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Contribution of Dark Matter Annihilations to the Low-Redshift Metagalactic Ionization Rate

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Dark matter annihilations can inject a significant amount of energy into the visible sector following the clustering of Dark Matter (DM) into halos at late times. Motivated by the DM interpretation of the gamma-ray excess in the inner Milky Way, we study the diffusive escape of the electrons and positrons produced by DM annihilations from the host halo, and the subsequent in-situ upscattering of the CMB photons in the IGM. This ICS emission component contributes to the cosmic UV background and becomes an efficient source of heating and ionization of the Lyman-alpha forest at low redshift, when the contribution from the star-forming galaxies and quasars is expected to decline. We further investigate its relevance to the recent mismatch (Kollmeier et al. 2014) between the expected and observed number of Lyman-alpha absorbers at low-redshift. Regardless of the relevance to this crisis, the prediction of a \sim GeV electron-positron population in the IGM can put constraints on the DM annihilation cross section, considering the well-measured X-ray background.

Oral or Poster Presentation

Oral

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