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An introduction to 21cm cosmology using HI intensity mapping

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21cm cosmology is a new and exciting area of research with
a great deal of potential. We have now entered an era of precision cosmology, but almost all of the information used to achieve this precision has come from the CMB at redshift z ˜ 1100 or from galaxy surveys below z ˜ 1.5. Using observations of the redshifted 21 cm line of atomic hydrogen (HI) we can look at previously unexplored epochs, like the Dark Ages and the Epoch of Reionization (EoR), as well as complement (and compete with) the results from galaxy surveys at low redshifts.

In this talk I will present recent work on Weak Lensing studies using 21-cm radiation from the EoR as well as from a post-reionization "intermediate" redshift range (2<z<5) with the Square Kilometre Array (SKA).
I will also briefly talk about BAO detection at low redshifts (z < 1) using a single dish (BINGO) or multi-dish (MeerKat, SKA1) approach, and how their performance competes with state-of-the-art optical galaxy surveys (EUCLID).
Both of these studies are based on the innovative technique of HI intensitymapping, which does not require detecting the galaxies but instead treats the 21cm emission as an unresolved background. Forecasts for HI detection in auto- and cross-correlation using SKA pathfinders will also be shown.

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Session Classification: CMB, LSS and cosmological parameters