SKY NOISE SPECTRAL INDEX AND IONOSPHERIC VARIABILITY FROM 50-190 MHZ WITH EDGES DATA

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We report new measurements of the all-sky Galactic sky noise spectral index between 50-190 MHz from the Experiment to Detect the Global EoR Signature (EDGES). Zenith drift scan observations were made using the EDGES instrument deployed at the Murchison Radio-astronomy Observatory (MRO) in Western Australia from 12 April 2015 to 1 November 2015. A rectangular shaped low-band "blade" antenna was used in the frequency range of 50-100 MHz, while two antennas with different dipole-like patterns (high-band "blade" and "fourpoint" styles) were used in the frequency range of 100-190 MHz. The two high-band antennas were used to assess dependence of the measurements on chromatic beam patterns, because corrections for the beam shape are made before fitting the spectrum to the three parameter sky model

$$T_{sky}(\nu) = T_{150}\left(\frac{\nu}{\nu_{150}}\right)^{-\beta+\gamma\ln\left(\frac{\nu}{\nu_{150}}\right)},$$

where T_{150} is the temperature at ν_{150} = 150 MHz, β is the spectral index, and γ is a spectral index refinement parameter. The beam correction is done using a convolution of the antenna beam (derived from a CST model of the antenna) and a frequency scaled Haslam sky map. Initial results show that beam correction improves the model fit for most LST hours and becomes less pronounced as the number of terms in the model fit increases. Perturbations in the ionospheric absorption and the electron temperature associated with these perturbations are also calculated by using the time variations in the calibrated spectrum, as in (Rogers et al., 2015, Radio Science, 50, 130) where the spectra difference data sets are created either by 1) subtracting the spectra measured on different days but at the same LST times; or 2) subtracting a single spectra from the average of the spectra on all other days. We extend the lower end of the frequency range from 80 MHz to 50 MHz and extend the span of days analyzed from 3 weeks to 6 months to improve accuracy of the measurement of sky noise spectral index variation with LST and to estimate the γ parameter and its variation with LST.