

A Novel Approach towards the Search for Gamma-ray Emission from the Northern Fermi Bubble with HAWC

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The *Fermi* bubbles are structures observed in gamma rays at GeV energies, emanating from the central region of our galaxy and extending up to 8.5 kpc above and below the galactic plane. While initial studies showed a flat brightness across the entire structure, more recent work found a brightening at the base. We perform a template-based search for TeV signals from the northern *Fermi* bubble and just from the base of it in data from the High Altitude Water Cherenkov (HAWC) gamma-ray observatory. We employ a profile likelihood approach to calculate the significance and flux from the search regions. With no significant signal from the northern *Fermi* bubble and its base, we report new upper limits on the integral flux at 95% confidence level. Our integral flux upper limits for the northern *Fermi* bubble are more constraining than the previous limits reported by HAWC. Moreover, we present, for the first time, TeV limits pertaining to the base of the bubble which constitutes a more fair comparison to Fermi-LAT data points close to this particular region.

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Subcategory

Experimental Results

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