Contribution ID: 130

Type: not specified

Radiation Injection as a Solution to the EDGES 21 cm Anomaly

Thursday 24 May 2018 16:30 (20 minutes)

The recently claimed anomaly in the measurement of the 21 cm hydrogen absorption signal by EDGES at redshift z = 17, if cosmological, requires the existence of new physics. The possible attempts to resolve the anomaly rely on either (i) cooling the hydrogen gas via new dark matter-hydrogen interactions or (ii) modifying the soft photon background beyond the standard CMB (suggested by the ARCADE 2 excess as well). We argue that solutions belonging to the first class are generally in tension with cosmological dark matter probes once simple dark sector models are considered. Therefore, we propose soft photon emission by light dark matter as a natural solution to the 21 cm anomaly. We find that the signal singles out a photophilic dark matter candidate characterised by an enhanced collective decay mechanism, such as axion mini-clusters.

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Session Classification: Parallel Session on Astro-DM II