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Finding the needle in Galaxy Evolution: HI Stacking

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Abstract content
   (Max 300 words)
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Neutral atomic hydrogen (HI) is the raw fuel from which the star-forming molecular gas forms and is therefore an important tracer of galaxy evolution. Due to the intrinsic faintness of the HI emission line (observed at rest at 21cm), galaxies beyond a few hundred megaparsecs are difficult to observe directly with current radio telescopes. However, in the next year, MeerKAT and other SKA pathfinder telescopes will begin operating and enable deeper, large surveys (e.g. LADUMA) of neutral gas in galaxies. HI Stacking is an observational technique that will be highly exploited to learn about the HI content of galaxies that are not directly detected. Stacking involves combing the HI spectra of all the galaxies in a distant sample, thereby generating a high signal-to-noise measure of their total HI content. We have developed a Python-based software package that is capable of carrying out this HI stacking procedure for a set of given input HI galaxy spectra. We have applied our software to studying the non-detected HI spectra of galaxies in the Nancay Interstellar Baryons Legacy Extragalactic Survey (NIBLES). In doing so, we aim to extend by two orders of magnitude the stellar mass range probed by local Universe stacking experiments. Our future goal is for our package to be used to stack HI spectra from the LADUMA survey which aims to study the HI galaxy properties of galaxies over more than two thirds the age of the universe.

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

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