Dust and stellar emission in dust-rich galaxies observed with ALMA: a challenge for SED fitting techniques

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Abstract

Over the past few years ALMA has detected dust-rich galaxies whose cold dust emission is spatially disconnected from the UV rest-frame emission. This represents a challenge for modeling their integrated spectral energy distributions (SED). The dust attenuation to apply to the stellar emission of these objects is an open issue and is expected to affect the determination of physical quantities.

In order to go further in the analysis, we selected 17 sources at $z \approx 2$ in the HUDF and GOODS-S fields detected with ALMA and Herschel and for which exquisite ultraviolet to near-infrared rest-frame ancillary data are available. The fit of the stellar continuum alone only reproduces up to 50% of the total dust luminosity observed by Herschel and ALMA. The combined stellar and dust SEDs are well fitted when different attenuation laws are introduced. Shallow attenuation curves are needed for the galaxies whose cold dust distribution is very compact compared to starlight, we will introduce a double power-law recipe to represent the global shape of the attenuation curve from the UV to the NIR.

The stellar mass estimates are affected by the choice of the attenuation law. The star formation rates are robustly estimated as long as dust luminosities are available. The large majority of these galaxies are above the average Main Sequence of Star Forming Galaxies and one source is a strong starburst.

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