WIDG

Wright Laboratory

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Yale University

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Ongoing Work for HIRAX at Yale

The Hydrogen Intensity and Real-time Analysis eXperiment (HIRAX) is a planned radio telescope array that will consist of 1000 close packed 6 m dishes that will be deployed in South Africa. HIRAX will survey the majority of the southern sky to measure baryon acoustic oscillations (BAO) using the 21 cm hyperfine transition of neutral hydrogen. The experiment is optimized to measure the 100 h-1 Mpc BAO scale by measuring integrated emission from many neutral hydrogen sources ("intensity mapping"). It will operate between 400-800 MHz in 1024 frequency bins, corresponding to a redshift range of $0.8 < z < 2.5$ and a minimum $\delta Z/Z$ of 0.003. The primary science goal of HIRAX is to constrain the dark energy equation of state by measuring the BAO scale as a function of redshift over a cosmologically significant range. In addition to BAO cosmology, the large survey area and real-time analysis capabilities of the HIRAX array will make it a powerful tool for identifying pulsars and astrophysical transients such as fast radio bursts. An initial eight-element prototype array has been deployed at the Hartebeesthoek Radio Astronomy Observatory (HartRAO), providing the first end-to-end test of the HIRAX hardware, and the deployment of the first elements to the full array site in the Karoo is planned for early 2019. This presentation describes the array design, current status of deployment, drone calibration measurements, and preliminary forecasts of scientic constraints from the full array, and highlights the contributions of researchers at Yale.

Lunch is served outside of WLC-245 starting at 11:45 a.m. RSVP requested.

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