

Dark matter physics: from the early universe to near-field cosmology

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Cosmological observables, from the CMB anisotropy to the census of galaxies in the local universe, offer the most direct and broad tests for the nature of dark matter, including a number of scenarios that are challenging or even impossible to test in a laboratory setting. I will review the status of the recent early-universe and late-universe searches for the identity of dark matter, summarizing the best current limits on scattering between dark matter and baryons, the non-thermal production mechanisms for sterile neutrinos, and mass bounds on thermal-relic dark matter. I will highlight the interplay between complementary probes of dark matter physics, focusing especially on the substructure in the Milky Way and its potential to resolve cosmological tensions. Finally, I will discuss the prospects for unveiling the physics of dark matter in the coming decade.

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