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Lyman-alpha forest tomography and cross-correlation with cosmic voids

vendredi 6 mai 2022 10:00 (15 minutes)

The Lyman-alpha (Ly α) forest is a unique probe of large-scale matter fluctuations at high redshift ($z > 2$). In this presentation, I will show how to obtain 3D maps of the matter distribution from Ly α data using tomographic reconstruction methods. This field was pioneered by deep, small-field observations. Here, I will present the largest tomographic map of matter fluctuations at $z > 2$ over the $\sim \text{Gpc}^3$ volume covered by Ly α forest from SDSS-IV quasar spectra in the Stripe 82 field [Ravoux, Armengaud et al. JCAP07(2020)010].

I will then present a catalog of high-redshift voids extracted from this map. The associated measurement of the cross-correlation between voids and the Ly α forest provides the very first observation of the matter velocity flow around voids (through RSD effect) at such high redshifts. The data are in good agreement with simulations and well adjusted with a purely linear Kaiser velocity model [Ravoux, Armengaud et al. 2022].

Orateur: RAVOUX, Corentin

Classification de Session: Neutrinos