Cosmic Dawn Science with the SKA-Low

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Description:
The low-frequency component of the Square Kilometre Array will be the largest radio telescope capable of studying the Cosmic Dawn, the period in which the first stars formed in the infant Universe. The SKA, which commenced construction in 2021, will consist of hundreds of stations formed from 256 dual-polarisation, wideband dipole antennas, which are tuned to undertake a range of science, and have a large collecting area. Despite this, they are also complicated instruments, together form a complex response to the sky, which varies with frequency, making precision science more challenging. This project will use state-of-the-art simulations of the station primary beam response to the sky to (1) understand the properties of the Cosmic Dawn signal, as seen by the SKA; (2) define and shape how the Cosmic Dawn experiment can best utilise the telescope characteristics, (3) help define the observing strategy for the 5000-hour experiment. A student with a good grounding in science and some engineering understanding will be a good match for this project.

Caption: SKA prototype dipole antennas in a test SKA station (credit: Goh/ICRAR)