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Title: Optimizing observation strategies for redshifted HI detection using upgraded Ooty Radio Telescope (ORT)

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Abstract: Observations of the high-redshift Universe with the 21 cm hyperfine line of neutral hydrogen promise to open an entirely new window onto the early phases of the cosmic structure formation. The study of the HI 21 cm power spectrum provide a promising tool to map large scale HI distribution in post-reionization era ( $z \leq 6$ ). The majority of the recent or upcoming radio interferometric experiments are aimed at measuring the HI 21 cm signal statistically and map out the large scale HI distribution at high redshifts. Ooty Radio telescope (ORT) is currently being upgraded, after the planned upgrade it may be used as an interferometer. The upgraded ORT can detect signal at frequency  $\nu = 326.5$  MHz which corresponds to an HI signal at redshift  $z = 3.35$ . In the thesis, we develop visibility correlations formalism for upgraded ORT, power spectrum for redshifted HI signal is measured using N-body simulations[2]. We will investigate different observation strategies using the telescope for statistical detection of HI signal above good noise level within optimized integration time and suitable number of beams.

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