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More Ways to (Be) Cool: Compact Objects from Inelastic Dark Matter

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A dissipative dark sector can result in the formation of astrophysical compact objects. In this work, we investigate the formation of exotic compact objects assuming a subdominant inelastic dark matter model, and study the resulting landscape of these objects. Inelastic transitions introduce radiative processes which can impact the formation of compact objects via mutliple cooling channels. In particular, we consider cooling from dark Bremsstrahlung and a rapid decay process after inelastic upscattering. We find that having multiple cooling processes can result in a notably unique landscape of compact objects when compared to a scenario with only one cooling channel. The resulting distribution of these astrophysical compact objects and their properties can be used to further constrain and differentiate between dark sectors.

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