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Imaging and Beamforming Schemes for large-N aperture Arrays

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In this work, I will present a summary of the beamforming techniques, both in the RF and in the digital domain used for aperture arrays in the SKA. In particular I will show results of the Two-Polarisation All-Digital (2-PAD) Aperture Array demonstrator designed and built in the UK as part of SKADS. Further to this, I will present new techniques including the Fast-Fourier Transform Telescope and the MOFF correlator which allow traditional imaging and calibration techniques to scale as NlogN rather than N^2. I will show how these techniques are being investigated on 2-PAD and on new science-capable demonstrators (specifically in the EoR and H1-precision cosmology regime) that will be built in the US as well as on one of the representative sites.

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