

# CHARACTERISTIC EMISSION OF STAR-FORMING HIGH REDSHIFT GALAXIES: TESTING THE IR TEMPLATE

Jana Bogdanoska

Institute of Physics - UKIM, Skopje

[janabogdanoska@pmf.ukim.mk](mailto:janabogdanoska@pmf.ukim.mk)



COST MW-Gaia WG1/WG4 Workshop

Gaia – Beyond the Milky Way

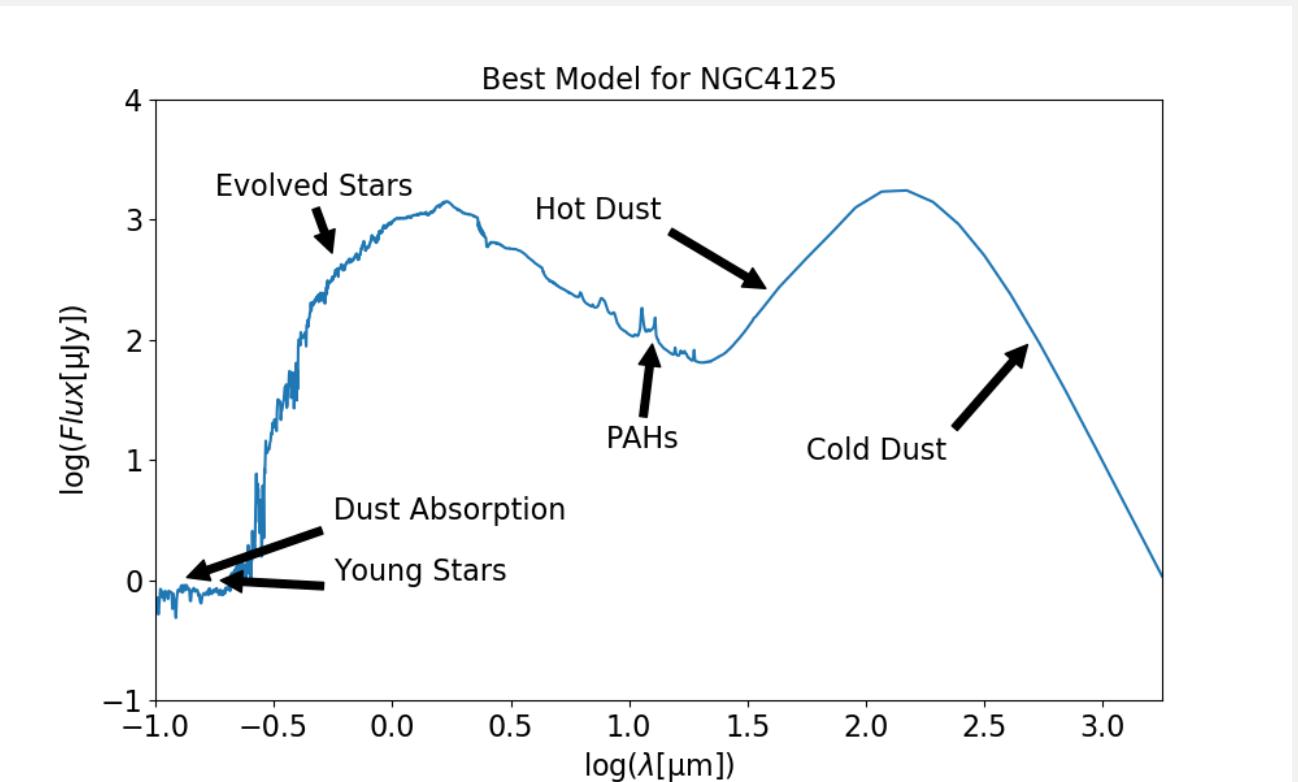
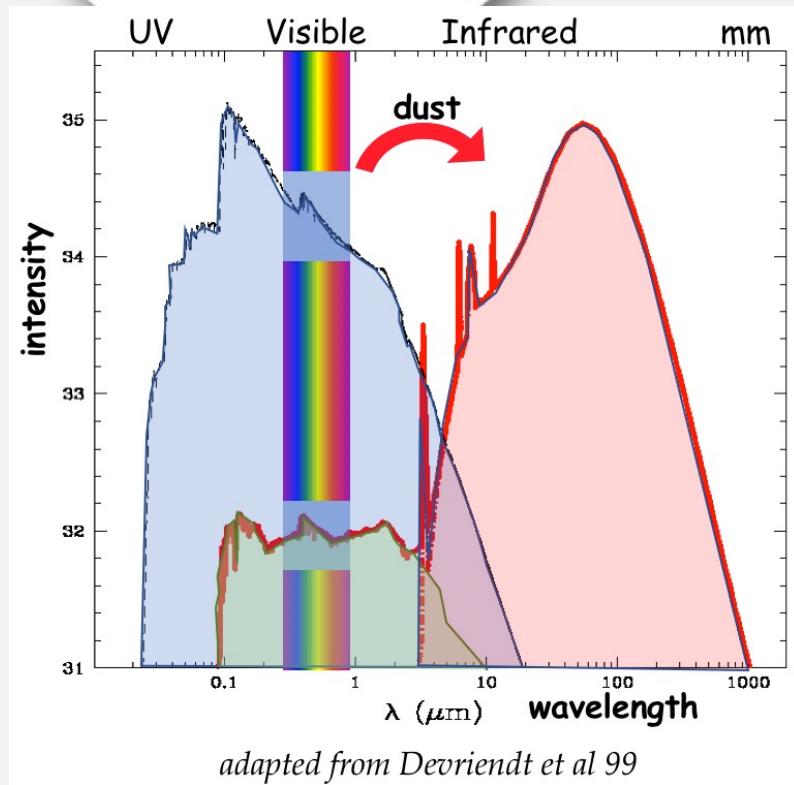
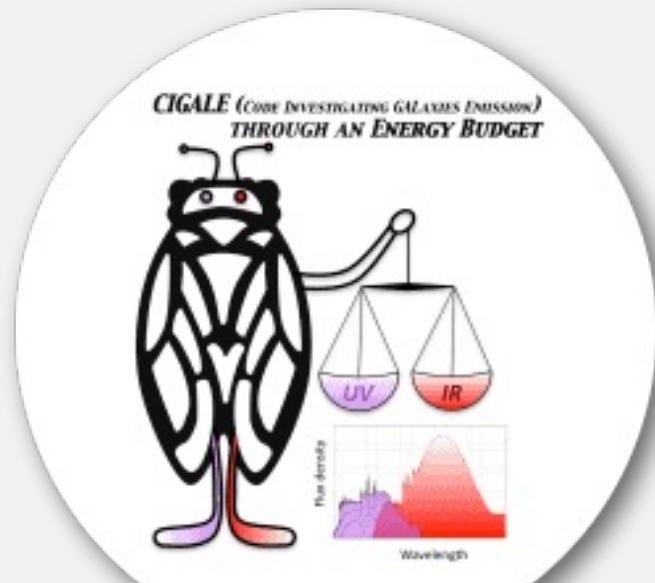
Athens, 27-28-29 September 2022



# Background

- Extragalactic astronomy – star formation history, dust attenuation and emission
- Early Universe evolution (high redshift)
- SED fitting
- First heard about GAIA extragalactic data ~1 month ago

# SED fitting



# Dust Emission Models

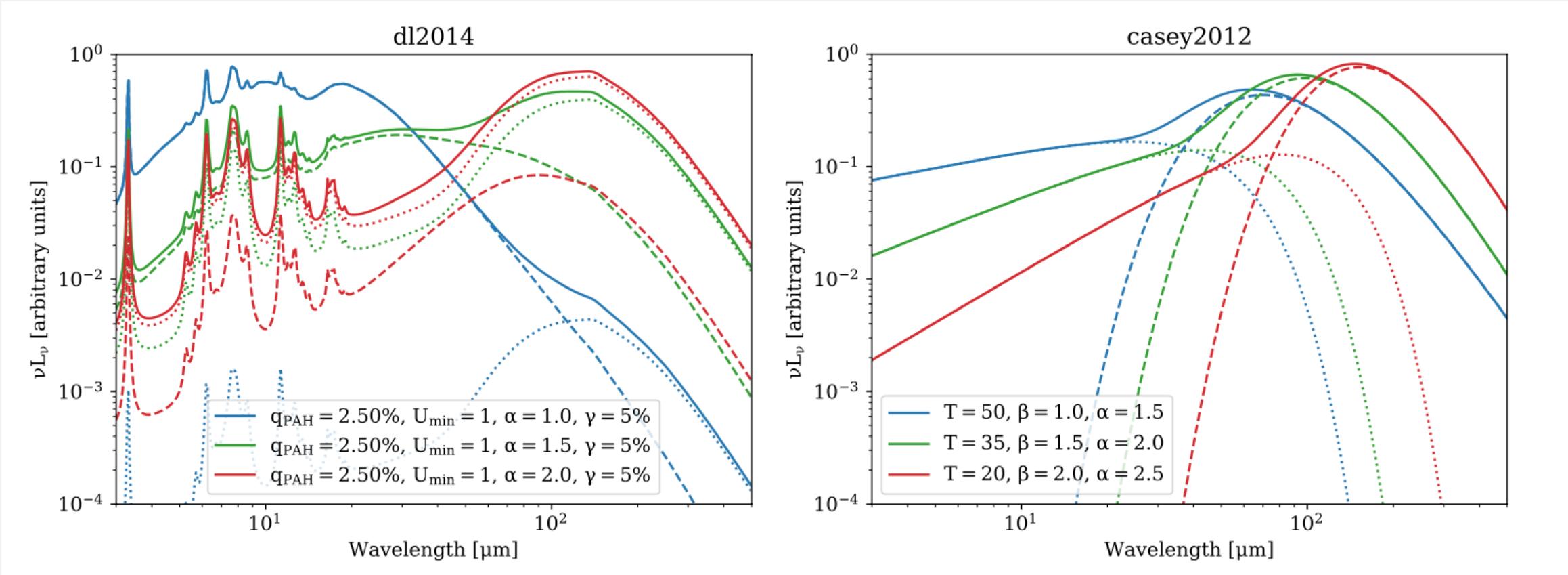


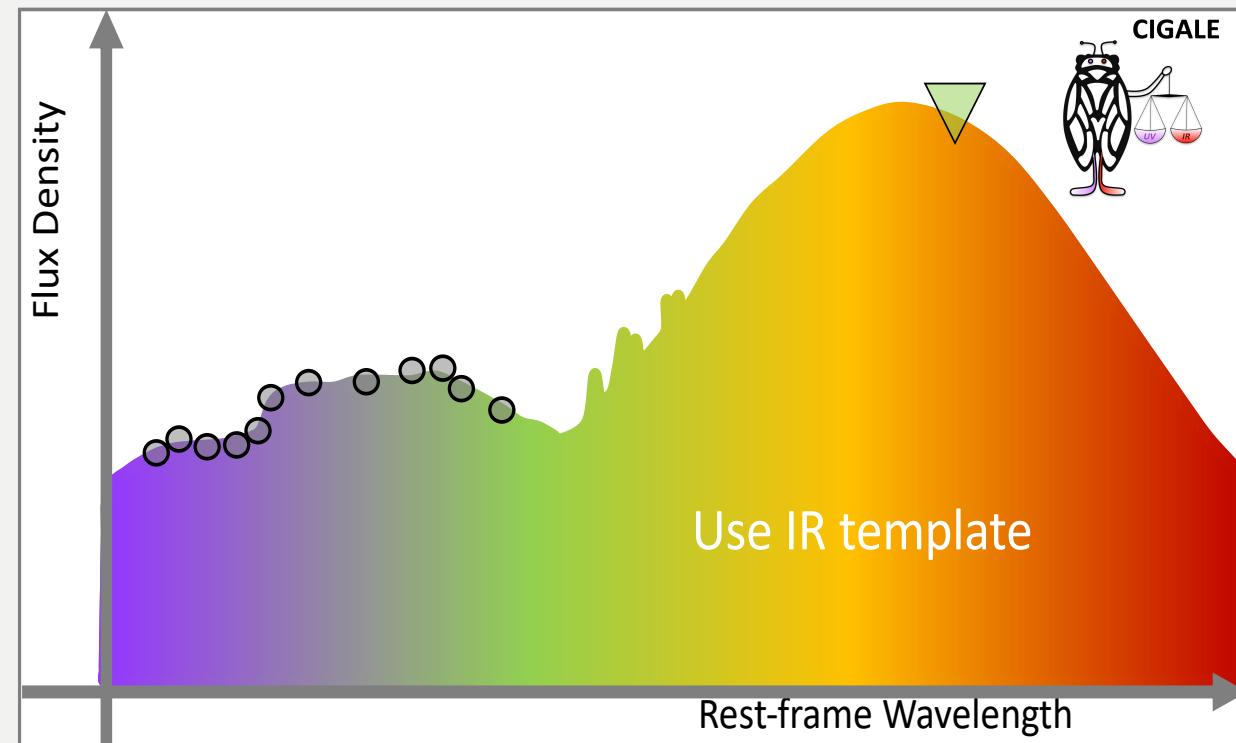
Fig. 5 of Boquien et al. (2019)

# IR Template for dust emission

	PL+G_MBB	PL+OT_MBB	DL2014
$\alpha$	$2.13 \pm 0.78$	$2.00 \pm 0.82$	N/A
$\beta$	$1.47 \pm 0.53$	$0.91 \pm 0.35$	N/A
$T_{dust} [\text{K}]$	$63.79 \pm 8.94$	$52.82 \pm 9.80$	N/A
$q_{PAH}$	N/A	N/A	0.47
$\alpha$	N/A	N/A	$2.37 \pm 0.35$
$u_{min}$	N/A	N/A	$10.08 \pm 7.06$
$\gamma$	N/A	N/A	$0.53 \pm 0.30$
$L_{dust}/10^{20} [\text{W}]$	$3.59 \pm 1.85$	$2.28 \pm 0.68$	$2.34 \pm 1.13$

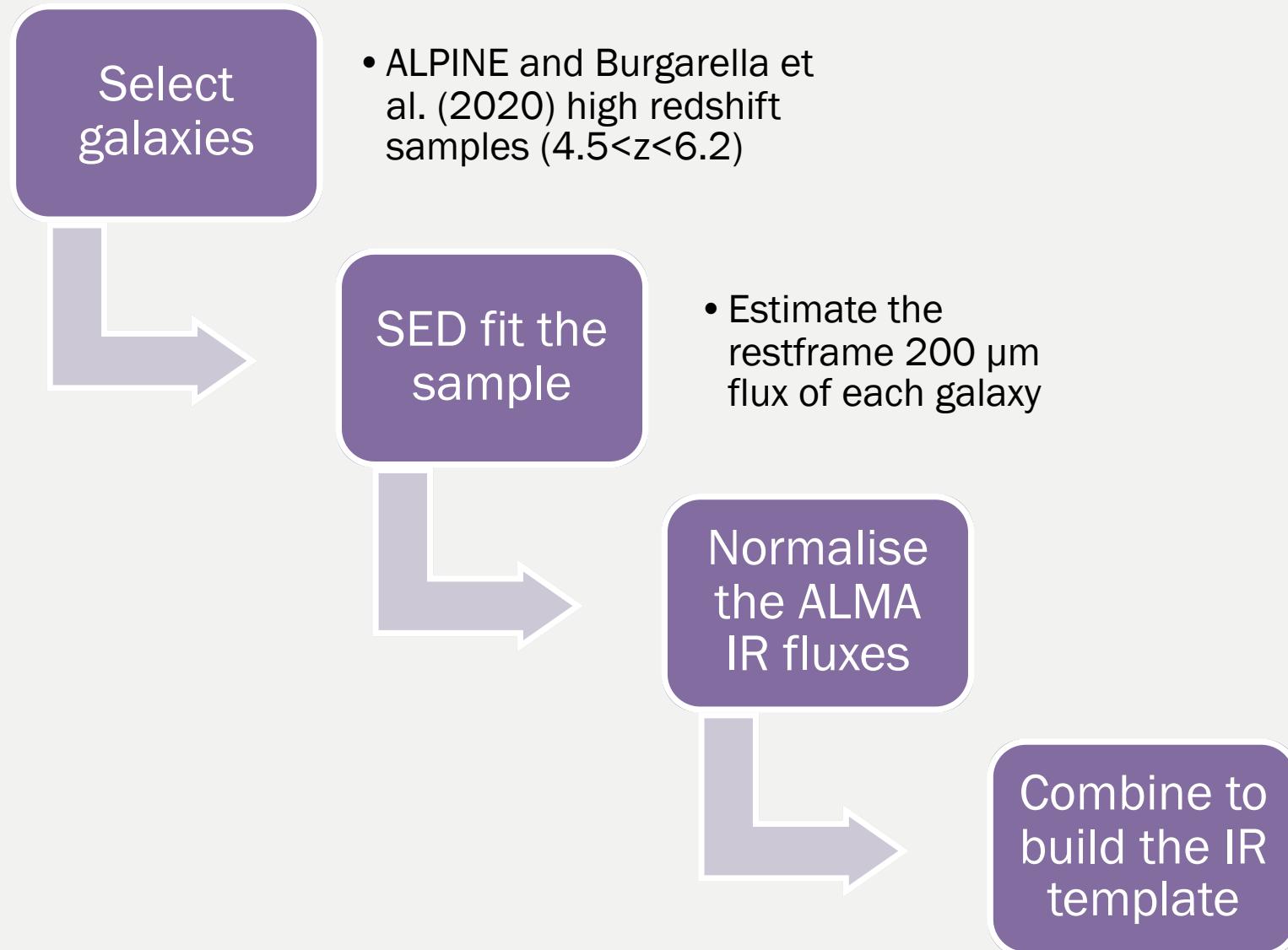
- PL+G\_MBB: power law + general modified black body
- PL+OT\_MBB: power law + optically thin modified bb
- DL2014: Draine and Li 2014

Burgarella et al. (2022)

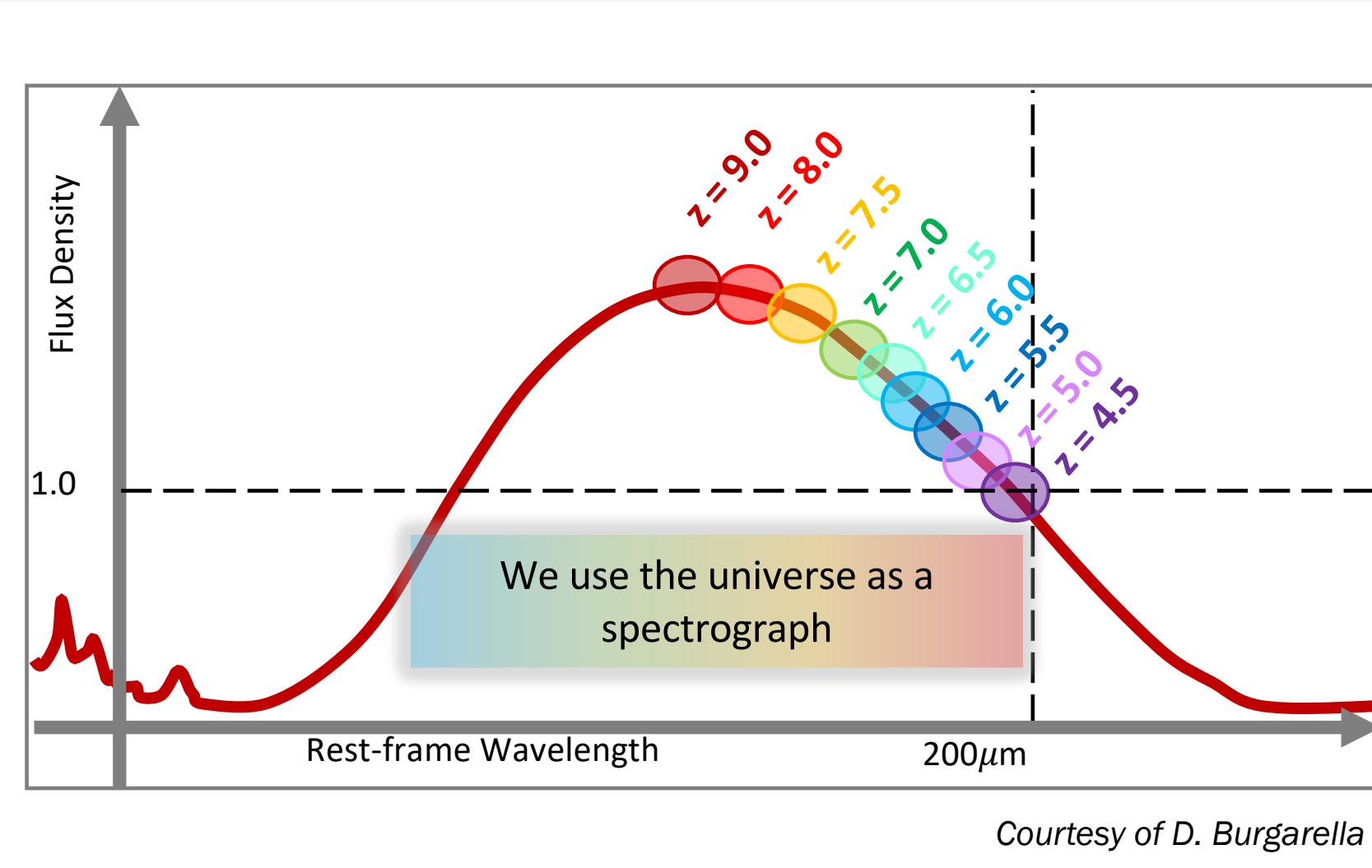


Courtesy of D. Burgarella

# Building the composite IR template

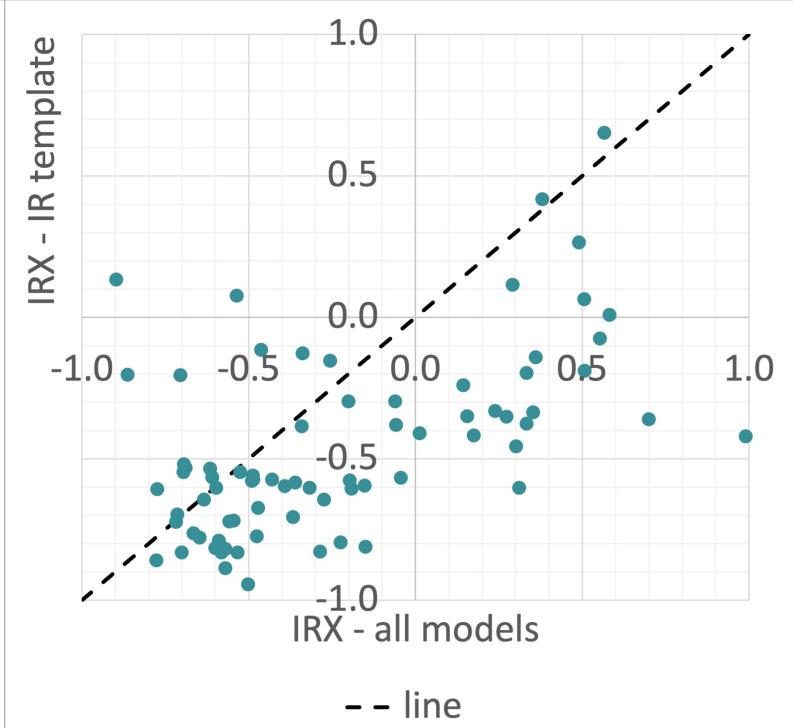
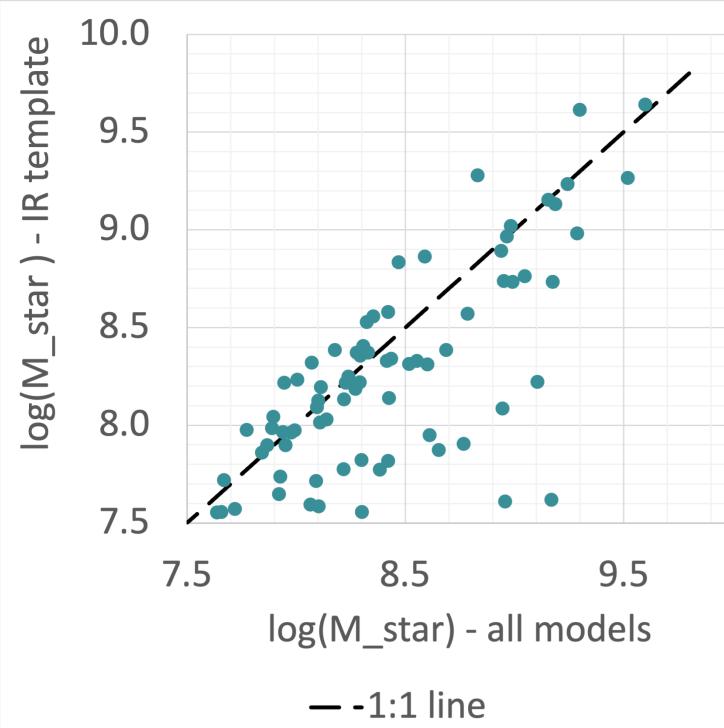
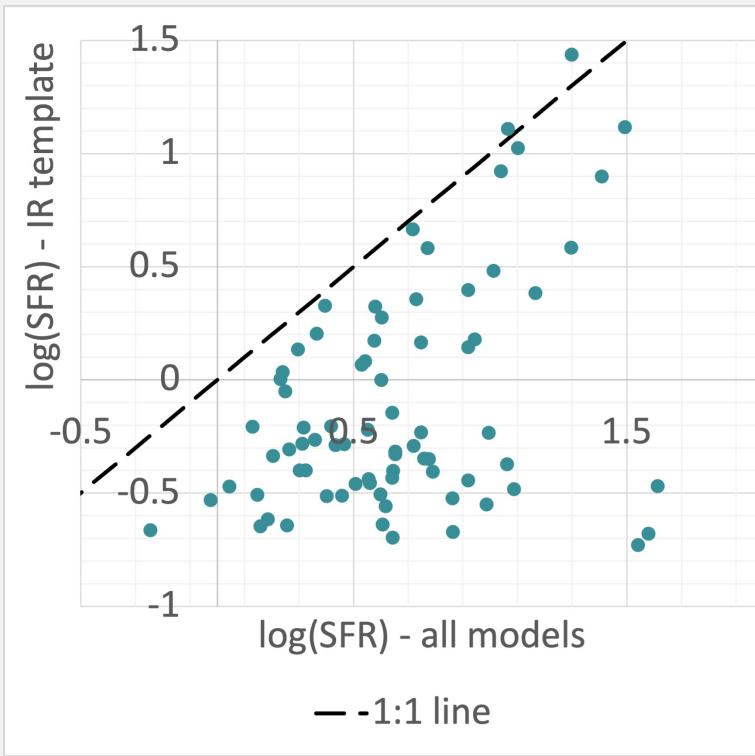


# Combine to build the IR template

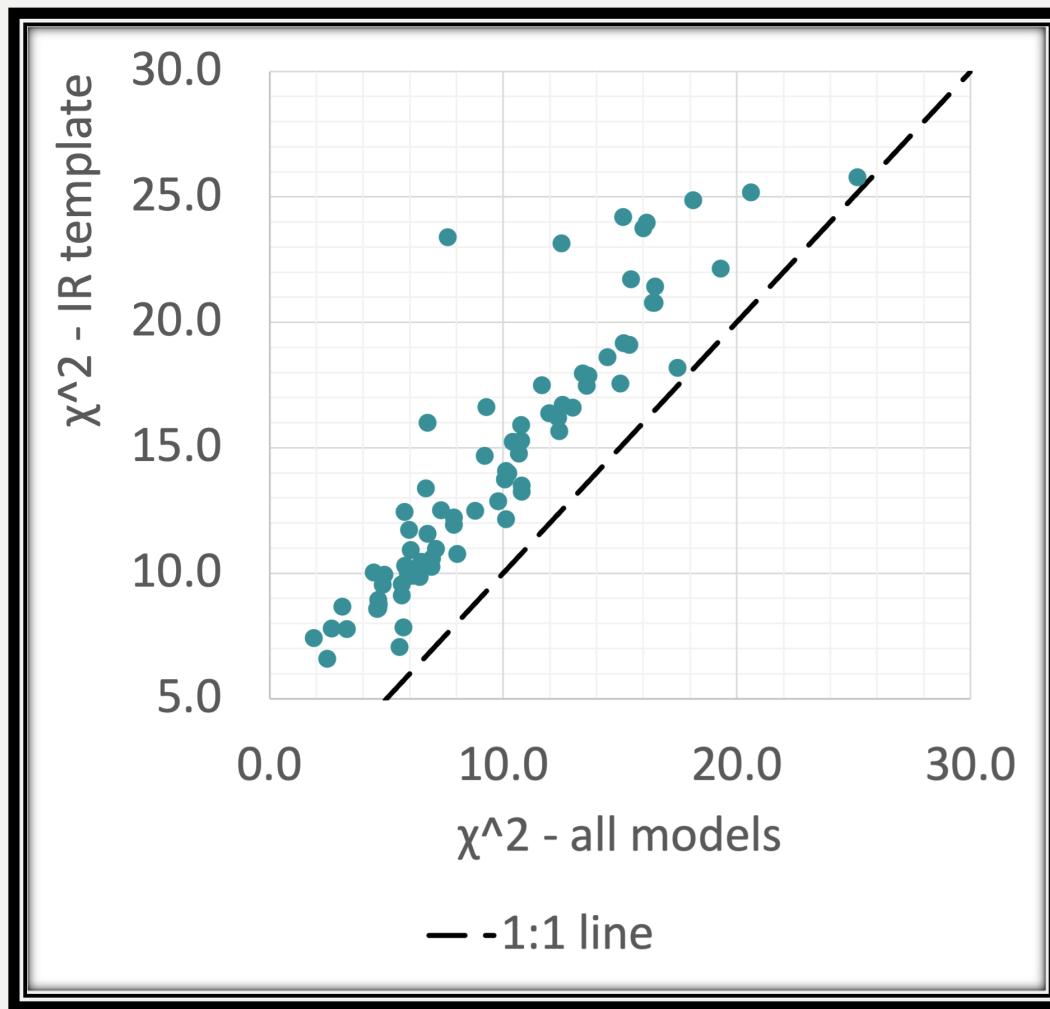


# Testing the IR template

- Data from Bouwens et al. (2016)
- Regular SED fitting (all models) compared to SED fitting with the IR template



# Result from the test



- Lowered the cost significantly
- We see an average difference of around  $\Delta\chi^2 = 4.6$

# Connection to GAIA

- Test the IR template on GAIA data
  - *Analogous objects*
  - *Ancillary catalogue*
- Focus on dust
  - *Dust emission models*
  - *Chemical evolution models*
- Suggestions??

# Conclusions

- We were able to provide an IR template
- IR template is useful, but at the loss of quality of fitting
- Difficult to consolidate GAIA data with high redshift multi-wavelength research, but not impossible

**THANK YOU!**