

X05a Discovery of a new group consisting of four submillimeter galaxies at  $z = 3.2$ 

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Intensive ALMA continuum imaging surveys toward bright submillimeter galaxies (SMGs) revealed that  $\gtrsim 20\%$  of those SMGs consisting of more than two fainter SMGs, contrary to our previous understanding that bright SMGs have only one infrared luminous ( $L_{\text{IR}} \gtrsim 10^{13} L_{\odot}$ ) counterpart galaxy. Now a new question is whether the multiple SMGs located close each other on the sky are physically bounded at a same redshift.

We report the discovery of a new group of SMGs at  $z = 3.2$  consisting of four SMGs. This group was originally discovered as the brightest AzTEC SMG ( $F_{1100\mu\text{m}} = 7.7 \text{ mJy}$ ), SDF1100.001 in the Subaru Deep Field. Our ALMA 1-mm continuum mosaic map covered the entire AzTEC beam ( $\phi = 30''$ ) with a uniform rms sensitivity of  $\sim 70 \mu\text{Jy beam}^{-1}$ , and resolved SDF1100.001 into four SMGs, SDF1100.001.1 (3.4 mJy), 2 (1.5 mJy), 3 (1.1 mJy), and 4 (1.3 mJy). In order to obtain the spectroscopic redshifts of those SMGs, we conducted blind CO line scans at 100-GHz band toward SDF1100.001 using NOEMA. The NOEMA spectra detected a CO(3–2) line from all of the four SMGs, indicating that they are located at  $z = 3.2$ . The two submillimeter continuum brightest SMGs at the center of the group have a very wide CO(3–2) line width of  $\sim 800\text{--}700 \text{ km s}^{-1}$  (FWHM), which is predicted by simulation of a gas-rich major merger. The multiple SMGs in the SDF1100.001 field may be triggered by multiple gas-rich major mergers, and there massive galaxies are rapidly being assembled.