X38a   Search for extended Lyman-α nebulae around $>$10k quasars at $z > 2$

Rhythm Shimakawa, Yongming Liang, Satoshi Kikuta (NAOJ), Rieko Momose (Carnegie Observatory), Haruka Kusakabe (University of Geneva), Tadayuki Kodama (Tohoku University)

Enormous Lyα nebulae (ELANe) around quasars have provided unique insights into the formation of massive galaxies and their associations with super-massive black holes since their discovery. However, their detection remains highly limited. We introduce a systematic search for extended Lyα emission around $>$10k quasars at $z > 2$ using a simple but very effective broad-band selection (Shimakawa 2022) based on the data from the Hyper Suprime-Cam Subaru Strategic Program. Although the broad-band selection detects only bright Lyα emission ($> 1 \times 10^{-17}$ erg s^{-1}cm^{-2}arcsec^{-2}) compared with narrow-band imaging and integral field spectroscopy, we can apply this method to far more sources than such common approaches. As a result, we discovered extended Lyα emission for > 50 quasars in the Deep and Ultra-deep (35 deg^2) and Wide (890 deg^2) layers, some of which may be potential candidates of ELANe. We detected higher fractions of quasars with large nebulae around more luminous or radio-loud quasars, supporting results from previous observations for quasars at similar redshifts. Also we seemingly obtained more asymmetric nebulae from the lower redshift sample ($z \sim 2$).