Neutral hydrogen in the distant Universe: New results from the Australian SKA Pathfinder (ASKAP) telescope

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Our knowledge about the amount and distribution of neutral hydrogen (HI) in galaxies in the distant Universe remains patchy and incomplete, yet this component of the interstellar medium is critical to understanding how galaxies evolve over cosmic time. Observations of the redshifted 21cm HI line, seen in absorption against bright radio continuum sources, can provide new information about the HI content of distant galaxies and the role of cold gas in AGN fuelling and feedback processes.

The large field of view, wide spectral bandpass and radio-quiet site of the Australian SKA Pathfinder (ASKAP) radio telescope provide a powerful new capability for 21cm HI absorption studies of galaxies in the redshift range $0 < z < 1$. I will show some first results from a pilot survey of 100 bright radio sources that we recently carried out with a six-antenna test array during ASKAP commissioning. I'll also discuss some of the more interesting challenges for the astrophysical interpretation of HI absorption-line data, and outline the exciting prospects for larger surveys with ASKAP in the near future.