ICRC2015

ICRC
The Astroparticle Physics Conference
34th International Cosmic Ray Conference
July 30 - August 6, 2015
The Hague, The Netherlands

Contribution ID: **716** Type: **Poster contribution**

THE SUN SHADOW OBSERVED BY HAWC

Saturday 1 August 2015 15:30 (1 hour)

We present preliminary images of the sun shadow from data collected by the High Altitude Water Cherenkov Observatory (HAWC) during 2013 and 2014. HAWC is an air shower array located in the central region of Mexico that observes TeV cosmic rays at a rate of about 10 kHz. The magnetic field of the solar corona is very difficult to measure directly. However indirect observations of the solar corona are possible using the deficit in the flux of cosmic rays coming from the direction of the Sun. The inner magnetic field of the Sun as well as the interplanetary magnetic field frozen in the solar wind deviate low energy cosmic rays. In contrast, high energy cosmic rays (TeVs) are expected to be absorbed in the Sun's photosphere and to produce a shadow in the Sun's nominal position viewed from Earth. Several ground-based instruments have observed during the last decades effects of the heliospheric magnetic field on the size of the sun shadow and its position. In this work, we compare our maps to those obtained by similar ground-based measurements obtained during earlier solar cycles and discuss long-term monitoring of the solar magnetic field with HAWC.

Collaboration

HAWC

Registration number following "ICRC2015-I/"

1347

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Session Classification: Poster 2 SH

Track Classification: SH-EX