

# TeV Astrophysics at the HAWC Observatory

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The field of TeV gamma-ray astrophysics is currently dominated by two types of air shower experiments: imaging air Cherenkov telescopes (IACTs), which conduct very sensitive but low-uptime pencil-beam surveys of the gamma-ray sky; and surface arrays, which are moderately sensitive but carry out synoptic surveys with high uptime. The High Altitude Water Cherenkov Observatory, or HAWC, is a surface array of 300 water Cherenkov detectors deployed 4100 m above sea level in Sierra Negra, Mexico. It is sensitive to cosmic rays and gamma rays between 100 GeV and 100 TeV, and observes two-thirds of the sky each day. HAWC is uniquely suited to study very high energy sources of cosmic rays and search for regions of extended gamma-ray emission. Because of its high uptime, HAWC will also play a crucial role in triggering multi-wavelength and multi-messenger studies of active galactic nuclei, gamma-ray bursts, and other transient sources. The observatory was completed in January 2015, but observations with the partially-finished detector began in July 2013. We will describe the first year of data collected with HAWC, which includes the observation of TeV emission from the Galactic Plane and other known Galactic sources, a number of AGN, and the anisotropy of cosmic rays at 1 TeV. We will also discuss the prospects for a robust multi-wavelength and multi-messenger program with HAWC.

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