A22a Different AGNs contributions to SMGs and ULIRGs at High Redshifts

○ Yasuyuki Watabe (University of Tsukuba/Arcetri Observatory)、Guido Risaliti、Marco Salvati、Emanuele Nardini、Eleonora Sani (Arcetri Observatory)

Observations with the Submillimeter Common User Bolometer Array on the James Clerk Maxwell Telescope discovered a new population of submillimeter galaxies (SMGs). SMGs are mainly distributed around $z = 1 - 3$. SMGs have far-infrared luminosity greater than $10^{12} L_{\odot}$, implying that they are ultraluminous infrared galaxies (ULIRGs). Also, SMGs are likely to be associated with an early phase in the formation of massive galaxies, supermassive black holes and AGNs. Therefore, making clear the origin of their energy sources is very important to understand the star formation history and the AGN activities in the high-z Universe.

The mid-infrared (MIR) spectrum could have advantages to divide the starburst and the AGN components. The MIR spectra of starbursts and AGNs are characterized by the strong polycyclic aromatic hydrocarbon features and a strong continuum, respectively. The highly sensitive instruments aboard the *Spitzer Space Telescope*, especially the Infrared Spectrograph (IRS), become powerful tools for performing detailed studied of SMGs.

For these SMGs, we quantitatively estimate the starburst and the AGN components by 6-8 μm composite spectra for each redshift range, performed with *Spitzer*-IRS. We find that low-z SMGs clearly shows the starburst-dominated spectrum shape, while AGN feature begins to become important to decide the spectrum shape of high-z SMGs. However, in either case of low and high-z SMGs, starbursts dominate their bolometric luminosity. We also discuss the difference between these SMGs and high-z ULIRGs selected 24 μm flux.