

TeV Halos: A New Class of TeV Sources Powered by Pulsars

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Observations by the HAWC and HESS telescopes have found extended TeV emission consistent with a handful of young and middle-aged pulsars. In this talk, I will show that these detections have significant implications for our understanding of both pulsar emission and TeV astrophysics. First, the spectrum and intensity of these “TeV Halos” indicates that a large fraction of the pulsar spindown energy is efficiently converted into electron-positron pairs. This provides observational evidence necessitating pulsar interpretations of the rising positron fraction observed by PAMELA and AMS-02. Second, the isotropic nature of this emission provides a new avenue for detecting nearby pulsars with radio beams that are not oriented towards Earth. Third, these observations indicate that the total emission from unresolved pulsars produces the majority of the TeVgamma-ray flux observed from the Milky Way.

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