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Observational signatures of compact dark stars

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Asymmetric dark matter is generically expected to form compact dark stars, which can be searched for through their strong gravitational effects on the light from background stars or on the dynamics of other celestial objects in their vicinity. In this paper we analyze the possible signatures of compact dark stars in asymmetric dark matter scenarios with a portal to the Standard Model. We argue that compact dark stars could capture protons and electrons from the interstellar medium, which then accumulate in the core of the dark star, forming a very hot gas that emit X-rays or γ-rays. For dark matter parameters compatible with current laboratory constraints, compact dark stars could be sufficient luminous to be detected at the Earth as point source in the X-ray or γ-ray sky.

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