

## Testing a Multi-element, Multi-beam, FPA Beamformer in Free-space Test Range

The Expanded GMRT (eGMRT) is a proposal to look at three expansions to the GMRT - increasing the field of view, increasing angular resolution and improving the sensitivity to the extended radio emission. In this talk, we would focus on the testing of multi-element, multi-beam beamformer using the 144-element Focal Plane Array (FPA) procured from ASTRON. The preliminary tests for the beamformer are being carried out with FPA as an aperture array. A free-space test range, meeting the far-field requirements at L-band, has been developed at the GMRT site. The narrow beamwidth transmitting antenna (a 3m diameter parabolic dish and a cross-dipole feed at the prime-focus) required for beam pattern measurement and beamsteering experiments was fabricated at NCRA. Beamsteering measurements have been carried out by radiating continuous wave and broadband noise in this test range. Tests have also been carried out to observe navigational satellites in the L-band with the transmitting antenna used for “phasing” the array. The test methodology, details of the experiments and the results would be described. The test results from the beamsteering experiments show a close match with the theoretically expected outcome. The entire process of testing from setup to data acquisition and analysis is automated to allow for a speedy understanding of the data and efficient debugging. Currently, we are working to test multiple beams in the field-of-view (FoV) by applying optimal beamforming weights.