Dusty galaxies at $z > 3$

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Abstract

The $z > 3$ regime for dusty galaxies is still unexplored due to the limited sensitivity of infrared observations, and thus our knowledge of how infrared galaxies evolve beyond $z > 3$ is still limited. With the combination of the deepest Spitzer and Herschel data taken with the GOODS- and CANDELS-Herschel programs, we have selected $3 < z < 5$ infrared luminous galaxies based on their infrared colors, photometric redshifts, and radio priors to observe with Keck/MOSFIRE (K-band). In this redshift range, the emission lines ([OIII], Hβ, or [OII]) can be detected in K-band to not only confirm their redshifts but also investigate their gas properties. The target high-z infrared luminous galaxies are much more dusty and massive than typical UV-selected galaxies (Lyman break galaxies). The redshift confirmations and gas diagnostics with near-infrared spectroscopy facilitate estimates of the total SFR density at $z > 3$ and metallicity measurements for comparison with that of UV-selected galaxies.