

T01a Search for massive LAE overdensities traced by IGM to study their coorelation at $z\sim 2.2$

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The correlation on the 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 on the 8.2-m Subaru Telescope with HSC to probe Lyman Alpha Emitters (LAEs) at $z\sim 2.2$ in the fields traced by such extreme group of HI absorbers. The CoSLAs are selected from QSO spectra of the complete SDSS-III/BOSS and SDSS-IV/eBOSS database covering over 10,000 deg², equivalent to a survey volume of ~ 1 cGpc³, which is one order of magnitude larger than current $z\sim 2$ galaxy surveys. Here we show our preliminary results that massive large scale structures are found in the first two observed fields. And we also find the first hint of a direct positive correlation between our LAEs overdensity sample and the optical depth of Lyman-alpha absorption, which is also supported by the cross-correlation analysis for the distribution of LAEs and QSOs with low/high optical depth subsamples. Such results approve that IGM gas tends to assemble in the regions where galaxies cluster together at large scale during the epoch of *Cosmic Noon*.