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Constraining New Physics in Astrophysical Environments with HAWC KRISTI ENGEL, University of Maryland, College Park, HAWC COLLABORATION — Astrophysical observations at the highest energies are an excellent probe of fundamental physics. With its sensitivity to gamma rays with energies of $\sim$ 300 GeV to past 100 TeV—as well as its large instantaneous field-of-view of ~ 2 sr and a duty cycle over 95%—the High Altitude Water Cherenkov (HAWC) Observatory is uniquely suited to search for signatures of beyond-the-standard-model physics in astrophysical environments. In its first five years of operations, we have used HAWC data to constrain the local Primordial Black Hole burst rate density, performed indirect dark matter (DM) searches from a multitude of targets including dwarf galaxies, the galactic halo, the Virgo cluster, and the Sun, and to test for possible signatures of Lorentz Invariance Violation as well as constrain its energy scale. HAWC has also joined forces with other gamma-ray experiments to cover a wide range of DM masses from multi-GeV to multi-TeV. We present recent results for this diverse set of searches for new physics, placing some of the strongest limits in the world.

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