Latest Results from EDGES

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The Experiment to Detect the Global EoR Signature (EDGES) measures the all-sky radio spectrum between 50 and 200 MHz from the Western Australian outback. The experiment consists of a high-band instrument operating over 90-200 MHz (14>z>6) and a low-band instrument covering 50-100 MHz (27>z>13). Each instrument utilizes a nearly identical receiver and scaled copies of the same antenna design. The low-band ground plane is larger than for the high-band and extends out to 15 meters from the antenna, compared to 7 meters for the high-band ground plane. Each receiver includes two internal noise references for stability calibration. Extensive laboratory calibration measurements are acquired before deploying each instrument in order to achieve absolute calibration at the 0.01% level.

Over the last two years, the experiment has operated two low-band instruments to investigate repeatability of measured spectral features and sources of experimental systematic errors. The instruments have proven robust to several hardware modifications and recalibrations. The most significant source of uncertainty appears to be the accuracy of antenna and receiver reflection coefficient measurements. Antenna reflection coefficient measurements are performed in situ using a VNA connected to a remote calibration unit in the receiver.

Here we report verification test results of the instruments and the latest astrophysics and cosmological constraints derived from observations. High-band observations have recently set new constraints on the duration of reionization, disfavoring reionization durations less than dz~1 at the Planck best-fit reionization redshift of ~8.5 (Monsalve et al. 2017 *in press*, ArXiv: 1708.05817). We are presently exploring constraints on astrophysical model parameters using models from Kaurov & Gnedin, Mirocha, and Fialkov, Barkana & Cohen. Low-band observations have been analyzed and we find persistent residuals to polynomial foreground models fit and removed from the data. Consistent results are obtained for all LST bins, both low-band instruments, and two analysis pipelines. Evidence is emerging for a curvature term in the Galactic diffuse emission power-law profile at low frequencies.