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Probing ultra-light axions with the 21-cm signal during Cosmic Dawn

Monday, 18 July 2022 20:40 (20 minutes)

Ultra-light axions (ULAs) are a promising and intriguing set of dark-matter candidates. We study the prospects to use forthcoming measurements of 21-cm fluctuations from cosmic dawn to probe ULAs. In this poster, I focus in particular on the velocity acoustic oscillations (VAOs) in the large-scale 21-cm power spectrum, features imprinted by the long-wavelength (k~0.1 1/Mpc) modulation, by dark-matter–baryon relative velocities, of the small-scale (k~10–1000 1/Mpc) power required to produce the stars that heat the neutral hydrogen. Damping of small-scale power by ULAs reduces the star-formation rate at cosmic dawn which then leads to a reduced VAO amplitude. Accounting for different assumptions for feedback and foregrounds, I will show that the 21-cm experiments may be sensitive to ULAs with masses up to 10–18eV, two decades of mass higher than current constraints.

In-person or Virtual?

In-person

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