

Evolution of the [OIII] and [OII] luminosity functions up to $z \sim 5$ from HiZELS: implications for the star formation and AGN activity history of the Universe

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Abstract

We unveil the evolution of the [OIII] and [OII] luminosity functions and star formation histories from $z \sim 0.8$ to 4.7 using data from HiZELS. This is the first time that the [OIII] and [OII] luminosity functions and star formation histories have been studied at these redshifts in a self-consistent analysis. This is also the largest sample of [OIII] and [OII] emitters in this redshift range, with a large comoving volume coverage of $1.6 - 3.0 \times 10^6$ Mpc⁻³ in two independent volumes (COSMOS and UDS), greatly reducing the effects of cosmic variance. We find significant evolution in both $L_\star$ and $\phi_\star$ and find it is in agreement with UV/LBG studies. We will also present the first star formation history of [OII] emitters up to $z \sim 5$ and find that our $z < 2$ star formation rate density measurements are in agreement with H α and stacked radio studies, suggesting that our sample is representative of a star-forming population, but our results extend the population out to $z \sim 5$. Our star formation history is able to recover the stellar mass density evolution. We will also explore our unique and robustly-selected samples to explore dust extinction properties, clustering, and the nature and evolution of line-emitters from $z \sim 0$ to 5 and directly compare those with the results of previous UV/LBG studies.