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**A future wide field-of-view TeV gamma-ray observatory in the Southern Hemisphere** MIGUEL MOSTAFA, Pennsylvania State Univ, HAWC COLLABORATION — High-energy gamma-ray observations are an essential probe of cosmic-ray acceleration. Detection of the highest energies and the shortest timescales of variability are key motivations when designing the next generation of gamma-ray experiments. The Milagro experiment was the first-generation of gamma-ray detectors based on the water-Cherenkov technique, and demonstrated that it is possible to continuously monitor a large fraction of the TeV sky. The second-generation water-Cherenkov experiment, the High Altitude Water Cherenkov observatory, consists of an array of 300 water-Cherenkov detectors covering an area of 22,000 $m^2$ at 4,100 m a.s.l. The larger effective area, the higher altitude, and the optical isolation of the detectors led to a 15-fold increase in sensitivity relative to Milagro. Instruments with a wide field of view and large duty cycle are capable of surveying the TeV sky, mapping the diffuse emission, detecting emission from extended regions, and observing transient events such as gamma ray bursts. They also have the potential for discovering electromagnetic counterparts to gravitational waves and astrophysical neutrinos. I will present the preliminary design of a third-generation water-Cherenkov observatory located at very high altitude in South America.

Miguel Mostafa
Pennsylvania State Univ

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