X42a LAE fraction at $z = 2.9$–6.6 probed by MUSE in the Hubble Ultra Deep Field

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The redshift (z) evolution of Lyα emitter (LAE) fraction among galaxies, X(LAE), has been used to probe the evolution of the HI gas fraction of the intergalactic medium (IGM) at the end of reionization. X(LAE) has been found to increase from $z = 3$ to 6, and to decrease at $z > 6$. However, uncertainties in the measurement and interpretation of X(LAE) are still matters of debate (e.g., Stark et al. 2011; Tilvi et al. 2014; Garel et al. 2015; Caruana et al. 2017; De Barros et al. 2017). In this work, we use optical IFU spectroscopic data of VLT/MUSE in the HUDF survey (Bacon et al, 2017). The broad wavelength coverage and the wide FoV IFU of MUSE as well as the unprecedented depth of MUSE-HUDF data allow us to obtain the most homogeneous and complete sample of LAEs at $z = 2.9$–6.6 compared with any other earlier studies ($\sim$ 700 LAEs, Inami et al. 2017), which reaches as faint as UV magnitude, M_{1500}, of -16.3 magnitude. We construct a UV-selected galaxy sample from a HST catalog (Rafelski et al. 2015), and evaluate the redshift evolution of X(LAE) as a function of Lyα equivalent, EW(Lyα), and M_{1500}. At $-21.75 \leq M_{1500} \leq -17.50$, X(LAE) for $EW > 25$Å shows moderate increase (or plateau evolution) from $z \sim 3$ to 5. At $z \sim 3$, X(LAE) is found to be higher for the fainter M_{1500} sample at $M_{1500} \leq -17.50$, which is consistent with the previous studies, while the trend is not obvious at higher z. Considering the effect of completeness, we will discuss implications for reionization and assess the validity of using X(LAE) as a probe of the IGM neutral fraction at the end of reionization.