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Constraints on Synchrotron Radiation from Dark Matter Annihilation in Dark Star Remnants DAVID STEPHENS, Univ of Utah — The particle nature of dark matter is currently one of the largest unanswered questions in astrophysics. To probe the properties of dark matter, we will look at the synchrotron flux from dark matter annihilation in dark star remnants. In the early universe, the presence of dark matter has been shown to delay the ignition of nuclear fusion during star formation, resulting in large "dark stars" that can collapse to black holes. Each of these black holes will be surrounded by a highly dense area of dark matter, where dark matter particles annihilate to produce charged particles. In turn, the charged particles interact with magnetic fields producing synchrotron radiation. By summing the synchrotron flux across the entire population of dark star remnants and taking redshift into account, the observable synchrotron flux today can be estimated. Specifically, we examine the synchrotron flux from Weakly Interacting Massive Particles (WIMPs) as the candidate for dark matter across two annihilation spectra, 150 GeV WIMPs to W^+W^- and 600 GeV WIMPs to $\tau^+\tau^-$. Comparing the predicted synchrotron flux to observation, constraints can be placed on dark star remnants as a source of dark matter annihilation and on the WIMP mass and annihilation cross section.

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