

## Cosmology with the Lyman- $\alpha$ forest

*Wednesday, 8 May 2024 11:15 (10 minutes)*

The Lyman- $\alpha$  forest is a unique large-scale structure tracer at Mpc scales and below at high redshifts ( $2 < z < 4$ ). One of the key advantages of the Lyman- $\alpha$  forest is that, since the density fields are only mildly non-linear at the respective redshifts, a much wider range of scales can be used to robustly probe cosmology than with most galaxy surveys, making the Lyman- $\alpha$  fluctuations a powerful probe of early-Universe physics when combined with tracers that are sensitive to very large scales, e.g., cosmic microwave background (CMB) anisotropies. I will present the first measurement of the 3D Lyman- $\alpha$  forest power spectrum, the detection of the CMB lensing – Lyman- $\alpha$  forest power spectrum signal and discuss ongoing work to perform a full-shape cosmological analysis of Lyman- $\alpha$  forest data in the framework of the effective field theory of large-scale structure from cosmological surveys such as eBOSS, DESI and future spectroscopic surveys.

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