Population synthesis modelling of Luminous Infrared Galaxies at intermediate redshift

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Giovannoli et al, (2010), accepted on June, 3rd

Our goal is to derive physical properties of galaxies to understand their evolution. SED-fitting realised thanks to a numeric code :

CIGALE for Code Ivestigating GALaxy Emission
Noll et al. (2009b) & Burgarella et al. (2005)
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CIGALE : SED-fitting of LIRGs

INPUT: Photometric broad-bands, parameters of the Star Formation History, parameters of dust attenuation, library of Infrared SED models.

Stellar populations: Maraston et al. (2005)

Dust attenuation: Calzetti et al. (2000) law and no bump

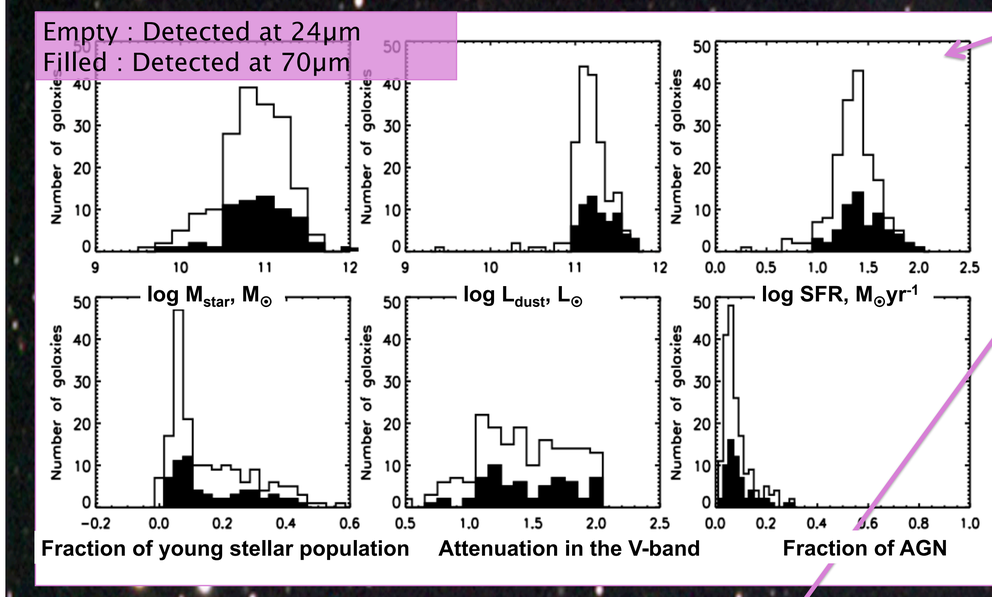
IR models : Dale & Helou (2002) models

OUTPUT : galaxie mass, L_{dust}, SFR, age of young and old stellar populations, fraction of burst, extinction, fraction of AGN

THE SAMPLE

181 LIRGs from the GTO, SPITZER/MIPS Chandra Deep Field South
Le Floc'h et al. (2005)
Photometric redshifts given by COMBO17, z=0,7+/- 0,5
80% detected in NUV
34% detected at 70 µm

Empty : Detected at 24µm
Filled : Detected at 70µm



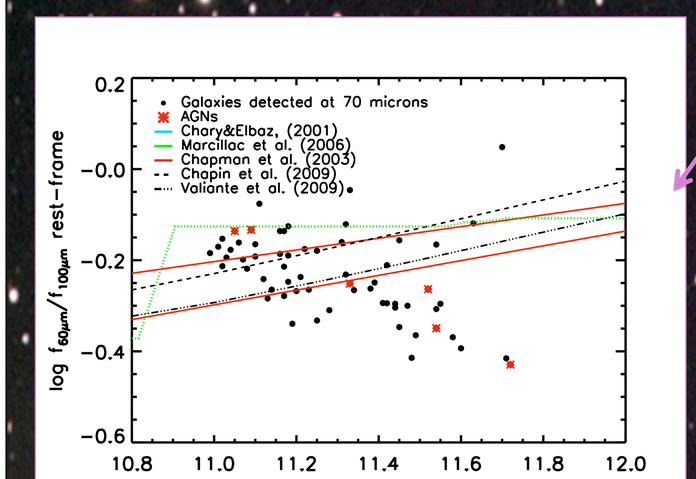
RESULTS FROM THE FIT PROVIDED BY CIGALE

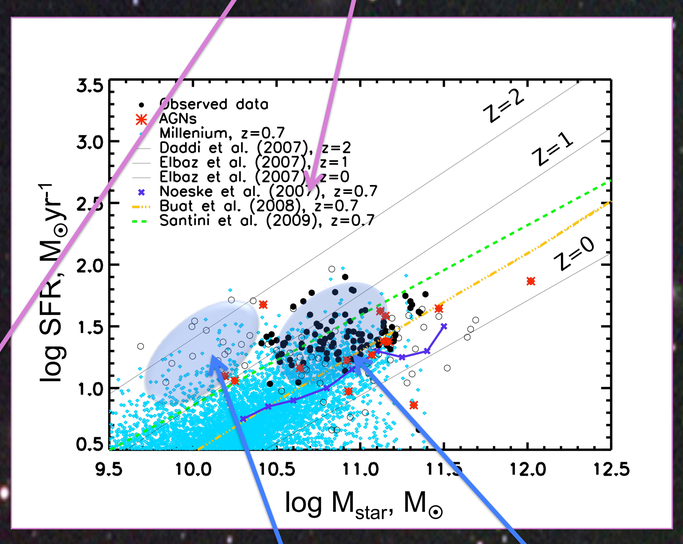
Galaxies detected at 70µm exhibit colder dust temperatures as traced by the ratio f60µm/f100µm than expected from local relations between dust luminosity and temperature.

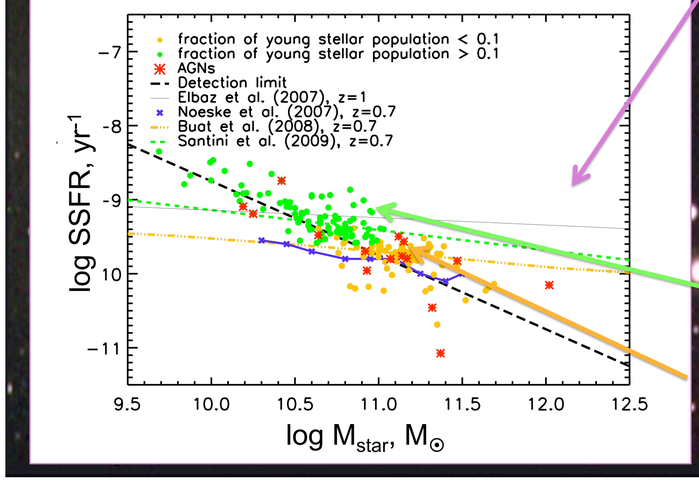
Our LIRGs appear to form stars actively; they exhibit a flat distribution with a large scatter in the star formation rate - stellar mass plot.
The amplitude of the dispersion is related to the age of the young stellar population, a tighter distribution being found for the largest ages.

We find that our galaxies with a stellar mass > 10^{11} $M_\odot$ have less than 10% of their mass coming from the young stellar population. The specific star formation rate for these massive galaxies never reaches the one found for intermediate-mass galaxies of our sample, confirming the downsizing scenario.

The multiwavelengths data analysis performed in this study provide reliable estimates of several physical parameters but may turn out insufficient to determine accurate dust temperatures. Forthcoming data from Herschel will help us to better constrain galaxies SEDs and thus to derive more reliable parameters.







Fraction of the young stellar population > 10%

Fraction of the young stellar population < 10%

Population older than 0.3 Gyr

Population younger than 0.3 Gyr

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