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EXGAL2011 – Pasadena – October 3rd-5th, 2011

Outline

PACS Evolutionary Probe

✓ Brief introduction

 \checkmark PEP: resolving the CIB

✓ The properties of MS galaxies as seen by Herschel and HST

✓ The contribution of high-SFR outliers

✓ Conclusions

Dominant SF mode?





See also Guzman et al. (1997), Brinchmann & Ellis (2000), Perez-Gonzalez et al. (2005), Papovich et al. (2006), Caputi et al. (2006), Reddy et al. (2006), Elbaz et al. (2007), Daddi et al. (2007), and many others.



Noeske et al. (2007)





PACS Evolutionary Probe



GOODS-S/N Lockman EGS ECDFS COSMOS + 10 Lensing Clusters + 2 z~1 clusters

What did we know?





Berta et al. (2011)

What do we know now!



Berta et al. (2011)

Redshift and Luminosity



Resolved CIB	
z ≤ 0.5	95% in normal glxs
0.5 < z ≤ 1.0	>90% in LIRGs
1.0 < z ≤ 2.0	50% in ULIRGs
z>2	88% in ULIRGs
Globally, ~50% of the CIB resolved in the three PACS bands was produced by LIRGs.	
Berta et al (2011)	

IR colors



Nordon et al. (2011, see also Elbaz et al. 2011)

IR colors



Nordon et al. (2011, see also Elbaz et al. 2011)

IR colors



Nordon et al. (2011, see also Elbaz et al. 2011)

PEP and the Main Sequence



Rodighiero et al. (2011)

Probing the Main Sequence



SF mode along the MS (data)

SDSS DR7, GALEX DR5

SFRs & Masses from MPA-JHU sizes & Sersic indices from NYVAGC

COSMOS

HST/ACS I814, Herschel/PACS 100, 160µm, Spitzer/MIPS 24µm

UDS

WFC3 H₁₆₀, Spitzer/MIPS 24µm

GOODS-N

HST/ACS z850, Herschel/PACS 100, 160µm, Spitzer/MIPS 24µm

GOODS-S

HST/ACS B₄₃₅, V₆₀₆, i₇₇₅, z₈₅₀, HST/WFC3 Y₀₉₈, J₁₂₅, H₁₆₀, Herschel/PACS 70, 100, 160µm, Spitzer/ MIPS 24µm

> Photometric redshifts with EAZY (Brammer et al. 2008) Stellar masses with FAST (Kriek et al. 2009) SFRs from UV+PACS / UV+MIPS / SFR_{SED} (Wuyts et al. 2011) Structural parameters with GALFIT (Peng et al. 2010)

- 639.924 galaxies
 @ z ~ 0.1
- 97.250 galaxies
 @ z ~ 1
- 24.456 galaxies
 @ z ~ 2

Profile shape



@z~0.1, see also Kauffmann et al. (2003); Brinchmann et al. (2004); Schiminovich et al. (2007)

SFR surface density



See also Schiminovich et al. (2007), Elbaz et al. (2011)

SFR_{IR} vs. SFR_{UV}

median log(SFR_{IR} / SFR_{uv}) observed



See e.g. also Heckman et al. (1998), Reddy et al. (2010)



The most extreme population



Magnelli et al. (in prep.)

On and off the Main Sequence



Rodighiero et al. (2011)

The lesser role of "starbursts"



Rodighiero et al. (2011), see also Daddi's talk

The lesser role of "starbursts"







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 \checkmark PEP resolves 55% (70%) of the CIB at 100 (160) micron.

✓ Herschel/PEP provides a new, continuous calibration of SFR tracers (SFR ladder).

 \checkmark Hubble sequence in place since z~2.5.

- ✓ Different structure and mode of SF in high-SFR tail.
- ✓ Compact quiescent galaxies descendants of high-SFR outliers?
- \checkmark Majority of star formation at high-z takes place on the MS.