

LOW FREQUENCY OBSERVING WITH THE ALLEN TELESCOPE ARRAY (ATA)

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When it is complete, the ATA will consist of 350 6.1 m diameter antennas in a two dimensional array of 800 m diameter. The distribution is irregular in appearance but is designed to have a nearly Gaussian distribution of baseline lengths to achieve a Gaussian snapshot beam. Maximum central sidelobes have peaks less than one percent. The field of view, corresponding to the 6.1 m beam is about three degrees at 1000 MHz, and the synthesized beam is about 1.5 arc minutes at this same frequency. The Array is expected to operate over a span of frequencies covering the range 500 MHz to 11.2 GHz with a single broadband receiver. Because potential interference from low frequency radio broadcast stations at low elevation angles is especially serious, an optical design has been chosen for the antennas that has minimal ground pick-up. This design also minimizes receiver noise pick-up from the ground. Low ground pick-up is characteristic of dual mirror systems, and an offset Gregorian was chosen accordingly. The offset choice is dictated by the need to operate at long wavelengths without too much blockage from a secondary mirror that is 2.4 m in diameter (four wavelengths at 500 MHz). The secondary is large compared to the 6.1 m primary. A further feature is a metal shroud, approximately cylindrical in shape that partially surrounds the feed, mounted between the primary and secondary at the bottom of the optical system. We describe the measured properties of one antenna in this array and the expected synthesized beam. We also discuss the excellent RFI characteristics of the Hat Creek site at low frequencies.

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