Abstract Submitted
for the APR21 Meeting of
The American Physical Society

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 (DGRB) is expected to be produced by unresolved extra-galactic objects such as active galactic nuclei, isotropic Galactic γ-rays, and possibly emission from dark matter annihilations or decays in Galactic or extra-galactic structures. The DGRB has only been observed below 1 TeV and above this energy, upper-limits have been reported. Observations or stringent limits on the DGRB above this energy could have strong multi-messenger 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 >100 TeV and continuously observes a wide field-of-view ($\sim$2 sr). With its high energy reach and large area coverage, HAWC is well-suited to significantly improve searches for the DGRB 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 DGRB was then verified using 535 days of Crab data and Monte Carlo simulations, leading to a new limit on the DGRB with HAWC as well as its implications for multi-messenger and dark matter studies.

Mora Durocher
Los Alamos National Laboratory

Date submitted: 18 Feb 2021 Electronic form version 1.4