

Emission Line Galaxies in CANDELS: Equivalent Width Distributions from Broadband Photometry at $z < 2$

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Abstract

We present a general technique to estimate equivalent widths of very strong nebular emission lines ([OII], [OIII] and $H\alpha$) at $z < 2$ exclusively from multiband photometry guided by a set of stochastic burst models based on BC03 SEDs. Offsets between CANDELS-UDS photometry and line-free simulated galaxy continuum colours up to 1 magnitude are used to derive equivalent width distributions reaching above $500\text{\AA}$. Because of the wealth of deep multiband coverage, the method is efficient in selecting large numbers of emission line galaxies (ELGs) over large comoving volumes for demographic studies and for identifying extreme equivalent width objects ($EW > 500\text{\AA}$) for potential spectroscopic follow-up. This subpopulation comprises up to 20%-30% of galaxies with $10^9 M_\odot < M < 10^{11} M_\odot$ and is found to be almost exclusively under 1 Gyr old and $A_V < 0.5$. There seems to be a transition between moderate and extreme ELGs which shifts from $M = 10^{8.5} M_\odot$ at $z < 1$ to $M = 10^9 M_\odot$ at $1 < z < 2$. The method is generally consistent and complementary with existing narrowband and spectroscopic surveys and agrees with other models including nebular emission.