Dept. of Space and Climate Physics
MULLARD SPACE SCIENCE LABORATORY

UCL

The *Herschel* view of the dust-obscured Universe

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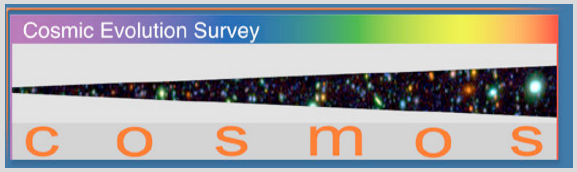
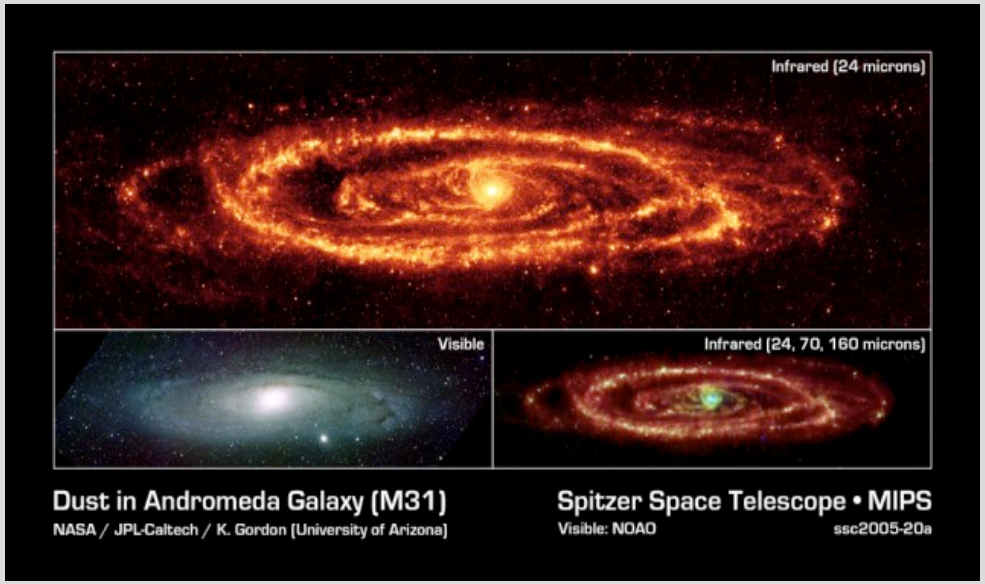
+ HERschel Multi-tiered Extragalactic Survey consortium (HerMES)
+ PACS Evolutionary Explorer consortium (PEP)
+ COSMOS collaboration



The dust obscured Universe

dusty, infrared-luminous galaxies



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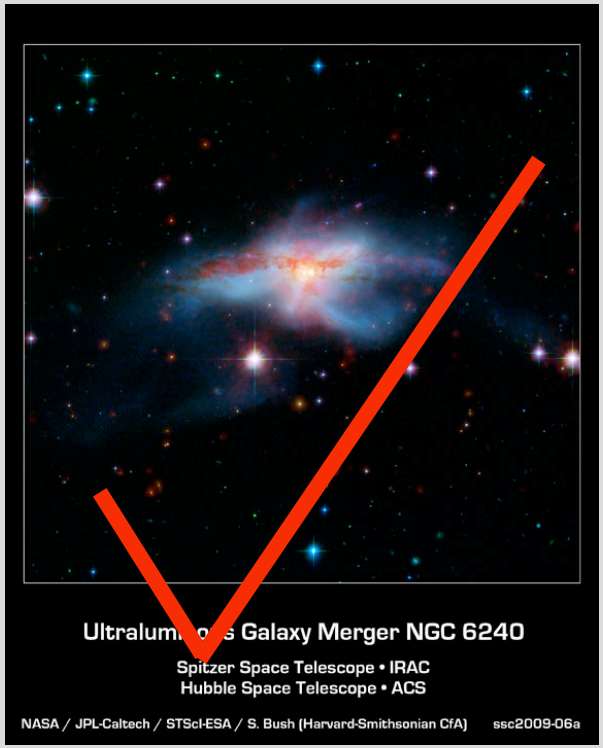
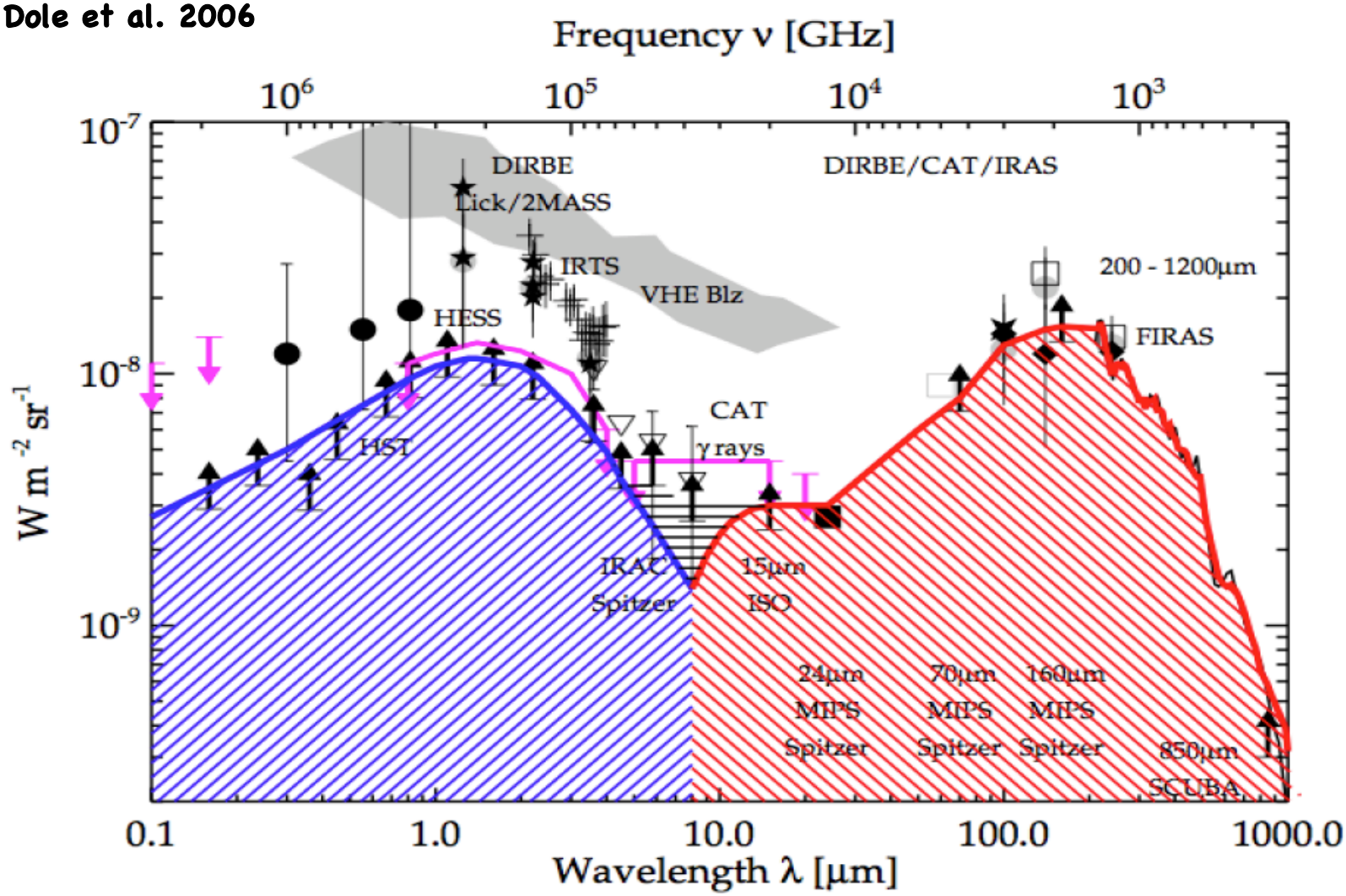


IR-luminous galaxies: backbone of cosmic energy production

Dole et al. 2006



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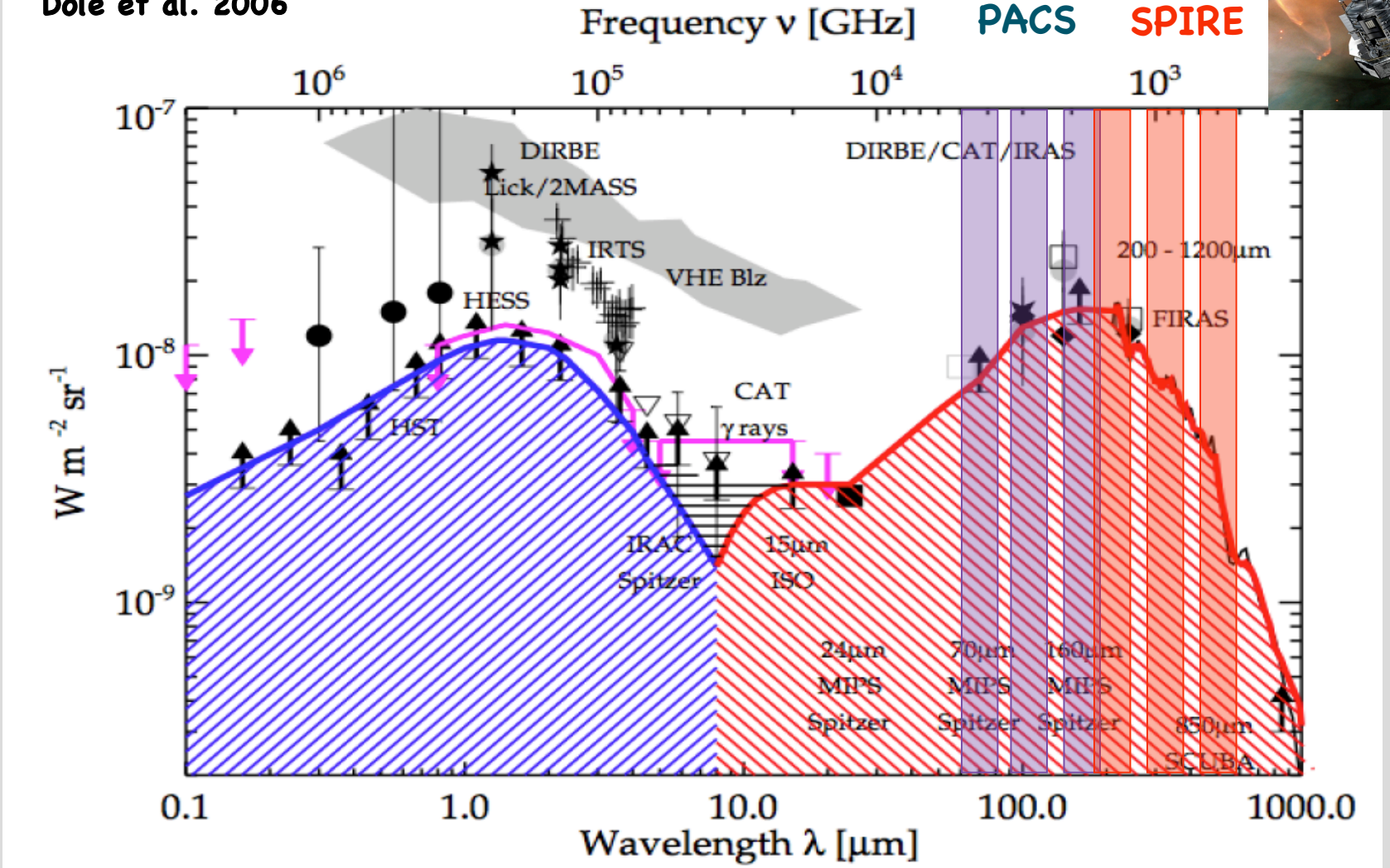
Herschel

Dole et al. 2006



Questions:

1) What are the properties of the dusty galaxy population?

2) Are dusty galaxies at high z, similar to their local counterparts?

Sample

Herschel sources in
GOODS-N, GOODS-S and COSMOS

Herschel PACS (100, 160μm) and SPIRE (250, 350, 500μm)
+ *Spitzer*/MIPS 24μm

~2000 sources

Requirements:

1) Sample consists of IR-luminous galaxies

>3σ detection in a *Herschel* band

Requirements:

2) Sample is complete in terms of SED types

Examine selection functions of *Herschel* wavebands:

SED shapes detectable at any given redshift as a function of galaxy luminosity and flux density limit of survey
(method described in Symeonidis et al. 2011a)

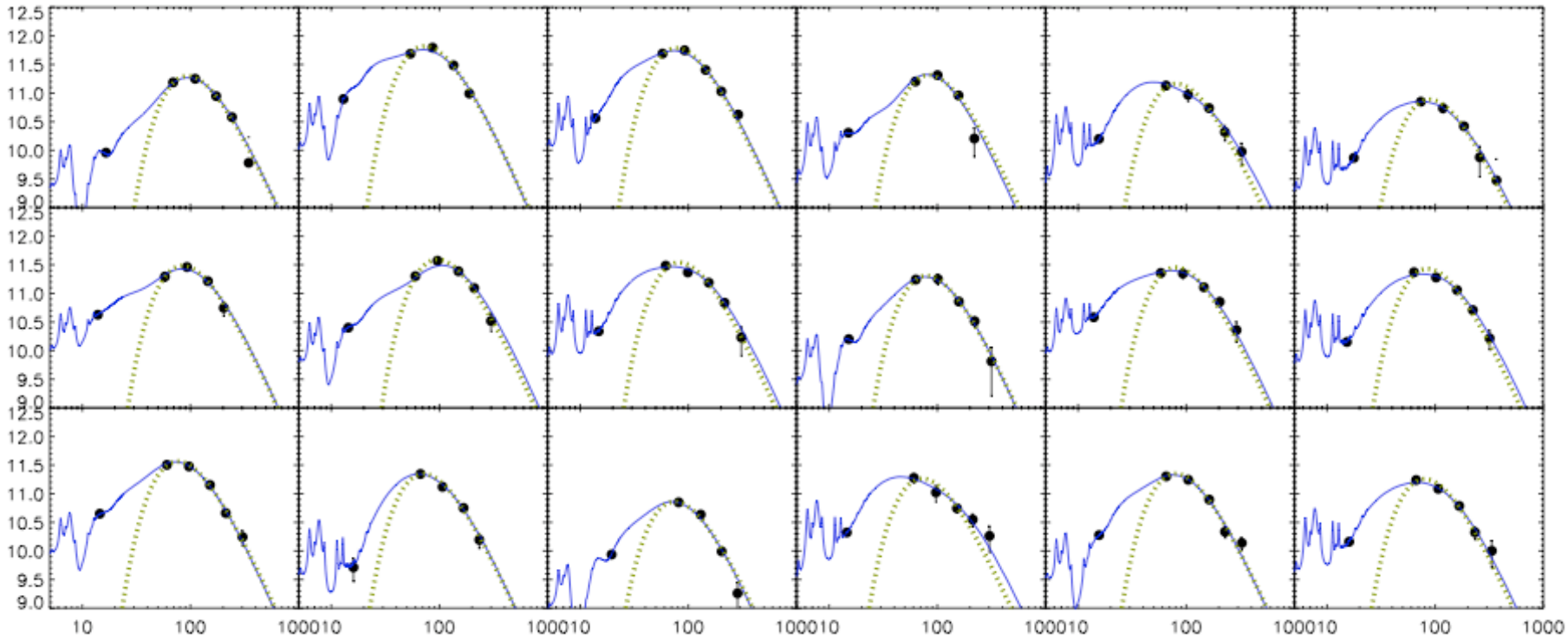
Herschel selection criterion: 100 + 160μm OR 160 + 250μm

Requirements:

3) At least 3 reliable points on the SED

24μm + ≥2 *Herschel* bands

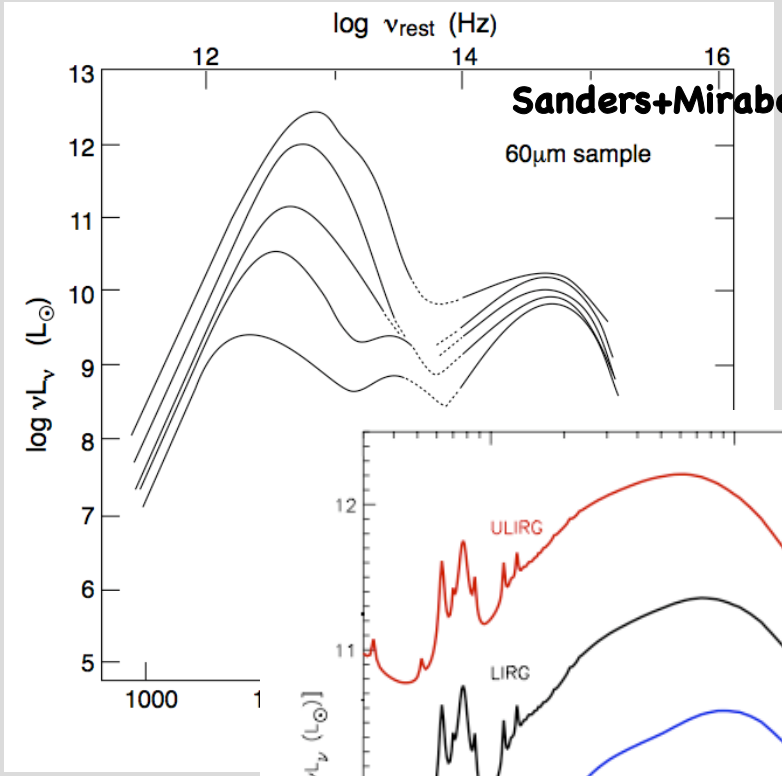
Example SEDs

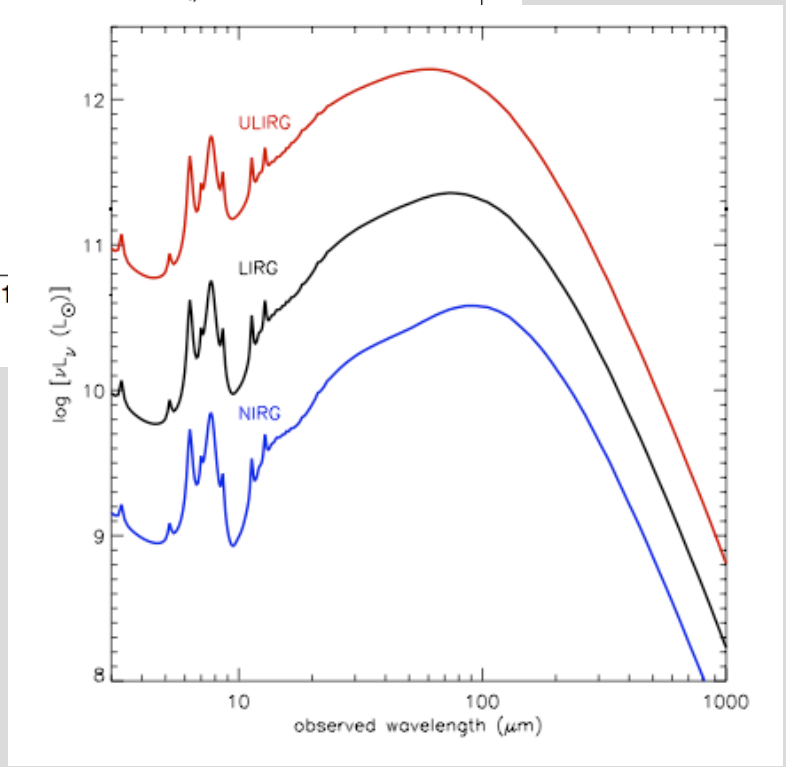


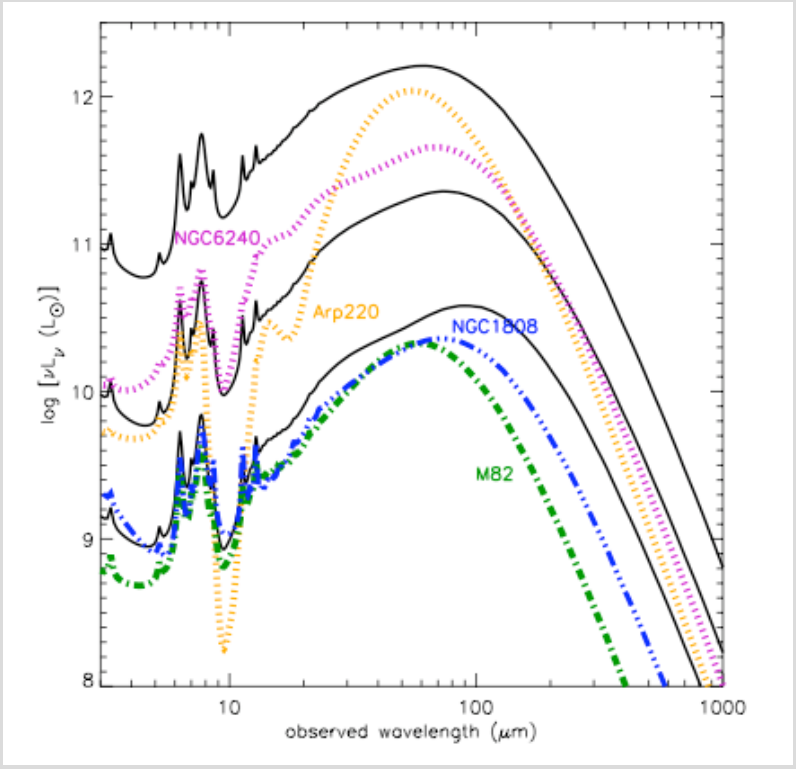
Symeonidis et al. 2012, in prep.

Blue curve - Siebenmorgen&Krugel 2007 model
Green dotted curve - greybody

Average SEDs

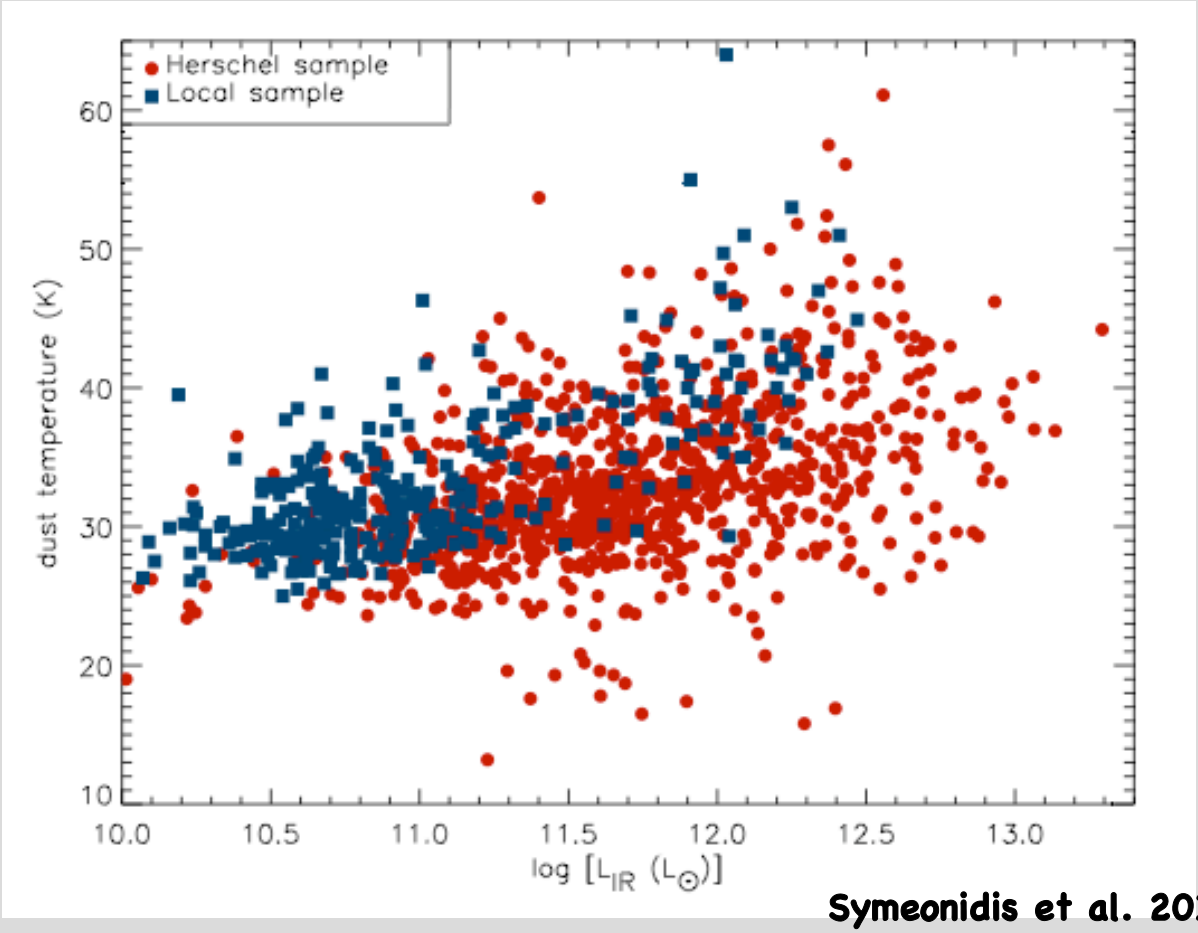






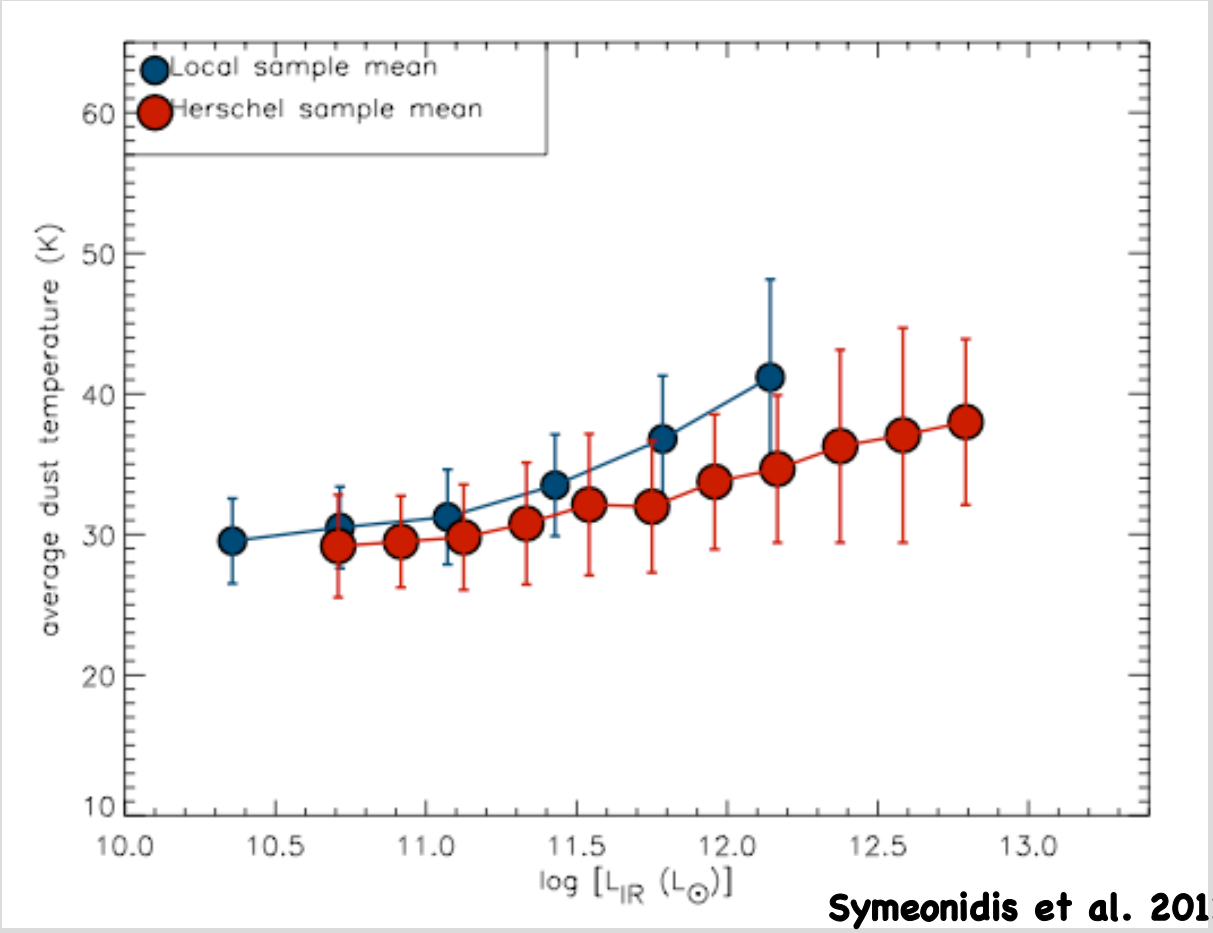
Symeonidis et al. 2012, in prep.

Dust temperatures



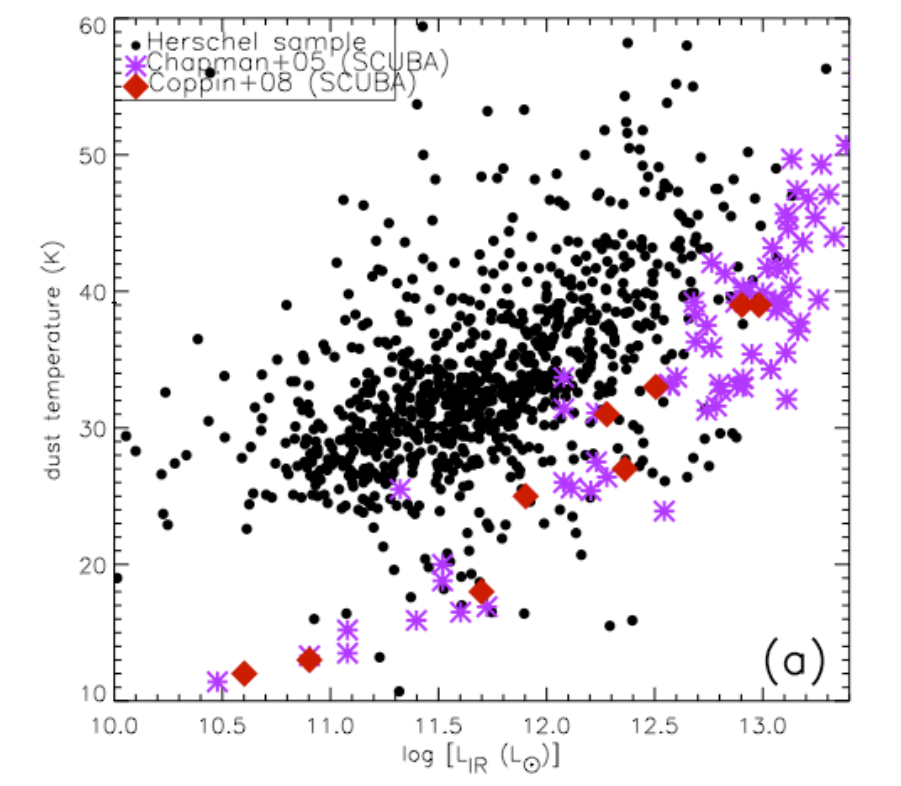
Symeonidis et al. 2012, in prep.

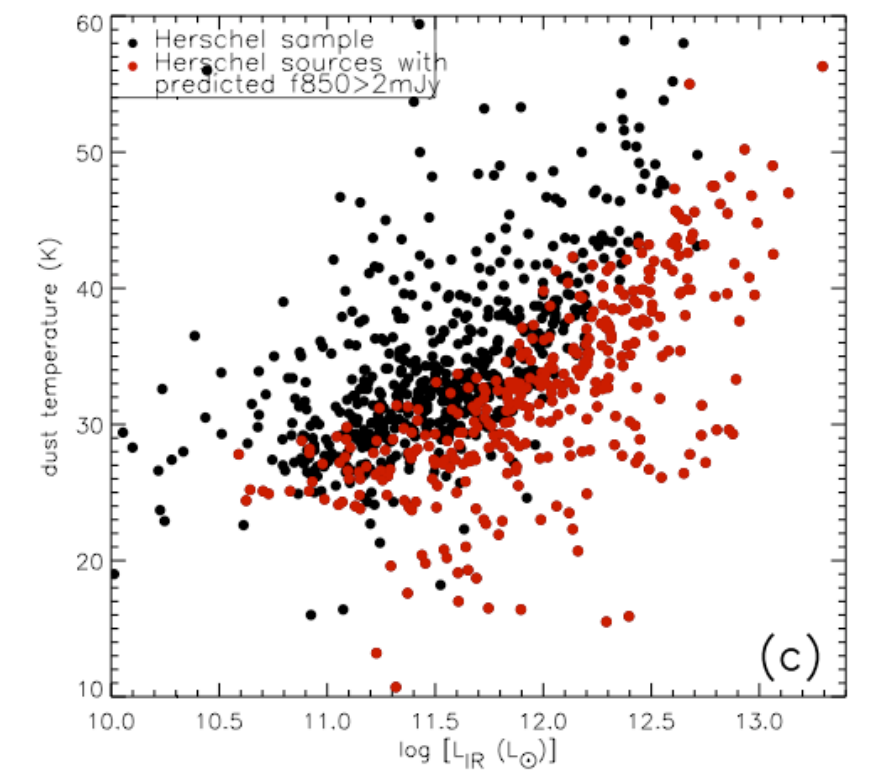
Dust temperatures



Symeonidis et al. 2012, in prep.

The connection between *Herschel* and SCUBA





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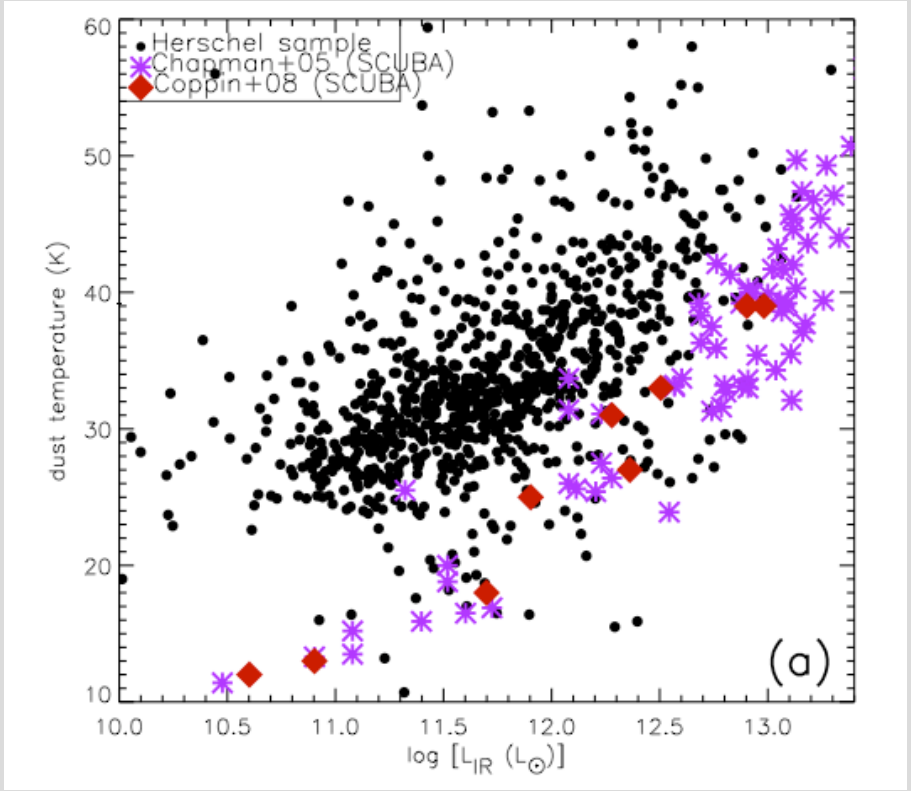

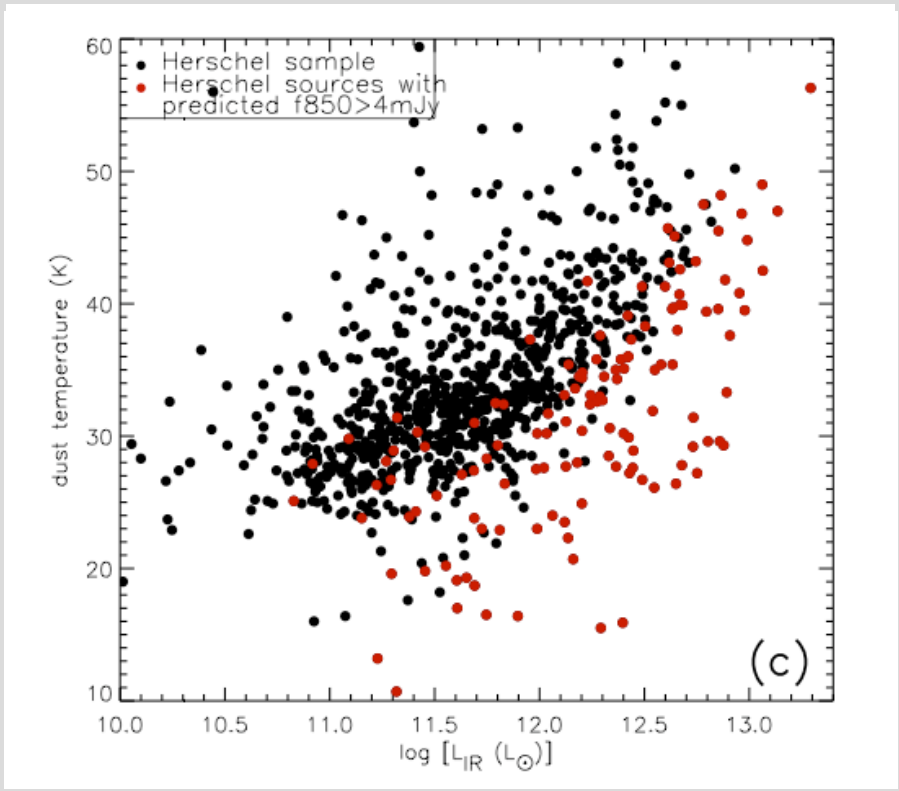

Symeonidis et al. 2012, in prep.

Conclusions:

We examine the properties of the IR-luminous population up to z~2, using a complete sample of ~1000 sources

We find:

- The mean dust temperature of z~1 ULIRGs is ~10K lower than that of local ULIRGs
- The SEDs of high-z IR-luminous galaxies have broad peaks irrespective of total IR luminosity - unlike local counterparts
- SCUBA-2 surveys will pick up a small fraction of the IR-luminous population, but opportunity to study SEDs of rare, high-z objects in detail

Thank you