

X46a Correlation between galaxy and IGM at $z \sim 2.2$ based on Subaru/HSC MAMMOTH overdensities and SDSS/(e)BOSS quasar spectra

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The correlation on distribution between HI in the intergalactic medium (IGM) and galaxies now attracts great interests. In the MAMMOTH project, Cai+2016 found that Coherently Strong Lyman-alpha Absorption Systems (CoSLAs) can be ideal tracers for massive overdensities. We performed deep narrowband imaging using the Hyper Suprime-Cam (HSC) on the 8.2-m Subaru Telescope to probe Lyman Alpha Emitters (LAEs) at $z \sim 2.2$ in the fields traced by such extreme groups of HI absorbers. The CoSLAs are selected from quasar spectra of the complete SDSS/(e)BOSS database covering over $10,000 \text{ deg}^2$, equivalent to a survey volume of 1 cGpc^3 , which is one order of magnitude larger than current $z > 2$ galaxy surveys. Here we show our results that massive large scale structures are found in the four observed HSC fields. We also find a hint of the direct positive correlation between our LAE overdensity sample and the optical depth of Lyman-alpha absorption in (e)BOSS background quasar spectra, which is also supported by a cross-correlation analysis for the distribution of LAEs and LoSs with low/high optical depth subsamples. Such results will help to constrain the different mass assembly history for galaxies and neutral intergalactic gas during the epoch of Cosmic Noon.