ICRC2015

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

Contribution ID: **1296** Type: **Poster contribution**

Dark Matter Annihilation and Decay Searches with the High Altitude Water Cherenkov (HAWC) Observatory

Tuesday 4 August 2015 16:00 (1 hour)

In order to observe annihilation and decay of dark matter, several types of potential sources should be considered. Some sources, such as dwarf galaxies, are expected to have very low astrophysical backgrounds but fairly small dark matter densities. Other sources, like the Galactic center, are expected to have larger densities of dark matter but also have more complicated backgrounds from other astrophysical sources. To search for these signatures of dark matter, the large field-of-view of the HAWC detector, covering 2 sr at a time, particularly enables searches from sources of dark matter annihilation and decay, which are extended over several degrees on the sky. With a sensitivity over 2/3 of the sky, HAWC has the ability to probe a large fraction of the sky for the signals of TeV-mass dark matter. In particular, HAWC should be the most sensitive experiment to signals coming from dark matter with masses greater than 10-100 TeV. We present the HAWC sensitivity to annihilating and decaying dark matter signals for several likely sources of these signals.

Registration number following "ICRC2015-I/"

1159

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Session Classification: Poster 3 DM and NU

Track Classification: DM-EX