HerMES

The Herschel Multi-Tiered Extragalactic Survey

Sébastien Heinis
Matthieu Béthermin
for the HerMES collaboration

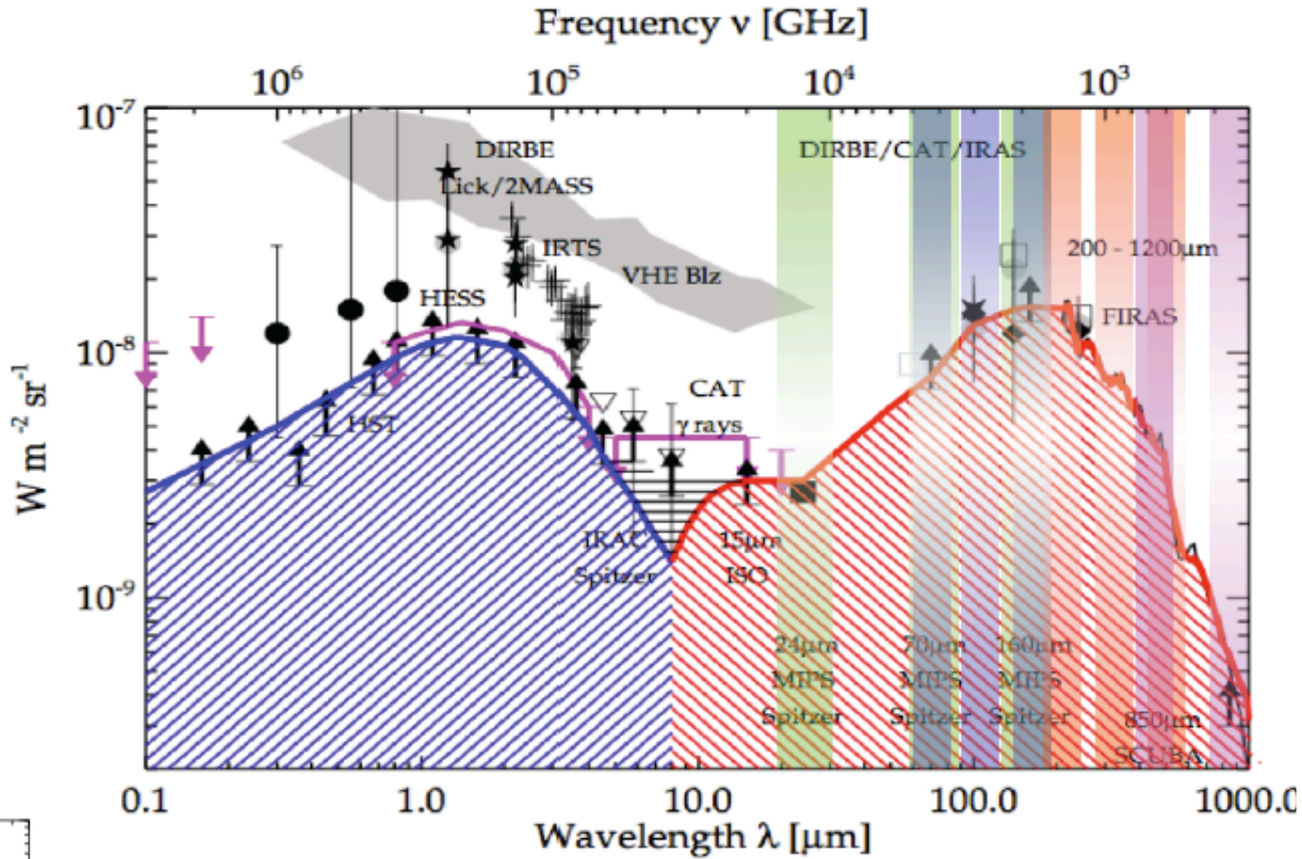
Bruno Altieri, Alex Amblard, Vinod Arumugam, Robbie Auld, Herve Aussel, Tom Babbedge, Alexandre Beelen, Matthieu Bethermin, Andrew Blain, Jamie Bock, Alessandro Boselli, Carrie Bridge, Drew Brisbin, Veronique Buat, Denis Burgarella, Nieves Castro-Rodriguez, Antonio Cava, Pierre Chanial, Ed Chapin, Scott Chapman, Michele Cirasuolo, Dave Celments, Alex Conley, Luca Conversi, Asantha Cooray, Darren Dowell, Naomi Dubois, Eli Dwek, Simon Dye, Steve Eales, David Elbaz, Duncan Farrah, Patrizia Ferrero, Matt Fox, Alberto Franceschini, Walter Gear, Elodie Giovannoli, Jason Glenn, Eduardo Gonzalez-Solares, Matt Griffin, Mark Halpern, Martin Harwit, Evanthia Hatziminaoglou, Sebastien Heinis, Peter Hurley, HoSeong Hwang, Edo Ibar, Olivier Ilbert, Kate Isaak, Rob Ivison, Guilaine Lagache, Louis Levenson, Nanyao Lu, Suzanne Madden, Bruno Maffei, Georgios Magdis, Gabriele Mainetti, Lucia Marchetti, Gaelen Marsden, Jason Marshall, Angela Mortier, Hien Nguyen, Brian O'Halloran, Seb Oliver, Alain Omont, Francois Orieux, Mathew Page, Pasquale Panuzzo, Andreas Papageorgiou, Harsit Patel, Chris Pearson, Ismael Perez-Fournon, Michael Pohlen, Jason Rawlings, Gwen Raymond, Dimitra Rigopoulou, Laurie Riguccini, Davide Rizzo, Giulia Rodighiero, Isaac Roseboom, Michael Rowan-Robinson, Miguel Sanchez-Portal, Bernhard Schulz, Douglas Scott, Nick Seymour, David Shupe, Anthony Smith, Jason Stevens, Myrto Symeonidis, Markos Trichas, Katherine Tugwell, Mattia Vaccari, Elisabetta Valiante, Ivan Valtchanov, Joaquin Vieira, Laurent Vigroux, Lingyu Wang, Rupert Ward, Don Wiebe, Gillian Wright, Kevin Xu, and Mike Zemcov, + *Consultants and Working Members*

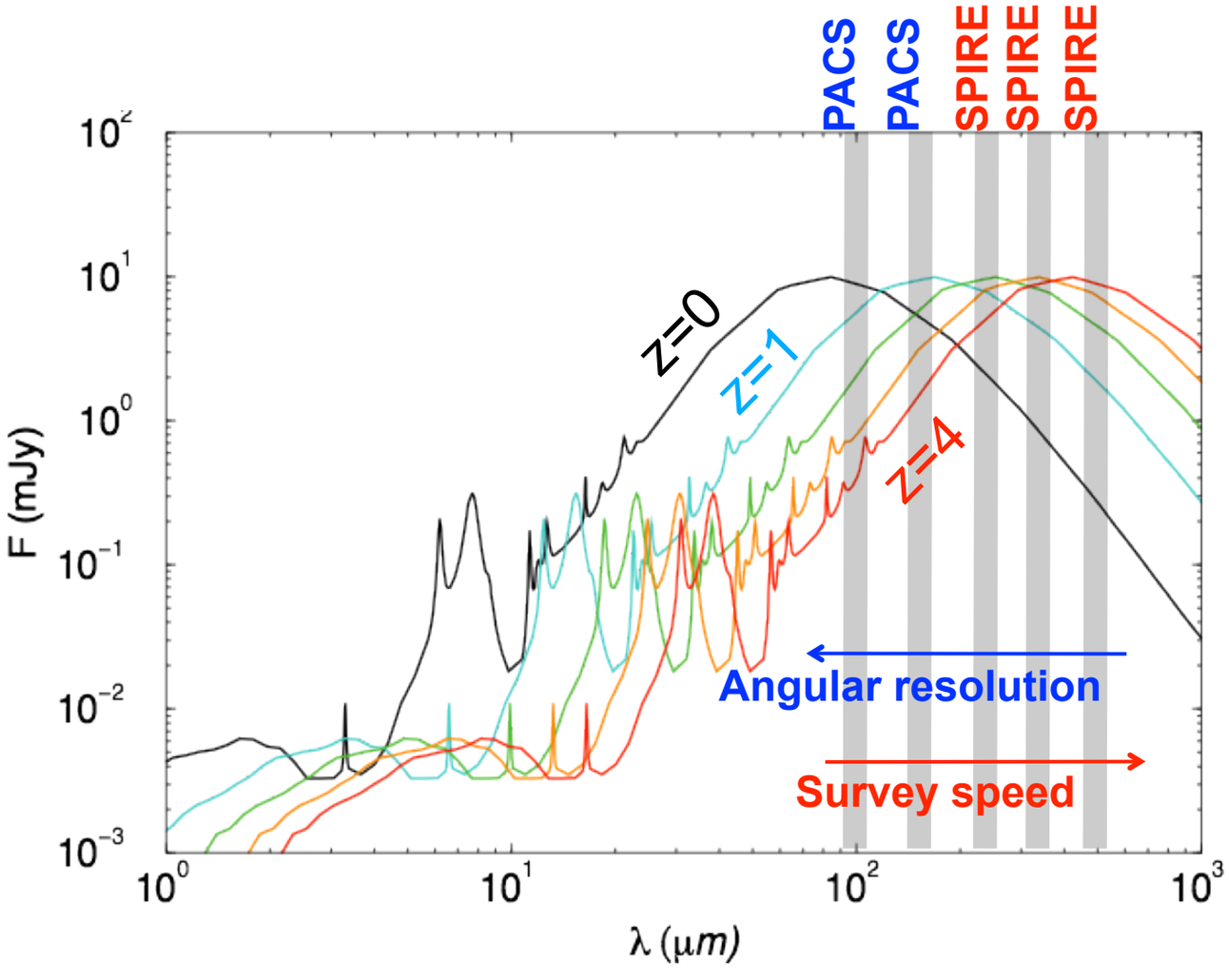
Faculty and Researchers, Postdocs, Students

HerMES Science Motivation

What is the history of Far-IR galaxies?

- How do they assemble and evolve over time?
- Where have luminous FIR systems gone today?
- How do FIR galaxies relate to dark matter?
- What is the role of dust in star formation?
- What is the connection between dusty star formation and AGNs?





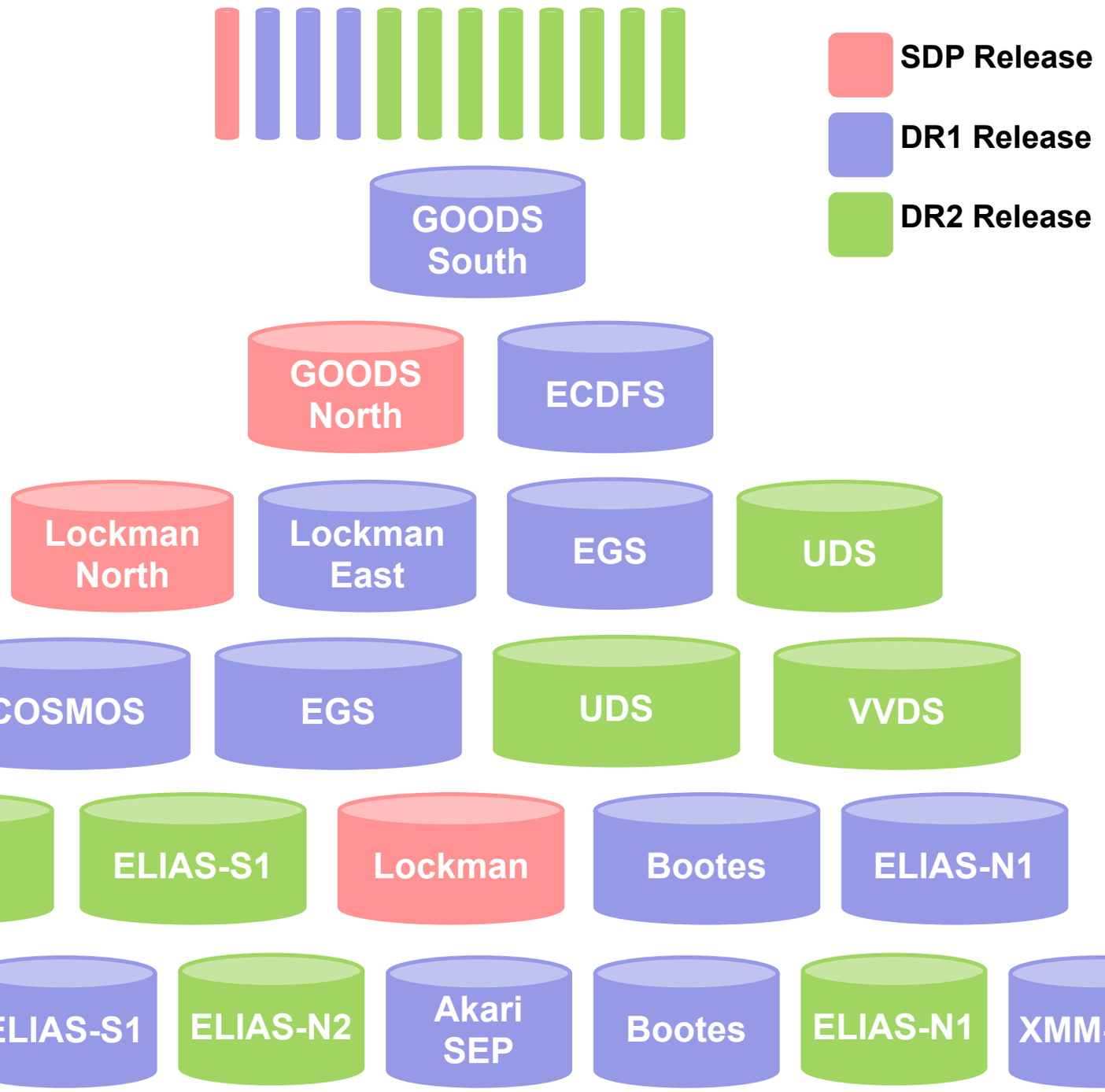
Herschel Extragalactic Surveys

- Observe at SED peak
- Bolometric far-IR luminosities
- Large and uniform samples

HerMES: Wedding Cake Survey

Clusters

L1	0.11 □°
L2	0.36 □°
L3	1.25 □°
L4	4 □°
L5	30 □°
L6	40 □°



Monaco, 1956
Wedding Cake with
6 Levels
like HerMES

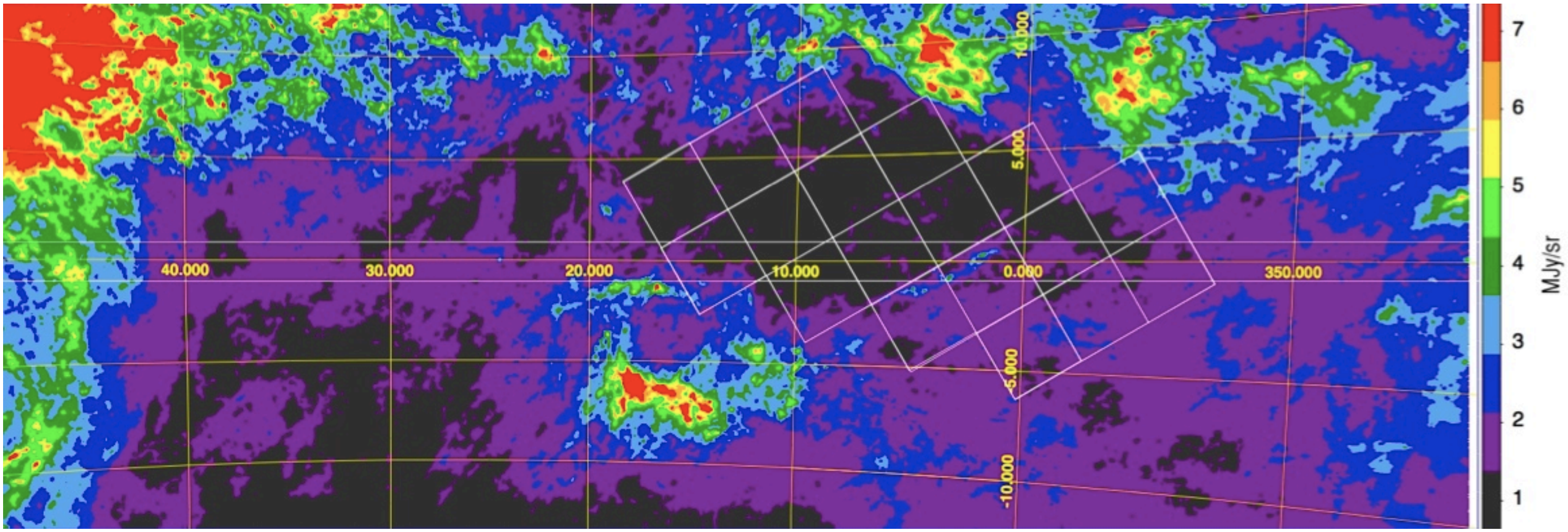
HerMES: Wedding Cake Survey

Clusters

L1	**0.11 □°**
L2	**0.36 □°**
L3	**1.25 □°**
L4	**4 □°**
L5	**30 □°**
L6	**40 □°**
L7	**270 □°**

HerMES Large-Mode survey (HeLMS)

A Cross-Linked Shallow Survey



Overlap:

SDSS stripe 82
CFHT stripe 82
UKIDDS LAS
ACT
VLA

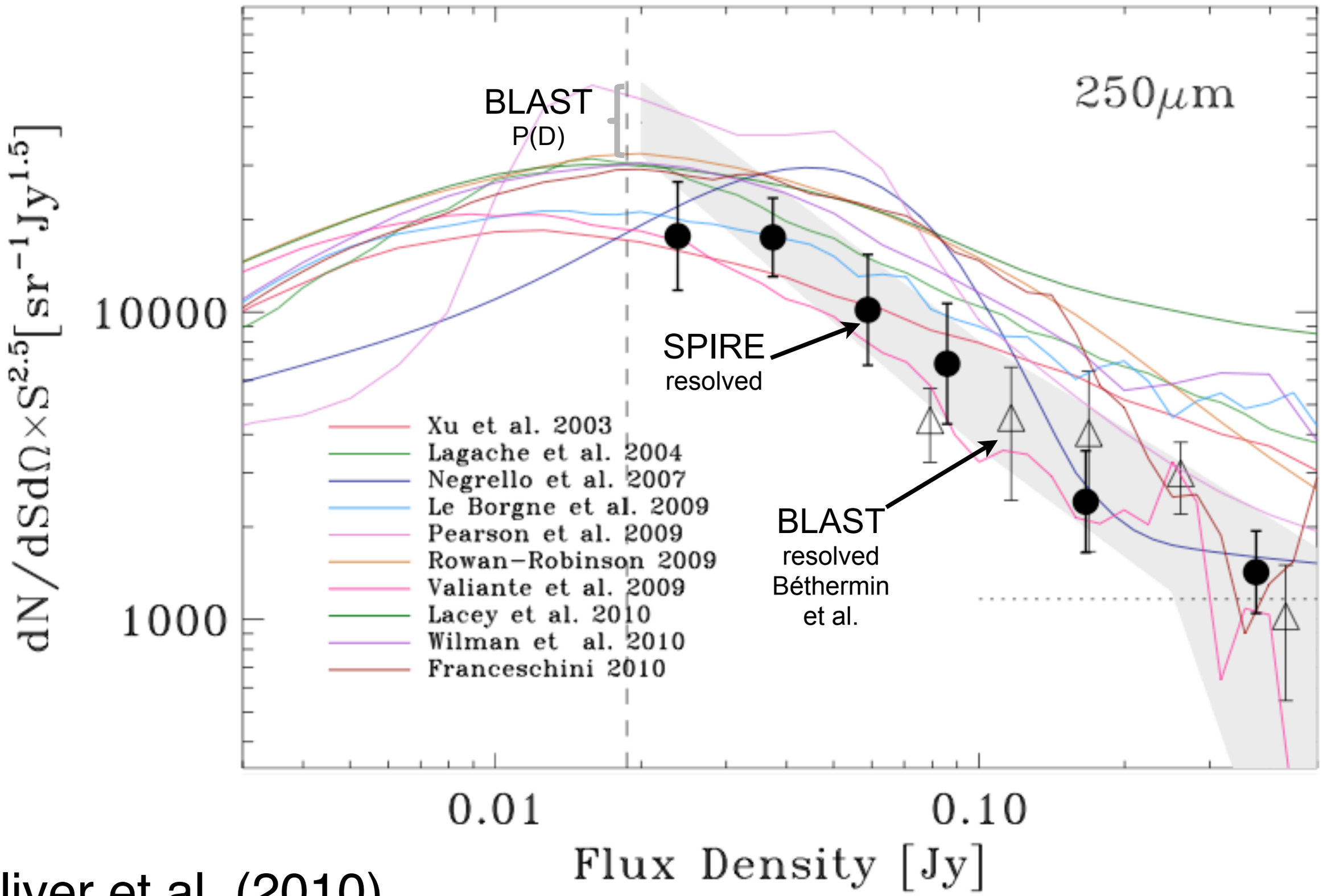
BOSS
Wigglez

Specifications

Total area = 270 sq. deg.
Total time = 103 h
SPIRE fast scanning
2x redundancy
AOR blocks = 16° x 3.8°
Extensive ancillary coverage
Minimal cirrus

Marco Viero

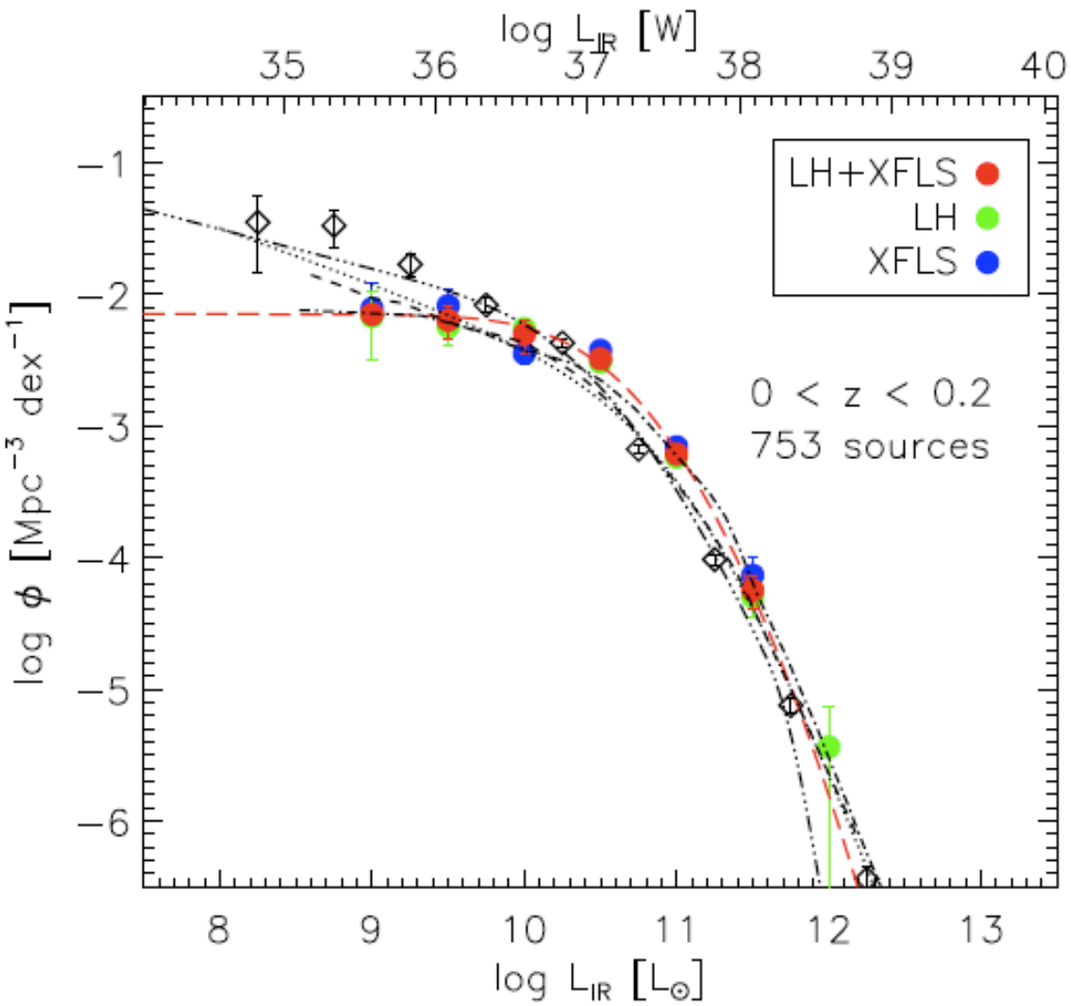
SPIRE Source Counts



Oliver et al. (2010)

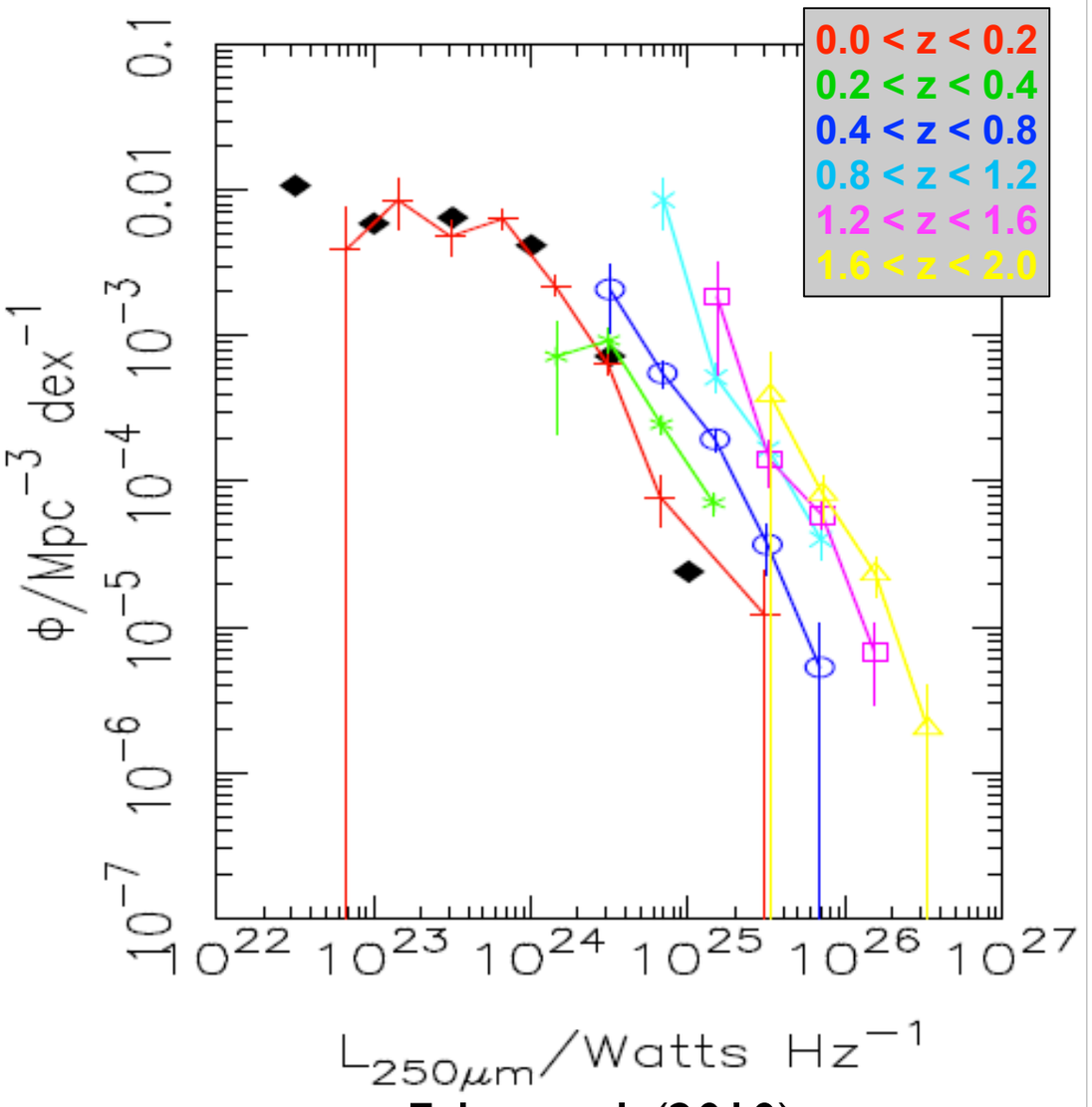
Firsts results on Luminosity Function

Local Luminosity Function



Vaccari et al. (2010)

HerMES Rest-Frame 250 μm LF

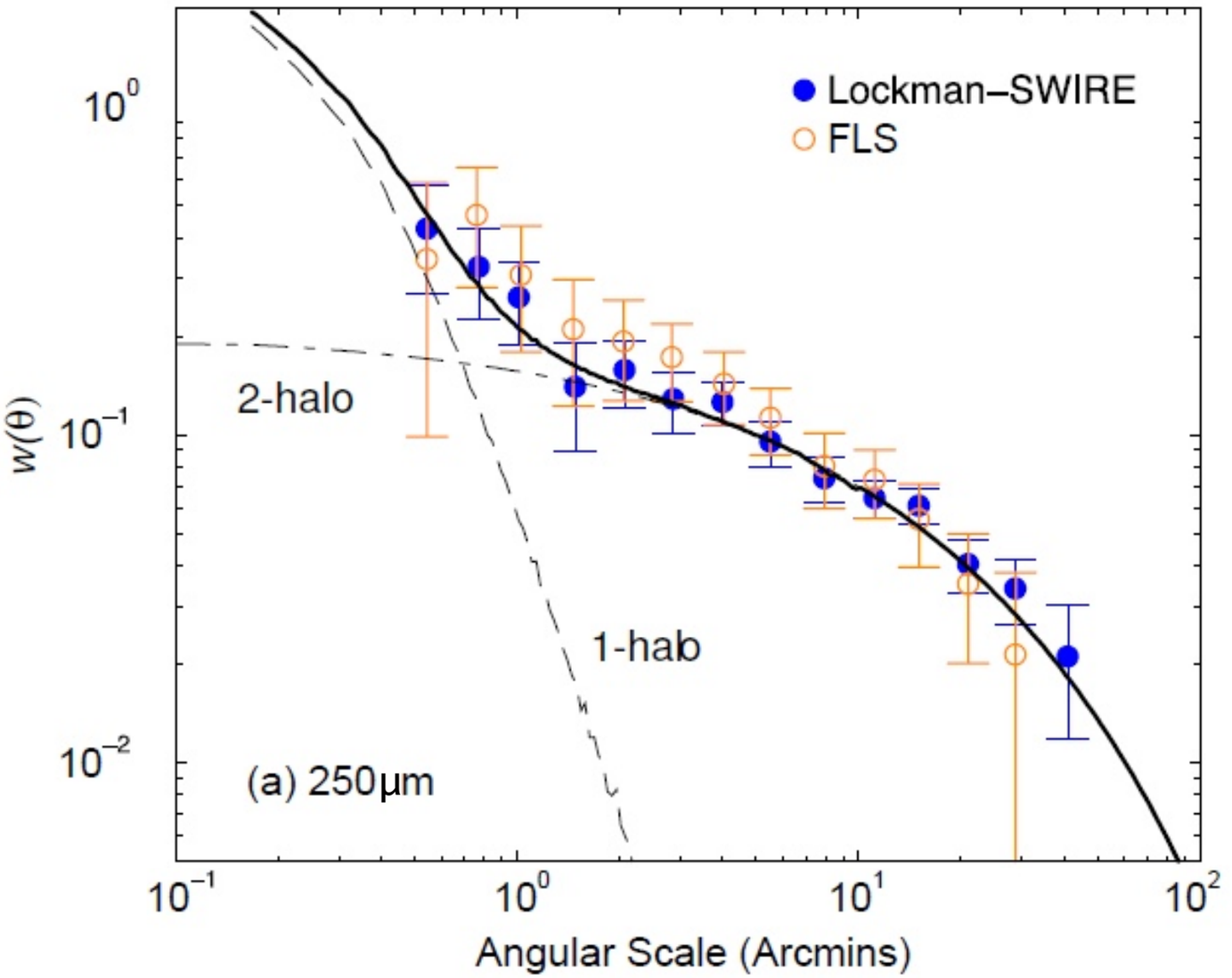


Eales et al. (2010)

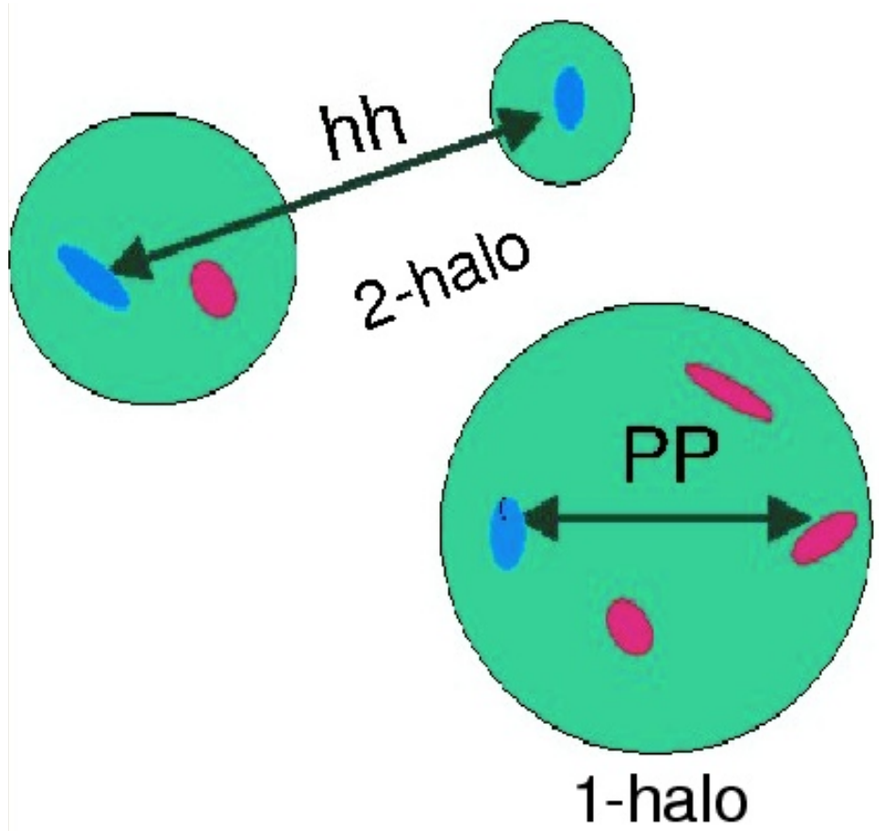
- Local sub-mm galaxy LF slightly above models
- Luminosity function increases out to z ~ 2
- Next: better statistics from bigger samples

Spatial Distribution of FIR galaxies

Angular Correlation Function of Detected Galaxies

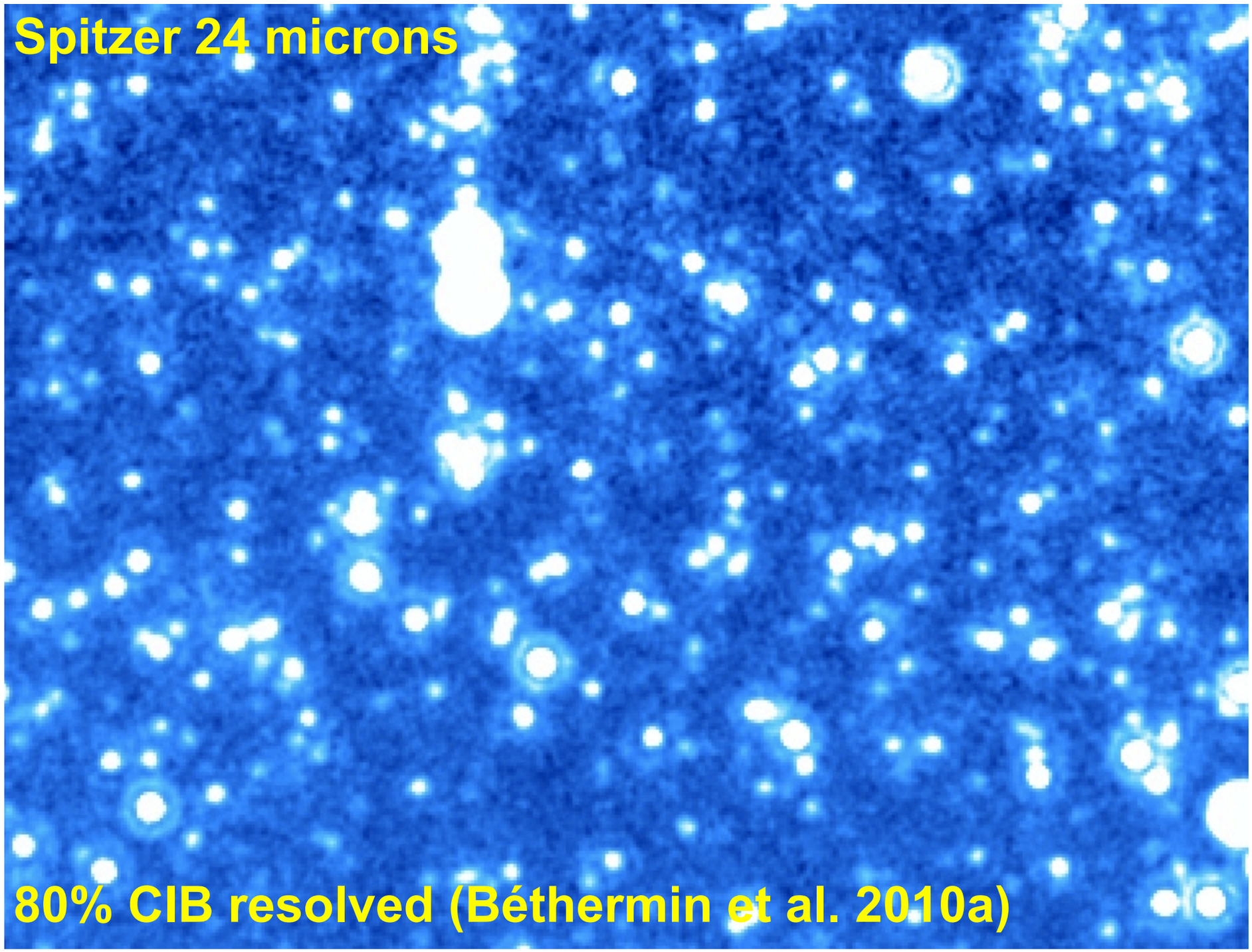


Cooray et al. (2010)

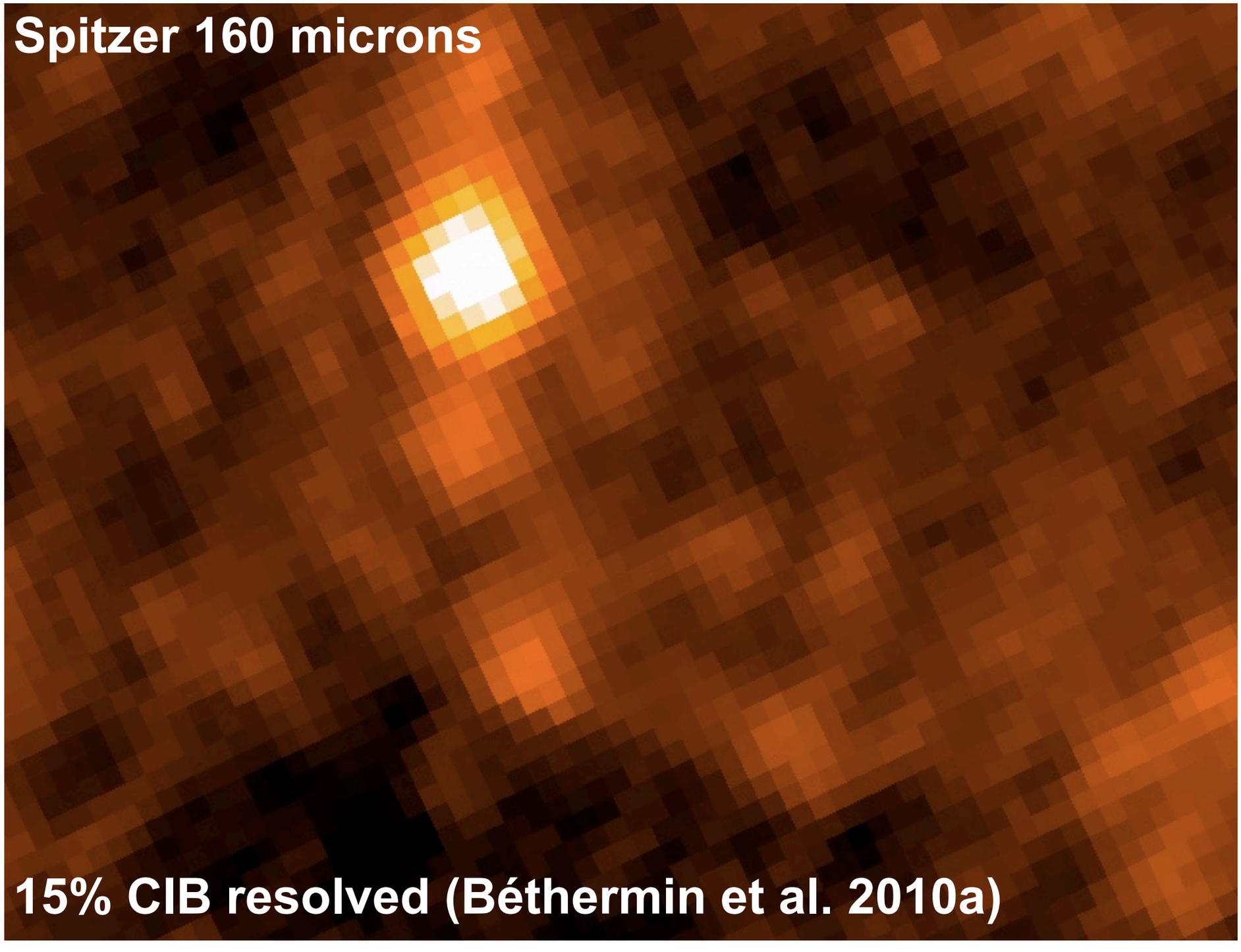


Spatial clustering of (z~2) galaxies compared to halo model

About confusion



About confusion



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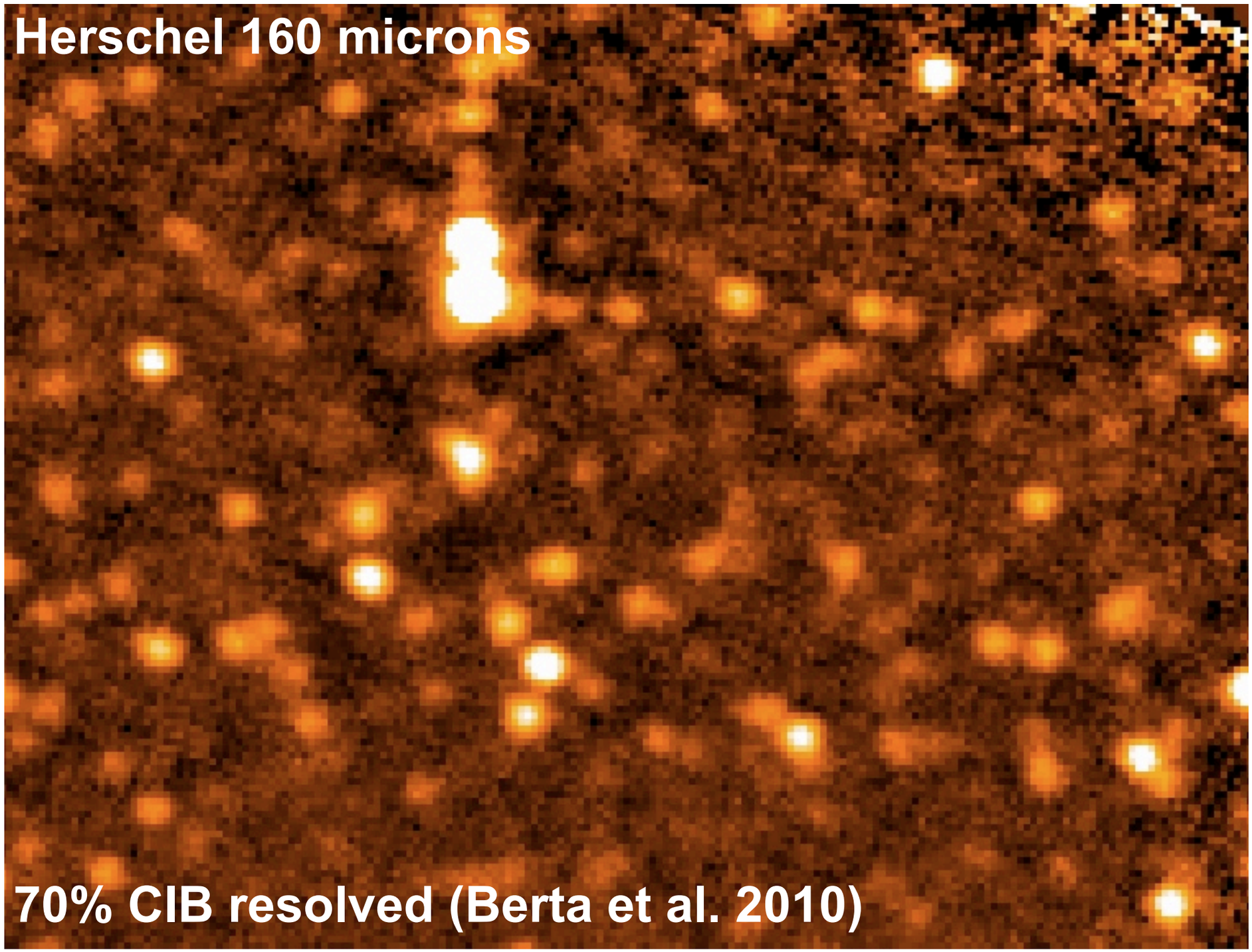

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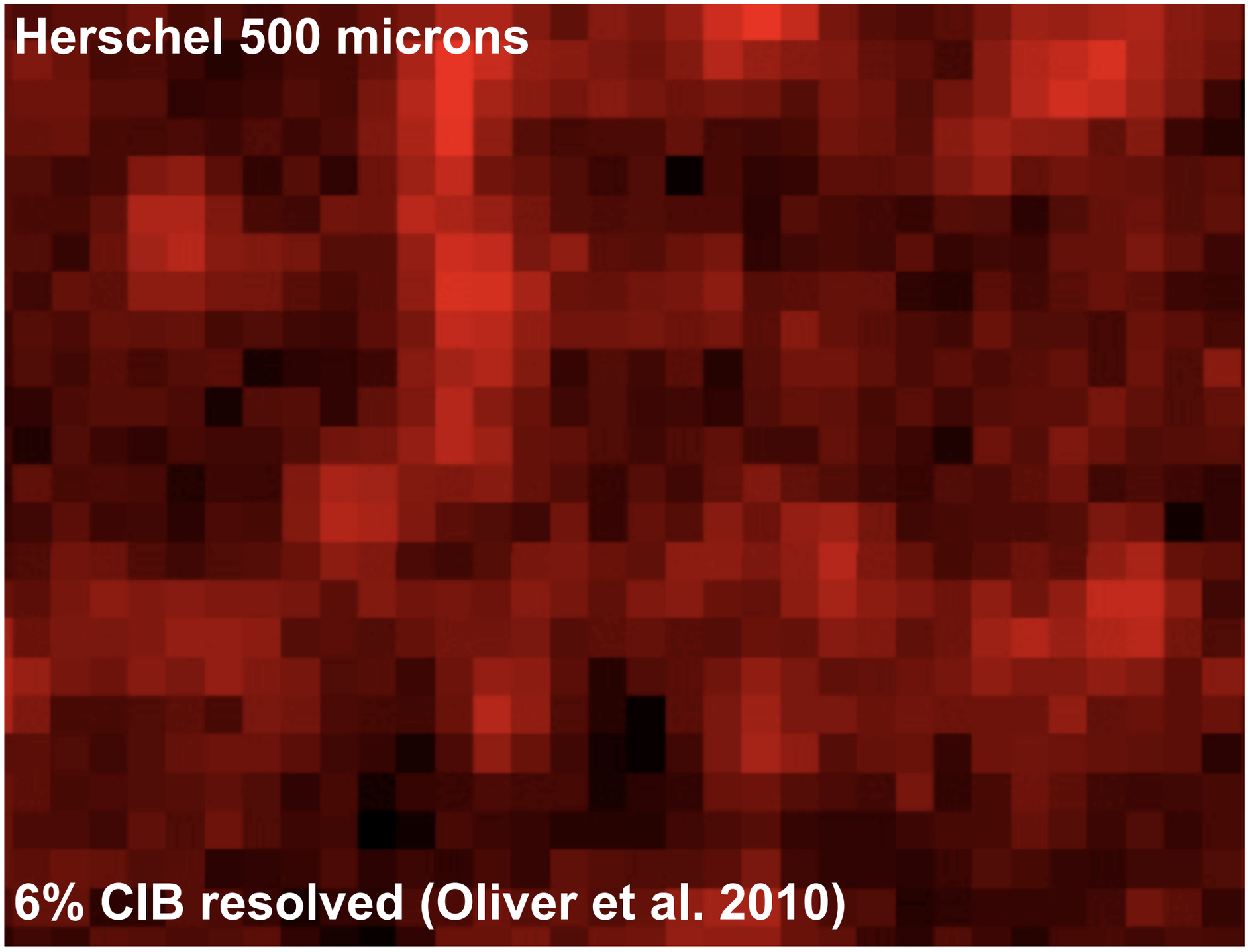
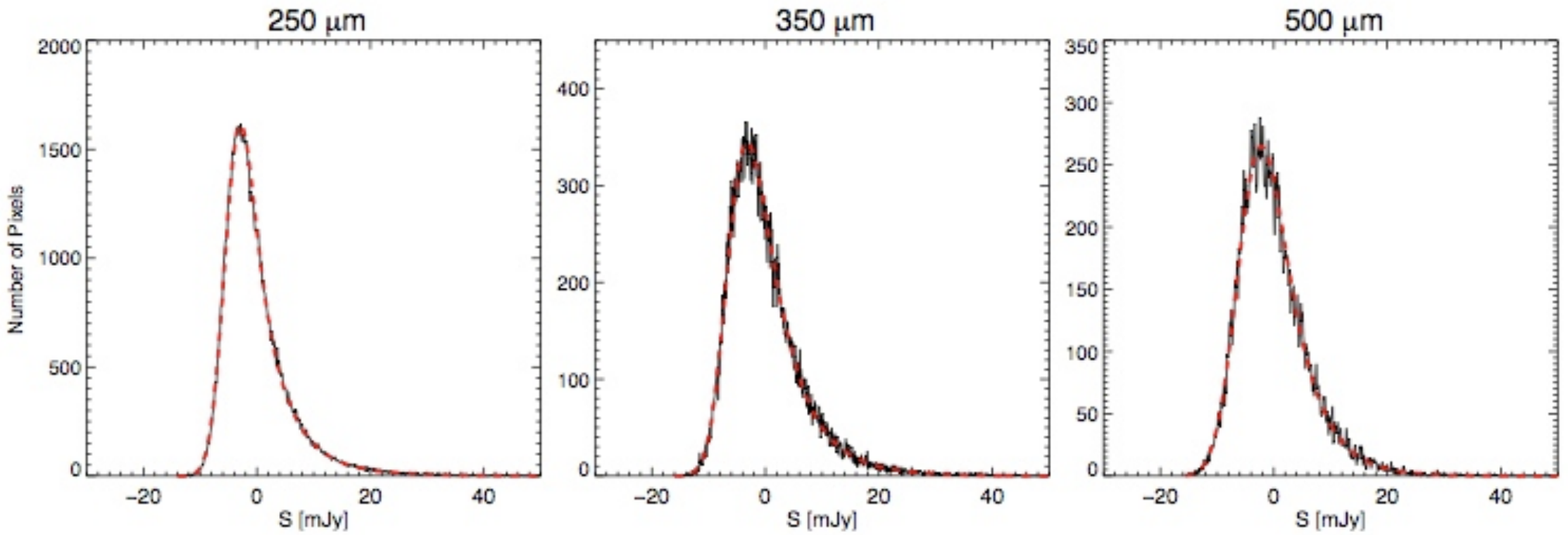
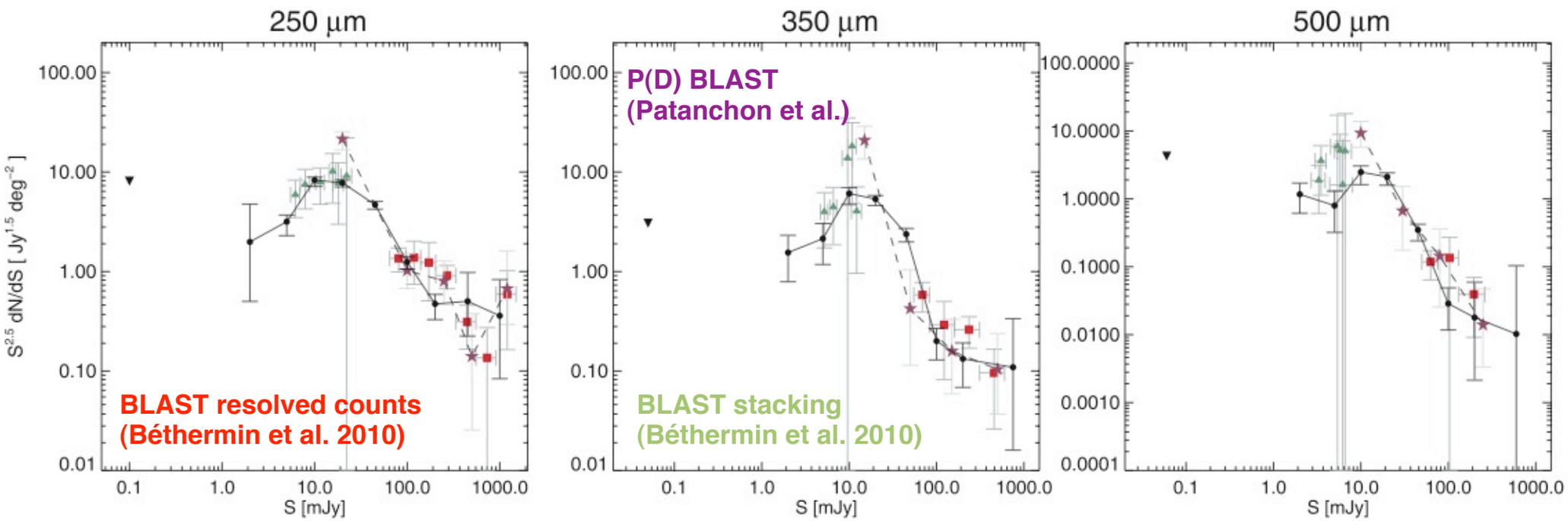


Counting faint sources: P(D) analysis



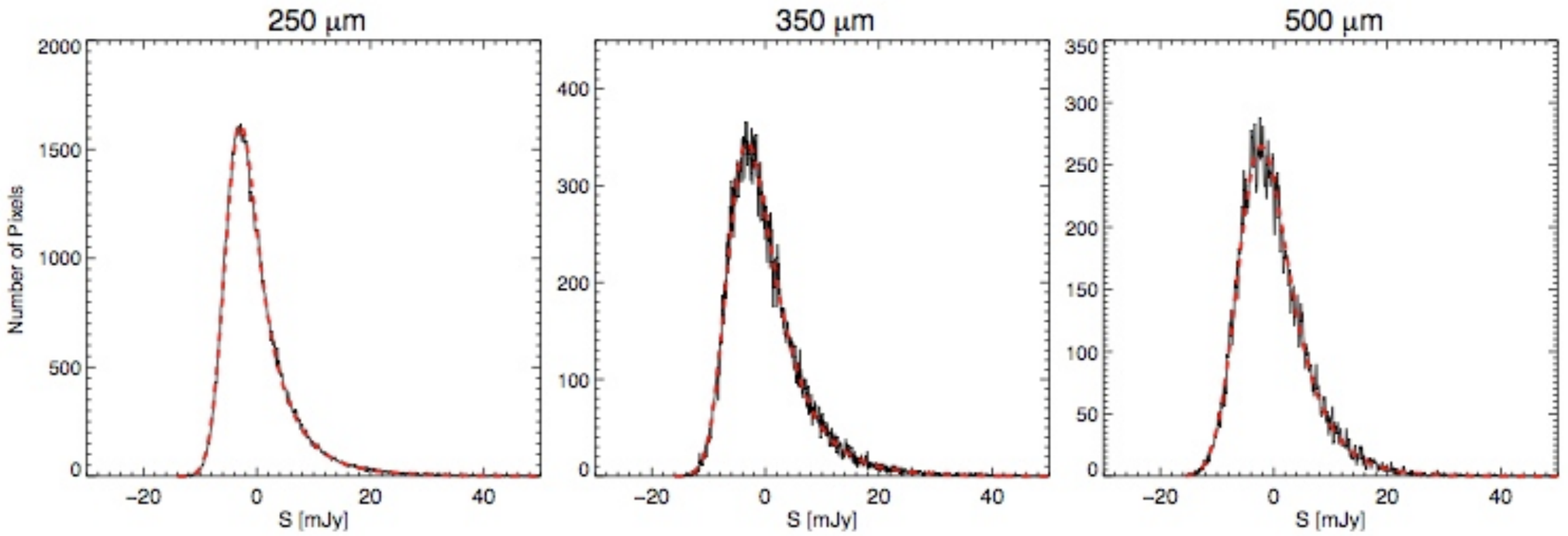
SPIRE Maps Histograms

Glenn, Conley, Béthermin et al. (2010)



250, 350, 500 μm counts

Counting faint sources: P(D) analysis



SPIRE Maps Histograms

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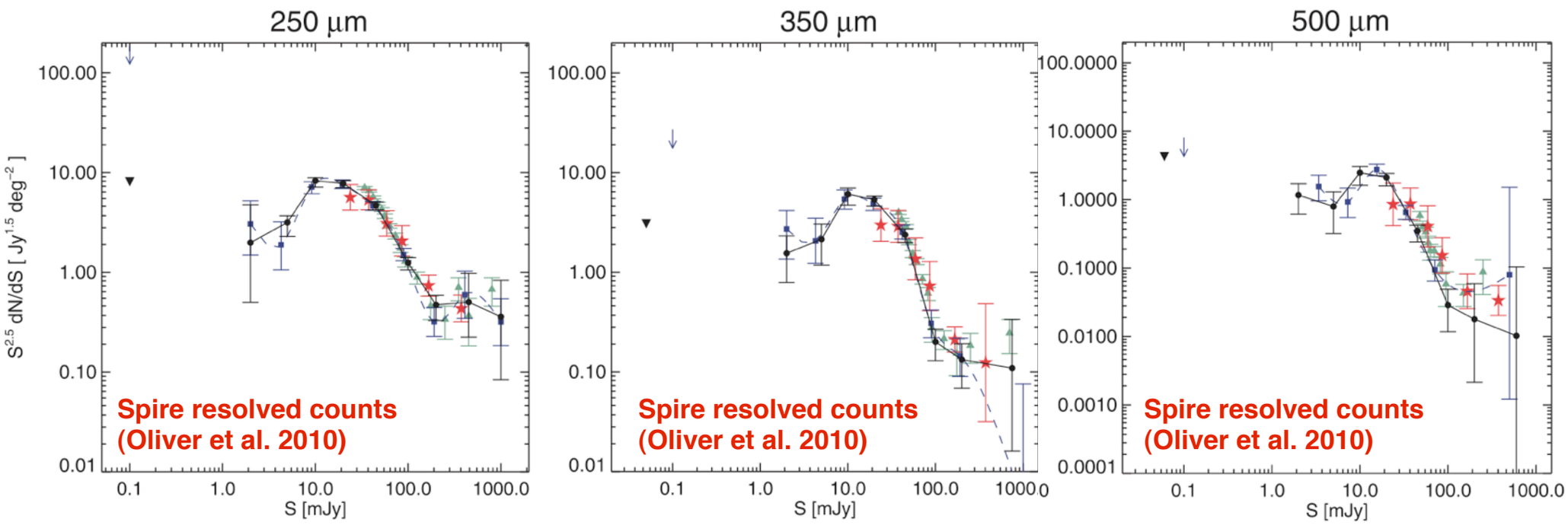
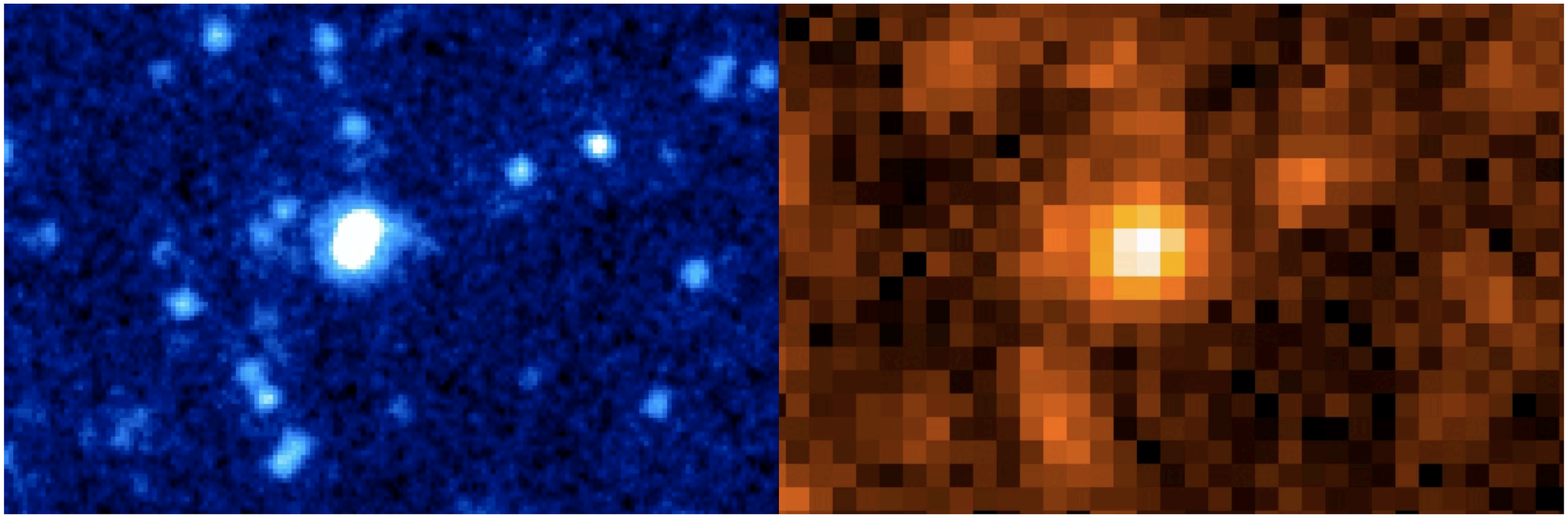


250, 350, 500 μm counts

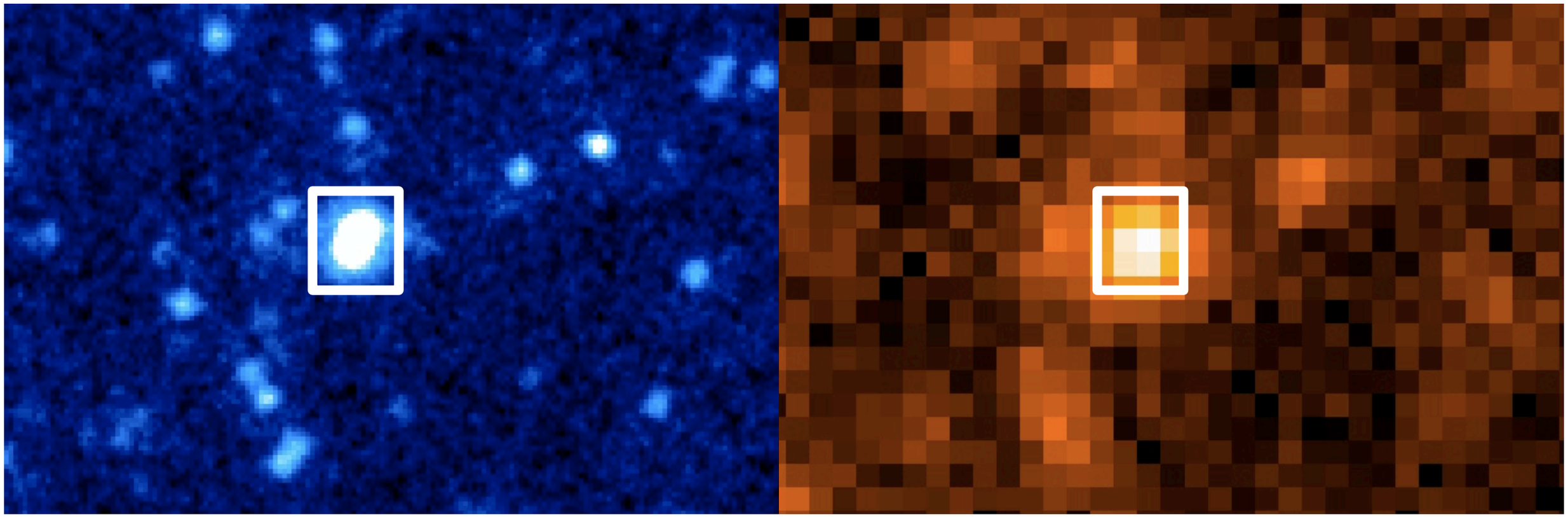
On the need of stacking



24 microns

250 microns

On the need of stacking



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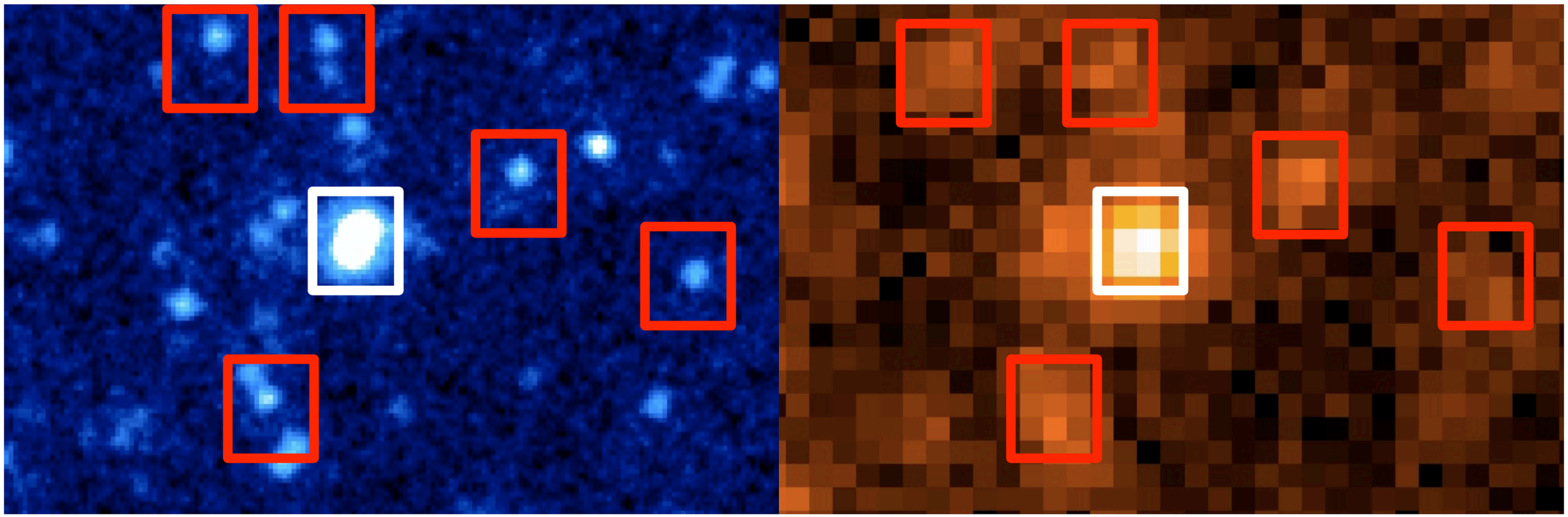

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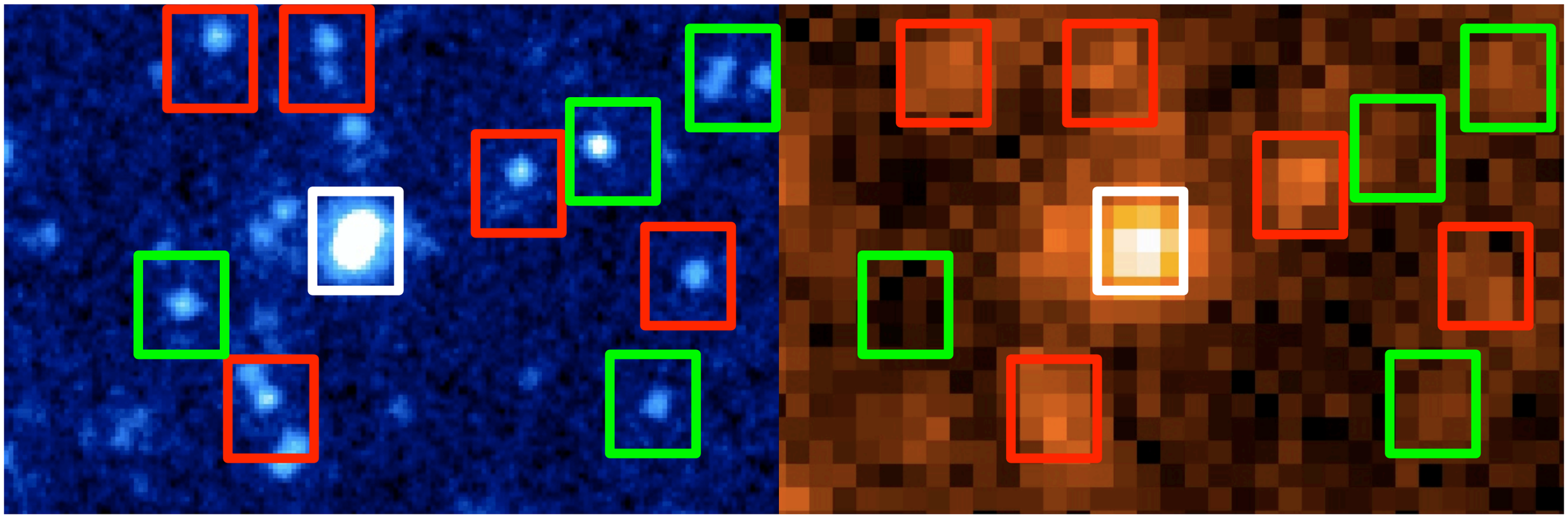
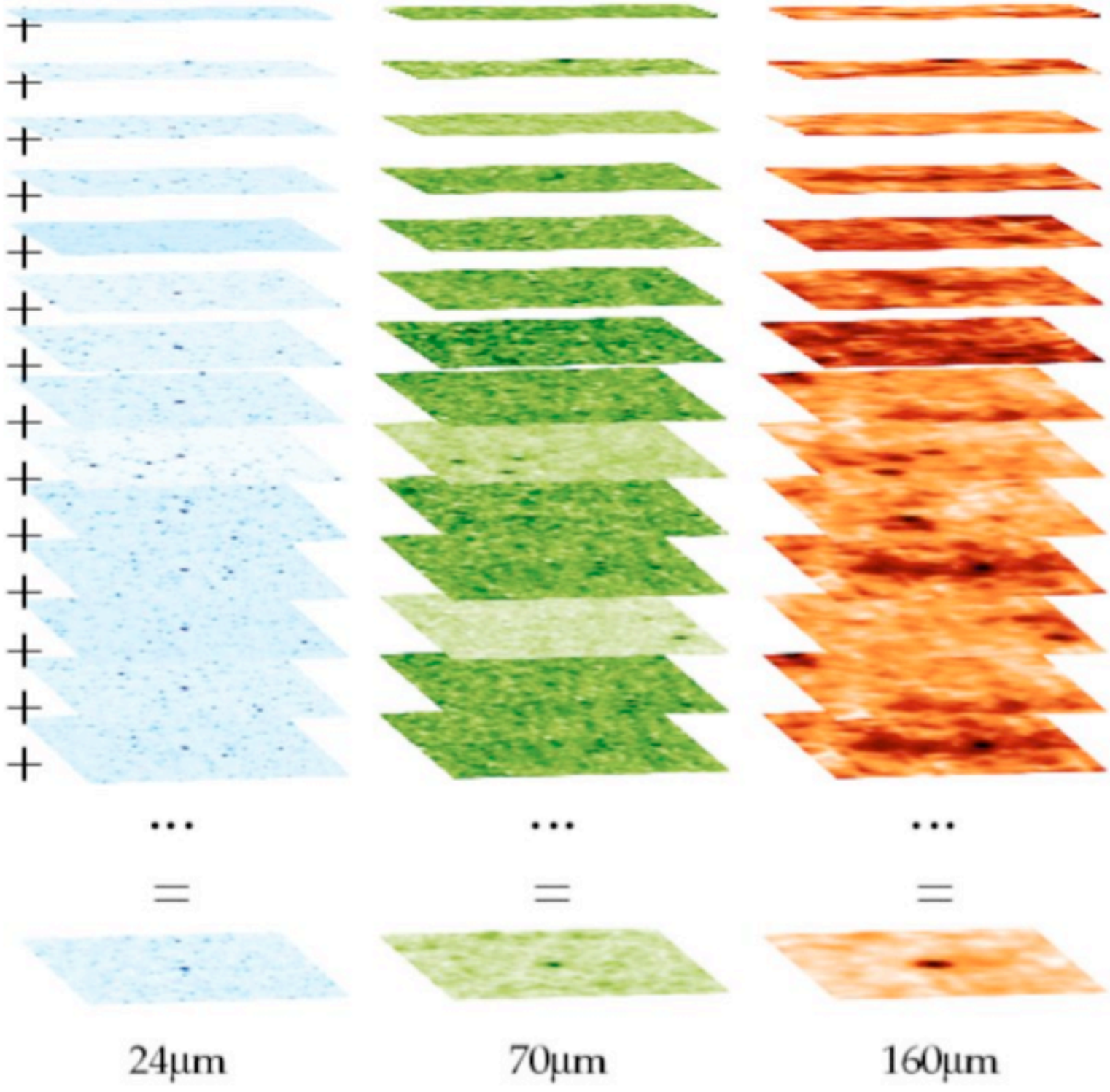


24 microns

250 microns

On the need of stacking

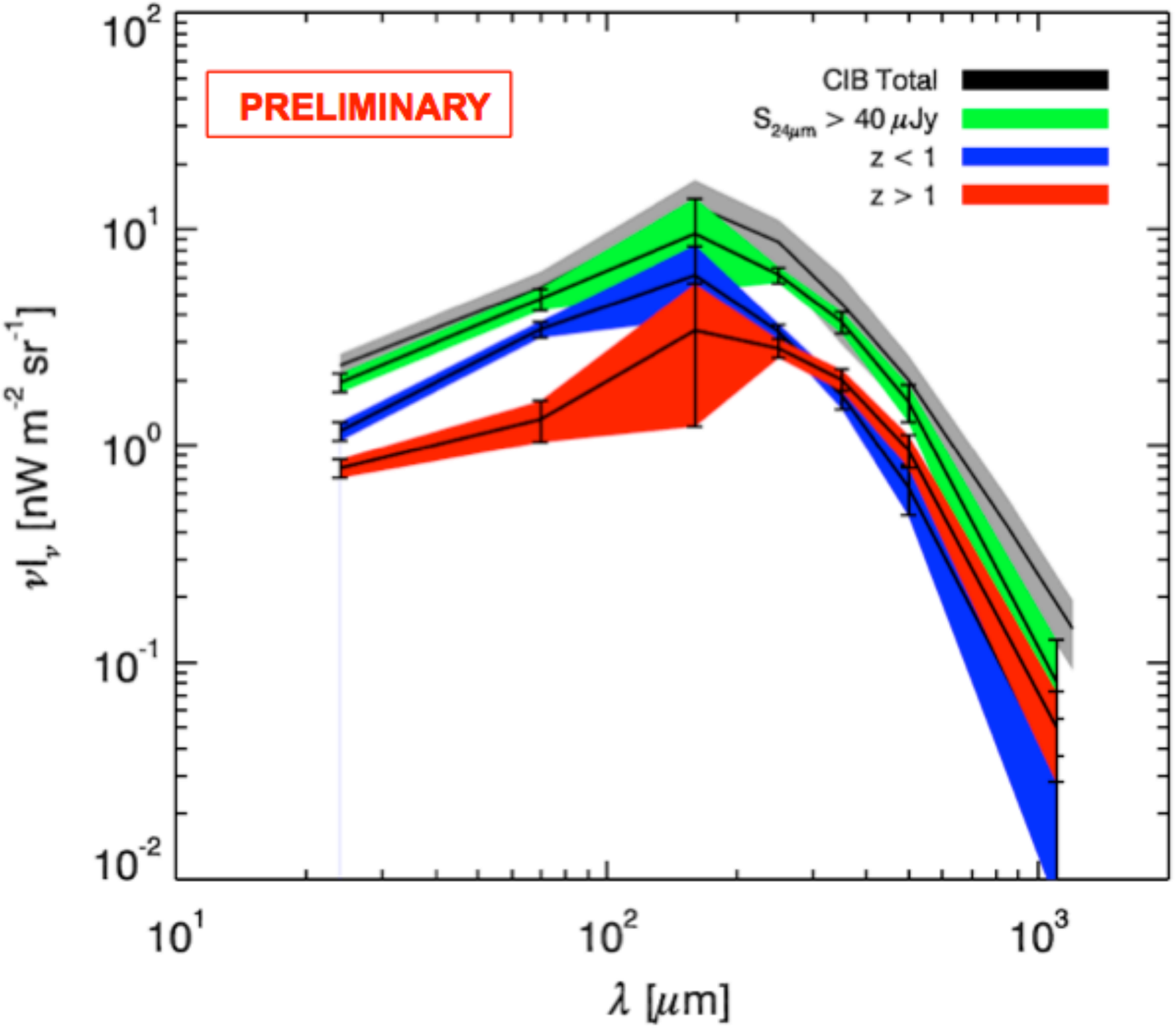


Dole et al. (2006)

Measuring the SED of the CIB

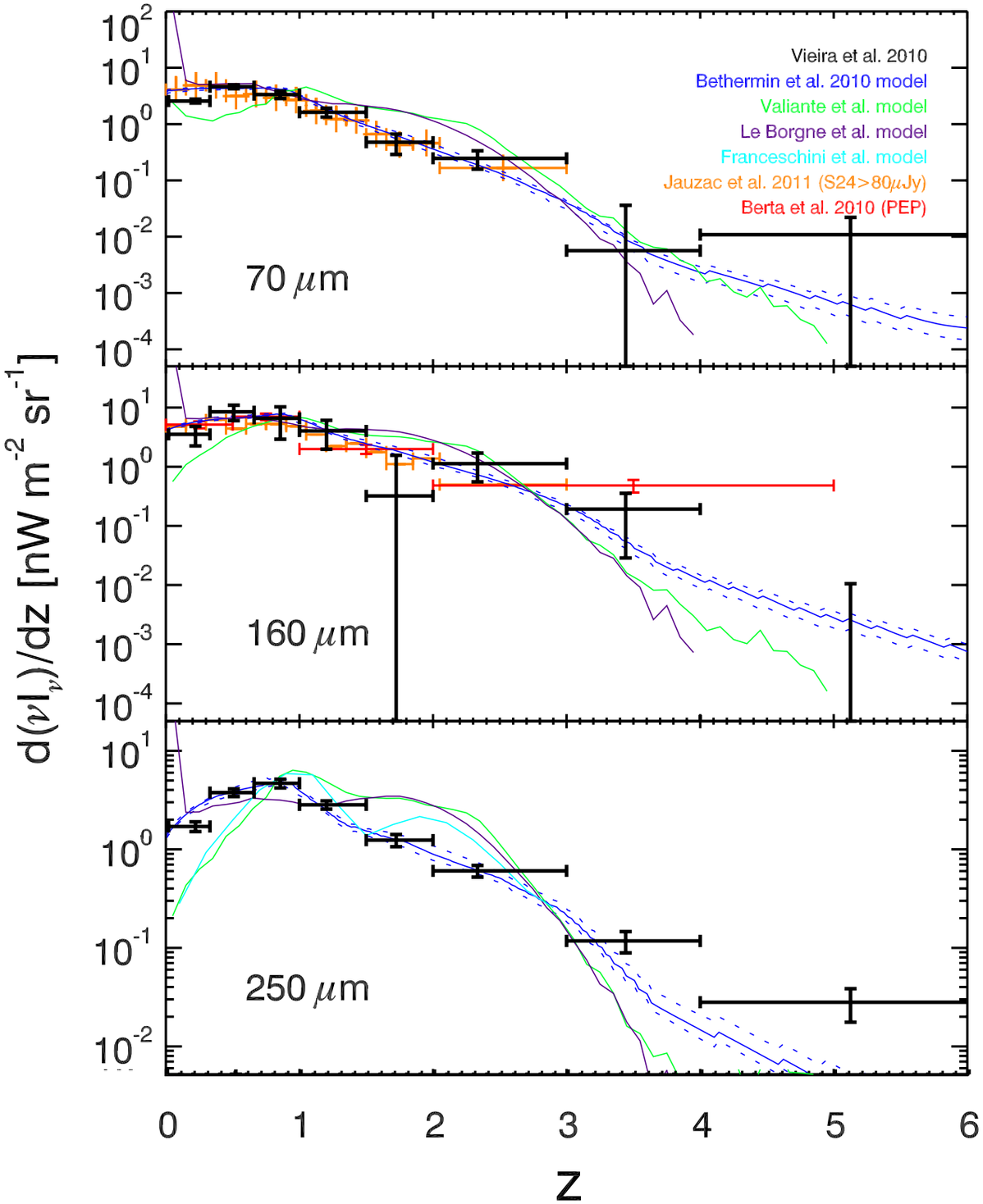
- Stacking of 24 μm sources at 160 μm (Spitzer/MIPS), 250, 350, 500 μm (Herschel/SPIRE) and 1.1 mm (Aztec)

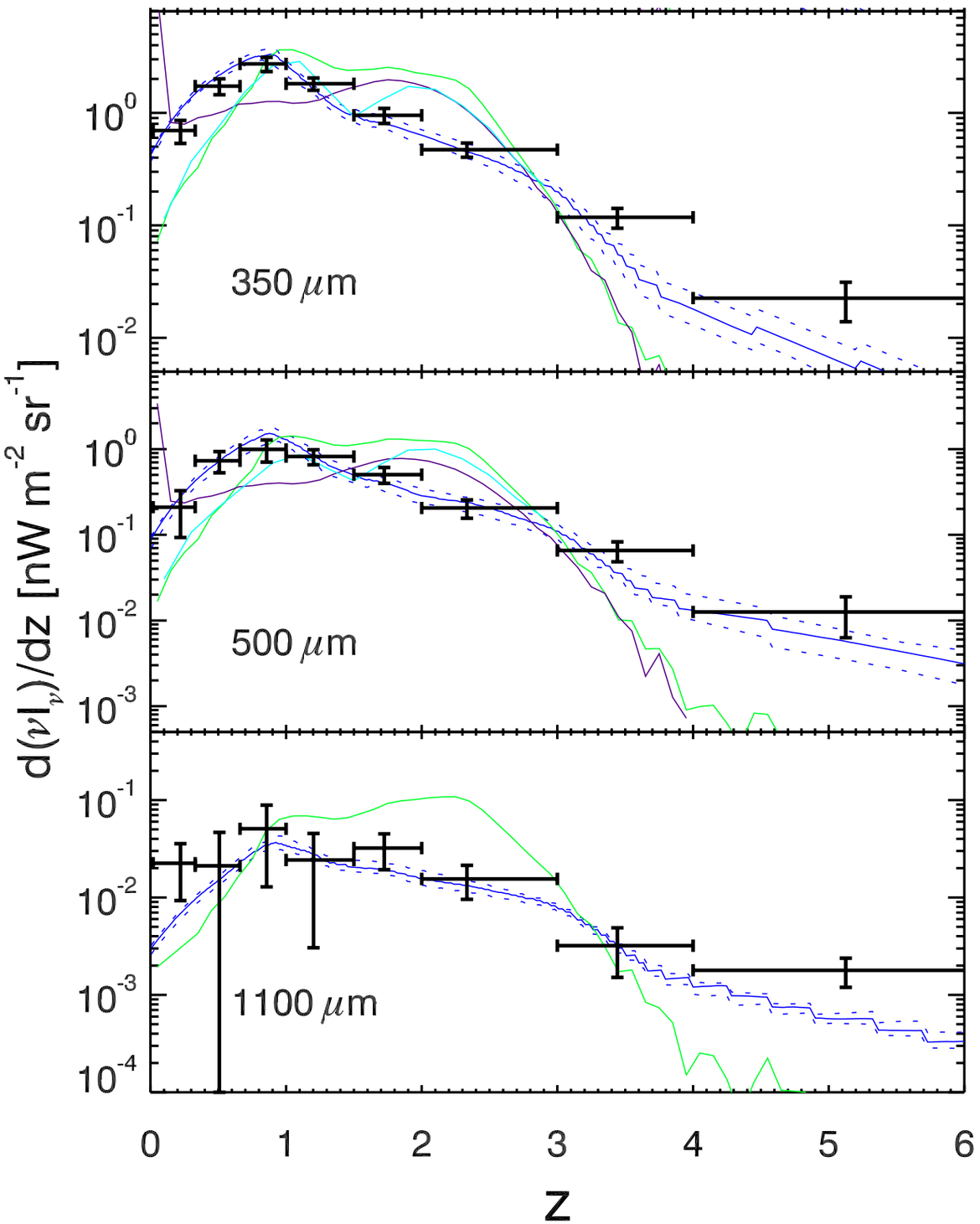
- Contribution of higher redshift sources shifts to larger wavelengths



Viera, Béthermin et al. (in prep)

CIB as a function of z



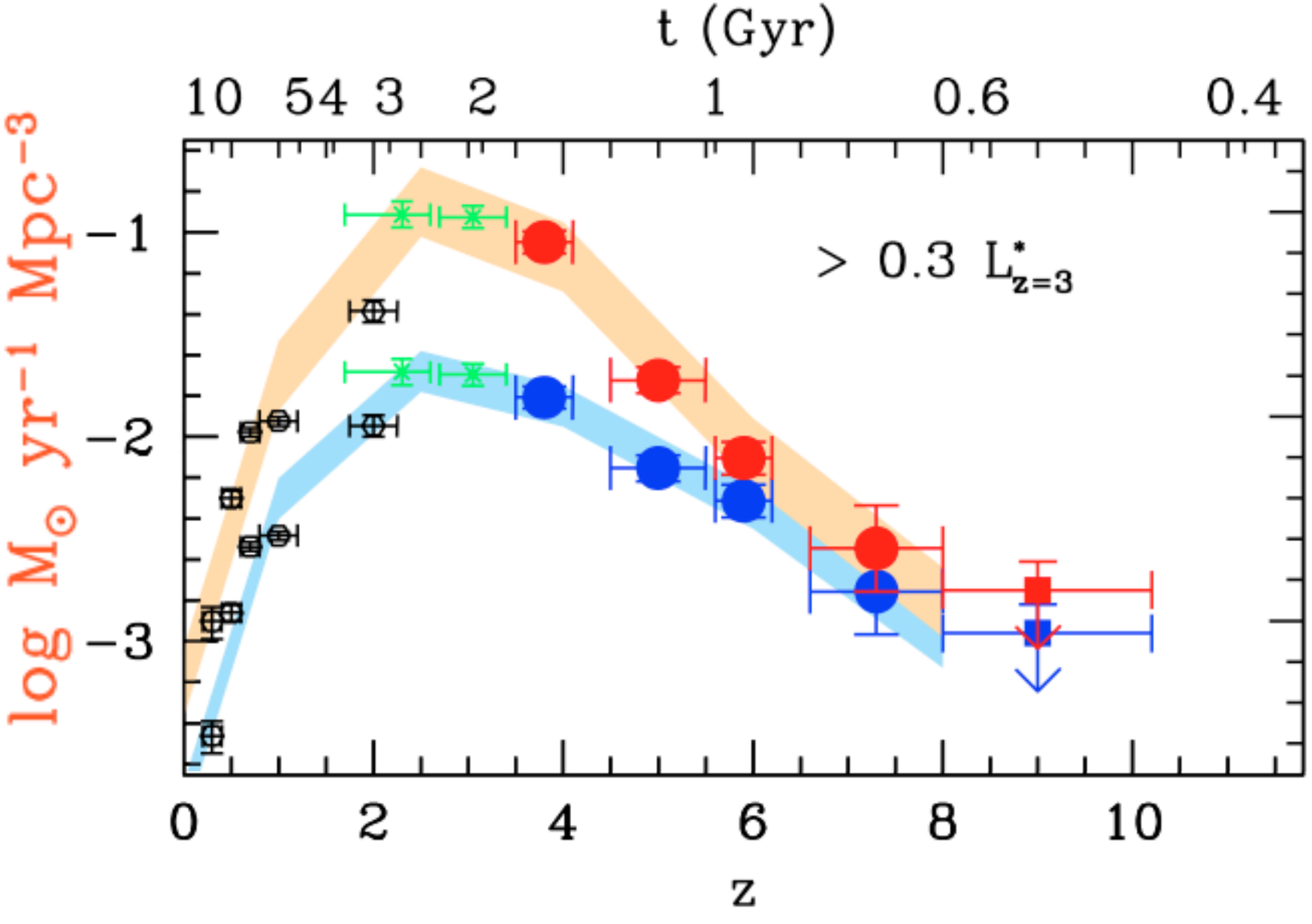


Viera, Béthermin et al. (in prep)

Cosmic Star Formation evolution

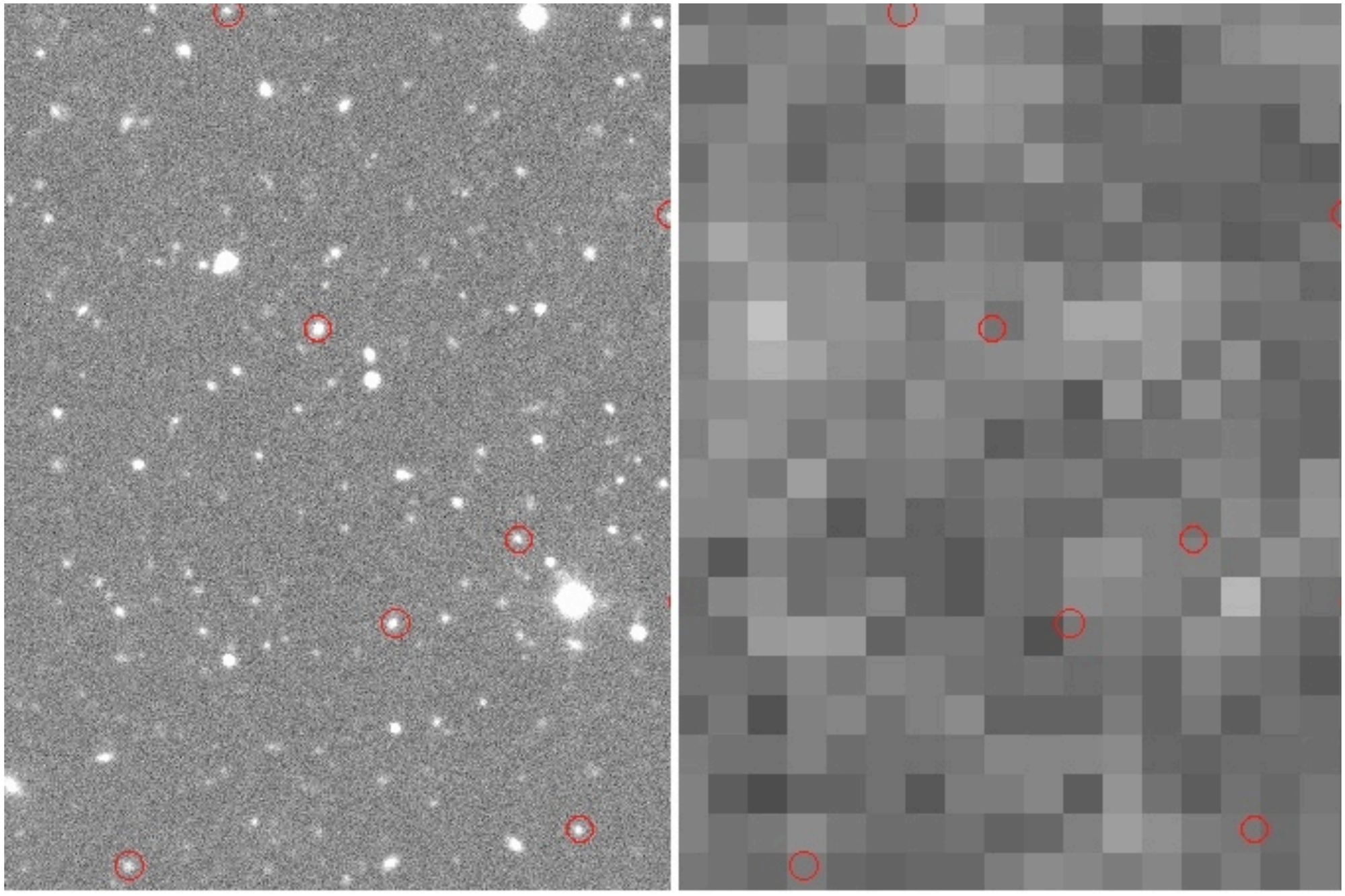
- Evolution of Cosmic Star Formation Rate to constrain galaxy evolution

- What about extinction?



Bouwens et al. (2009)

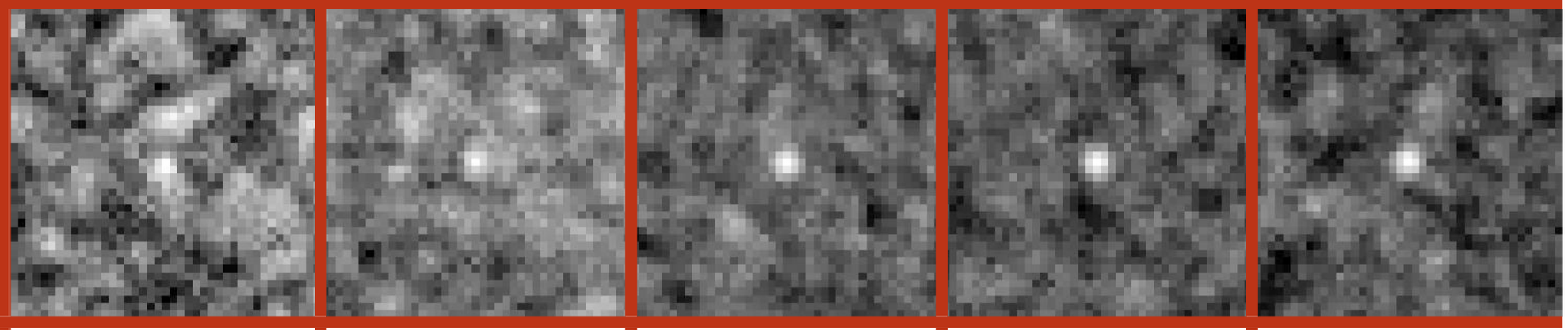
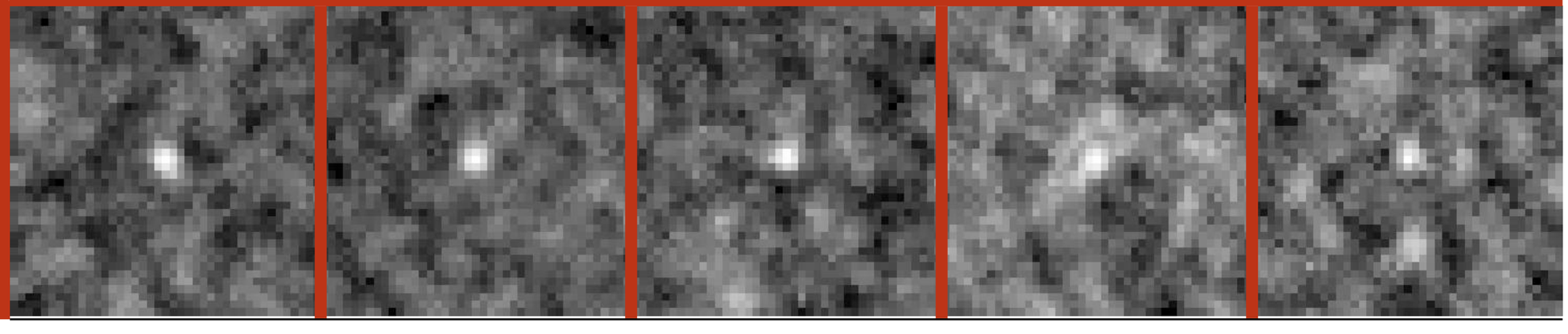
FIR properties of UV selected sample



u band

250 microns

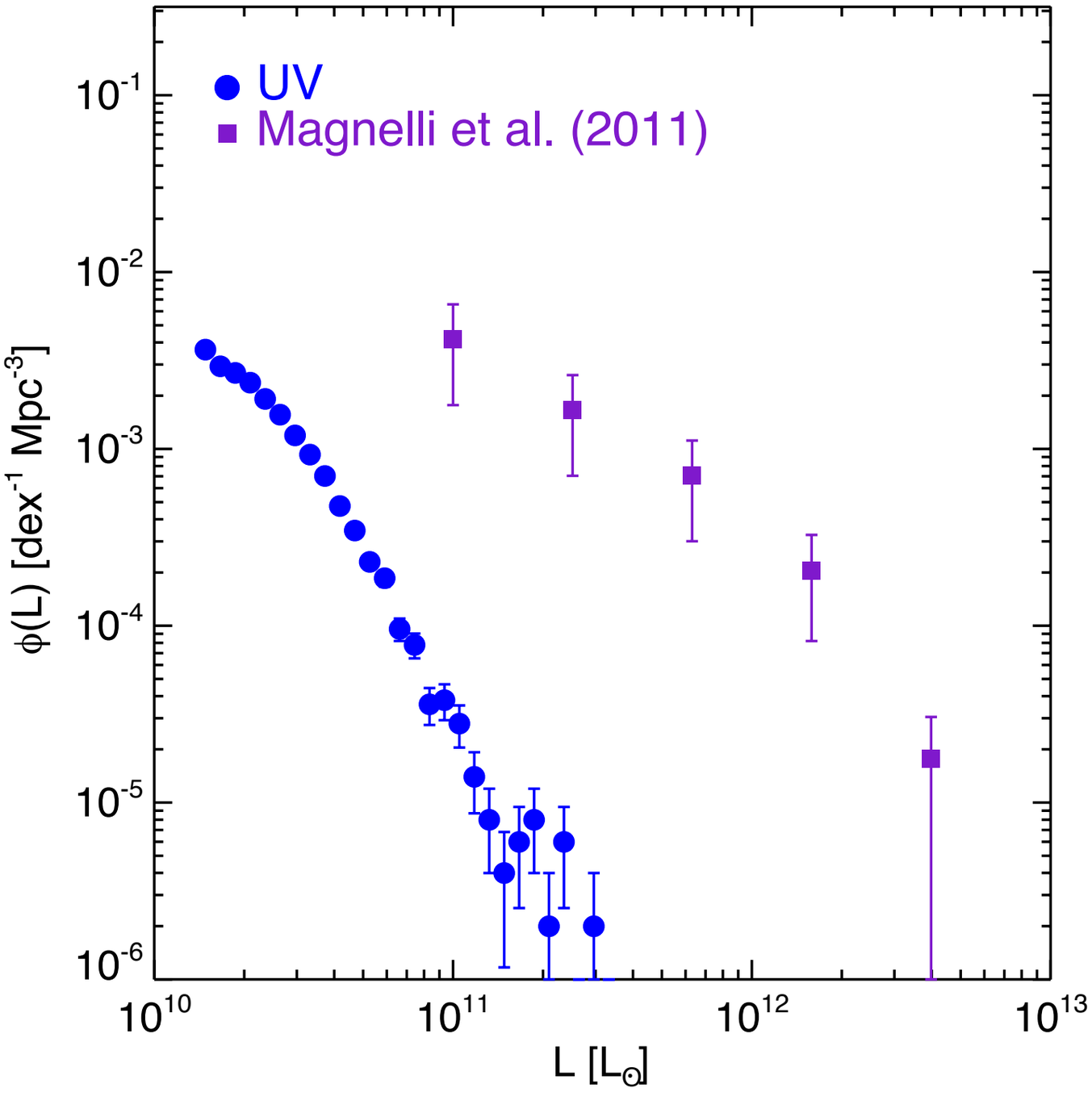
Stacking as a function of UV luminosity

<Log(L_{FUV})>	9.9	10	10.1	10.2	10.3
					
<Log(L_{FUV})>	10.4	10.5	10.6	10.7	10.8
					

Heinis et al. (in prep)

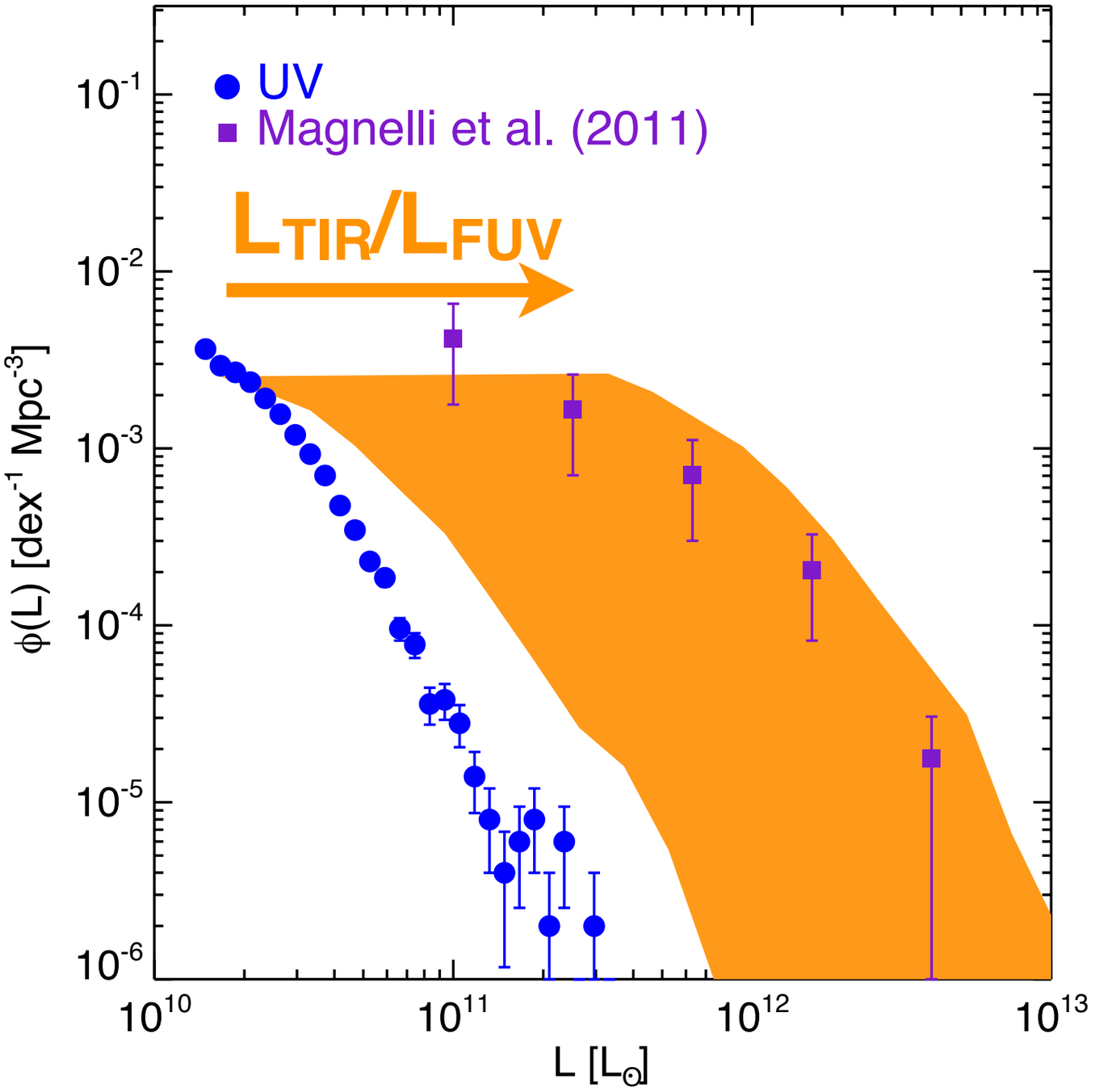
Recovering the TIR luminosity function

Which L_{TIR}/L_{FUV} to obtain the TIR LF?



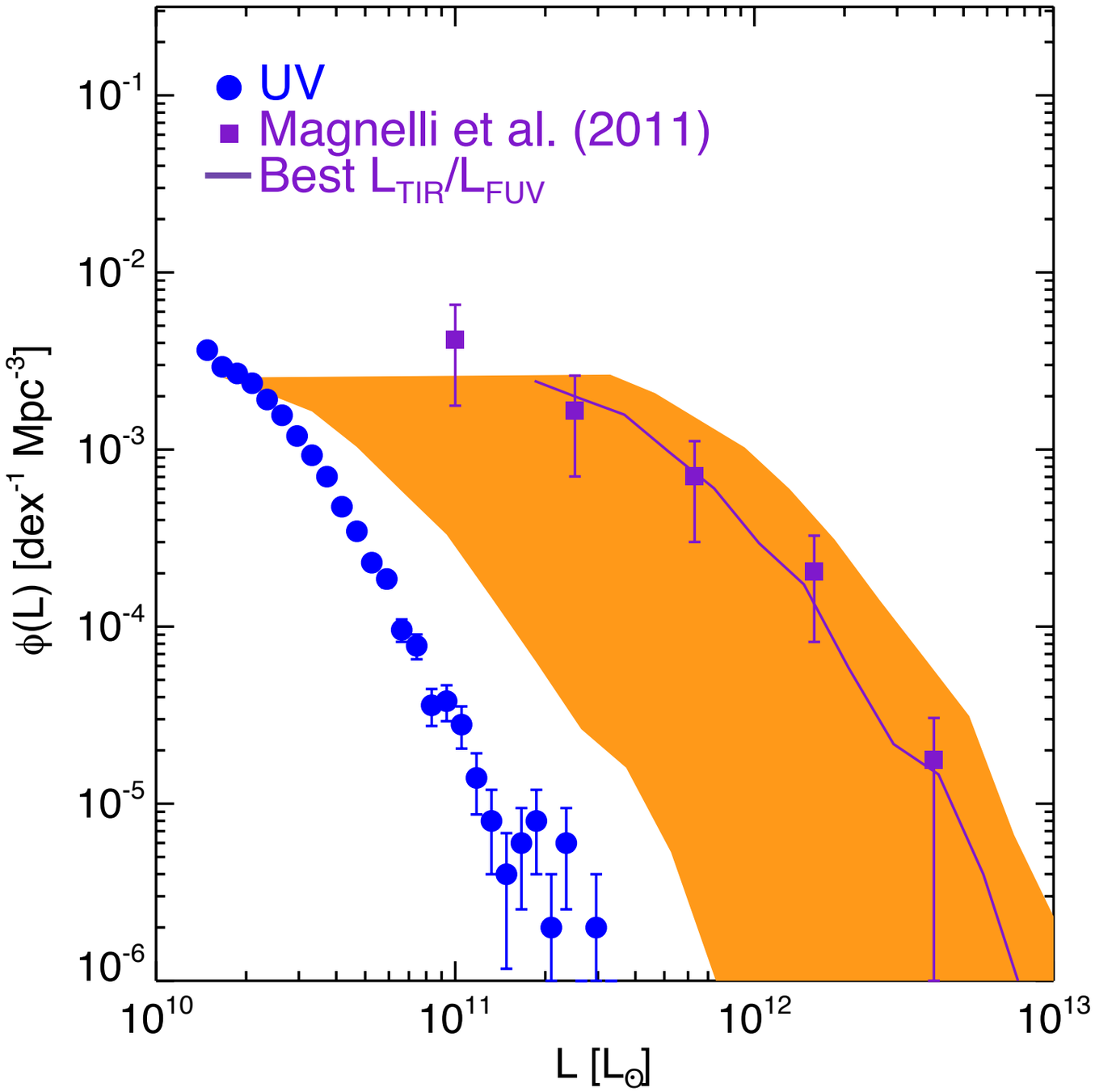
Recovering the TIR luminosity function

- Assume L_{TIR}/L_{FUV} independent of L_{FUV}
- Assume fixed dispersion around mean L_{TIR}/L_{FUV}

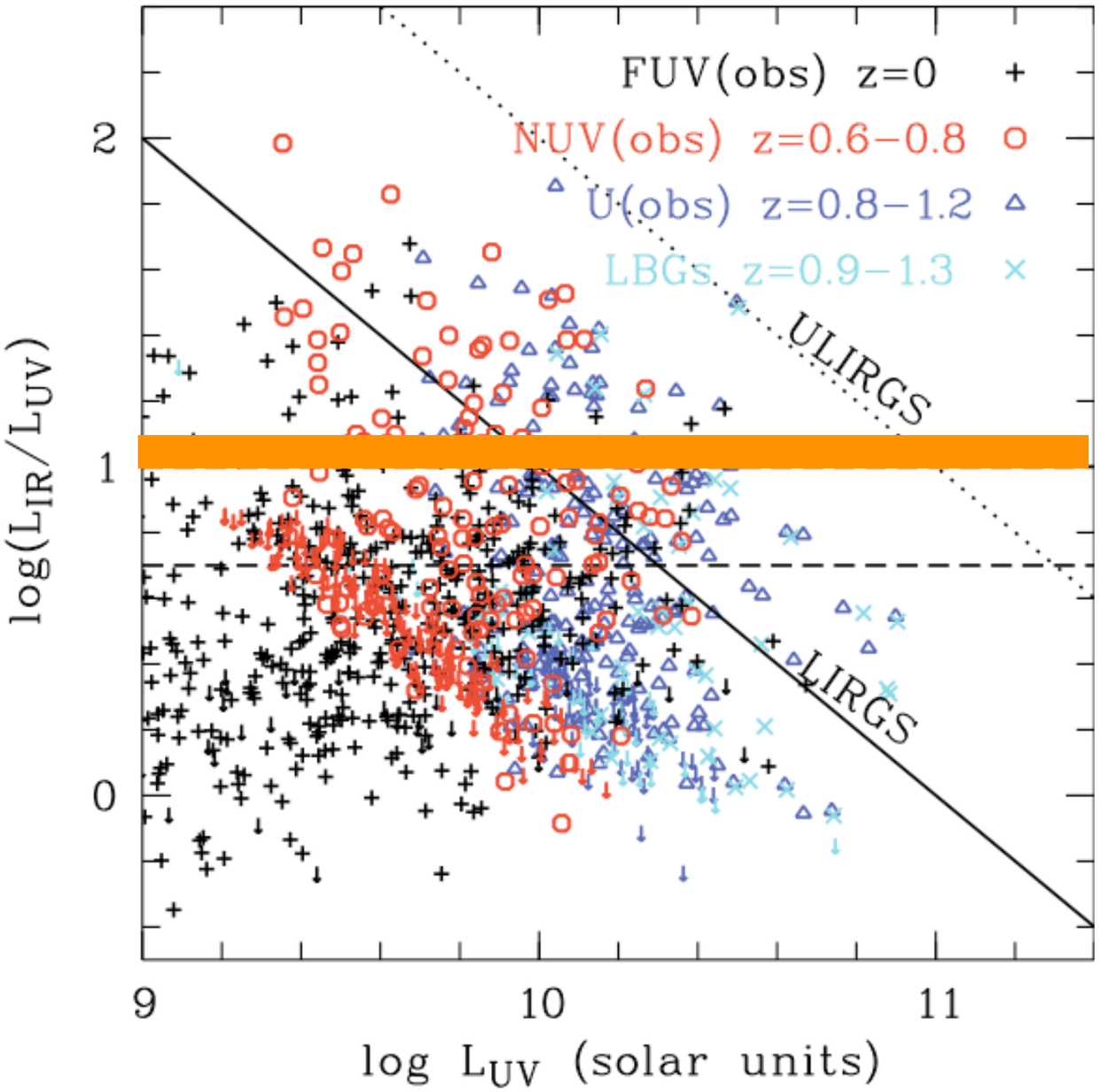


Recovering the TIR luminosity function

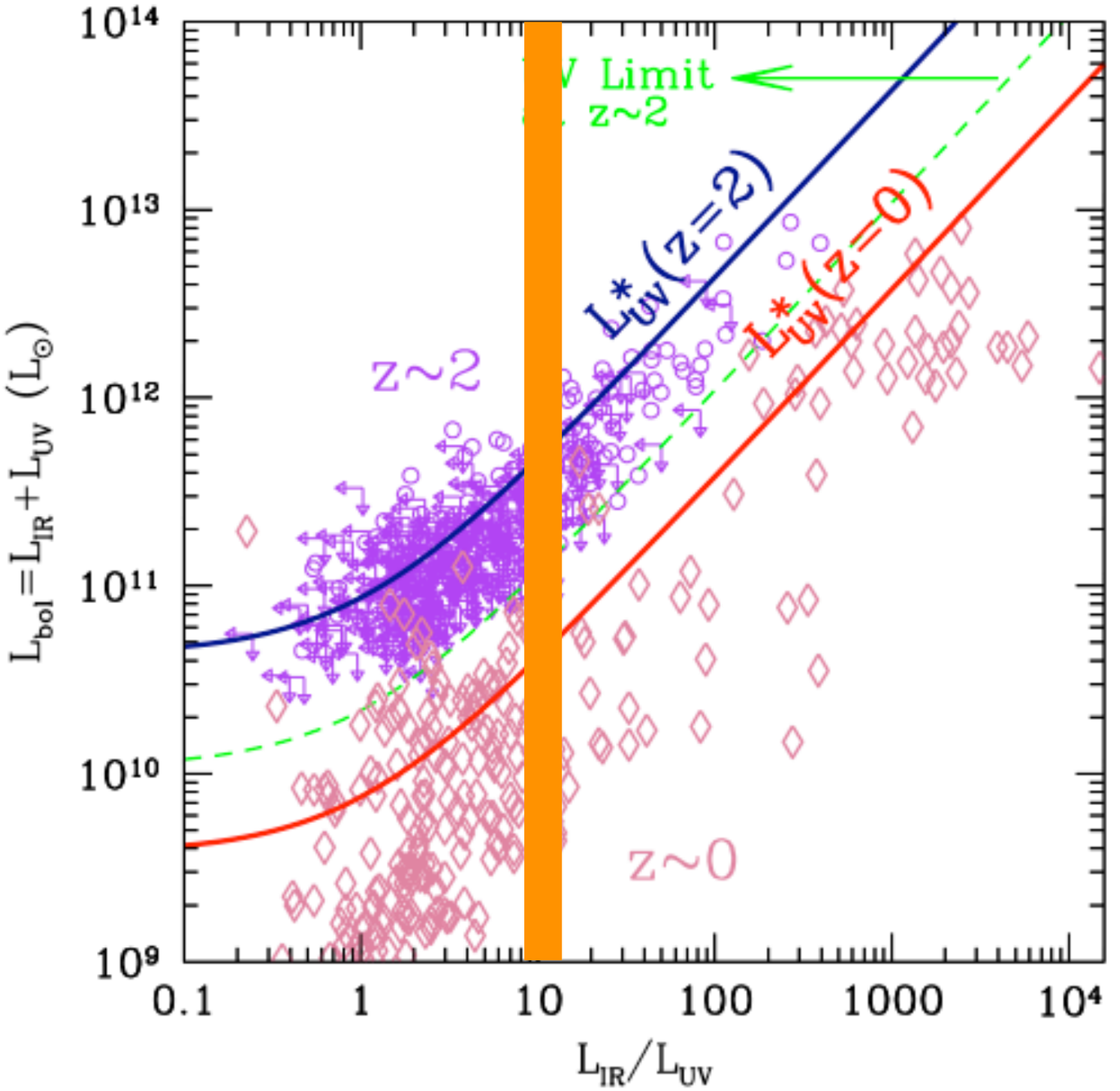
Can recover TIR LF with LTIR/LFUV = 11.8 ± 3



Comparison with other studies



Buat et al. (2009)



Reddy et al. (2010)

Conclusions

- HerMES will be a great legacy dataset

- Current science papers based on a small amount of data

- Observations more than half completed

- DR1 papers and release in preparation (http://hedam.oamp.fr/hermes/)