Contribution ID: **76** Type: **Contributed talk in mini symposium**

Lyα Intensity Mapping with optical broad-band imaging

Monday, 11 December 2023 16:50 (10 minutes)

Lyα Intensity Mapping with optical broad-band imaging

Intensity Mapping is a promising observational technique, consisting in the tracing of emission lines on large angular scales, without resolving any particular objects. In this talk, I will present a new method to perform Lyα intensity mapping by studying the fluctuations in the background of broad-band images versus the Lyα forest of QSO spectra, in order to trace the unresolved Ly-alpha emission that permeates the inter-galactic medium (IGM). We perform a forecast for currently existing/ongoing surveys (DESI and the g-band data of its Legacy Imaging Surveys, DECaLS/BASS), and show that even the absence of any detection may place competitive upper limits in the total Lyα luminosity at z˜3. We fully expect this signal to be detectable in the z˜3 range with imaging data from already planned space missions (CSST) and ground surveys (LSST), and maybe even at z>3.5 (Euclid). Such detection would be the first imaging observation of the large-scale structure (>10 cMpc/h) of diffuse Ly-alpha emission, and would help constraining the total Ly-alpha luminosity (both from diffuse IGM emission and unresolved Lyα emitters), as well as shed light on the bias of this diffuse Ly-alpha emission as a tracer of large-scale structure. High SNR detections with future photometric surveys could even lead to the use of this Intensity Mapping technique as a cosmological probe to explore large-scale structure at a redshift range (z˜3) that it is scarcely sampled by current galaxy surveys.

Primary author: RENARD GUIRAL, Pablo (Tsinghua University)

Presenter: RENARD GUIRAL, Pablo (Tsinghua University)

Session Classification: Cosmology with large-scale structure