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Searching for TeV signatures of cosmic ray interaction and dark matter near the Sun with HAWC Observatory MEHR UN NISA, Univ of Rochester, HAWC COLLABORATION — Very high energy gamma rays from the quiescent Sun have been observed up to almost a 100 GeV. The most likely origin of this emission lies in the pion decay resulting from galactic cosmic rays interacting in the Suns atmosphere. Another proposed source of the flux is dark matter annihilation through mediators that decay just outside the Sun into standard model particles. Both models predict that gamma-ray emission should continue above 1 TeV. Measurements of the Sun in the TeV range can help constrain the origin of very high-energy solar gamma rays. The High Altitude Water Cherenkov (HAWC) Observatory is a wide field-of-view array that is currently the only detector capable of measuring gamma rays from the Sun at multi-TeV energies. We present results from a search for excess gamma rays from the Sun using three years of data from HAWC. Our measurements provide the strongest upper limits on TeV gamma rays from the solar disk. We discuss the implications of these measurements on the origin of the solar gamma-ray excess.

Mehr Nisa
Univ of Rochester

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