

NICHOLE BARRY

CURTIN UNIVERSITY

INVESTIGATING TRADITIONAL RADIO ASTRONOMY TECHNIQUES IN THE CONTEXT OF THE EPOCH OF REIONIZATION

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Radio interferometers measure millions and millions of visibilities every minute, which live neither in image space nor fully Fourier space. Thus, many of our traditional analysis techniques revolve around the use of FFTs and histogramming procedures in order to reconstruct images. A major science case for next generation radio interferometers is detecting the Epoch of Reionisation, the era of the first stars and galaxies, in order to constrain our models of the Universe. Using the 21cm signal of primordial hydrogen to create power spectrum of this time period requires a delicate intersection of precision, sensitivity, and advanced mathematical techniques. We showcase the phenomenal feat that is required to measure the Epoch of Reionization and show ways that traditional radio interferometer techniques fail to reach the required precision given the faint, spectral nature of the signal.

