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Investigating HI Intensity Mapping Techniques with KAT-7 Via Simulations

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The emerging observation technique to probe dark energy is HI intensity mapping (IM). The technique mainly depends on mapping the integrated intensity of HI (21 cm) emission of each pixel on the sky without absolutely resolving individual galaxies. However, the technique is faced with some challenges in terms of data analysis and specifically, in measuring the primary beam response of our instrument. Thus, the primary beam modulates the intensity as a function of sky position, which is precisely what is being measured by intensity mapping
experiment in the first place. This has to be overcome in order to make such an experiment work to the best of its capabilities. We present a raster scan simulation of autocorrelation observations with KAT-7 using OSKAR and then compare our output to existing HI intensity mapping data observed with KAT-7.

Summary

Unlike radio interferometers which can produce direct imaging by just taking the Fourier transform of visibilities, single dish mode of observation, on the other hand, can not bring up an automatic imaging, alternately, we can apply other techniques such as the raster scan observation approach to achieve this.

Apply to be
 considered for a student
   award (Yes / No)?

Yes

Level for award
 (Hons, MSc,
   PhD, N/A)?

PhD

Main supervisor (name and email)
and his / her institution

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Institution:: Rhodes University

Would you like to
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No

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