Photometric Properties of White Dwarf Dominated Halos

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Using stellar population synthesis techniques, we explore the photometric signatures of white dwarf progenitor dominated galactic halos, in order to constrain the fraction of halo mass that may be locked-up in white dwarf stellar remnants. We first construct a 10^9 M_sun stellar halo using the canonical Salpeter initial stellar mass distribution, and then allow for an additional component of low- and intermediate-mass stars, which ultimately give rise to white dwarf remnants. Microlensing observations towards the Large Magellanic Cloud, coupled with several ground-based proper motion surveys, have led to claims that in excess of 20% of the dynamical mass of the halo (10^{12} M_sun) might be found in white dwarfs. Our results indicate that (1) even if only 1% of the dynamical mass of the dark halo today could be attributed to white dwarfs, their main sequence progenitors at high redshift ($z\sim3$) would have resulted in halos more than 100 times more luminous than those expected from conventional initial mass functions alone, and (2) any putative halo white dwarf progenitor dominated initial mass function component, regardless of its dynamical importance, would be virtually impossible to detect at the present-day, due to its extremely faint surface brightness.