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Using simulated quasar catalogs for the BAO in lyman-α analysis of eBOSS and DESI

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The accelerated expansion of the universe caused by the presence of dark energy was first observed in 1998 by measurement of the luminosity of type Ia supernovae. In 2005, a new probe for dark energy, the Baryon Acoustic Oscillation (BAO) was introduced. This probe is based on the imprint left in the matter density field by sound waves propagating in the primordial universe. Following the initial detection of this BAO signal, several surveys, including eBOSS and its successor DESI, have been designed to measure this signal in the quasar and galaxy distribution through the computation of their correlation function.
Quasars with redshift higher than 2 have in their spectra a collection of absorption lines called the lyman-α forest. These absorptions stem from the presence of neutral hydrogen clouds along the line of sight of the quasar. Each of these absorption lines are mass tracers that can be used to calculate the correlation function. Neutral hydrogen clouds with column density above $2 * \log 20\ cm^{-2}$ are called Damped Lyman-α Absorbers (DLAs). Their presence in quasar spectra skews the calculation of the correlation function and has to be addressed. Hitherto DLAs in data are identified by a DLA finder algorithm and masked out of the forest.
My work focuses on studying the impact masking the DLAs has on the measured cosmological parameters. I will present results using simulated quasar spectra catalogs with different masking strategies to determine the efficiency of this method.

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