



Contribution ID: 720

Type: Talk in the parallel session

Constraining beyond Λ CDM models with 21 cm intensity mapping forecast observations combined with latest CMB data

Wednesday, 7 July 2021 10:35 (25 minutes)

Observations of the 21 cm signal through intensity mapping techniques are expected in the near future. This new observable will allow to probe evolution of the Universe in a very wide redshift range, from the dark ages, through the epoch of reionization up to the present time. We constrain cosmological parameters from forecast measurements of the 21 cm signal power spectrum $P_{21}(k, z)$ combined with the latest CMB data from Planck 2018 observations. In the same framework, we test also modified gravity models to unveil beyond Λ CDM features coupling information from primordial probes, such as the CMB, to lower redshift ones. We extend the codes EFTCAMB/EFTCosmoMC to compute the likelihood function for $P_{21}(k, z)$ and we construct a mock data set of forecast intensity mapping observations. At the time being we are bound by the experimental state-of-the-art to consider the redshift bin $z = 0.39$. However, in the future it may be possible to study also wider redshift ranges. We describe our likelihood implementation and present the results we obtained from the statistical Monte-Carlo Markov-Chain analysis we conducted.

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Session Classification: The Early Universe

Track Classification: Early Universe: The Early Universe