

Realizing the Promise of 21 cm Cosmology with HERA

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21 cm cosmology promises to provide an exquisite and perhaps revolutionary new 3D probe of our early universe. With it, we can uncover the astrophysics of the first luminous objects in the universe, improve CMB constraints on cosmological parameters, and cross-check the recent EDGES detection of an anomalously large absorption feature that points tantalizingly at new physics. However, realizing that promised probe of the astrophysics and cosmology of the the “Cosmic Dawn” and the epoch of reionization (EoR) has proven extremely challenging. We’re looking for a small signal buried under foregrounds orders of magnitude brighter. We need large interferometers, precisely calibrated, producing mountains of data to have any shot of seeing the signal. In this talk, I will present the Hydrogen Epoch of Reionization Array, a purpose-built interferometer currently under construction in South Africa that is designed not just to detect the EoR but to characterize its evolution and to push deeper into the Cosmic Dawn. I will discuss the analysis techniques we’ve developed and the progress we’ve made separating the 21 cm from astrophysical foregrounds.

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