

X51b The MUSE Hubble Ultra Deep Field Survey: Ly α Equivalent Widths at $2.9 < z < 6.6$

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We present rest-frame Ly α equivalent widths, EW, of 470 Ly α emitters (LAEs) detected with MUSE on VLT at $2.9 < z < 6.6$ in the Hubble Ultra Deep Field. Based on the deep MUSE spectroscopy with ancillary HST photometry data, we have carefully measured EW values taking into account extended Ly α emission and UV continuum slopes (β). Our LAEs have unprecedented depths in both Ly α luminosities and UV absolute magnitudes: from $\log L(\text{Ly}\alpha) \sim 41.0$ to 43.0 erg s^{-1} and from $M_{\text{UV}} \sim -16$ to -21 (0.01 - $1.0 L_{z=3}^*$). The EW values span in the range of ~ 5 to 240 \AA or larger, and the EW distribution can be well fitted by the exponential law of $N = N_0 \exp(-\text{EW}/w_0)$. Interestingly, we find 13 (five) objects with $\text{EW} > 200 \text{ \AA}$ (400 \AA) above 1σ uncertainties. Four among the 13 LAEs show signatures of mergers or AGN activity: a Ly α blob has the clear detection of the HeII $\lambda 1640$ line. For the remaining nine very large EW LAEs, we find that EW values can only be reproduced by young stellar ages ($< 100 \text{ Myr}$) and low-metallicities ($< 0.02 Z_{\odot}$). With these results, we discuss importance of accurate measurements of EW values.