Abstract Submitted
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Interplay of ionized gas dynamics and dark matter physics in galaxy formation[1] KEITA TODOROKI, MIKHAIL MEDVEDEV, Univ of Kansas, MARK VOGELSBERGER, MIT — The problem of galaxy formation remains an outstanding problem in cosmology. Conventional paradigm assumes that dark matter is passive: it forms large halos which gravitationally pull gas into them. The rich physics of star formation, ISM physics, cosmic ray production and other baryonic effects and feedback are regulated by MHD or plasma kinetics. Such a paradigm seems to face some problems at galactic and sub-galactic, scales known as the missing satellite, core-cusp, and too-big-to-fail problems. We propose a model in which dark matter may experience inelastic interactions in the dark sector. The simplest two-component dark matter model has recently been shown to robustly resolve the small-scale problems in N-body dark-matter-only simulations [1,2]. Here we present simulations of an isolated galaxy using the full, state-of-the-art baryonic feedback machinery used in IllustrisTNG simulations. Our results indicate that the novel dark matter effects lead to 'effective' heating of the central parts of the galaxy akin to that due to the stellar and supernova outflow feedback. We discuss some observational predictions following from our study. [1,2] K. Todoroki, M.V. Medvedev, MNRAS, 483, 3983 (2019); MNRAS, 483, 4004 (2019)

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