

Abstract Submitted  
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**HAWC Energy Reconstruction via Neural Network**<sup>1</sup> SAMUEL MARINELLI, Michigan State University, HAWC COLLABORATION — The High-Altitude Water-Cherenkov (HAWC)  $\gamma$ -ray observatory is located at 4100 m above sea level on the Sierra Negra mountain in the state of Puebla, Mexico. Its 300 water-filled tanks are instrumented with PMTs that detect Cherenkov light produced by charged particles in atmospheric air showers induced by TeV  $\gamma$ -rays. The detector became fully operational in March of 2015. With a 2-sr field of view and duty cycle exceeding 90%, HAWC is a survey instrument sensitive to diverse  $\gamma$ -ray sources, including supernova remnants, pulsar wind nebulae, active galactic nuclei, and others. Particle-acceleration mechanisms at these sources can be inferred by studying their energy spectra, particularly at high energies. We have developed a technique for estimating primary- $\gamma$ -ray energies using an artificial neural network (ANN). Input variables to the ANN are selected to characterize shower multiplicity in the detector, the fraction of the shower contained in the detector, and atmospheric attenuation of the shower. Monte Carlo simulations show that the new estimator has superior performance to the current estimator used in HAWC publications.

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