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An Optimized Search for Dark Matter in the Galactic Halo with HAWC

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With a mass of approximately ~10^12 solar masses, the Galactic Halo is the closest known large dark matter halo and a prime candidate for indirect dark matter detection. The High Altitude Water Cherenkov Observatory (HAWC) is a high energy (300 GeV to 100 TeV) gamma ray detector located in central Mexico. HAWC operates via the water Cherenkov technique and has both a wide field of view of ~2 sr and a >95% duty cycle, making it ideal for analysis of highly extended sources. We made use of these properties of HAWC and a new background-estimation technique optimized for extended sources to probe a large region of the Galactic Halo for dark matter signals. With this approach and taking into account electroweak corrections to the gamma-ray spectra, we set improved constraints on dark matter annihilation and decay between masses of 10 and 100 TeV Our constraints also take into account detector simulation systematics and are robust against uncertainties in the Galactic dark matter spatial profile.

Keywords

dark matter; galactic; constraints; HAWC; gamma ray

Collaboration

HAWC

other Collaboration

Subcategory

Experimental Results

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