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Master Thesis Defense

Entitled

COMMISSIONING OF THE UAEU RADIO ARRAY AND PILOT LOW-FREQUENCY RADIO ASTRONOMY STUDIES

by

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<https://uae-u-ac-ae.zoom.us/j/85800212868>

Abstract

As part of the UAEU Radio Astronomy Pathway Project, a 256-element Ground-based Radio Array Facility was deployed at the UAEU. A comprehensive exploration of radio astronomy, and investigations on existing radio arrays, emphasizing low-frequency radio signals and the challenges faced at this range, are crucial for the commissioning phase of the array. A core aspect discussed is the vital role of coaxial cables in preserving the integrity of low-frequency radio signals. To address the electrical length differences between the coaxial cable pairs used to connect the array's beamformers in the field to the beamformer controllers in the control room, precise measurements were carried out in collaboration with the Collage of Engineering, using dedicated equipment and techniques. And to correct for these electrical delays, coaxial cables to connect the beamformer controllers to the second-stage beamformer were used as "equalization cables", ultimately, optimizing the performance.

A pilot study of radio sources from the GLEAM 4-Jy (G4Jy) Sample, which is defined using the extragalactic catalogue of the GaLactic and Extragalactic All-sky MWA (GLEAM) Survey, was conducted. This study involves plotting multi-frequency spectrum of the sources to describe their spectral behavior, and give insights on the nature of these sources.

Keywords: Radio Astronomy, Radio array, MWA, Coaxial Cables, Low-Frequency Radio Astronomy, GRAF, Radio Sources