

X13a Census of Ly α , [OIII] λ 5007, H α , and [CII]158 μ m Line Emission with 1000 LAEs at $z=4.9-7.0$ Revealed with Subaru/HSC

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We investigate emission lines of Ly α , [OIII] λ 5007, H α , and [CII]158 μ m from 1,125 galaxies at $z = 4.9 - 7.0$. Fluxes of strong rest-frame optical emission lines of [OIII] and H α (H β) are constrained by significant excesses found in the *Spitzer* 3.6 and 4.5 μ m photometry. In the presentation in the last ASJ meeting (X50b), we present relations of a [OIII]/H α flux ratio and a [CII] luminosity to star-formation rate ratio. In this presentation, we will show results about H α emission and physical origin of these relations. At $z = 4.9$, we find that the rest-frame H α equivalent width $EW_{\text{H}\alpha}^0$ and the Ly α escape fraction $f_{\text{Ly}\alpha}$ positively correlate with the rest-frame Ly α equivalent width $EW_{\text{Ly}\alpha}^0$. We carefully investigate the physical origins of these relations with stellar-synthesis and photoionization models covering the vast parameter space of metallicity, ionization parameter, and stellar age, and find that these relations are explained by a simple anti-correlation between $EW_{\text{Ly}\alpha}^0$ and metallicity, indicative of the detections of the very metal-poor ($\sim 0.04Z_{\odot}$) galaxies with $EW_{\text{Ly}\alpha}^0 \simeq 200\text{\AA}$.