

DM Annihilation Cross Section Upper Limits

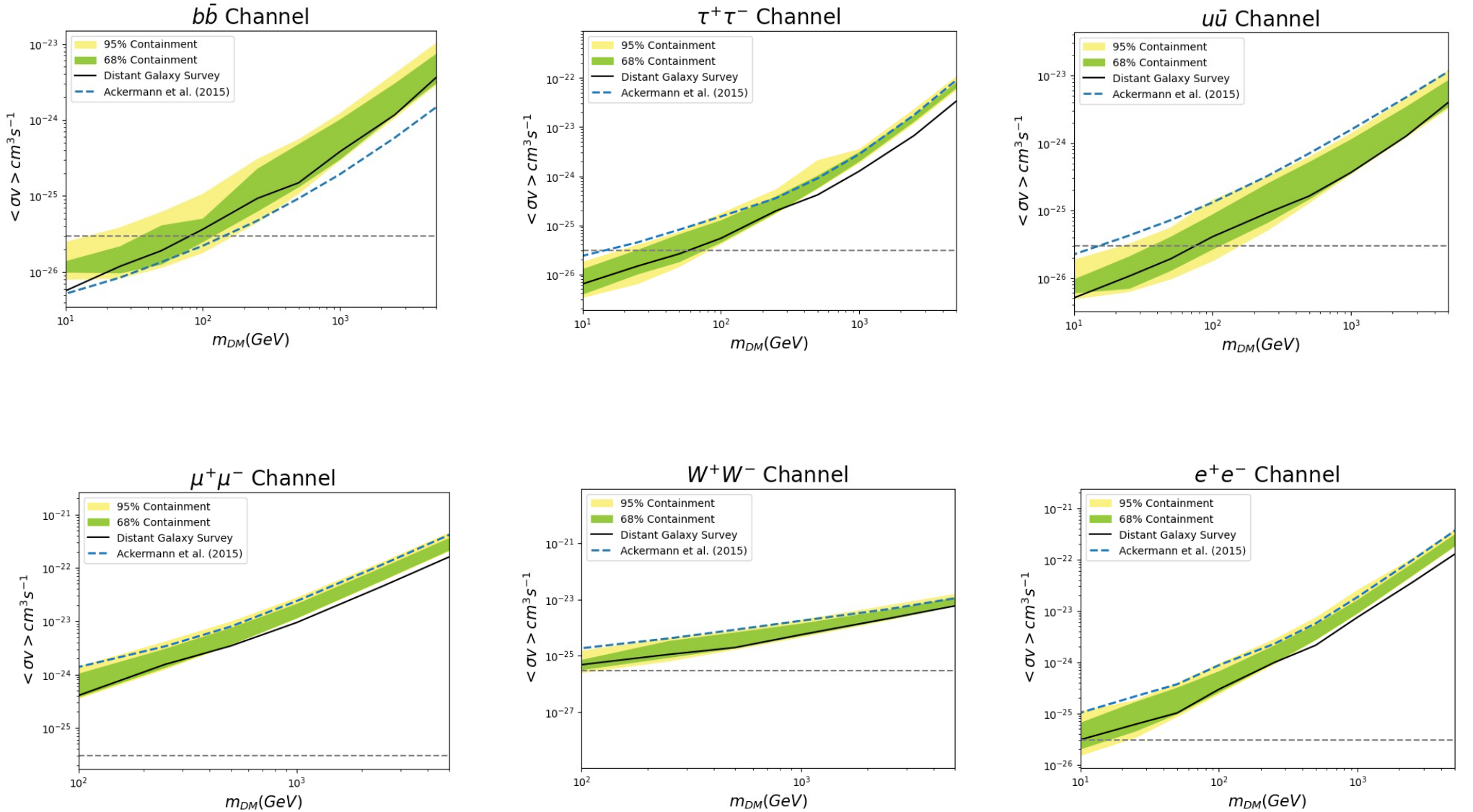


Figure 1: 95% upper confidence interval of the thermally averaged annihilation cross section of WIMP Dark matter with masses between 10 GeV and 5 TeV within the $b\bar{b}$, $\tau^+\tau^-$, $u\bar{u}$, $\mu^+\mu^-$, W^+W^- , e^+e^- annihilation channels. A combined binned likelihood analysis was conducted with 24 logarithmically-spaced photonic flux bins between 500 MeV and 500 GeV in twelve galactic halos at a distance greater than 15 MLY. Data was compared to the upper limits derived by the Fermi Collaboration (Ackermann et al., 2015) in their survey of 15 Dwarf Spheroidal Galaxies orbiting the Milky Way. Additionally, 20 blank-sky analyses at high galactic latitudes ($|b| > 30^\circ$), serving as the null (no DM source). The 1σ and 2σ containment bands for the annihilation cross section were graphed (represented as the green and yellow areas).

Global DM Test Statistic

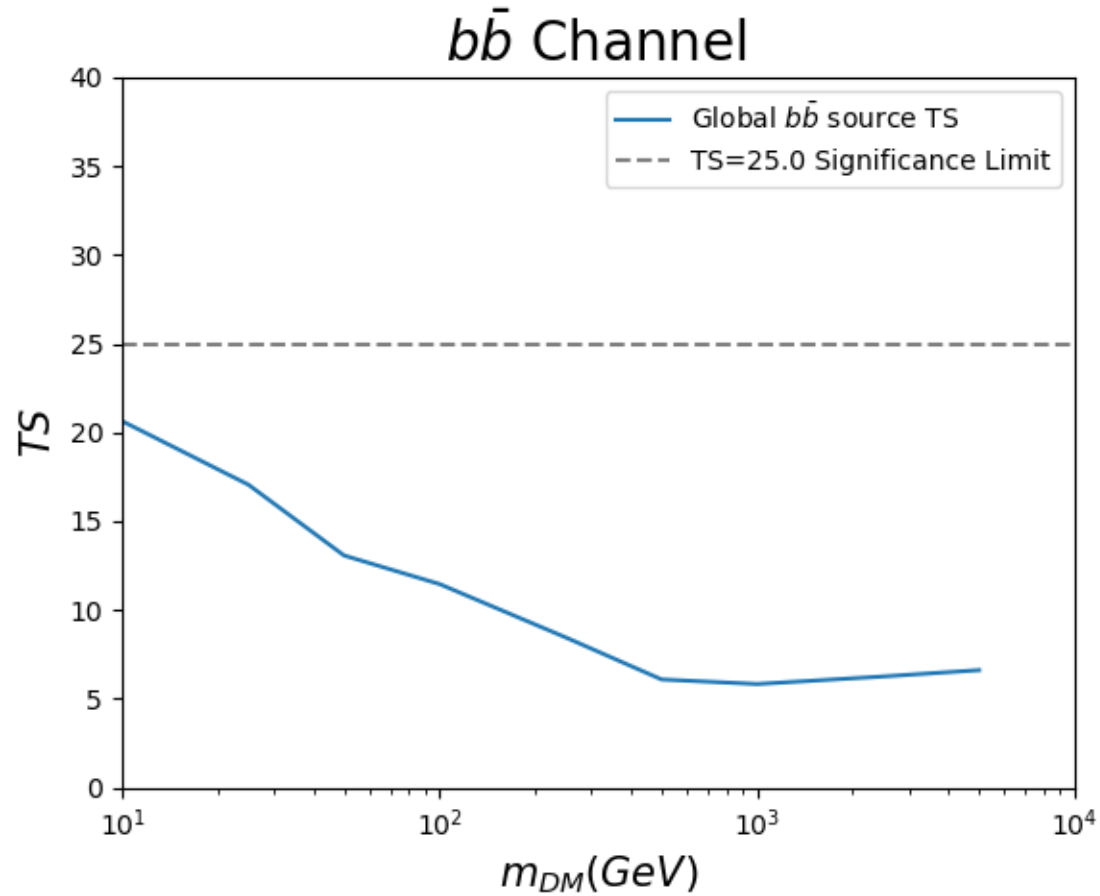


Figure 2: Mean test statistic for the $b\bar{b}$ channel across twelve surveyed galactic sources. There is no native formula to convert the Test Statistic into a p-value, thus it is regarded as a standalone variable. The LAT Source detection threshold is $TS > 25$ (Nolan et al. 2012). None of the six annihilation channels exceed this threshold, with the largest being the $e\bar{e}$ channel at $m=25$ GeV, with $TS = 20.24$. As a result, the collected dark matter source significance may lay solely in background fluctuations.