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Observations of the Moon and the Sun using TeV Gamma Rays and Cosmic Rays MEHR UN NISA, University of Rochester, ZIG HAMPEL, University of Wisconsin - Madison, HAWC COLLABORATION[1] — The Sun and Moon provide unique targets for studies of cosmic rays and gamma rays above 1 TeV. By observing the deficits (or "shadows") in the flux of Galactic cosmic rays created by the Moon and the Sun, we can measure particle deflection in the geomagnetic field, estimate the fraction of hadronic and leptonic antiparticles in the cosmic-ray flux, and probe hard-to-observe properties of the solar magnetic field. In addition, TeV gamma rays from the solar disk can be used to study cosmic-ray interactions in the solar photosphere and place limits on the annihilation of dark matter captured by the Sun's gravity. The High Altitude Water Cherenkov (HAWC) Observatory, operating in central Mexico since the end of 2014, is the only facility currently capable of observing TeV cosmic rays and gamma rays from the Moon and the Sun. We describe the first year of observations of the lunar and solar disks with HAWC, and discuss prospects for conducting solar and Galactic astrophysics with these data.

[1]High-Altitude Water Cherenkov Gamma-Ray Observatory

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