

THE MILEURA WIDEFIELD ARRAY DEMONSTRATOR

Hewitt, J. N., Cappallo, R. J., Kasper, J. C.
, Lonsdale, C. J., Morales, M. F., Salah, J. E.
Massachusetts Institute of Technology

The Mileura Widefield Array (MWA) Demonstrator, to be built in the radio-quiet environment of Western Australia, has several primary science goals. First, we seek to detect and characterize the redshifted HI signals from the cosmological Epoch of Reionization (EOR). The array will be capable of measuring the power spectrum of fluctuations, as well as imaging structures created by the ionizing radiation from quasars at a redshift of about 6.5. These investigations will shed light on the processes that led to the formation of the first galaxies and quasars. Second, the wide field capabilities of the array will be exploited to perform blind searches for transient sources of radio emission, a class of astronomical radio source that to date is largely unexplored. Third, the array will be used to probe the magnetoionic medium of the heliosphere with unprecedented precision by measuring propagation effects on the signals of background radio sources. Both interplanetary scintillation and Faraday rotation will be simultaneously monitored in order to constrain the magnetic field orientation in coronal mass ejection (CME) events, with the goal of better predicting the coupling of CME energy to the terrestrial magnetosphere.

The MWA Demonstrator will consist of 500 phased-array antennas optimized for the 80-300 MHz frequency range. It will have very high spectral and temporal resolution, electronic pointing agility and multibeaming capability. Most importantly, it will feature an inherently wide 20 to 30-degree field of view. We report on the status of the 500-element array MWA Demonstrator and detail the aspects of the design that uniquely address the science goals.

Abstract Submission Form

2004 National Radio Science
Meeting

Abstract: hewitt1968

Date Received: September 24, 2004

1. (a) Jacqueline Hewitt
MIT Center for Space Research
Room 37-241
Cambridge, MA
02139 USA
jhewitt@mit.edu
- (b) 617-253-3071
- (c) 617-253-3111
2. J - Radio Astronomy
3. (a)
4. I - Invited Paper, Program
chair: Perley
5. For session: Large Low
Frequency Arrays
for;Radio Astronomy
ip;Chair - Rick Perley