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Ultra-light dark matter: the light and fuzzy side of dark matter

Among the many possible candidates for the nature of dark matter, one of the most well-motivated class of models and leading candidate is the ultra-light dark matter. This class represents the lightest possible dark matter candidates, and exhibits a wave-like behavior on galactic scales. This leads to a rich phenomenology on small scales that can potentially not only reconcile the CDM picture with the small scale behavior of dark matter, but offer us the unique possibility to probe their distinctive predictions, and imprints that can reveal clues about the internal properties of dark matter. In this talk, I will review this class of models, describing and classifying the different constructions and their phenomenology. I will give special attention to the fuzzy dark matter, which is the simplest and most studied of these models. Given their vast cosmological and astrophysical effects on observables, I will describe the ongoing advances in constraining these models using current gravitational tests, and highlight the strong constraining power of small scale astrophysical observations. I will show the latest constraints and how with this we are narrowing down the mass range available for these models.

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