The Sunyaev-Zel'dovich Array Cluster Survey

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We present Sunyaev-Zel'dovich (SZ) Effect observations made with the Sunyaev-Zel'dovich Array (SZA). The SZA is an eight element array of 3.5m diameter telescopes located in the Owens Valley of California. The interferometer is outfitted with low-noise HEMT amplifier receivers operating over 26 to 36 GHz and 85 - 115 GHz; surface accuracies of 30μm rms permit observations up to frequencies of 300 GHz. A digital correlator is used to process 8 GHz of bandwidth from the selected receiver band.

At redshifts greater than about 0.1, galaxy clusters typically subtend several arcminutes on the sky. The small antenna diameters allow for close-packed configurations with sensitivity to scales as large as 5 arcminutes at 30 GHz. Six of the SZA antennas are arranged in such a compact configuration with separations ranging from 4.5 to 11.5m, yielding high brightness sensitivity for the detection of the SZ effect in clusters. Two outer telescopes, one to the north and one to the northeast of the central array, yield baselines of up to 65m to facilitate simultaneous detection of contaminating compact sources at a resolution of 0.3 arcseconds at 30 GHz. The instrument was designed specifically to conduct sensitive observations of the SZ effect in galaxy clusters, and is ideal for creating wide field mosaics.

Over the past two years, the SZA has observed targeted X-ray selected clusters at 30 GHz and 90 GHz, performed CMB anisotropy observations at 30 GHz, and completed a ~ 5 square degree blank-sky survey for clusters, also at 30 GHz. In this talk, we present a description of the instrument and results from the blank-sky survey for clusters.