THE YUAN-TSEH LEE ARRAY FOR MICROWAVE BACKGROUND ANISOTROPY

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***Abstract*— The Yuan Tseh Lee Array for Microwave Background Anisotropy (AMiBA) is a forefront interferometric array for research in cosmology. The Array is consisted of thirteen antennas, each equipped with a cryogenic receiver operating in the atmospheric window at 86-104 GHz, and with full polarization capabilities. The dish size of 1.2 meter is to sample large-scale structures (20′), while interferometry provided mode st resolutions (2′). A novel wide-band analog correlator was designed that is easily expandable for more interferometer elements. Monolithic millimeter-wave integrated circuit technology was used throughout as much as possible in order to miniaturize the components and to enhance mass production. It targets specifically the distribution of high-redshift clusters of galaxies via the Sunyaev-Zeldovich Effect (SZE), as a means to probe the primordial and early structure of the universe. AMiBA is sited on Mauna Loa at an elevation of 3,400m in Hawaii. The construction of AMiBA includes a novel hexapod mount, a carbon fiber platform, carbon fiber reflectors, MMIC receivers, a broadband correlator, numerous electronics, a retractable cover, site infrastructures, and software development. The AMiBA has deployed the initial 7-element interferometer to Hawaii in 2005, and subsequently expanded to the present 13-element configuration in Oct 2009. Full science operations have begun in early 2010. This paper will review the development of the telescope and its observation progress.**