

## **THE MURCHISON WIDEFIELD ARRAY: A STATUS REPORT**

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Representing the MWA Collaboration

The Murchison Widefield Array (MWA) is a low-frequency antenna array under construction in Western Australia by a collaboration of U.S., Australian and Indian institutions. The main scientific goals of the MWA are

- To detect and characterize structures in neutral hydrogen by observing the highly redshifted 21cm line associated with the formation of the first stars and galaxies and the reionization of the intergalactic medium
- To survey the sky for many types of astronomical transient sources, including pulsars, compact objects (neutron stars and possibly black holes), extrasolar planets, radio counterparts to gamma-ray-bursts, and possible new classes of sources
- To advance solar, heliospheric, and ionospheric science; in particular to understand the causes and effects of space weather, including coronal mass ejections
- To study a broad range of galactic and extragalactic astronomical phenomena

The MWA operating frequencies range from 80 to 300 MHz, giving a redshift range of 4 to 17 for astronomical sources of the 21cm line (addressing the first scientific goal) and providing sensitivity at continuum wavelengths where other phenomena (associated with the other three science goals) are expected to produce observable signatures. The MWA design is guided by three central considerations: the need for a very wide instantaneous field of view, the need for a large collecting area, and the need for a large set of high-SNR measurements for calibration and high-fidelity imaging. Consequently, an array design has been developed involving 500 physically small, dipole phased arrays (tiles), with about 10,000 m<sup>2</sup> of aggregate collecting area, and full cross-correlation of all tile pairs.

A prototype array of 32 antenna tiles is currently in operation at the Murchison Radio Observatory in the radio-quiet environment of the Western Australian outback. Initial scientific observations with the 32-tile prototype are in progress. Site preparation is also underway in anticipation of the planned buildout of the array to its full capability in 2012. We present a status report and preliminary scientific results.