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Limits on the Diffuse Gamma-Ray Background with HAWC MORA DUROCHER, Los Alamos National Laboratory, HIGH ALTITUDE WATER CHERENKOV COLLABORATION — The high-energy Diffuse Gamma-Ray Background (DGB) is expected to be produced by unresolved extragalactic objects such as active galactic nuclei, isotropic Galactic gamma-rays, and possibly emission from dark matter annihilations or decays in the Galactic dark matter halo. The DGB has only been observed below 1 TeV, and above this energy upper-limits have been reported. Observations or stringent limits on the DGB above this energy could have strong multimessenger consequences, such as constraining the origin of TeV-PeV astrophysical neutrinos detected by IceCube. The High Altitude Water Cherenkov (HAWC) Observatory, located in central Mexico at 4100 m above sea level, is sensitive to gamma rays from 300 GeV to above 100 TeV and continuously observes a wide field-of-view (2 sr). With its high energy reach and large area coverage, HAWC is well-suited to significantly improve searches for the DGB at TeV energies. In this work, strict cuts have been applied to the HAWC dataset to better isolate gamma-ray air showers from background hadronic showers. The sensitivity to the DGB was then verified using Crab data and Monte Carlo simulations, thus leading to a new limit on the DGB with HAWC as well as its implications for multimessenger and dark matter studies.

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