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# Characteristic Emission of Star-Forming High Redshift Galaxies: Testing the IR Template

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In anticipation of JWST data, today's study of early Universe galaxies focuses on preparations for efficient data handling. For that reason, in our previous work (Burgarella et al. 2021, in press), we constructed an IR template which is based mainly on the ALPINE data sample with an addition of a few other well-studied galaxies, which includes galaxies in the redshift range $4.5 < z < 6.2$. To build the IR template, a sample of galaxies with a well-sampled SED was chosen and SED fitting was performed on the entire sample using the flux data of all available filters. This mainly served to constrain the UV part of the SED, give an idea about the type of IR SED that we might expect, and have a best-fit model of the entire SED. Then, by normalising the SEDs of each individual galaxy at the rest-frame 200 $\mu$m flux, a composite IR SED was constructed from the normalised ALMA Band 6 or 7 fluxes of all galaxies, this time in the observer frame. When shifted to the observer frame, the flux of the ALMA Bands is at a different wavelength for each galaxy, due to the difference in redshift. We call this technique "using the Universe as a spectrograph". Finally, these data points were fitted to create a SED template representative of the entire studied sample. The IR template is expressed through the parameters of three different dust emission models that are required as input in the SED fitting code CIGALE which we consistently use in our work. By using these values of the parameters, the number of models needed to fit the SED is greatly reduced. In this work, we use older data from Bouwens et al. (2016) to test the IR template. Three of the objects from this dataset were already used in building the IR template, however, the majority of them did not meet the required minimum of 5 data points in the UV-optical and the S/N>1.5 criteria. The SED fitting with CIGALE is first carried out by using a grid of models for the dust emission. In a second fitting run, the parameters of the IR template are used. We compare the main output parameters of the models, i.e. the characteristics of the galaxies, as well as the typical diagnostic diagrams for this kind of sample, such as the SFR-M_star, IRX-M_star and IRX-beta diagrams. We also compare our results to the original findings of Bouwens et al. (2016).

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