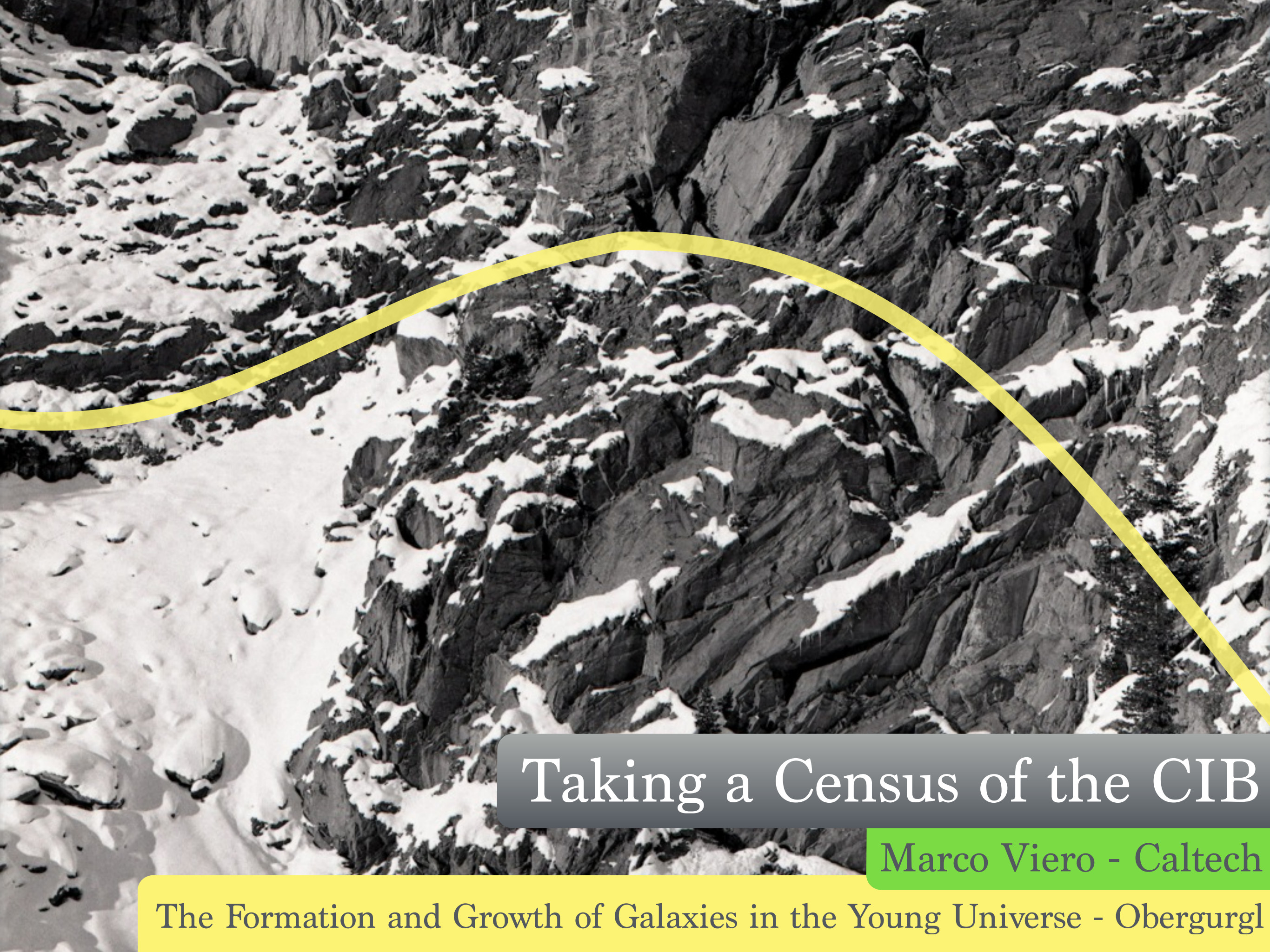
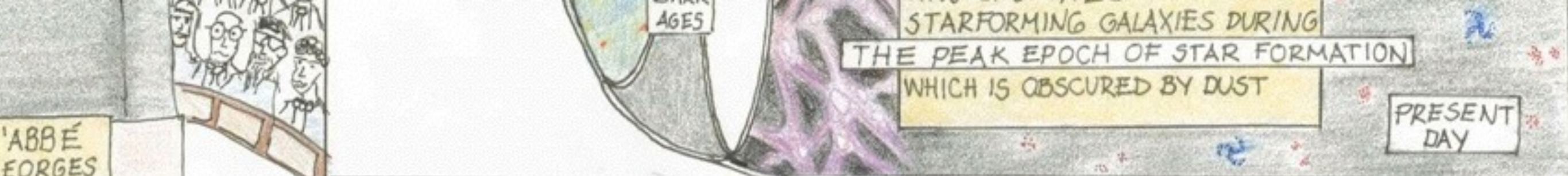




Taking a Census of the CIB

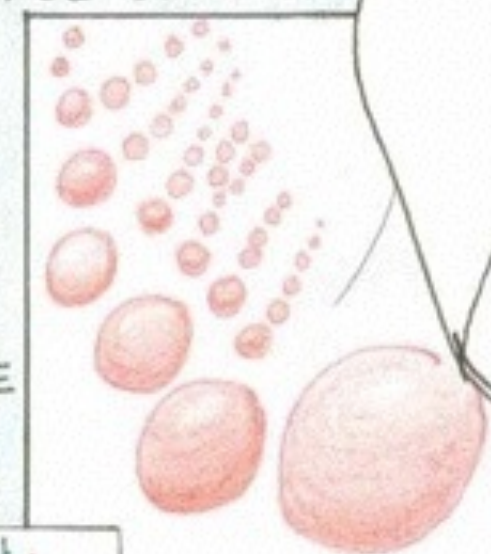
Marco Viero - Caltech

The Formation and Growth of Galaxies in the Young Universe - Obergurgl



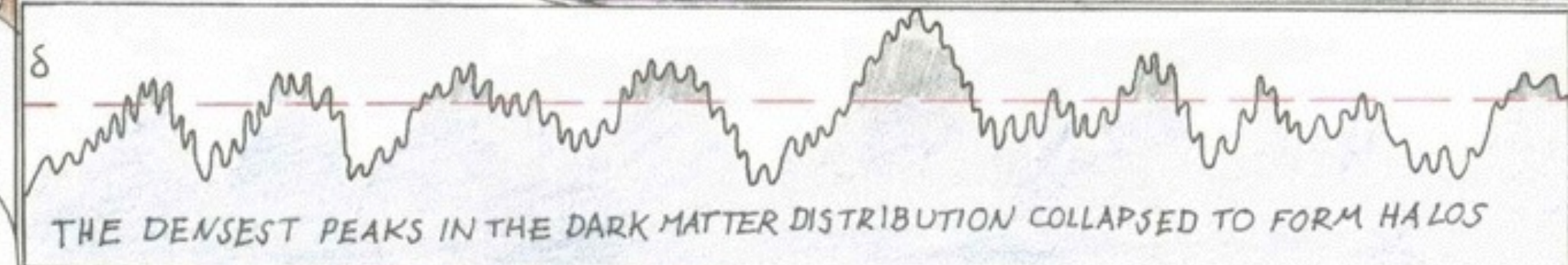
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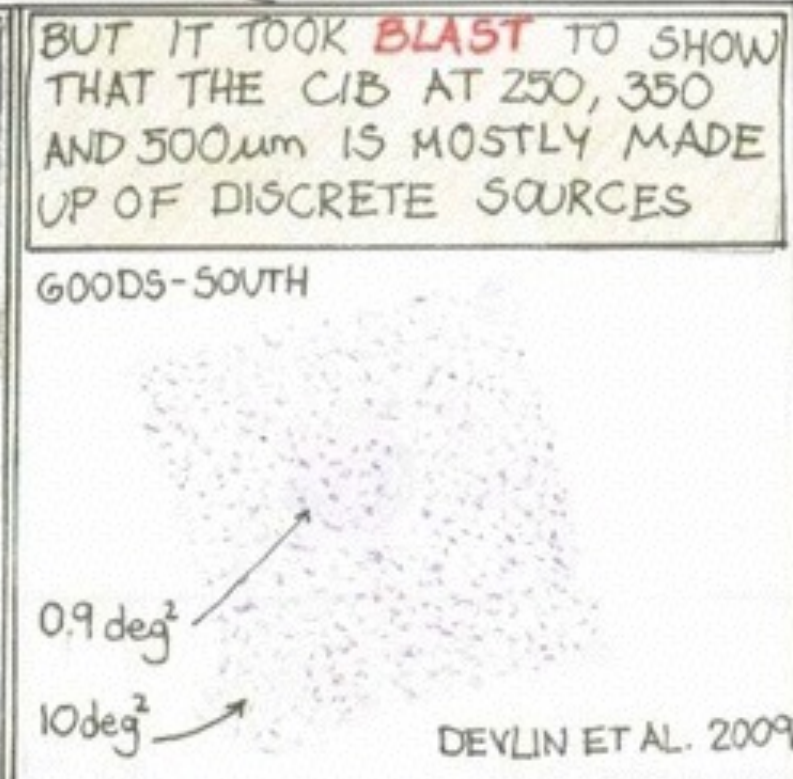
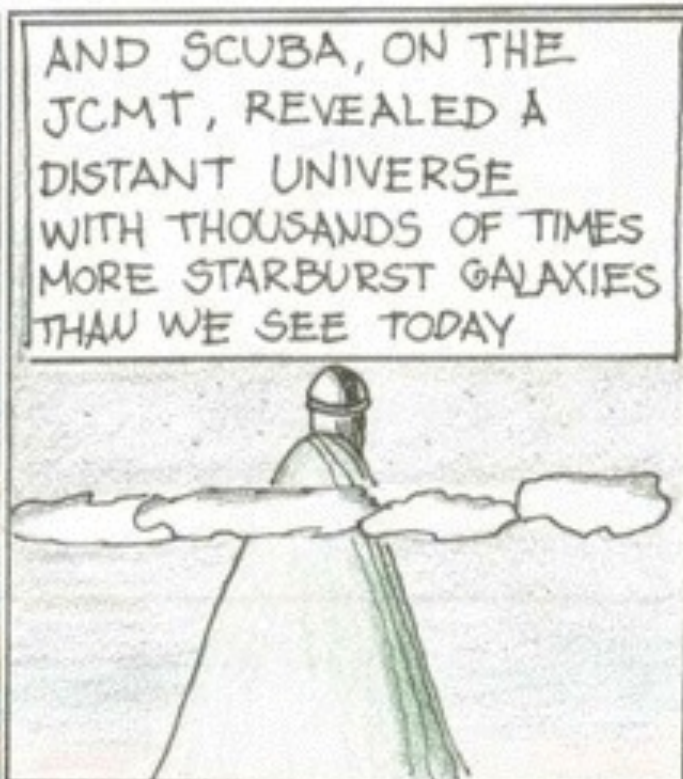
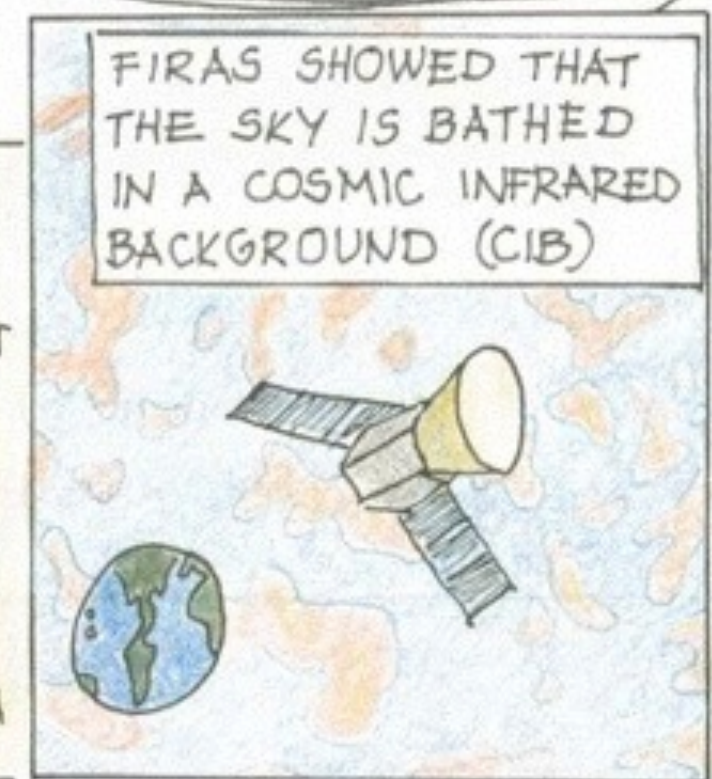
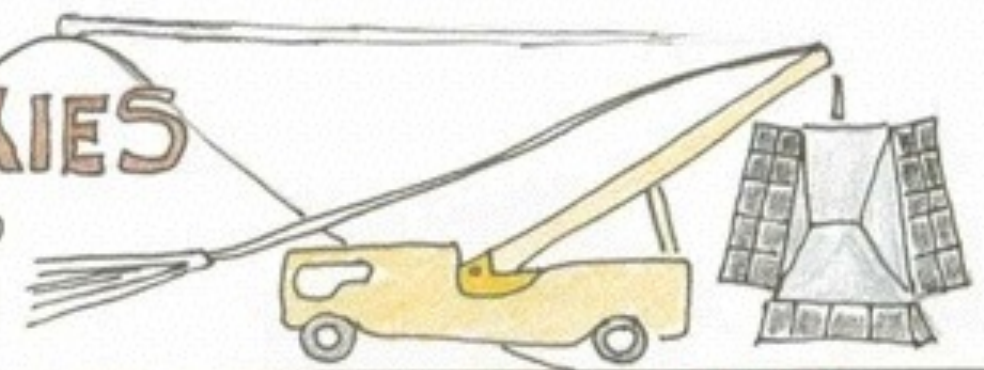
BUT ABSORPTION OF UV LIGHT BY DUST OBSCURES THEM FROM VIRTUALLY ALL BUT INFRARED OBSERVATIONS WHICH SEE WARM DUST EMISSION

LAST SOURCES IN LARGE SCALES ARE BIASED



CLUSTERING OF STAR FORMING GALAXIES WITH BLAST

BY MARCO VIERO
ILLUSTRATED BY JUAN SOLER



BUT ON SMALL SCALES THERE IS A DISAGREEMENT WITH THE **HALO MODEL**

THIS MIGHT MEAN THAT IN MASSIVE HALOS ($M > 10^{12} M_{\odot}$) STARBURST GALAXIES ARE FOUND ON THE OUTSKIRTS,



PLANCK

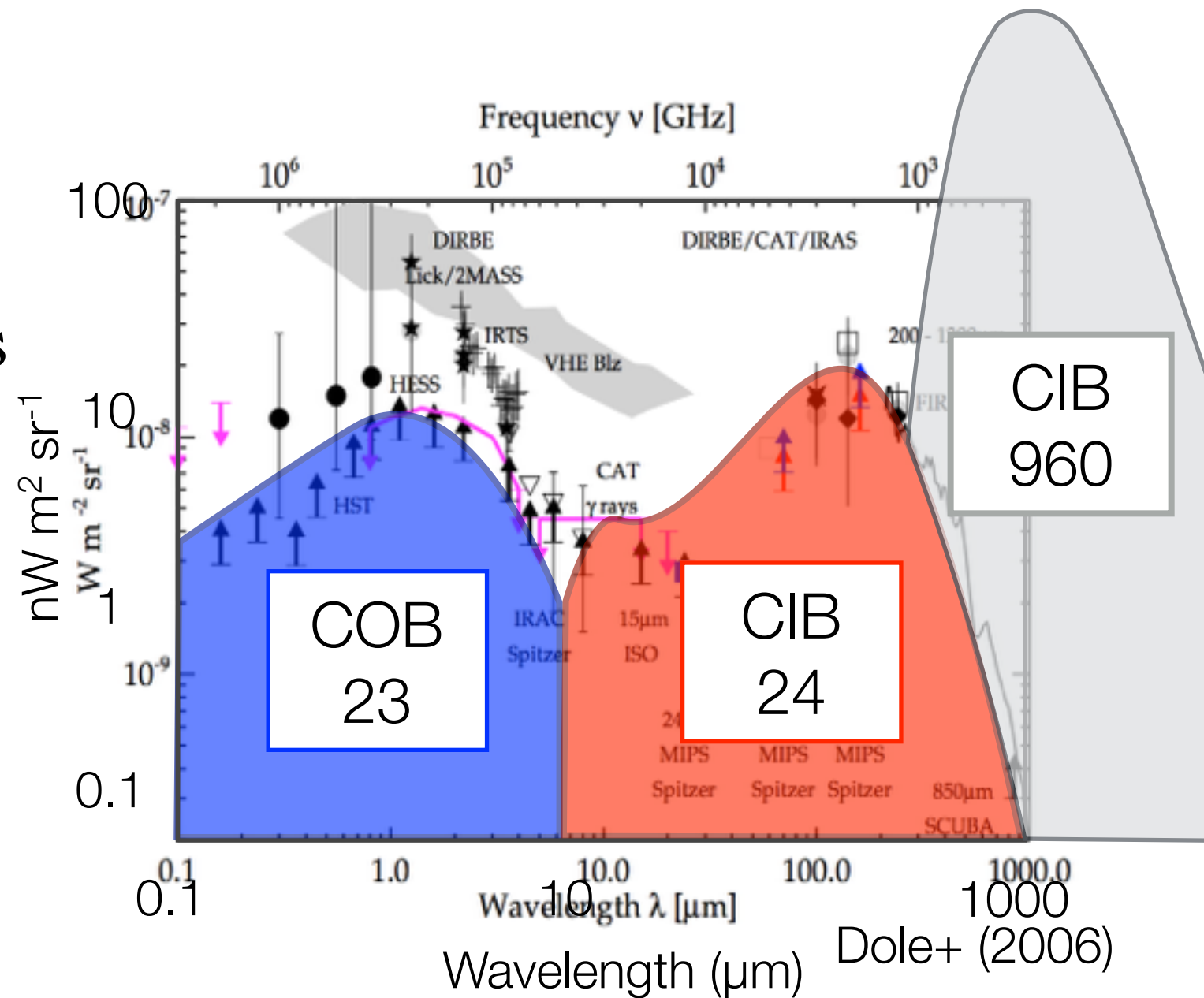
Taking a Census of the Cosmic Infrared Background

Specifically would like to know:

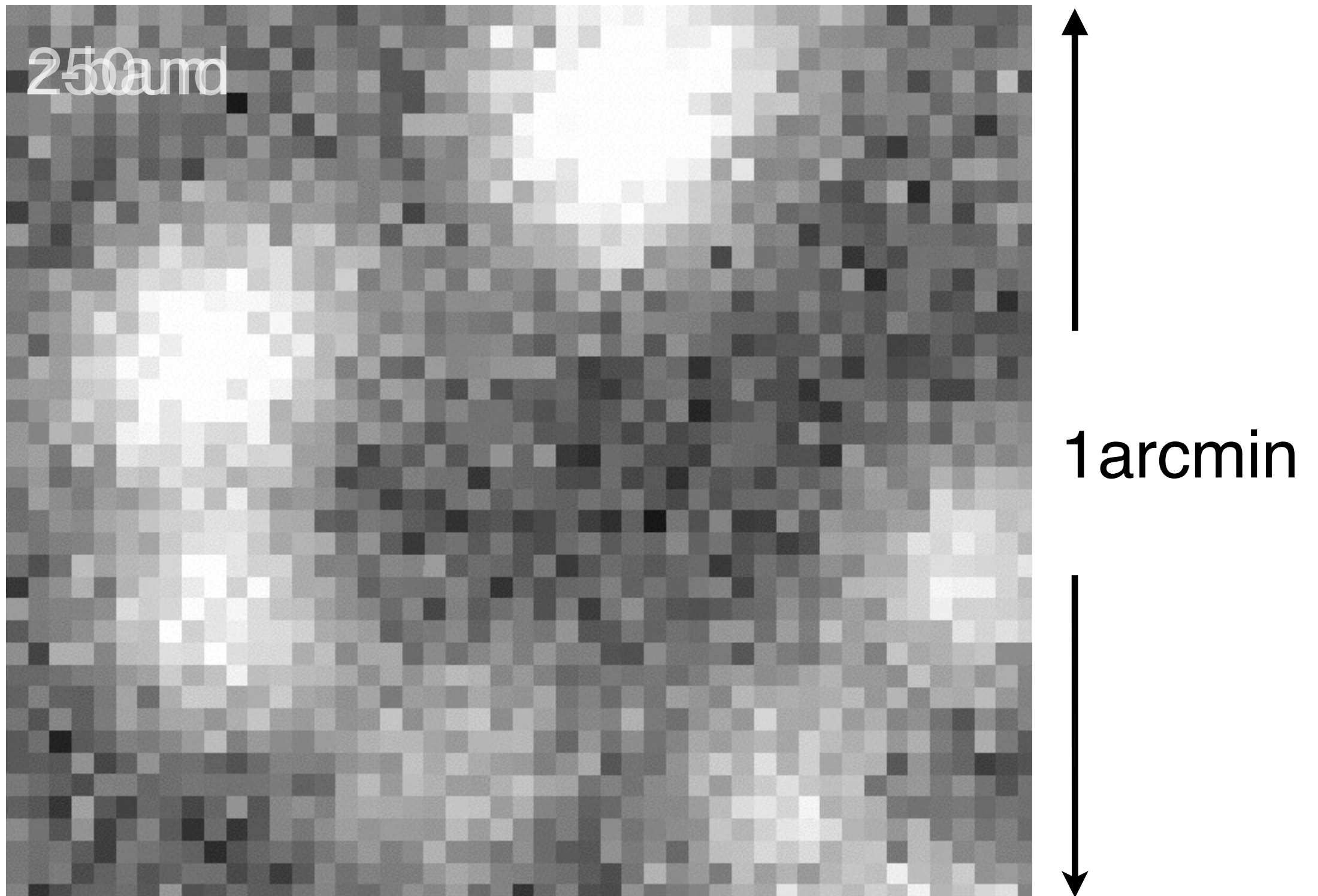
A. How much of the CIB is traceable to resolved galaxies in the UV/Optical/Near-infrared?

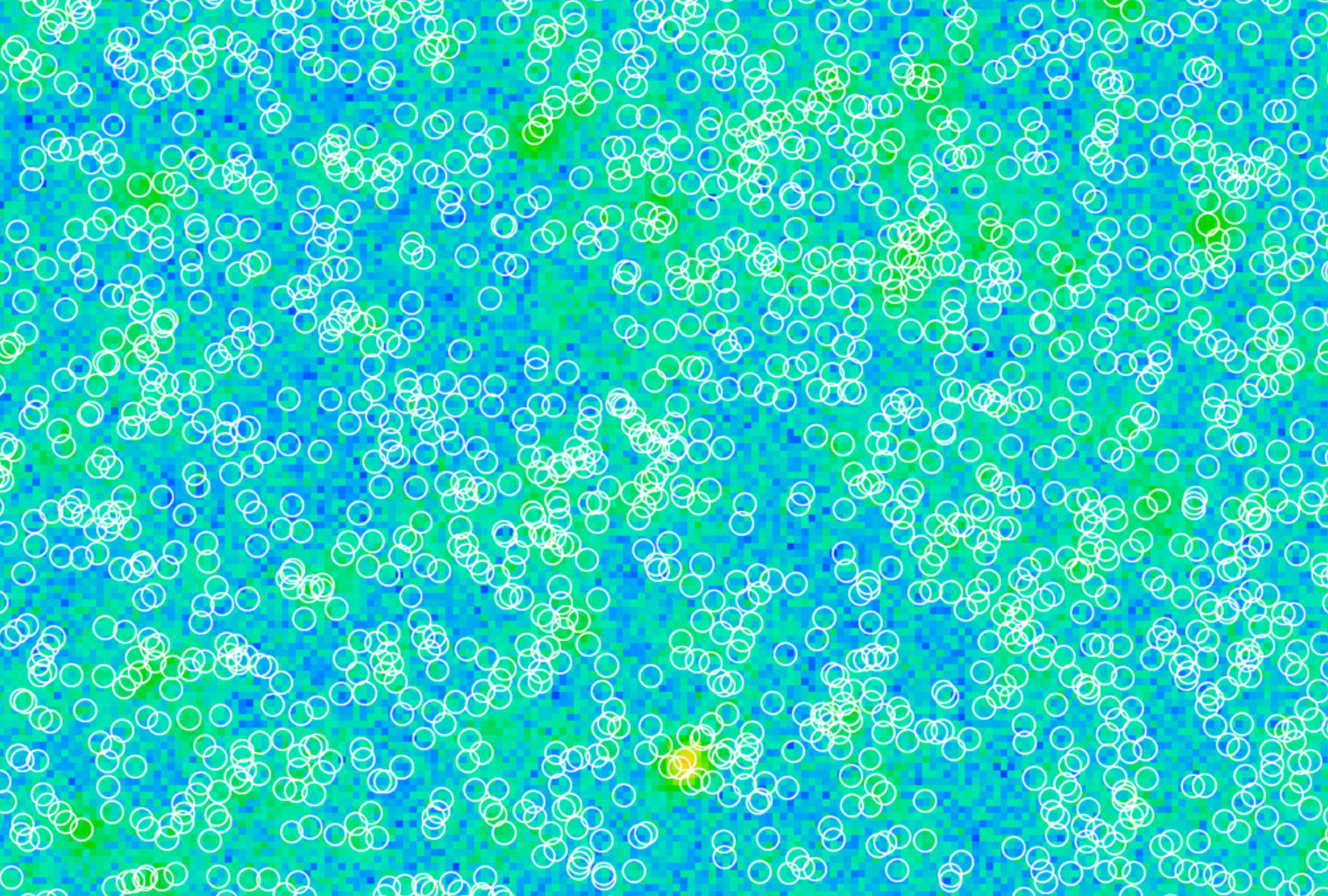
B. What is the breakdown (i.e., the census) by,

- **stellar mass**
- **redshift**
- *other?*



Source Confusion

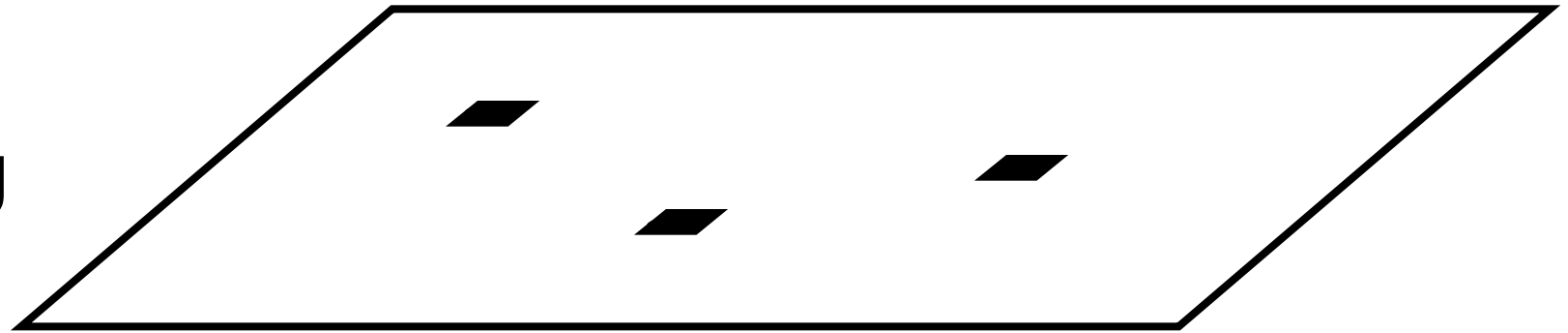




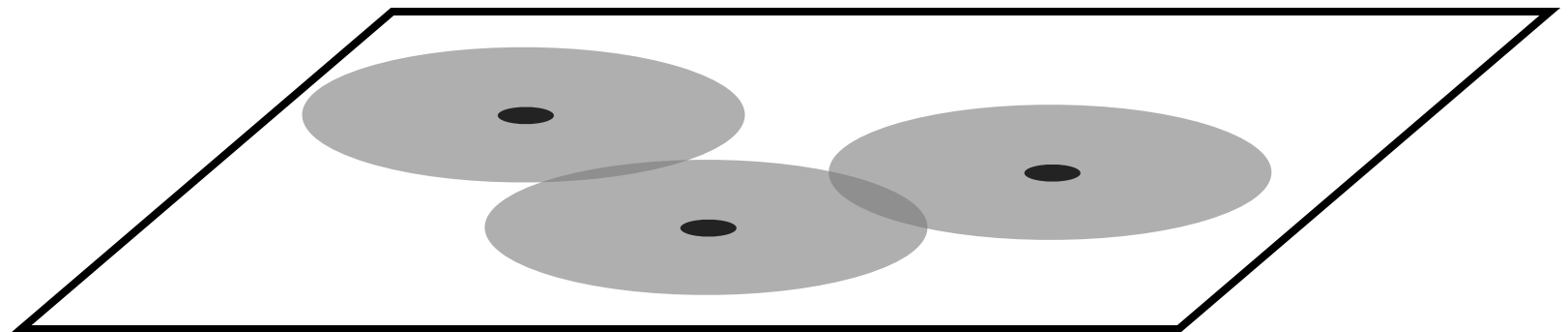
Overcoming Confusion through Cross-Correlations

SIMSTACK: Simultaneous Stacking Algorithm

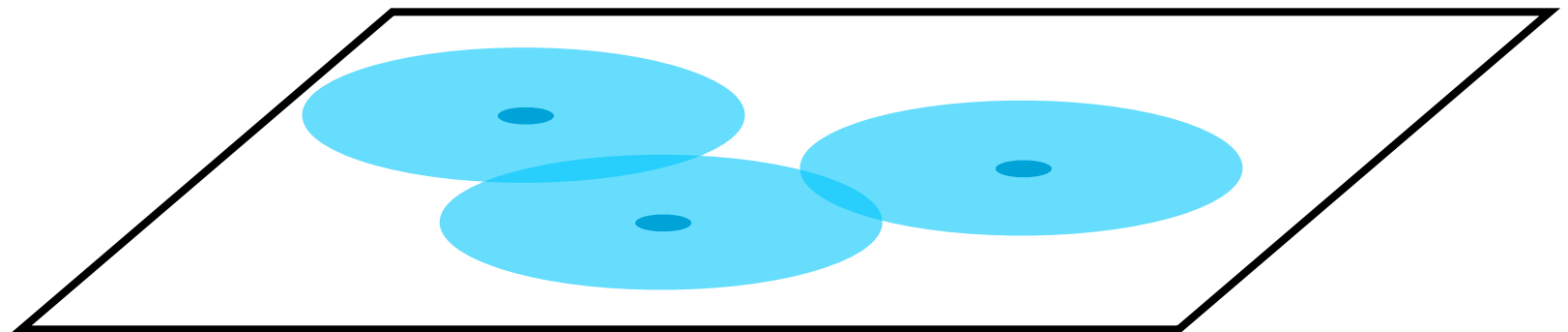
make hits map from catalog



convolve with map p.s.f.



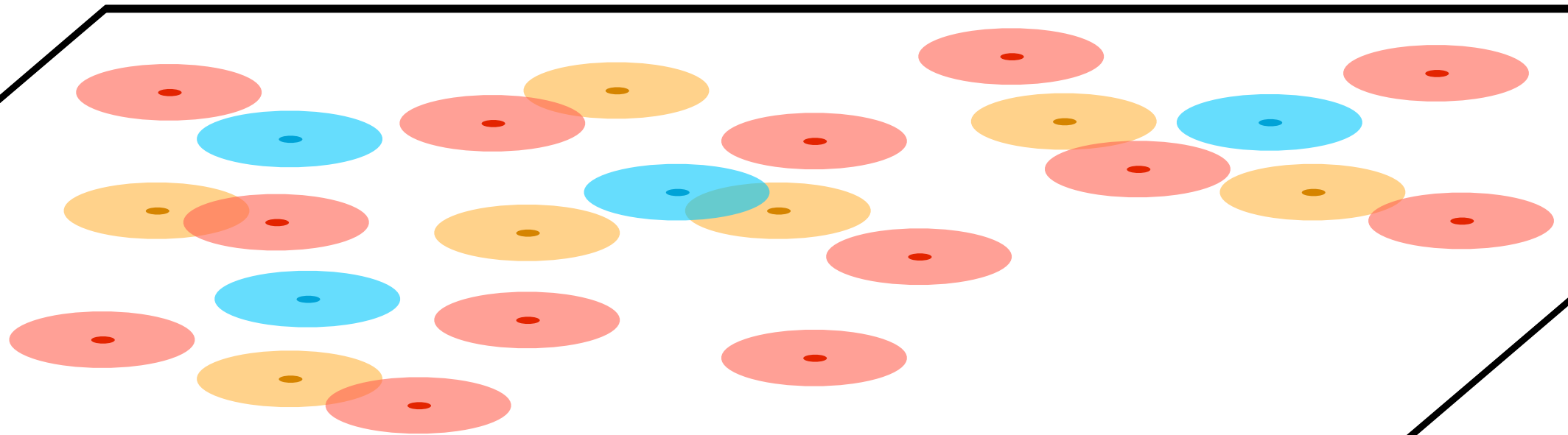
regress to find stacked flux



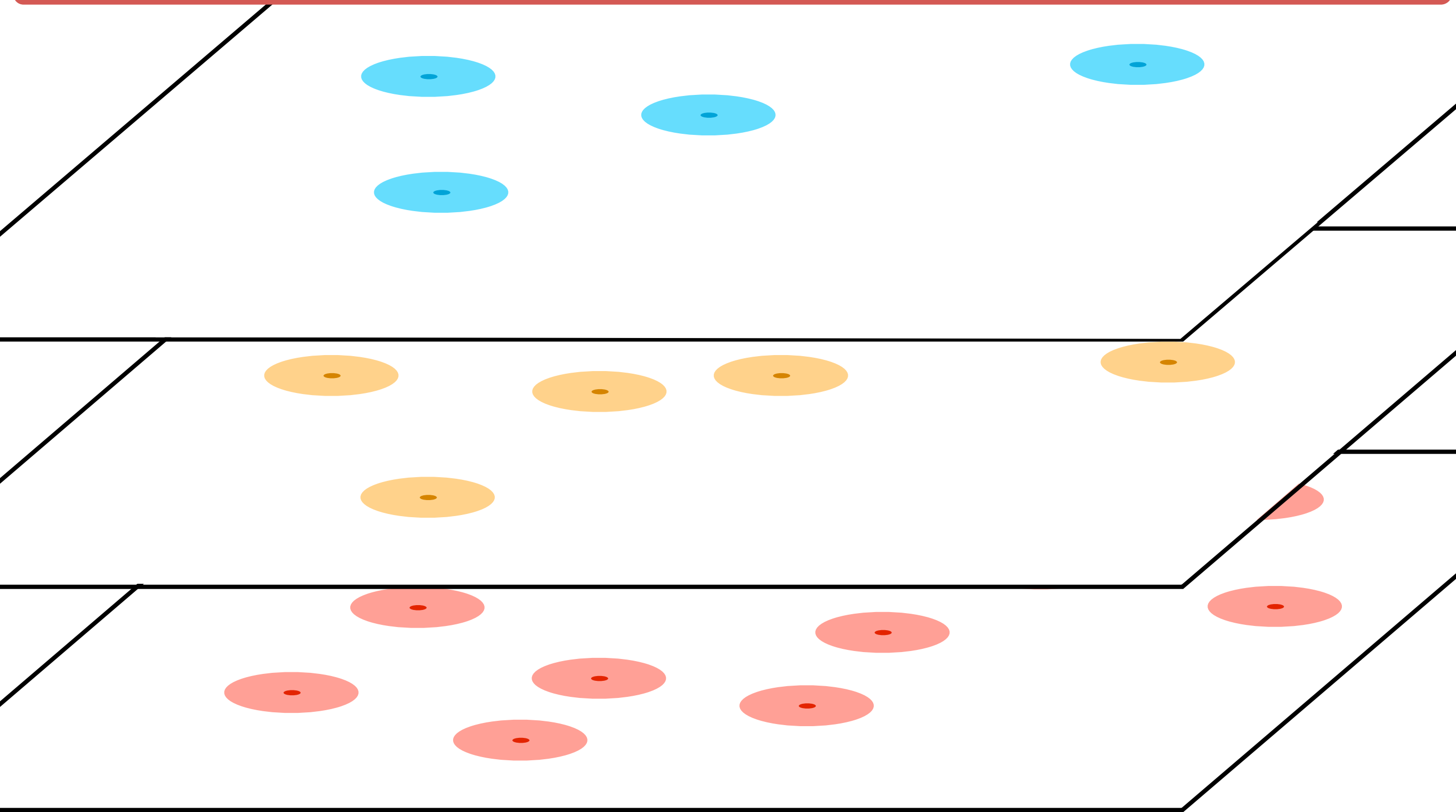
Formalism developed w/ Lorenzo Moncelsi (Caltech);
also see Kurczynski & Gawiser (2010), Roseboom et al. (2010)

SIMSTACK code publicly available in [arXiv:1304.0446](#)

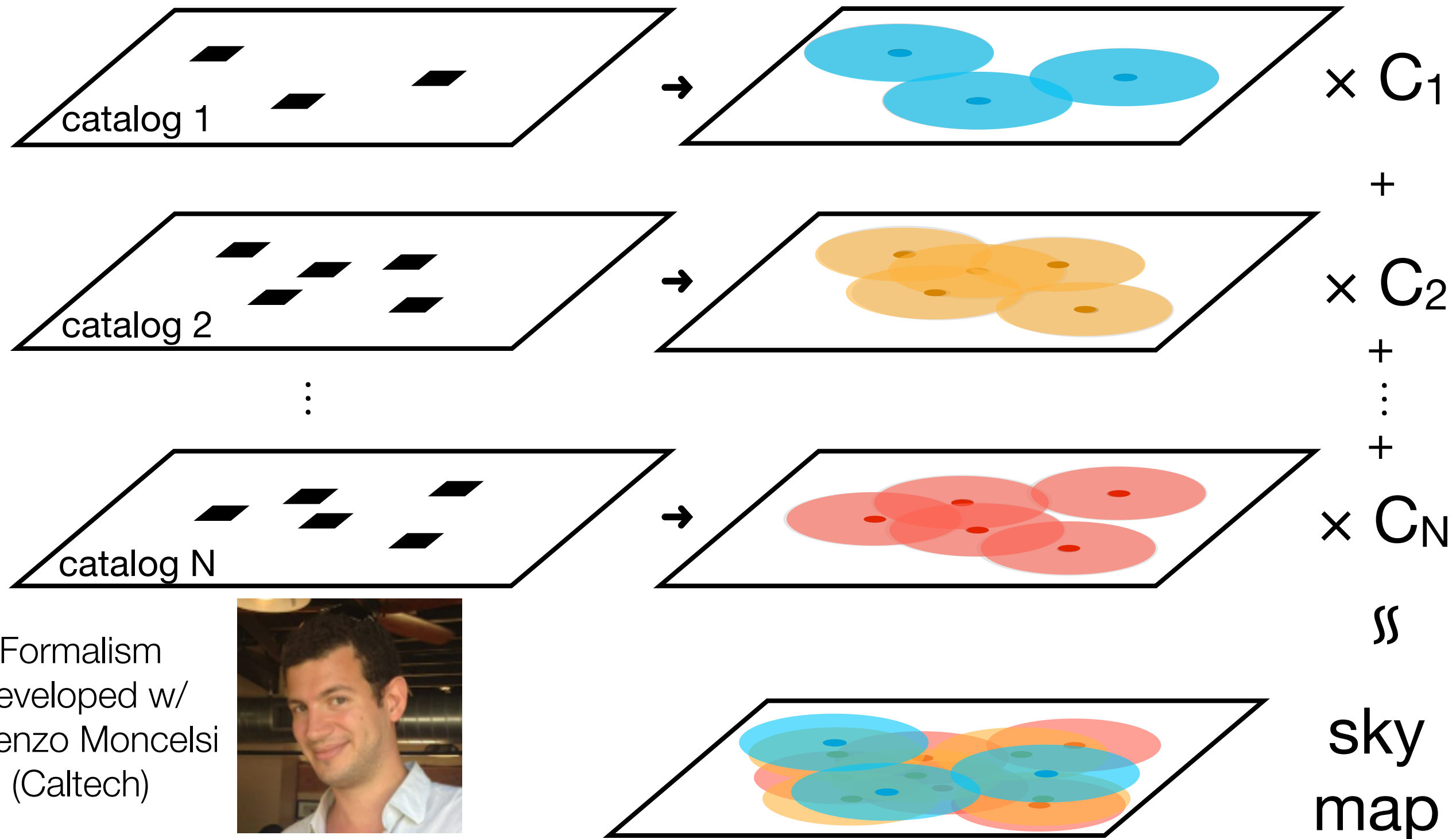
SIMSTACK: Simultaneous Stacking Algorithm



SIMSTACK: Simultaneous Stacking Algorithm

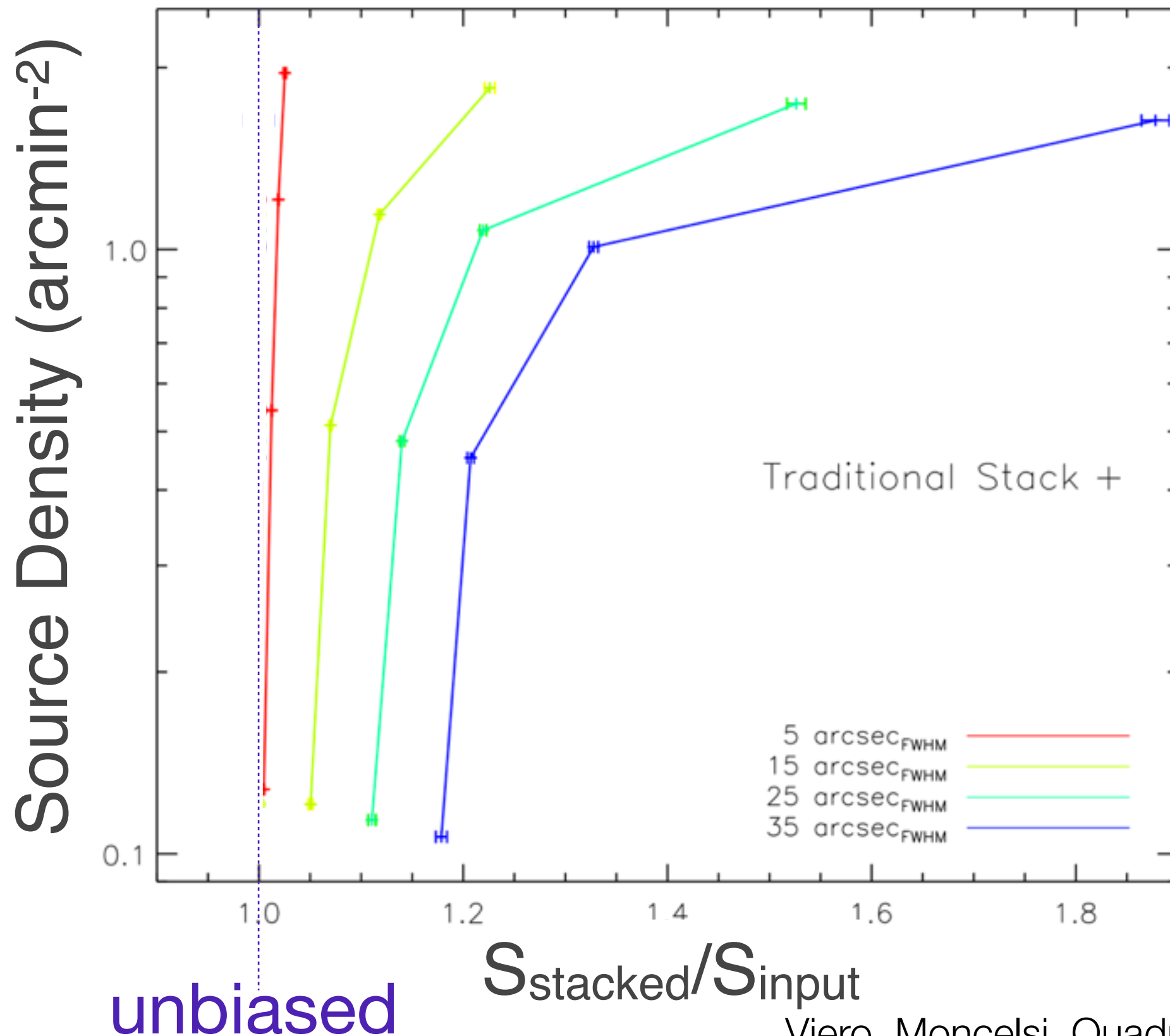


SIMSTACK: Simultaneous Stacking Algorithm



SIMSTACK code publicly available
see [arXiv:1304.0446](https://arxiv.org/abs/1304.0446)

SIMSTACK: Simultaneous Stacking Algorithm



Viero, Moncelsi, Quadri et al. (2013)

arXiv:1304.0446

SIMSTACK of Galaxies by Stellar Mass and Redshift

catalog (Williams & Quadri, in prep.)

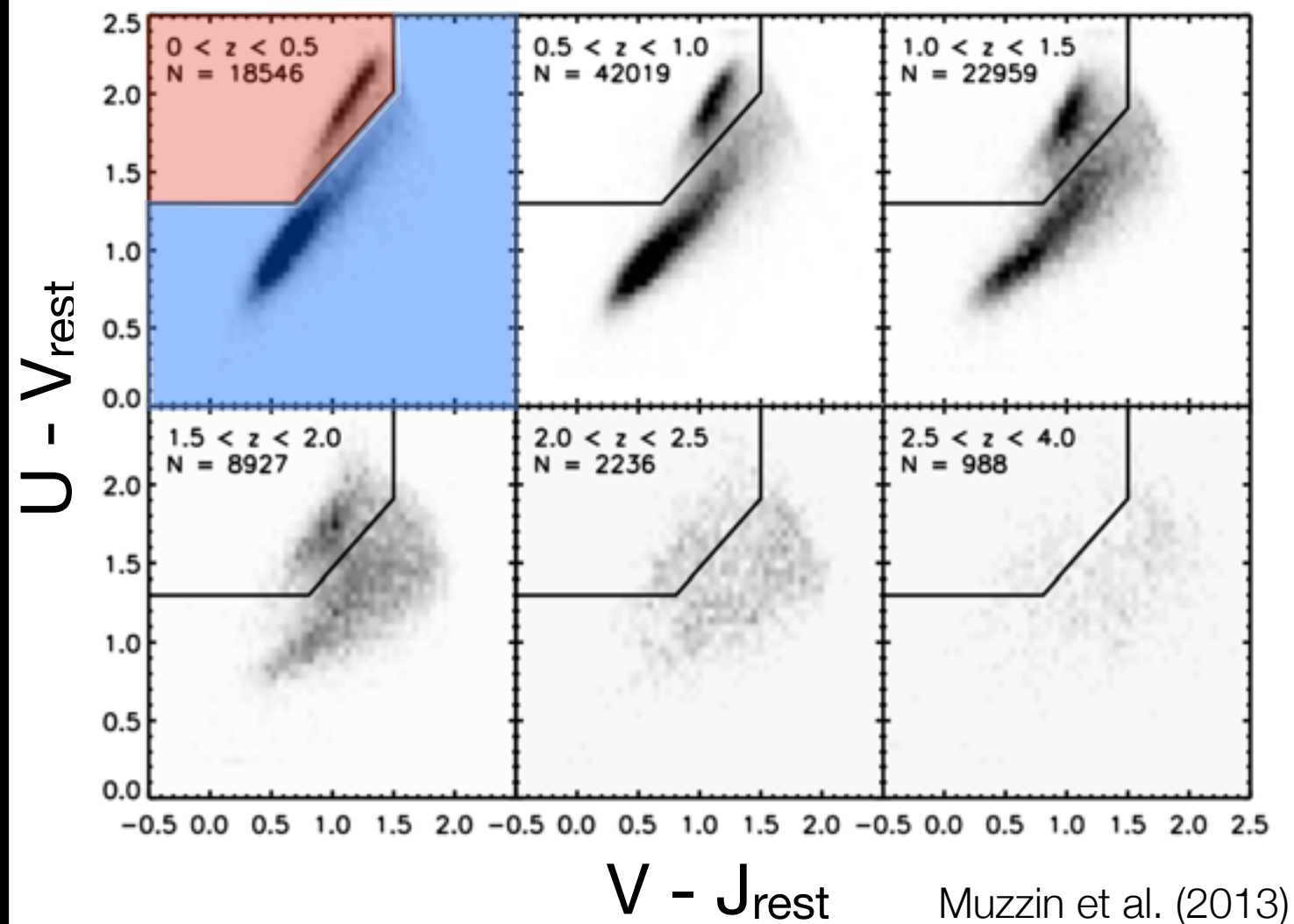
- UKIDSS/UDS [2/3 deg²]
- uBVRizJHK + IRAC ch1234
- K-band magnitude cut 24 AB
- 81,000 sources in ~0.63 deg²
- redshifts - EAZY (Brammer 2008)
- masses - FAST (Kriek 2009)

maps (HerMES; Oliver et al. 2012)

- *Spitzer*/MIPS
 - 24, 70um
- *Herschel*/PACS
 - 100, 160um
- *Herschel*/SPIRE
 - 250, 350, 500um
- ASTE/AzTEC
 - 1100um

HERMES

Separating Quiescent from Star-forming



SIMSTACK of Galaxies by Stellar Mass and Redshift

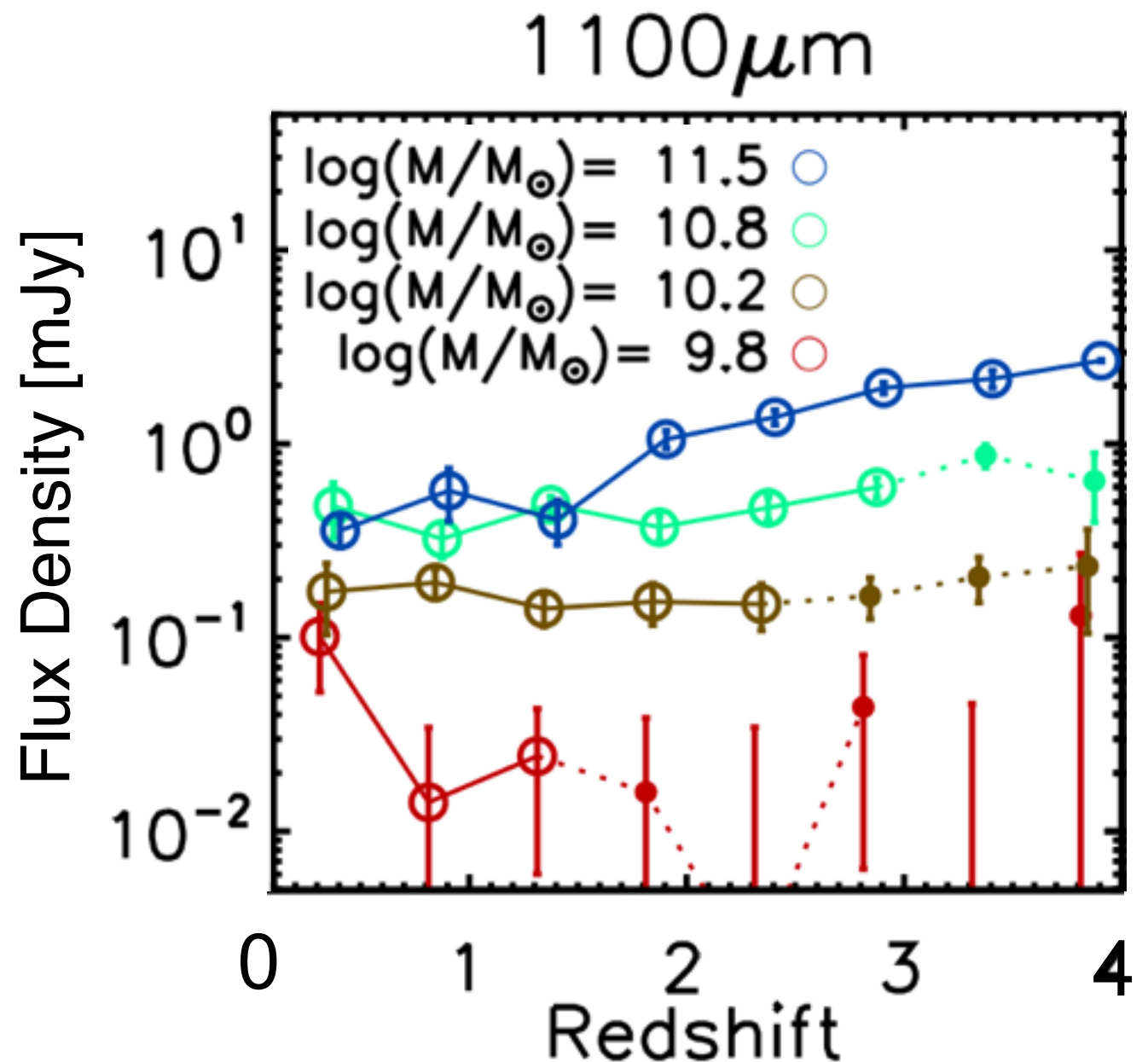
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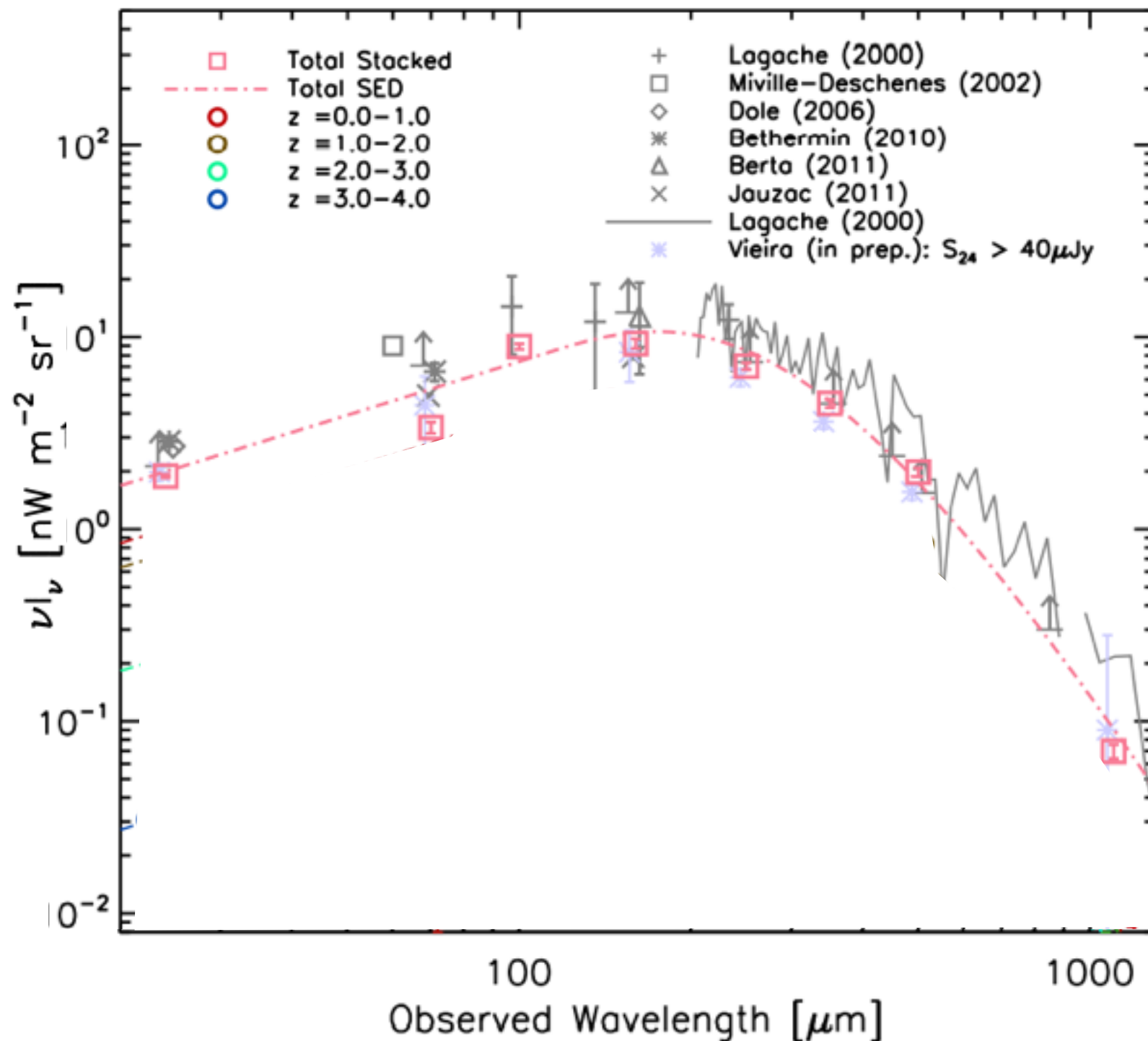
HERMES



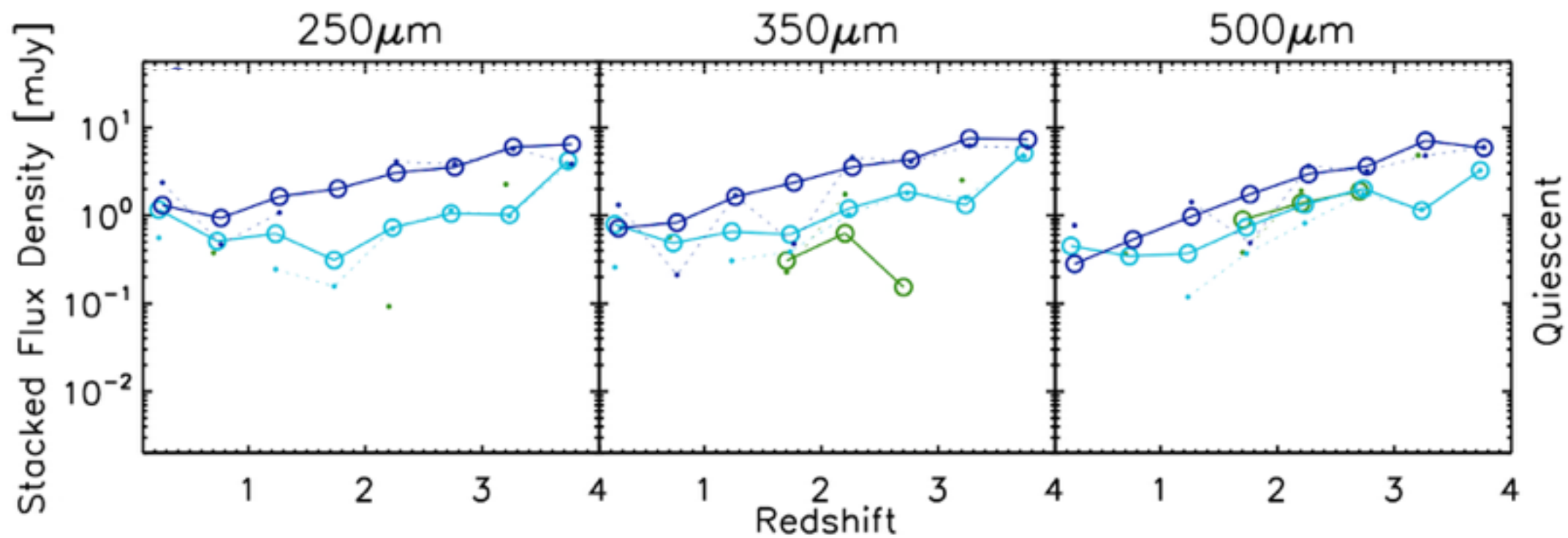
Viero, Moncelsi, Quadri et al. (2013)
arXiv:1304.0446

Stacked CIB

~70% at SPIRE
wavelengths

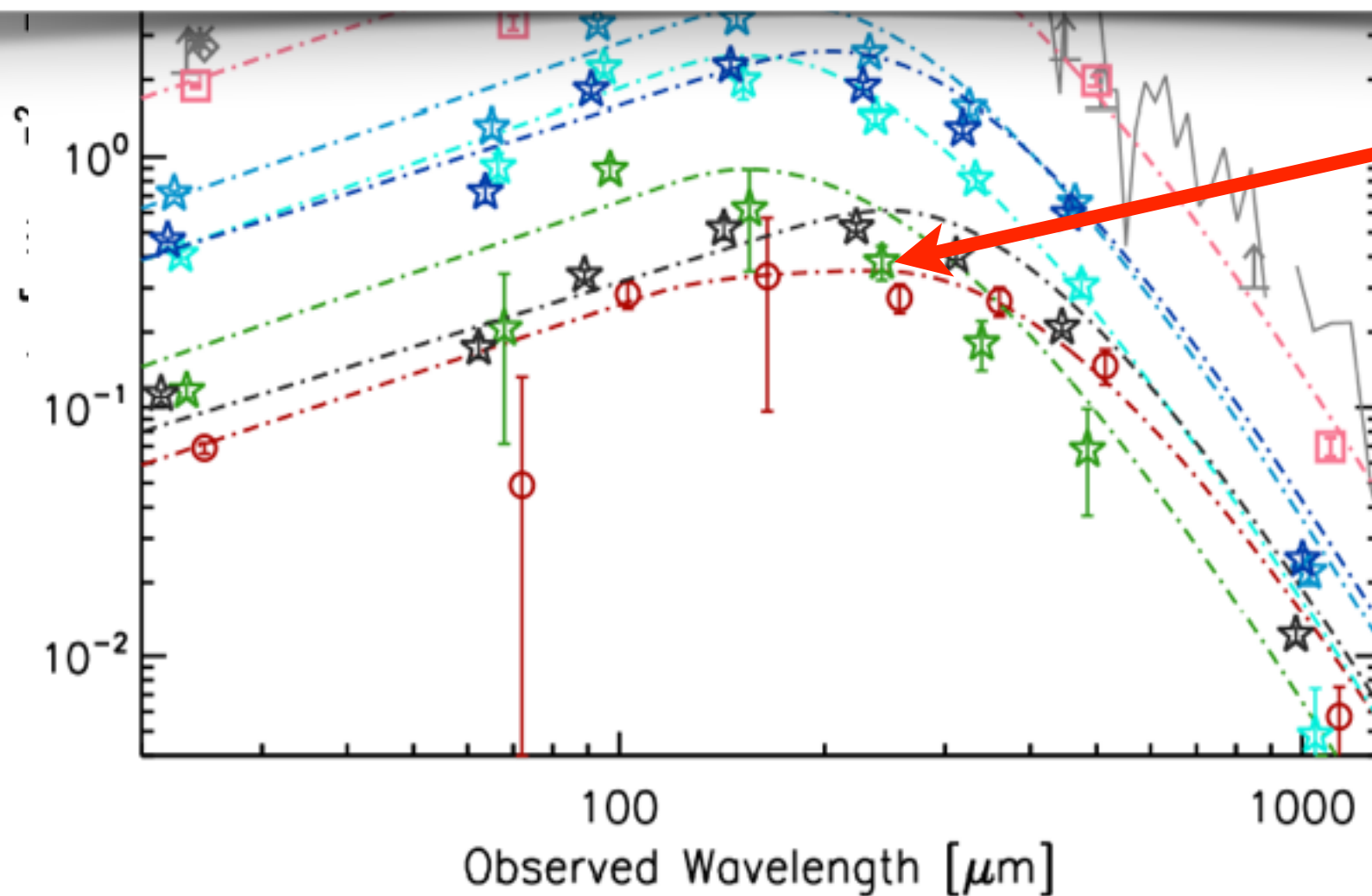


Viero, Moncelsi, Quadri et al. (2013)
arXiv:1304.0446



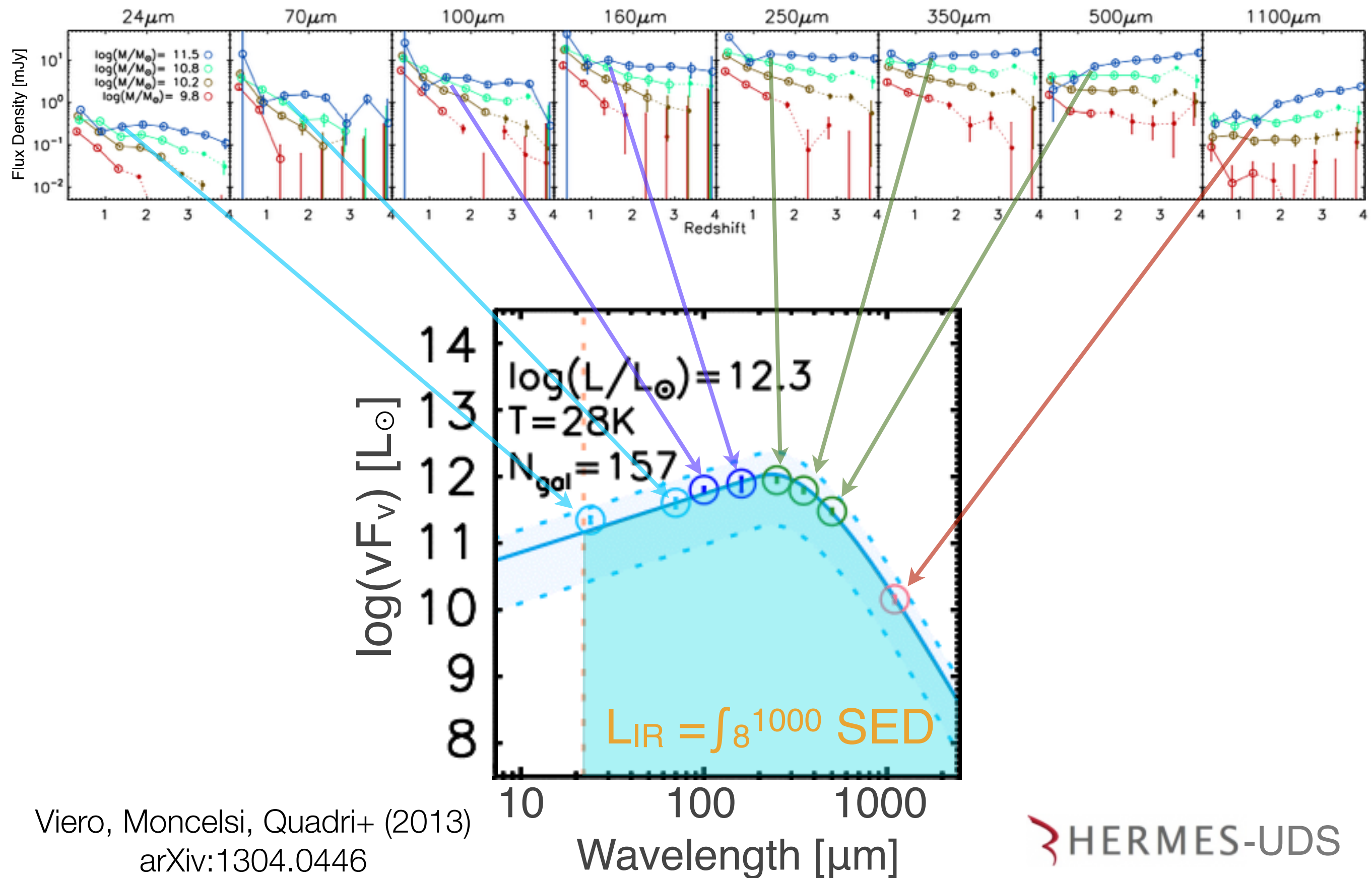
at SPIRE
lengths

$z \sim 10-11$
 $z \lesssim M^*$



~10% from "Quiescent"
Galaxies

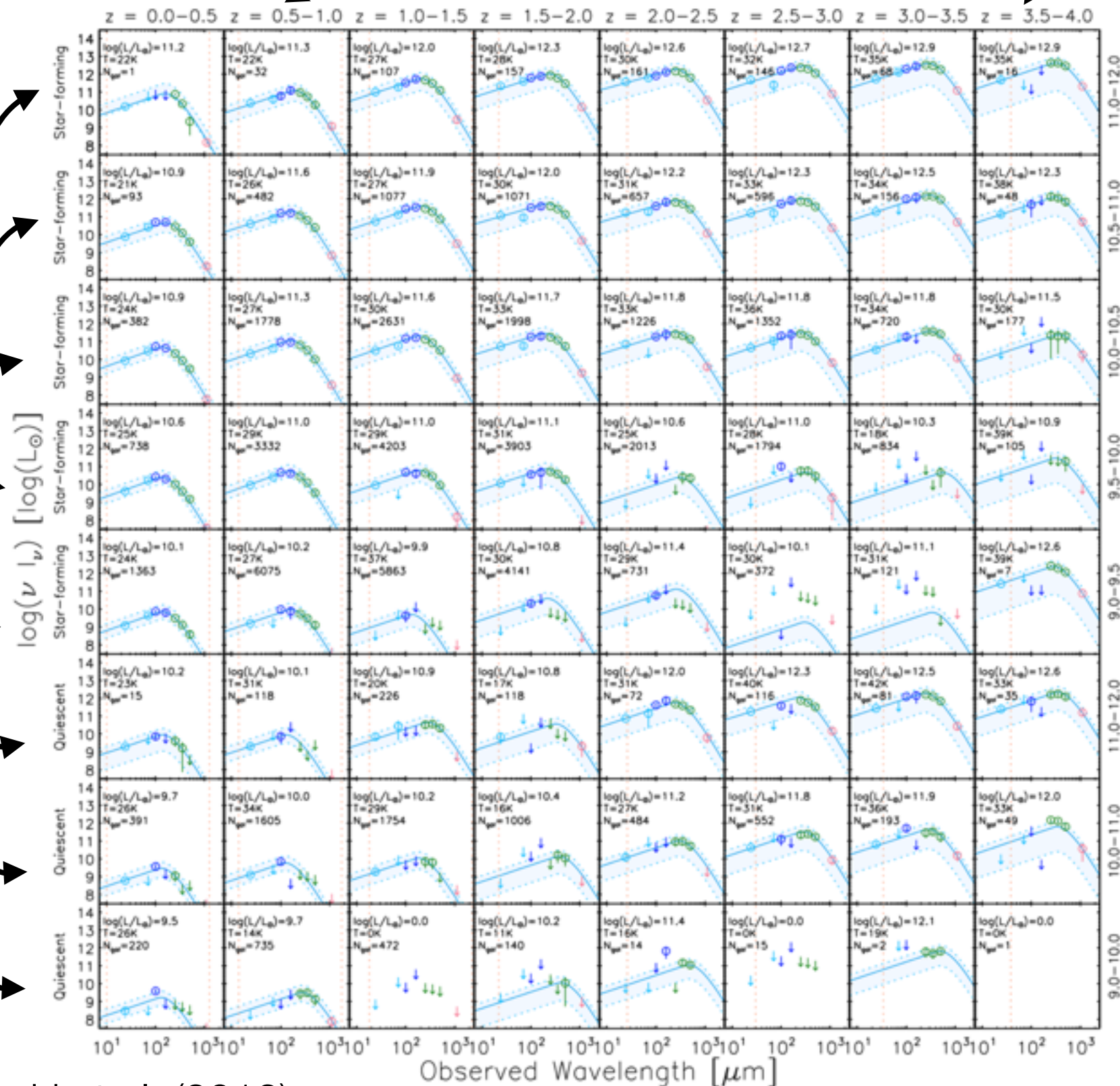
SIMSTACK of Galaxies by Stellar Mass and Redshift



SEDS

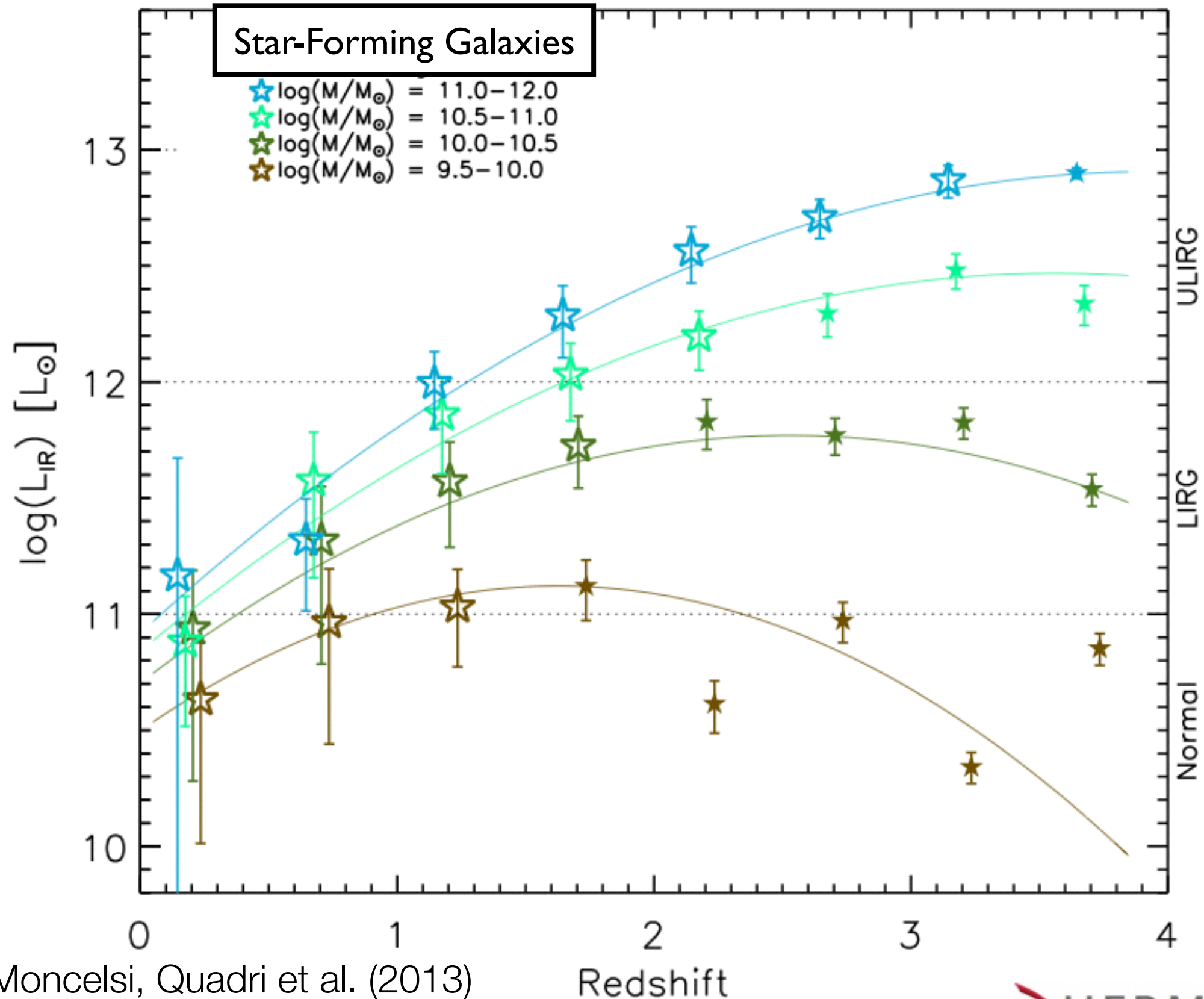
redshift
slices

stellar
mass
slices

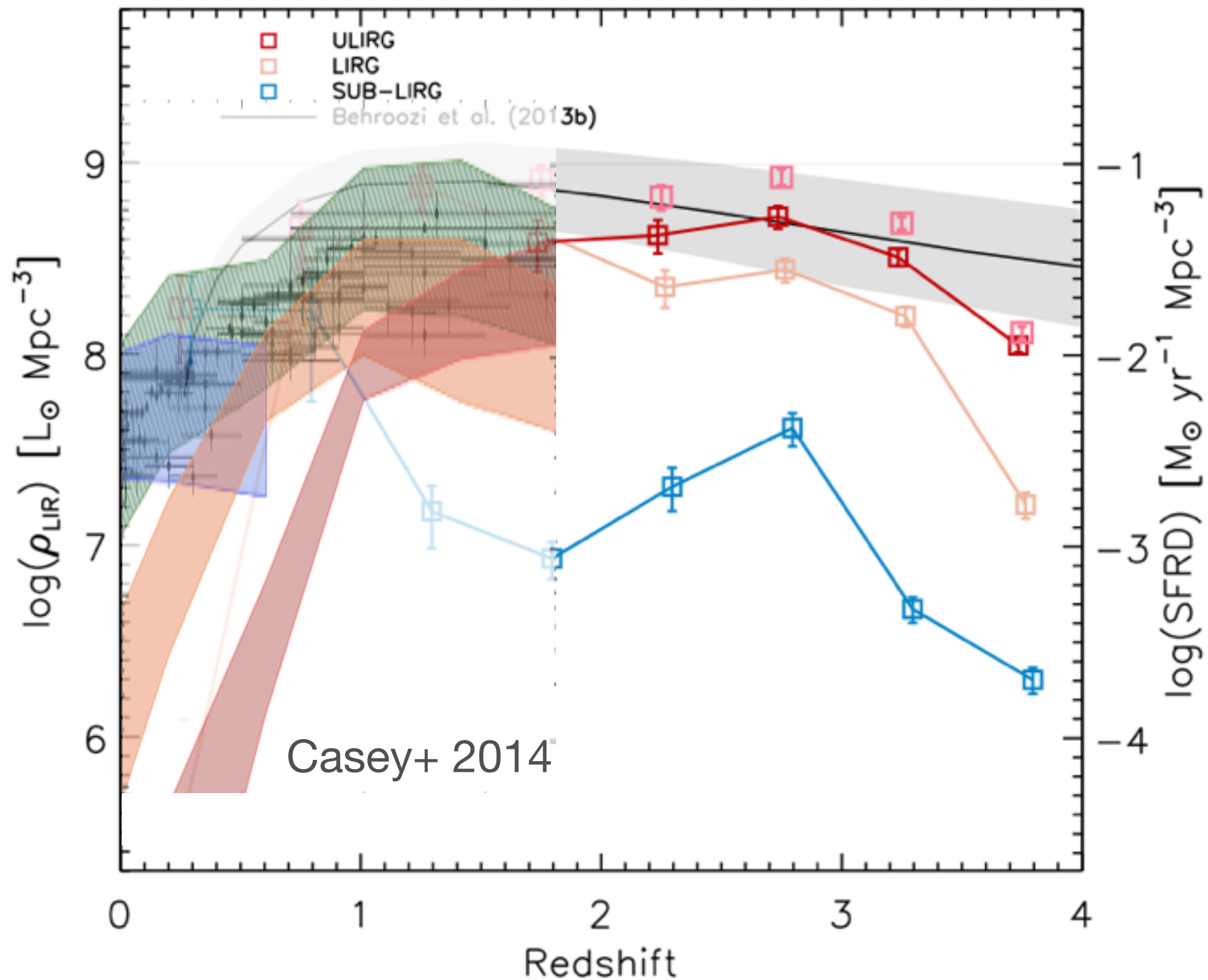


Viero, Moncelsi, Quadri et al. (2013)
arXiv:1304.0446

Average Galaxy Infrared Luminosity by Stellar Mass and Redshift



Stacked Infrared Luminosity Density



Viero, Monceli, Quadri et al. (2013)
arXiv:1304.0446

Summary

- **Origin of the CIB**
 - At least 70% of the CIB originates from known optical galaxies.
 - Most of that comes from galaxies with stellar mass $\log(M/M_{\odot})=10-11$, i.e., at or below M^* .
- **History of Cosmic Star Formation**
 - Star formation is dominated by lower mass galaxies locally, LIRGs with $\log(M/M_{\odot})=10-11$ between $z=1-2$, and ULIRGS with $\log(M/M_{\odot})>11$ at higher z .

ACT HERMES

SHELA

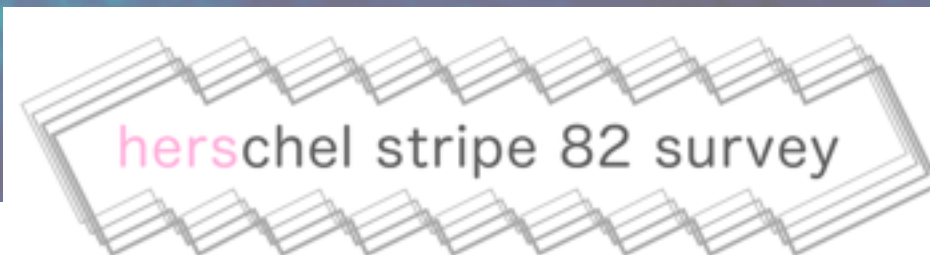
SpIES

HETDEX

SDSS Stripe 82

HeLMS

HerS





Viero+ 2014
arXiv:1308.4399



Oliver+ 2012
arXiv:1203.2562



Find Maps/Catalogs at:

(available now!) <http://www.astro.caltech.edu/hers>

(coming in June) <http://hedam.lam.fr/HerMES/>