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Lyman-alpha correlations from early DESI data

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The Dark Energy Spectroscopic Survey (DESI) will during its operation observe the spectra of 10s of millions of galaxies and quasars. Already, the largest ever 3D map of the universe has been created from combined Survey Validation (SV) and Main Survey data. Around one third of the total quasar sample will be observed at redshifts greater than ~ 2 , where we can use the Lyman-alpha (Ly α) forest (a region of strong absorption between the Lyman-beta and Ly α emission lines) to measure baryon acoustic oscillations (BAO) at an effective redshift of $z \sim 2.3$. In my talk I will briefly detail how we go from raw quasar spectra to the 3D correlation functions used in Ly α BAO measurements. These include the Ly α auto correlation, where Ly α forest pixels from different lines-of-sight are correlated, and the Ly α -quasar cross correlation, where pixels in the Ly α forest are correlated with quasars at all redshifts. I will also present results from the most recent stable DESI data release, used to form the basis of the first Lyman-alpha Working Group main paper of which I am a lead author.

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