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Lyman-alpha

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The Lyman- α forest, observed at optical wavelength, is a probe of large-scale matter density fluctuations at redshift higher than 2.1. It consists of absorptions in the electromagnetic spectrum of bright and distant sources such as quasars, due to the Lyman- α transition of intervening neutral hydrogen located along their lines-of-sight. As such, it provides a measurement of the amount of neutral hydrogen in the Intergalactic Medium (Croft et al. 1997).

The latest eBOSS data release (Dawson et al. 2016), provides Lyman- α forest data from 210,000 quasars. These spectra are a unique cosmological probe at high redshift range. The ongoing DESI observations will provide even more spectra with a higher density and resolution.

Large statistics Lyman- α forest data is used to measure the BAO scale using forest auto-correlation and cross-correlation with background quasars (du Mas des Bourboux et al. 2020). Using the small scale information of its 1D power spectrum, Lyman- α forest also offers strong constraints on neutrino and warm dark matter masses (Palanque-Delabrouille et al. 2019). Finally, I will also present a 3D tomographic map of Lyman- α absorption made from eBOSS data covering a near-Gpc³ volume (Ravoux et al. 2020).

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