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**Searching for Dark Matter in M31 with the High Altitude Water Cherenkov Observatory** ANDREA ALBERT, Los Alamos National Laboratory, HAWC COLLABORATION — There is overwhelming evidence that non-baryonic dark matter constitutes 85% of the mass in the Universe. Many promising dark matter candidates, like Weakly Interacting Massive Particles (WIMPs), are predicted to produce Standard Model particles like gamma rays via annihilation or decay. These gamma-rays would be observed by ground-based arrays like the High Altitude Water Cherenkov (HAWC) Observatory. With its wide field of view and constant monitoring, HAWC is well-suited to search for dark matter in extended targets like the M31 galaxy. We will present results from our search for a signal from dark matter annihilation or decay in M31 using 760 days of data from HAWC. A detection of dark matter through cosmic messengers would not only confirm the existence of dark matter through a non-gravitational force, but also indicate the existence of physics beyond the Standard Model.

Andrea Albert
Los Alamos National Laboratory

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