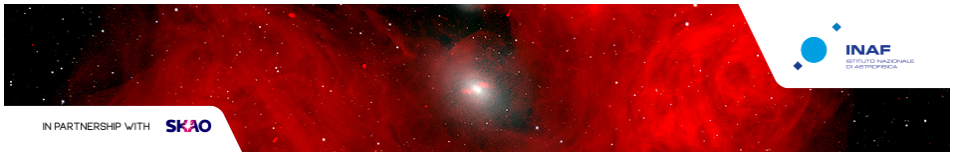

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Extracting the Epoch of Reionization signal for the SKA Foregrounds Data Challenge

Wednesday, 29 November 2023 12:30 (20 minutes)

The objective of the SKA Foregrounds Data Challenge is to evaluate the accuracy of the different techniques used to extract the cylindrically-averaged power spectrum of the Epoch of Reionization signal, clean from foreground contamination. We use the foreground avoidance method to constrain the EoR signal using 21CMMC, whereby only a small part of the EoR window is utilized. We model our sky comprising of just the EoR signal over 8 by 8 degrees and attenuate it by the provided SKA beam. We assume a flat sky approximation to Fourier Transform the sky, before sampling the visibility cube with the SKA baselines and adding thermal noise. The sampled visibilities are then re-gridded using a Gaussian kernel, and we apply a Blackman-Harris spectral taper. Finally, the 2D power spectrum is computed by cylindrically averaging the re-gridded cube, which is then evaluated against the SKA data using 21CMMC MultiNest sampler. We present the constrained EoR signal devoid of any contamination and instrumentation effect using this method.

Reasearch area

Epoch of Reionization

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Session Classification: Parallel - EoR, Cosmology