

Using mock quasar spectra to study systematics in eBOSS and DESI Lyman-alpha analyses

In 2005 the Baryon Acoustic Oscillation (BAO) provided a new probe for dark energy. The BAO is an imprint left in the matter density field by a propagating sound wave in the primordial universe. It presents itself as a standard separation distance that can be seen between two overdensity regions. Looking at the distribution of matter today, this standard separation can be seen as a peak - the BAO peak - and may be measured in the matter two-point correlation function. Experiments such as eBOSS and its successor DESI are designed to survey stars, galaxies, and quasars and use them as mass tracers. The Lyman-alpha forest is a distinct and useful feature in the spectra of high redshift quasars. Here, we focus on the correlation in Lyman-alpha forests to measure the BAO signal. The analysis is very robust, however, to test its systematics, mock spectra have been developed. We present two sources for systematics, the presence of Damped Lyman-alpha Absorbers in quasar spectra and the distortion introduced by the quasar continuum estimation, and study their effects on the correlation function in mocks.

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