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Sterile neutrino dark matter and the 3.5 keV line (15' + 5')

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The cold dark matter (CDM) paradigm has been extremely successful in explaining the large-scale structure of the Universe. However, it continues to face issues when confronted by observations on sub-Galactic scales. We first summarize the small-scale issues surrounding CDM and discuss the solutions explored by modern state-of-the-art numerical simulations including treatment of baryonic physics. We identify the 'too-big-to-fail' in field galaxies as among the best targets to study modifications to CDM, and discuss the particular solution of keV sterile neutrino warm dark matter. Furthermore, we discuss how the claimed anomalous 3.5 keV X-ray lines, when interpreted as sterile neutrino dark matter decay, provide a very good description of small-scale observations of the Local Group.

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