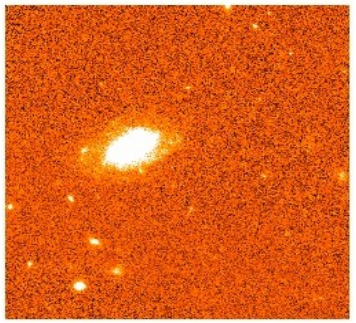
My research activity

Paola Santini (INAF–OAR)

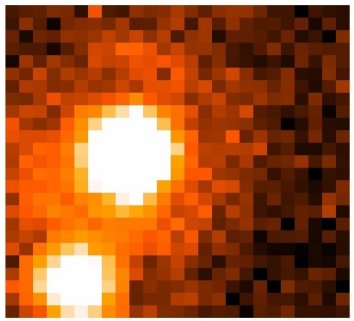
Catalog extraction

MIPS 24 um

Spitzer 24 μm catalog extracted with ConvPhot (De Santis+07) and added to the **GOODS–MUSIC** multiwavelength catalog (Grazian+06, Santini+09, http://lbc.oa-roma.inaf.it/goods)



z–band image (ACS)
Pixel size = 0.03"
PSF ~ 0.12"



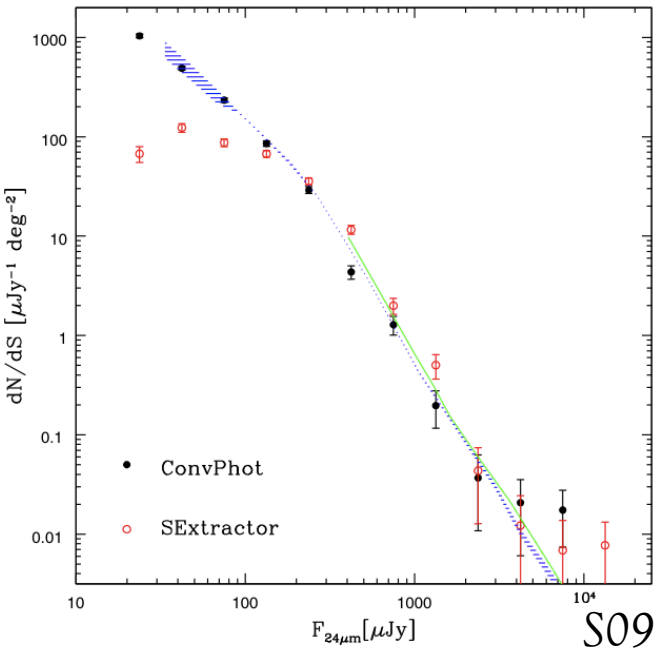
24 μm image (MIPS)
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PSF ~ 5.16"

GOODS–MUSIC

Photometry from **0.3 to 24 μm (15 bands)**
~143 arcmin^2 **CDF–South**
~15000 objects *z*, *Ks* and 4.5 μm selected
~1800 spectroscopic z + well calibrated zphot

MIPS 24μm band

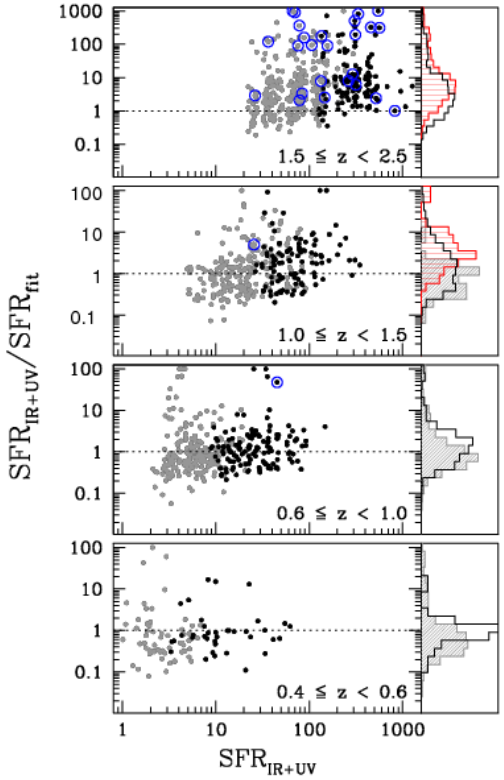
3313 (~22%) detected objects and 11841 (~78%) 1 σ upper limits
Flux limit of ~20 μJy with S/N~6–7



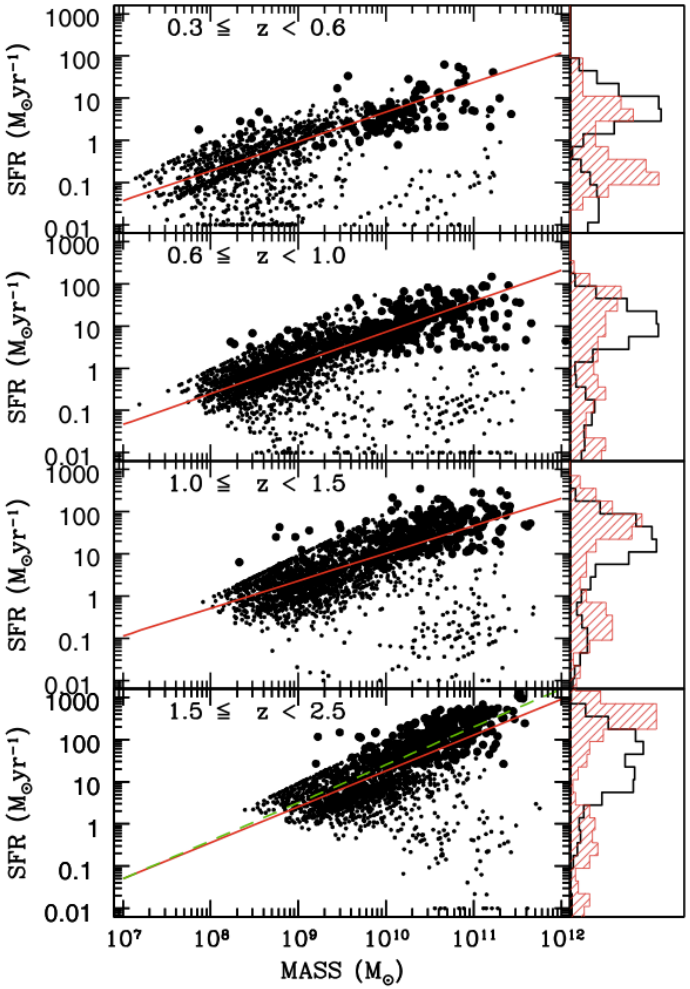
S09

The SFR in high-z galaxies

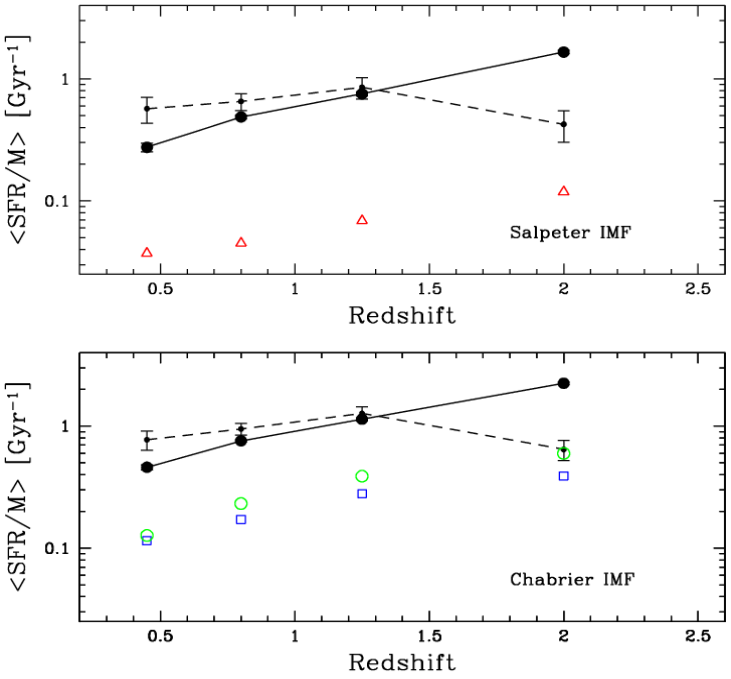
Comparison between SFR estimators



Main Sequences at different z



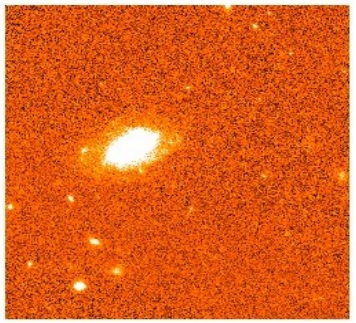
Specific SFR vs z and comparison with theoretical models



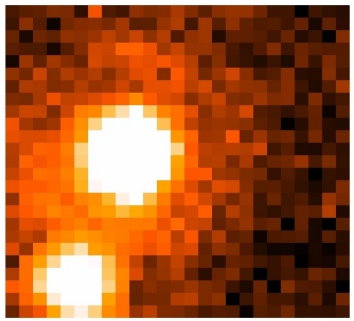
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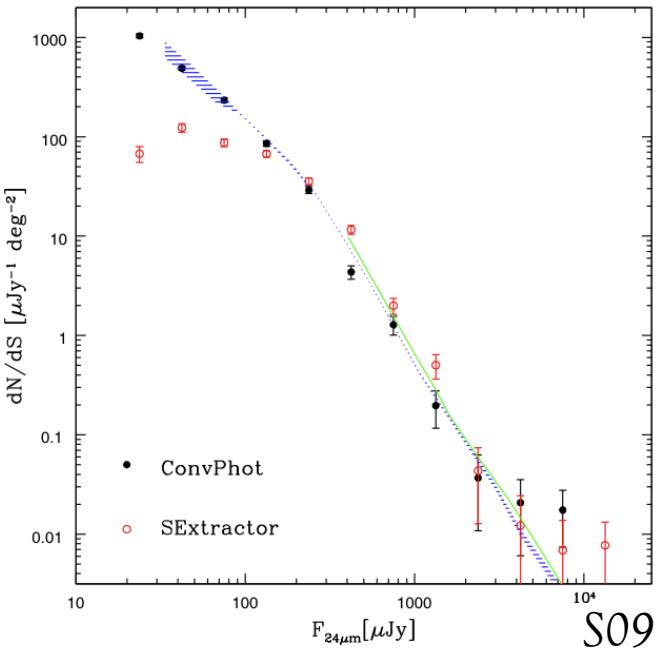
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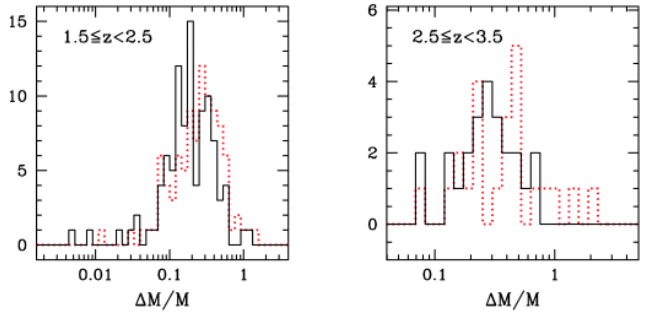
Herschel PACS

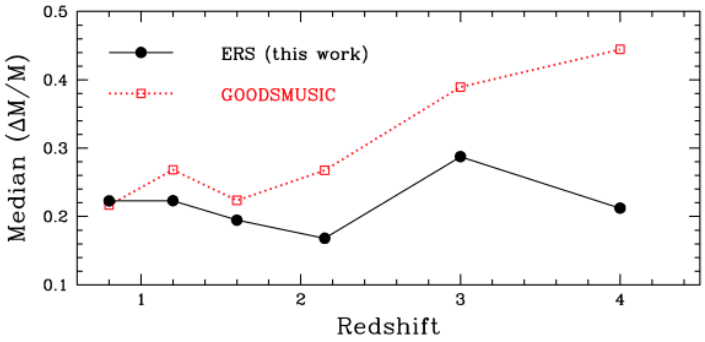
ConvPhot was used on SDP Herschel data with IRAC priors: the catalogs were tested against those produced by the Magnelli's code and turned out to be consistent

Stellar masses

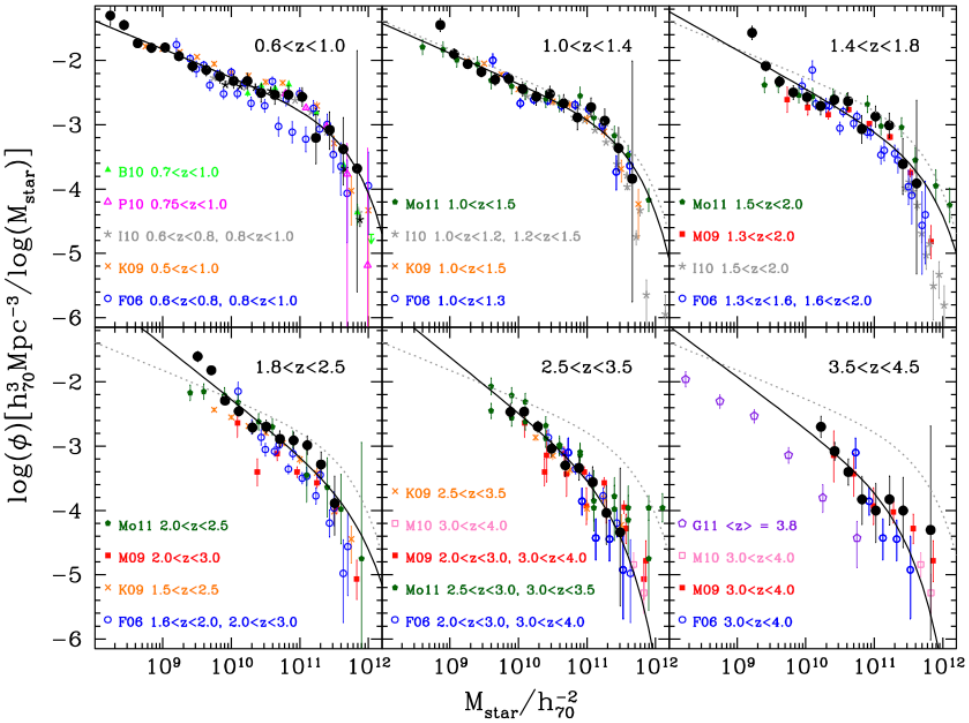
Pre-CANDELS deep NIR data:

- Ultradeep ERS - WFC3 images YJH (27.3-27.4 at 5σ limit) (reduction by A. Koekemoer, catalogs by A. Grazian)
- K band from Hawk-I (25.5 at 5σ limit) (Castellano+10)
- ~30% lower uncertainties on M_{star} (wrt GOODS-MUSIC at consistent photo-z and M_{star})

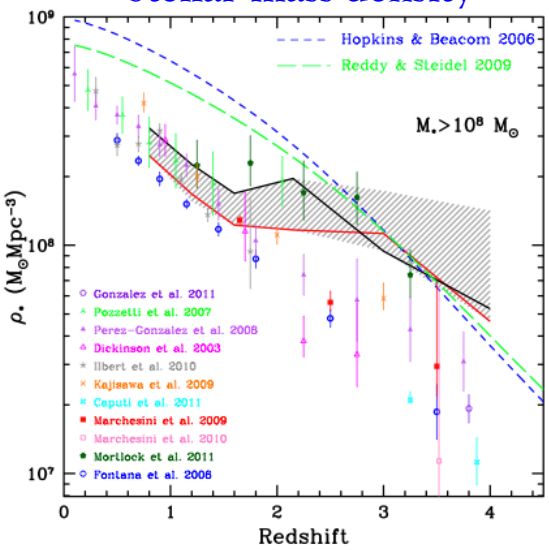




Stellar mass function at 0.6 < z < 4.5

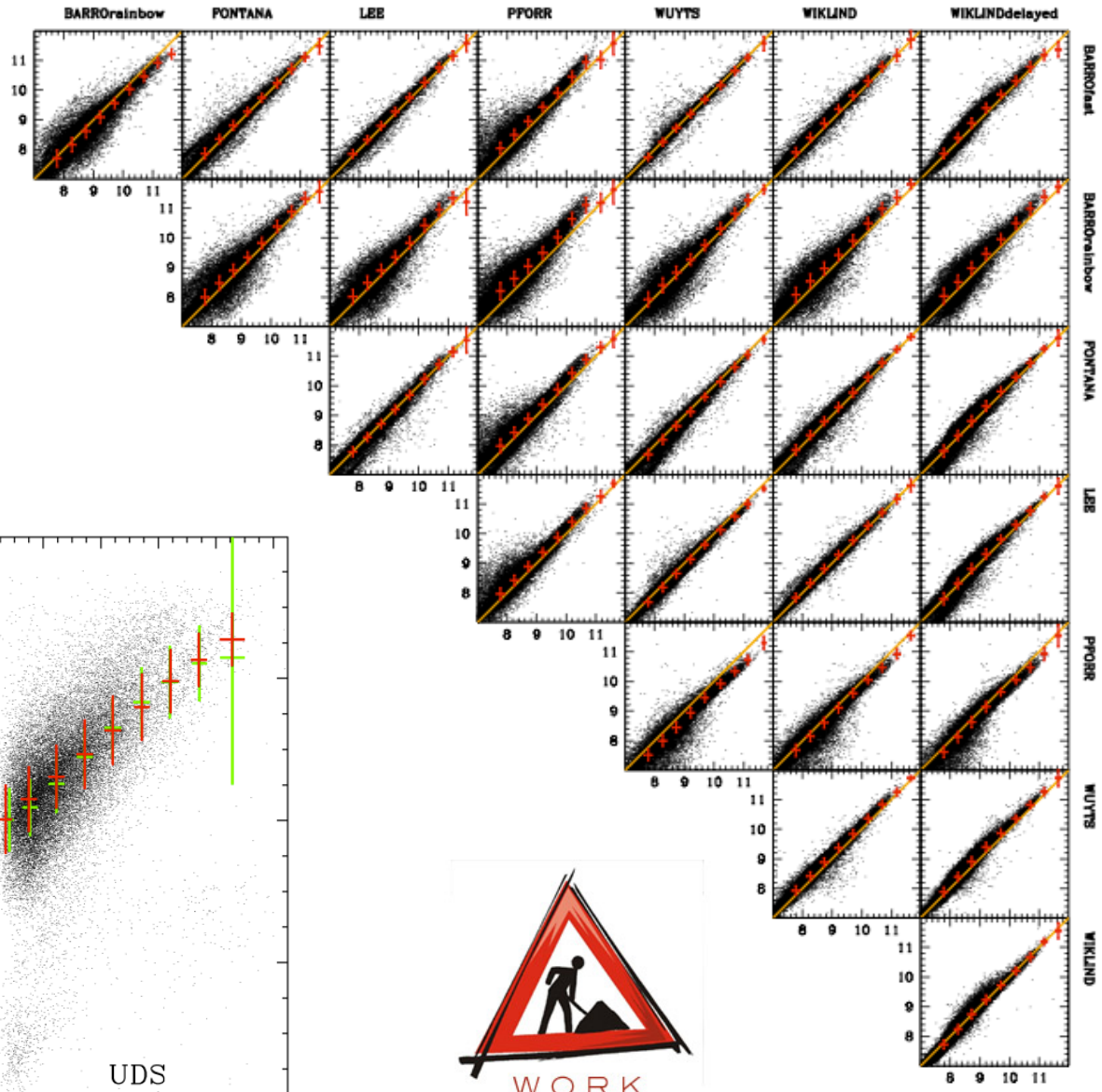


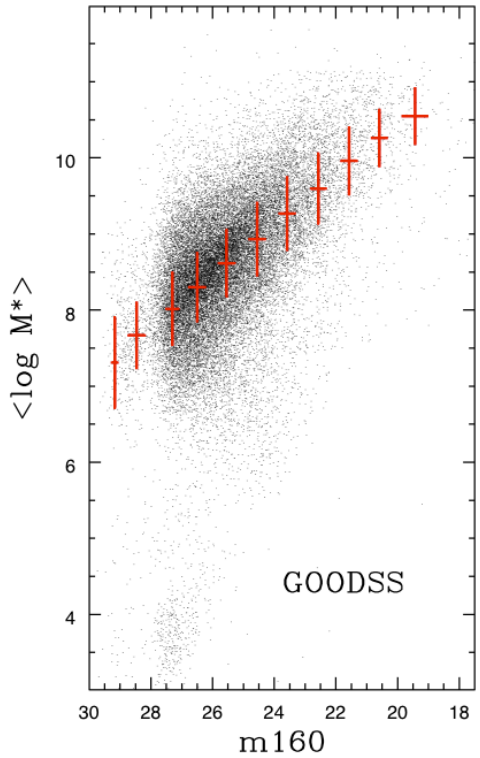
Stellar mass density



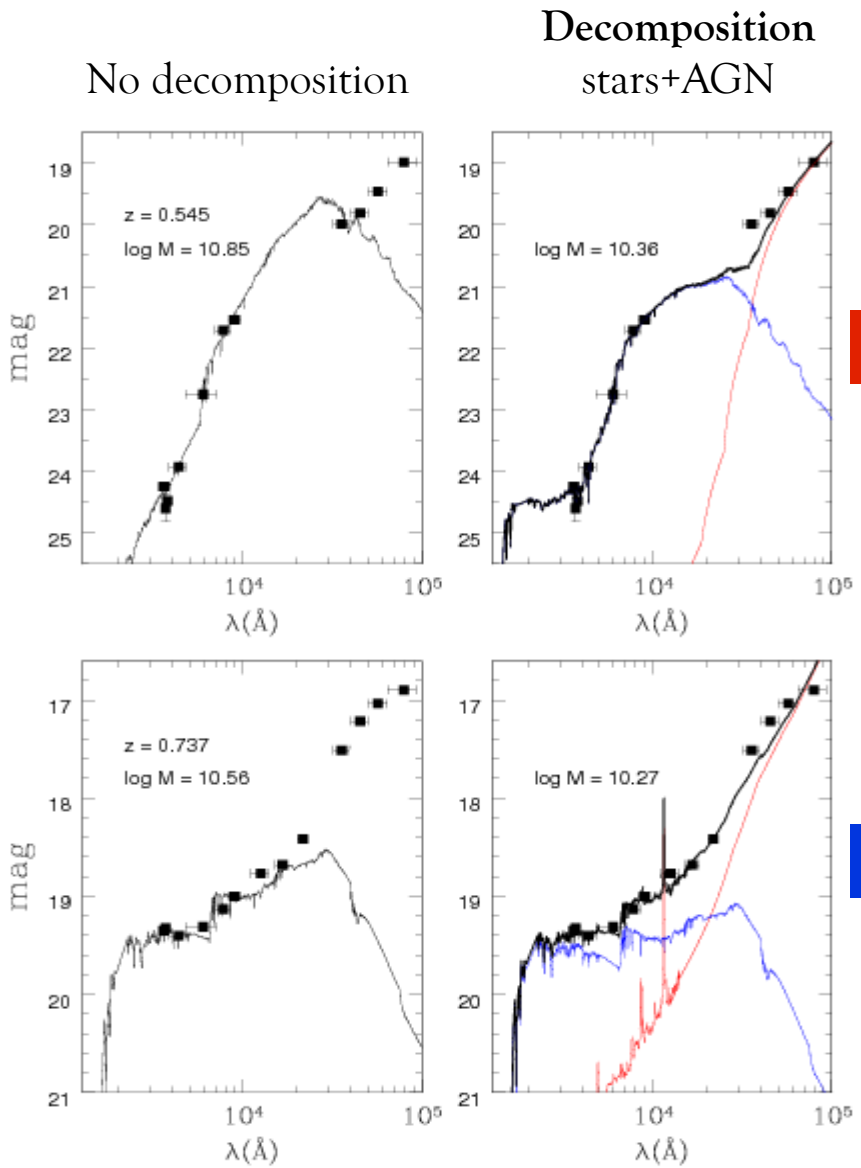
Stellar masses in CANDELS

Comparison among different estimates of stellar masses, done by various contributors within the CANDELS collaboration, based on the same GOODS–S and UDS catalogs and redshifts, but adopting different assumptions, codes, etc.



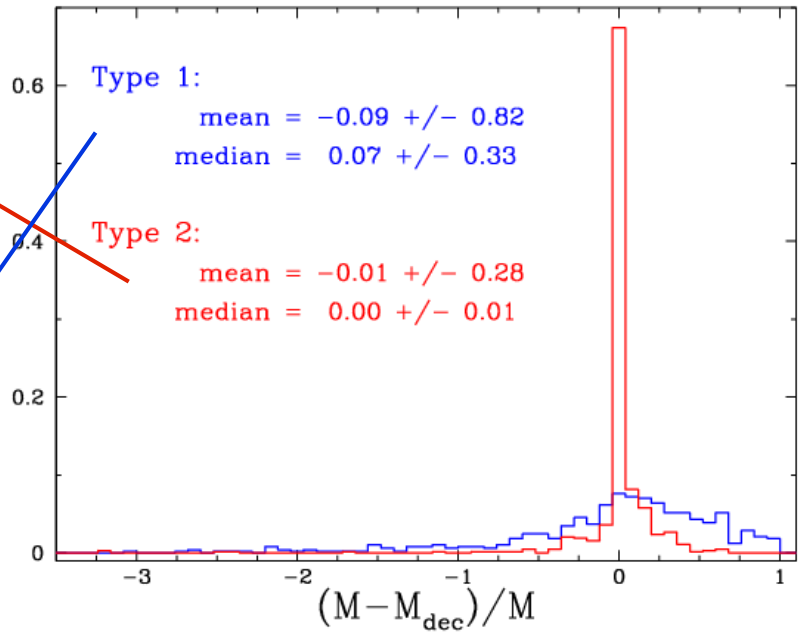


Stellar masses in AGN hosts

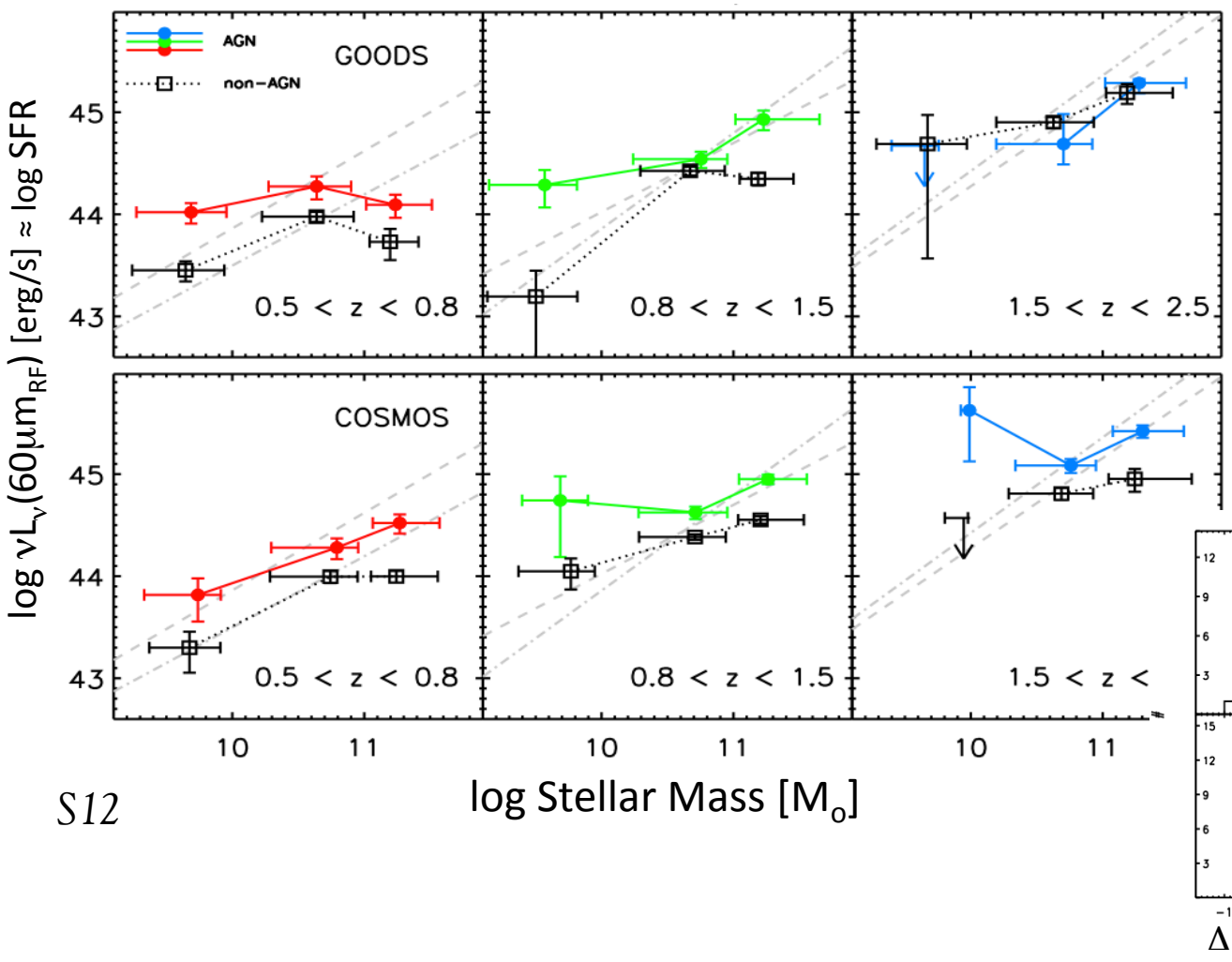


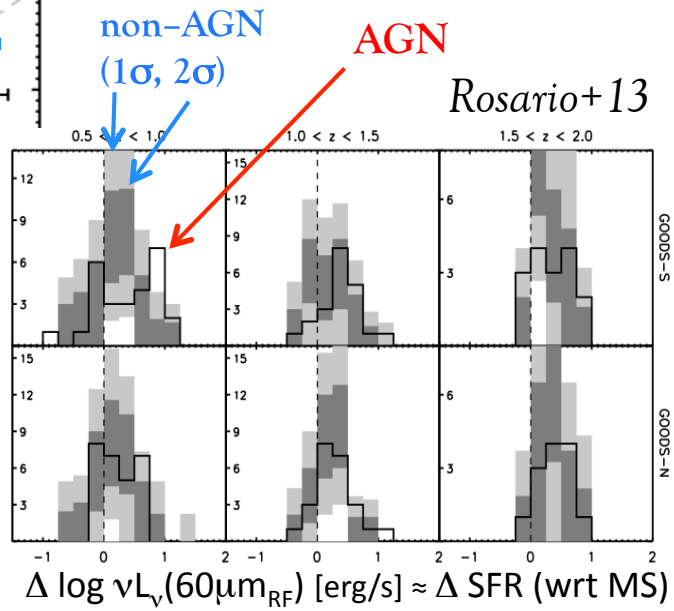
Type 2

Type 1



SF activity in AGN hosts





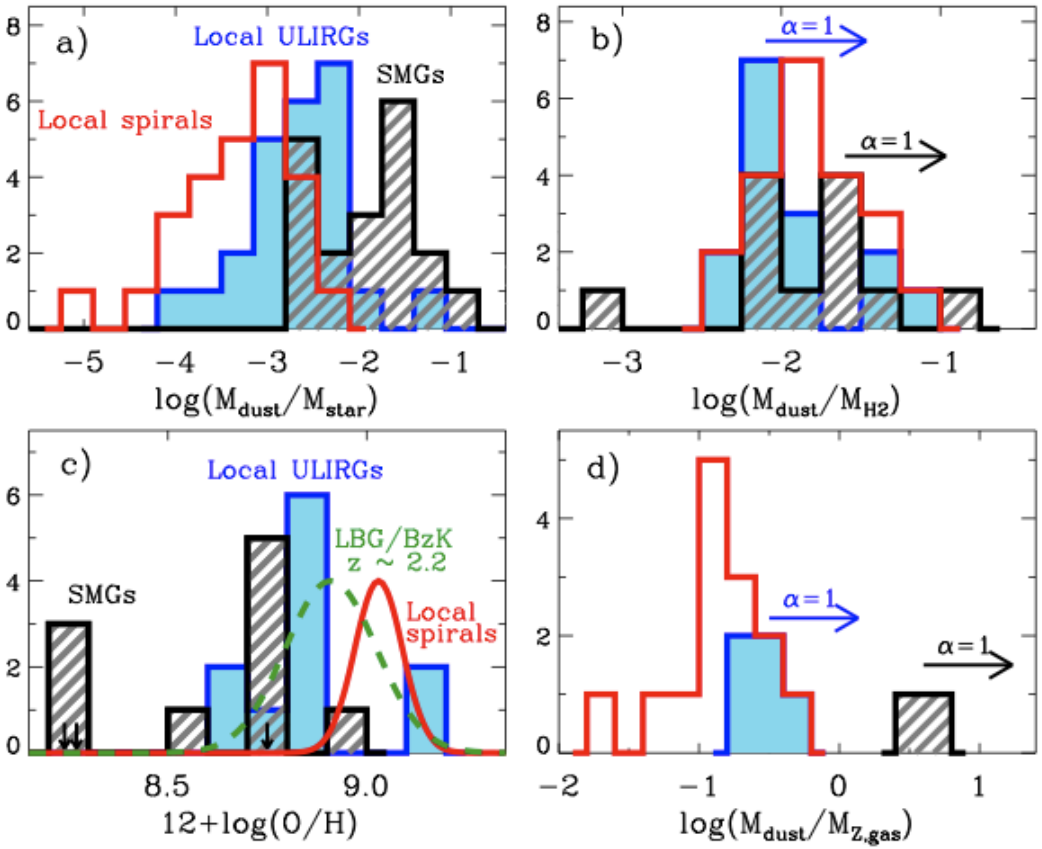
- enhanced SFR in the average population of AGN wrt non active galaxies of similar mass (including SF and passive sources)
- consistent SFR distribution in Herschel detected sources (i.e. around or above MS)
- AGN live in normal star–forming galaxies (not preferentially in starburst) gas–rich (Vito+subm.)

Dust studies with Herschel

Comparison of the dust, stellar, gas masses and gas metallicities of a sample of high–z SMGs with local SF galaxies (spirals and ULIRGs)

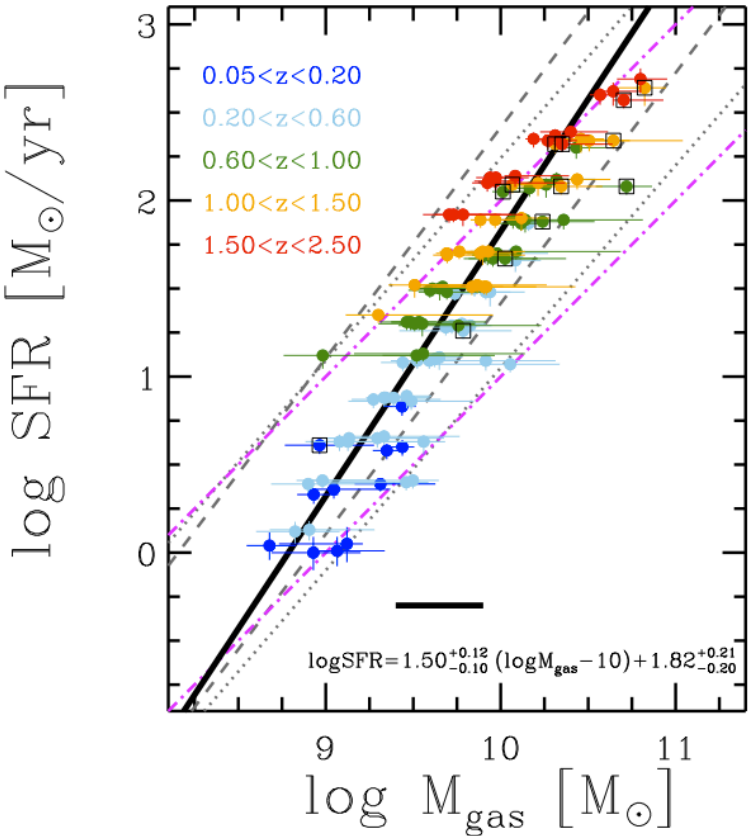
SMGs are very dust–rich, but have low gas metallicity: mass of metals from the dust content much larger (> factor 10) than the mass of metals inferred from the gas phase.

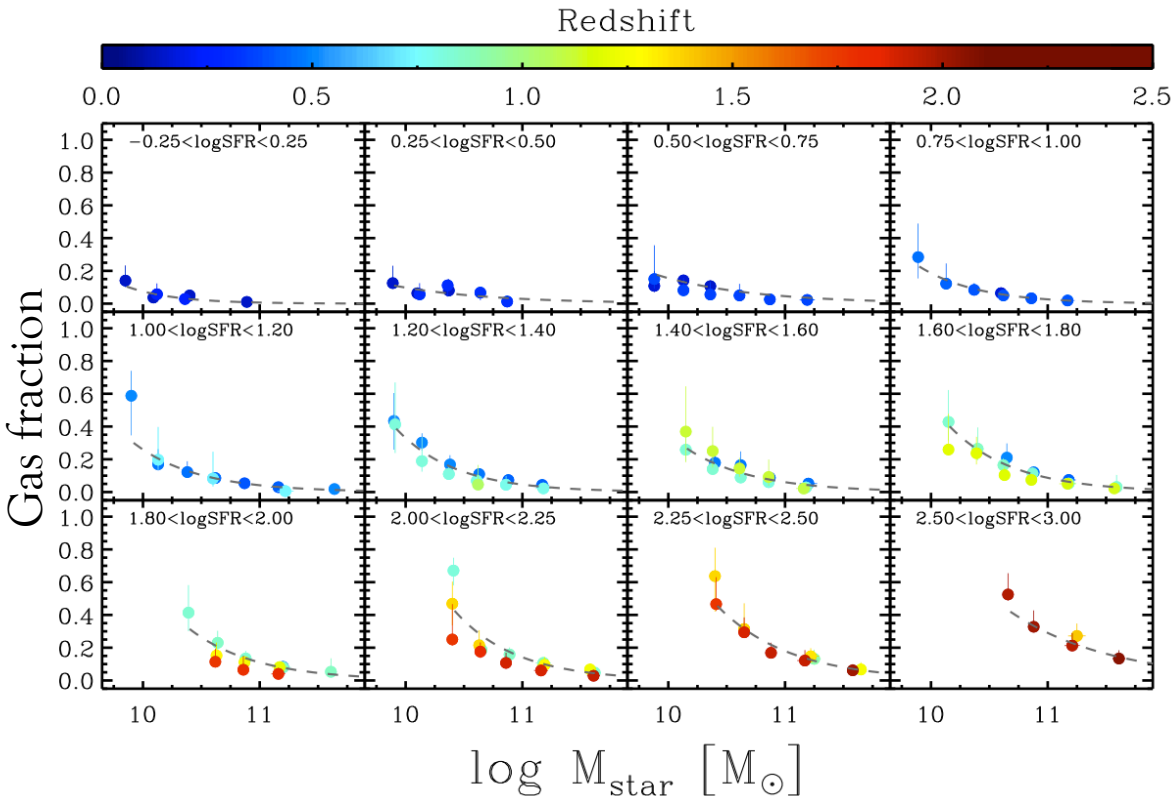
Plausible explanation:
The dust richness and the compact configuration make most of the ISM optically thick at visual wavelengths. As a consequence, the optical nebular lines used to infer the gas metallicity only probe the outer parts of the star-forming regions, which are probably more metal–poor.



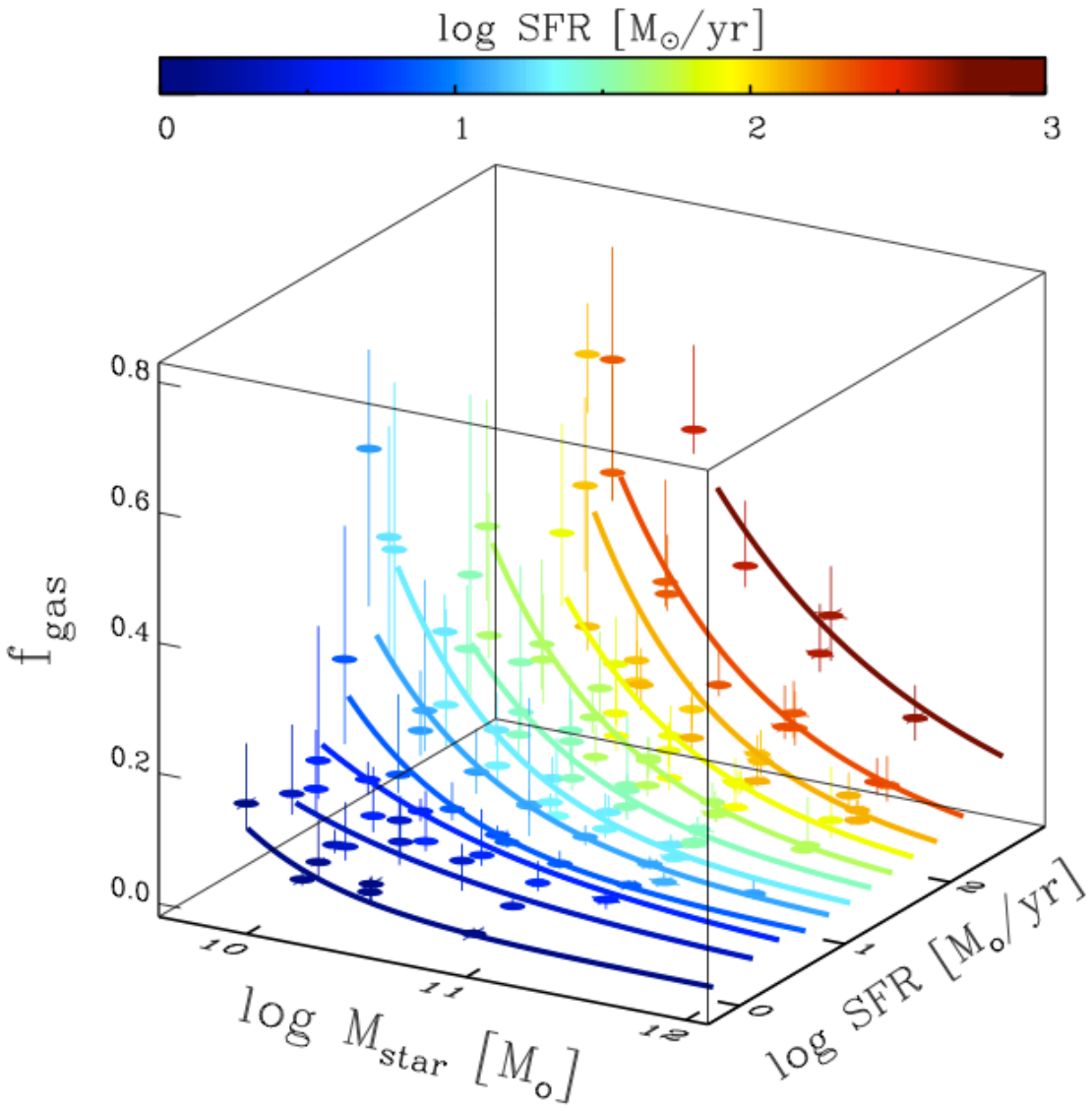
Dust and gas studies with Herschel

Investigation of scaling laws between galaxy fundamental physical parameters (SFR, M_{star}, M_{dust}, M_{gas}) and their redshift evolution (average properties).
Dust is used as a proxy of the gas mass by making assumptions on the dust/gas ratio





Dust and gas studies with Herschel



Gas (and dust) content are consistent with no evolution with redshift (within uncertainties) <u>at fixed M_{star} *and* SFR</u>

This does not imply lack of evolution: the global gas and dust content do evolve, since galaxies populate difference regions of this surface at different epochs