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Component separation in BINGO 21 cm simulated maps using GNILC

Wednesday, 24 August 2022 11:45 (20 minutes)

The 21 cm hydrogen line is arguably one of the most powerful probes to explore the Universe, from recombination to the present times. To recover it, it is essential to separate the cosmological signal from the much stronger foreground contributions at radio frequencies. The Baryon Acoustic Oscillations from Integrated Neutral Gas Observations (BINGO) radio telescope is designed to measure the 21 cm line and detect baryon acoustic oscillations (BAOs) using the intensity mapping technique. This work, analyses the performance of the Generalized Needlet Internal Linear Combination (GNILC) method, combined with a power spectrum debiasing procedure. The method was applied to a simulated BINGO mission. It compares two different synchrotron emission models and different instrumental configurations, in addition to the combination with ancillary data to optimize both the foreground removal and recovery of the 21 cm signal across the full BINGO frequency band, as well as to determine an optimal number of frequency (redshift) bands for the signal recovery.

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