamma \gamma) \gtrsim 10^{-4}$. For intermediate dark matter masses, gamma-ray-based and neutrino-based upper limits on the total cross section are comparable, with the former dominating for small masses and the latter for large masses. We comment on how these results depend on the assumptions about astrophysical inputs and annihilation final states, and how GLAST and other gamma-ray experiments can improve upon them.