

High redshift HI observations and a radio halo in Abell 370

Abstract

Direct measurements of the HI masses of galaxies during the epoch of galaxy formation $z \sim 1-3$ is one of the most critical missing jigsaws in our understanding of galaxy evolution. At present, direct detections of HI have been limited to $z \sim 0.3$ (Fernandez et al. 2016, Bera et al. 2019). We propose to observe the Hubble Frontier Field lensing cluster Abell 370 to detect the HI content of the Great Arc, a highly magnified disk galaxy at $z=0.725$. Using ray-tracing simulations, we predict an HI magnification of 19 ± 4 and a frequency integrated flux of 119^{+70}_{-52} JyHz. This corresponds to an observing time requirement of 10 hours for a 6 sigma detection using the MeerKAT sensitivity calculator. Commensal science cases include an HI stacking measurement at $z \sim 1$ using approximately 200 spectroscopic redshifts and the categorisation of the Abell 370 radio halo at UHF frequencies.