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Presentation Requested: oral

Category: Assembly of Galaxies / Mass & Structure Evolution

Question: What are the most recent advances in submillimeter detected galaxies? Now that ALMA offers the possibility for resolving them what have we learned about their sizes, gas fractions, distribution of gas, dust and stars.

ALMA 1100-micron continuum imaging survey of radio-submm faint 1100-micron-selected galaxies

We present the initial result of ALMA 1100-micron imaging of 30 Herschel/VLA-faint AzTEC sources in the SXDF/UDS carried out in ALMA cycle-1. Before ALMA observations, we observed the SXDF/UDS by using the AzTEC camera mounted on ASTE 10-m dish at 1100-micron aiming to reveal dusty obscured starbursts, SMGs, in the early Universe, up to $z \sim 10$ due to a strong negative K-correction if they exist. We achieved a sensitivity of ~ 0.5 mJy (1σ), a map area of 1200 arcmin² and a beam size of $30''$ (FWHM), and discovered 281 AzTEC SMGs in the SXDF/UDS. We selected 30 AzTEC sources among 281 AzTEC sources by using deep VLA 21 cm, and Herschel 100-500-micron data, aiming to reveal the nature of these 'submm-radio-faint' 1100-micron-selected galaxies. The resultant ALMA images achieve a sensitivity of 70-88 microJy/beam, $> \sim 6$ times better than that of the AzTEC/ASTE observation, and achieve a synthesized beam size of $0''.4-0''.7$ (FWHM), $> \sim 2000$ times better than that of AzTEC/ASTE map. We find 33 ALA continuum sources ($\geq 5\sigma$; $L_{\text{IR}} = 0.4-3.5 \times 10^{12} L_{\odot}$) in total, and 24/30 (=80%) of the 'submm-radio-faint' AzTEC sources have at least one significant ALMA continuum source. Deep Optical (Subaru SXDF)/Near(UKIDSS UDS) and Mid infrared(IRAC SpUDS and SEDs) data indicate that 18/33 (=55%) can be located at $z \gtrsim 4-5$. Among them we find that there are significant IRAC faint ALMA sources (< 26 AB mag at 3.6 and 4.5 micron), which are not detected except ALMA, a dark SMG. The baseline lengths of our ALMA data range up to 1200 kilo lambda for 10 AzTEC sources (and up to 400 kilo lambda for remaining 20 sources). We find that all of the 14 bright ALMA/AzTEC sources with ≥ 1 mJy and $\geq 10 \sigma$ detection are resolved, and the median size is ($0''.2$, FWHM).