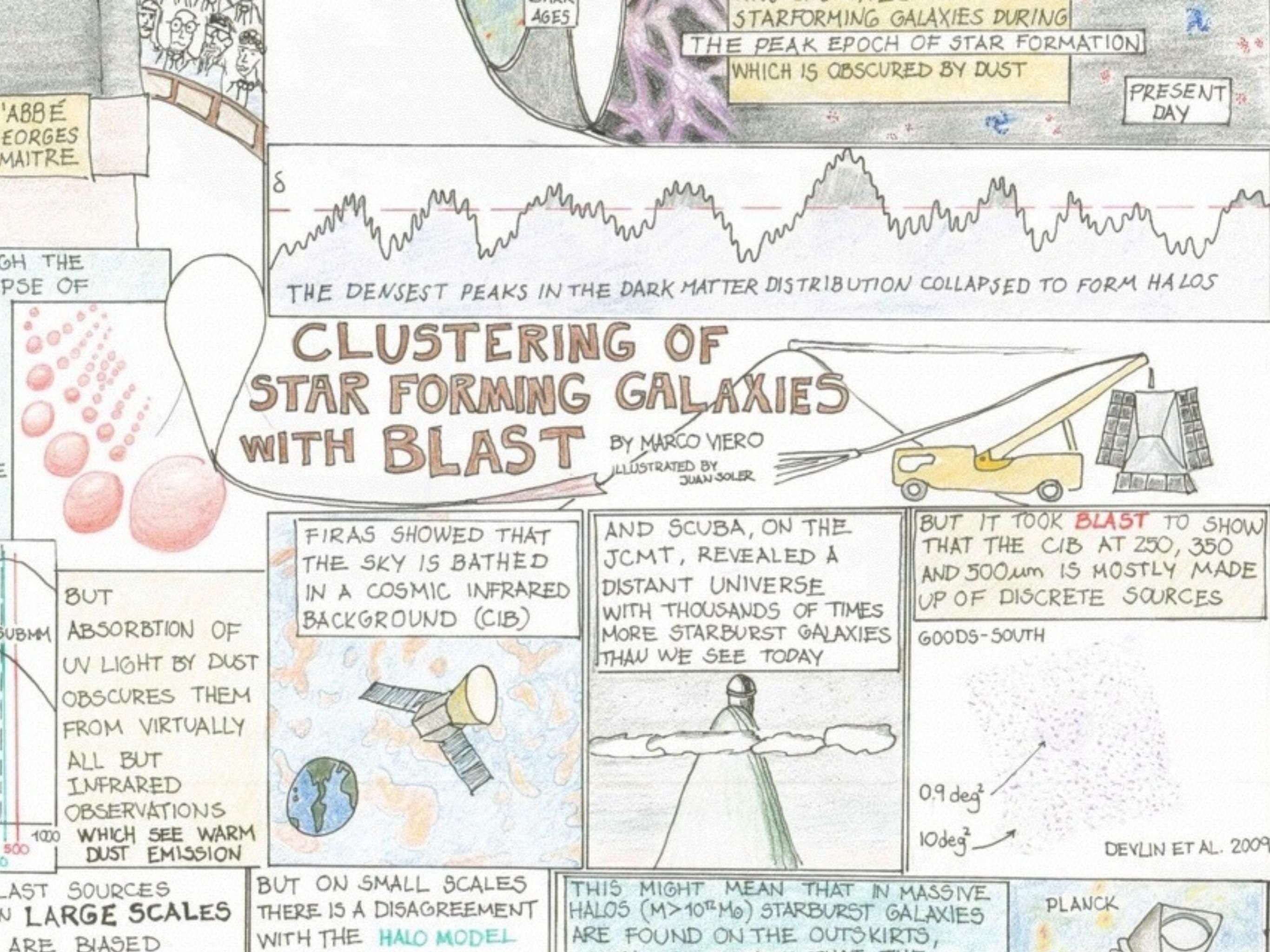


Taking a Census of the CIB

Marco Viero - Caltech

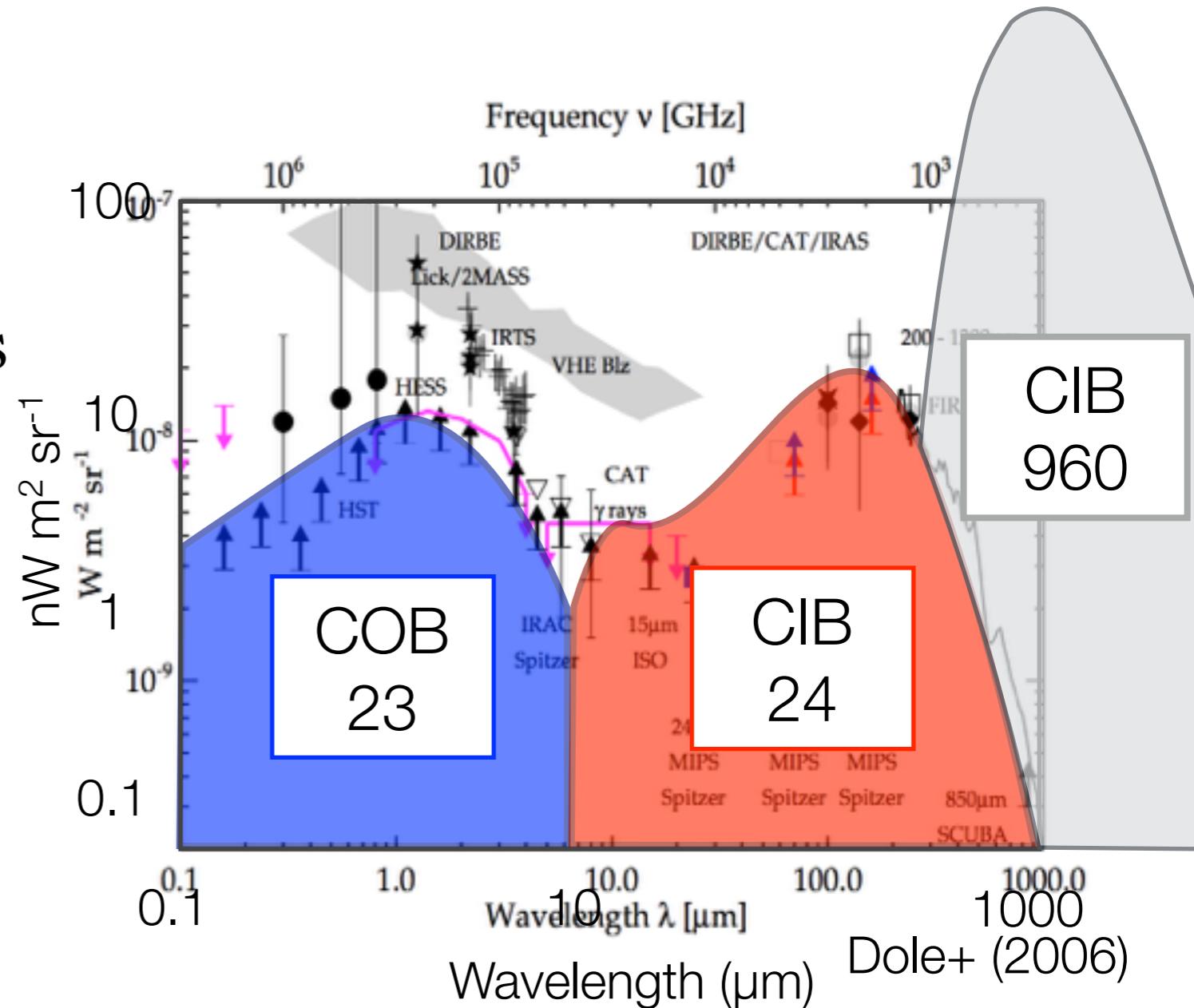
The Formation and Growth of Galaxies in the Young Universe - Obergurgl



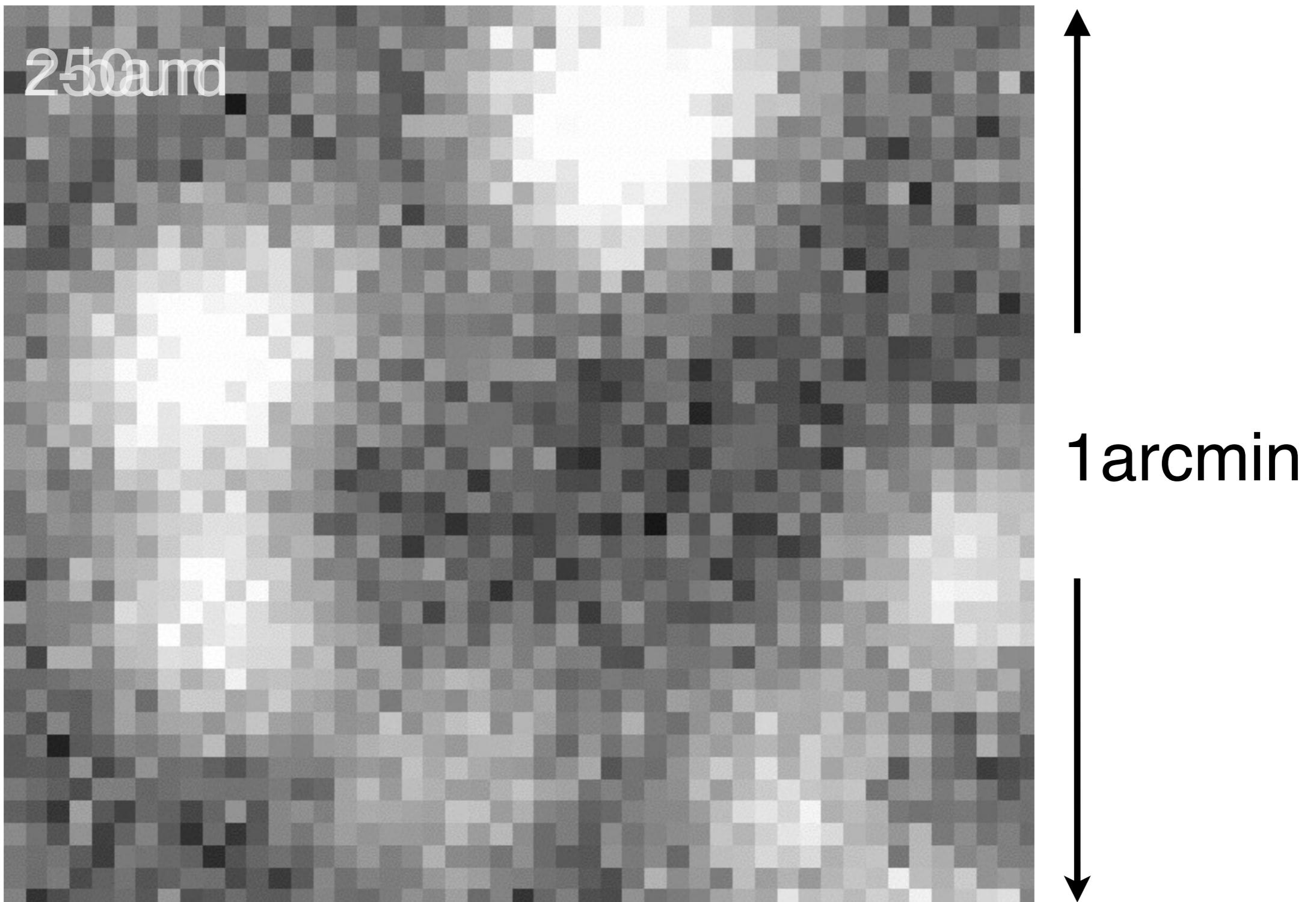
Taking a Census of the Cosmic Infrared Background

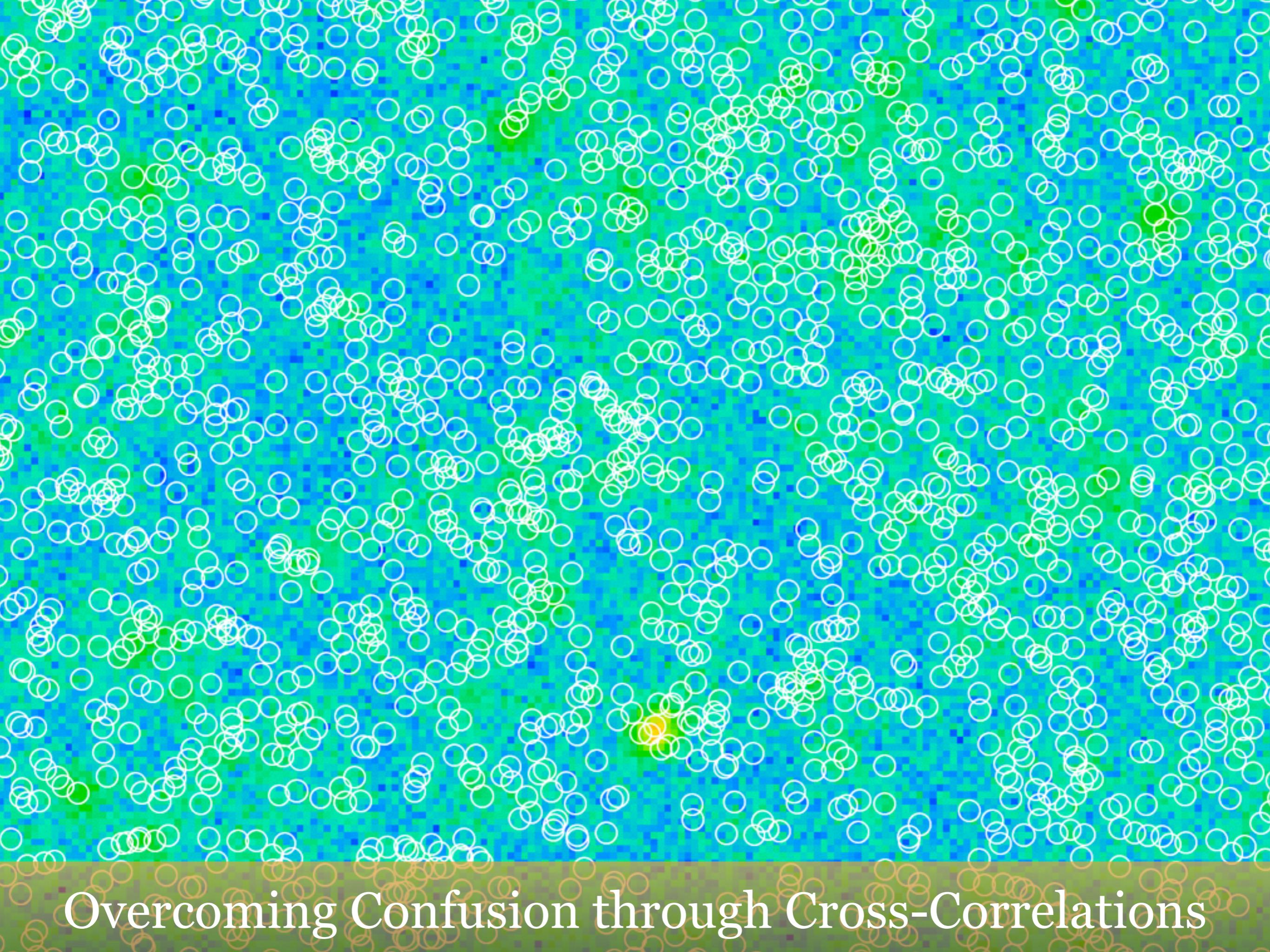
Specifically would like to know:

- 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

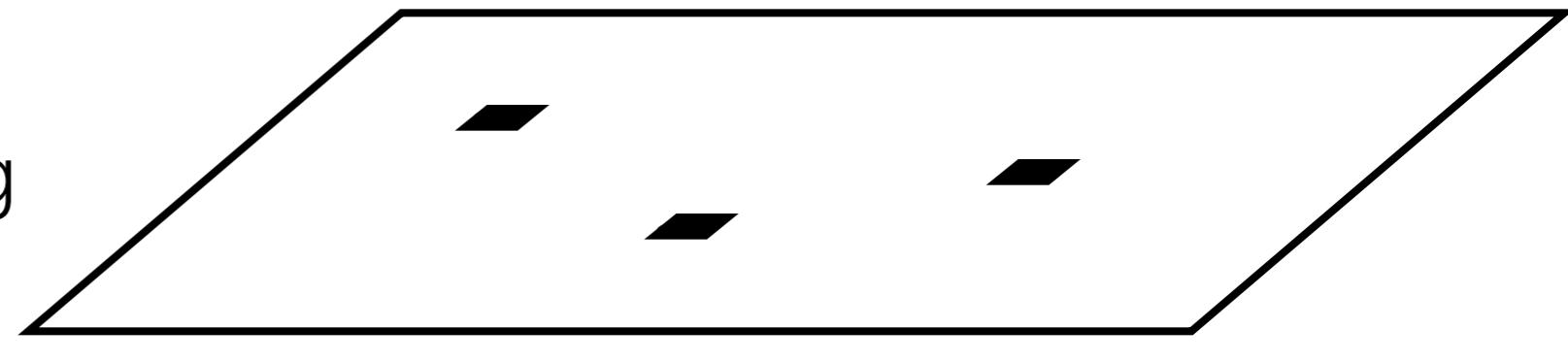




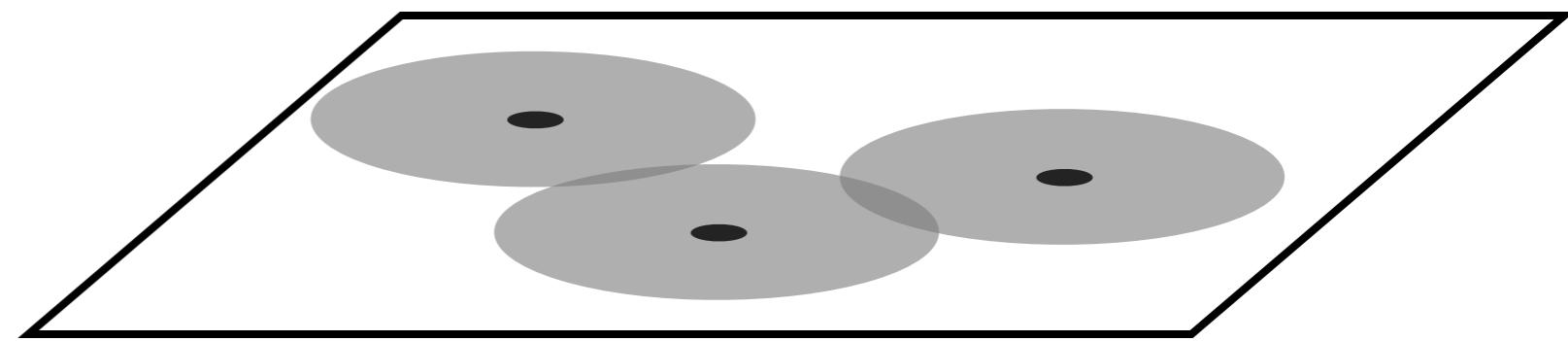
Overcoming Confusion through Cross-Correlations

SIMSTACK: Simultaneous Stacking Algorithm

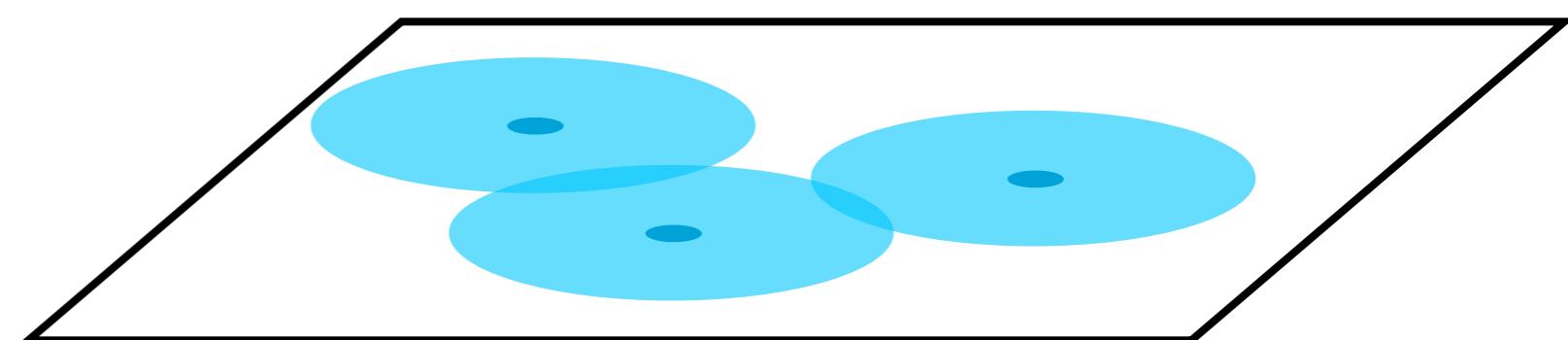
make hits map from catalog



convolve with map p.s.f.



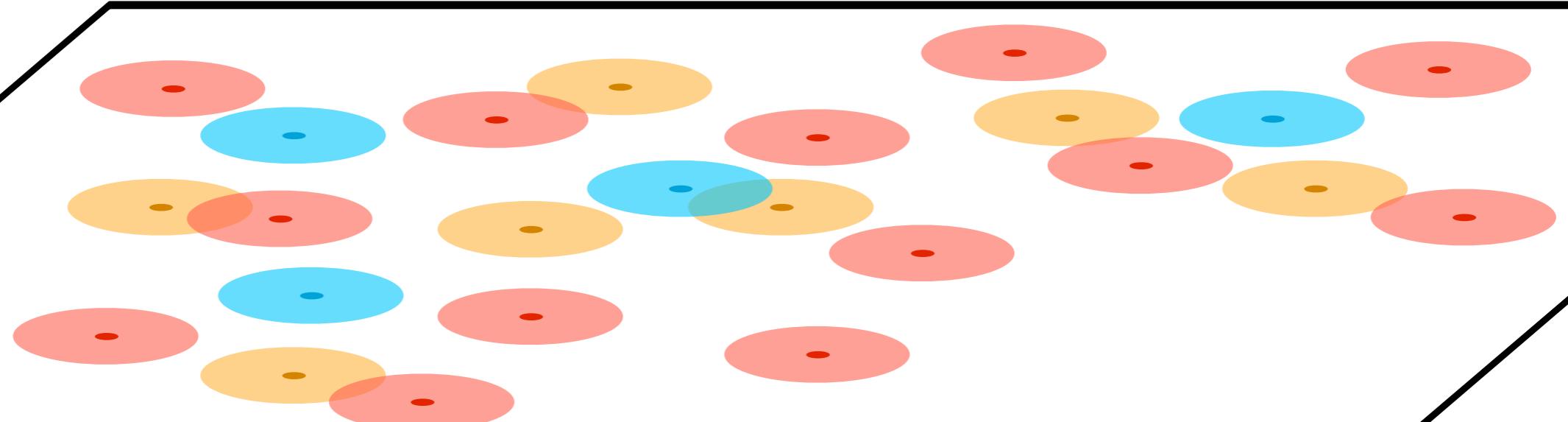
regress to find stacked flux



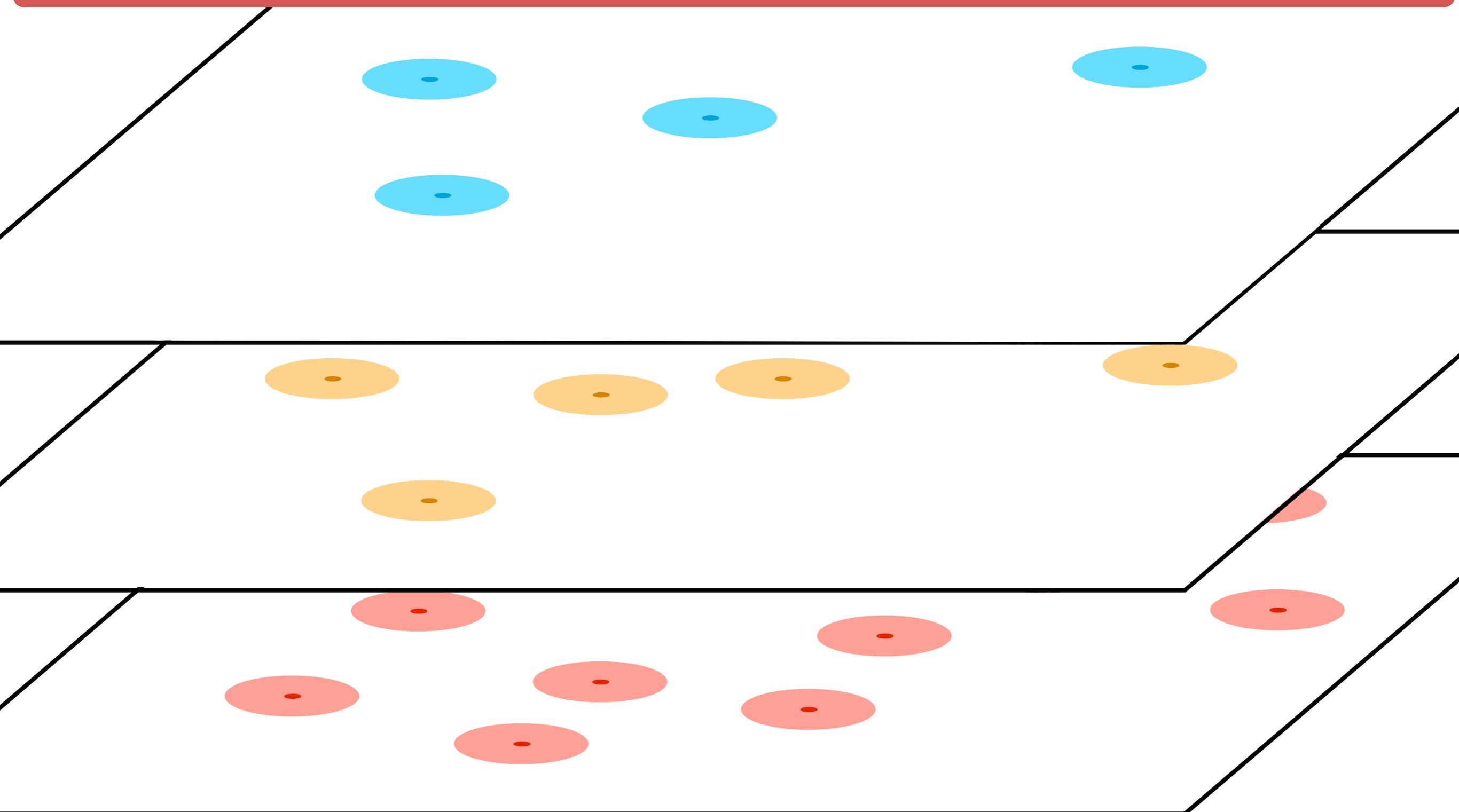
Formalism developed w/ Lorenzo Moncelsi (Caltech);
also see Kurczynski & Gawiser (2010), Roseboom et al. (2010)

SIMSTACK code publicly available in arXiv:1304.0446

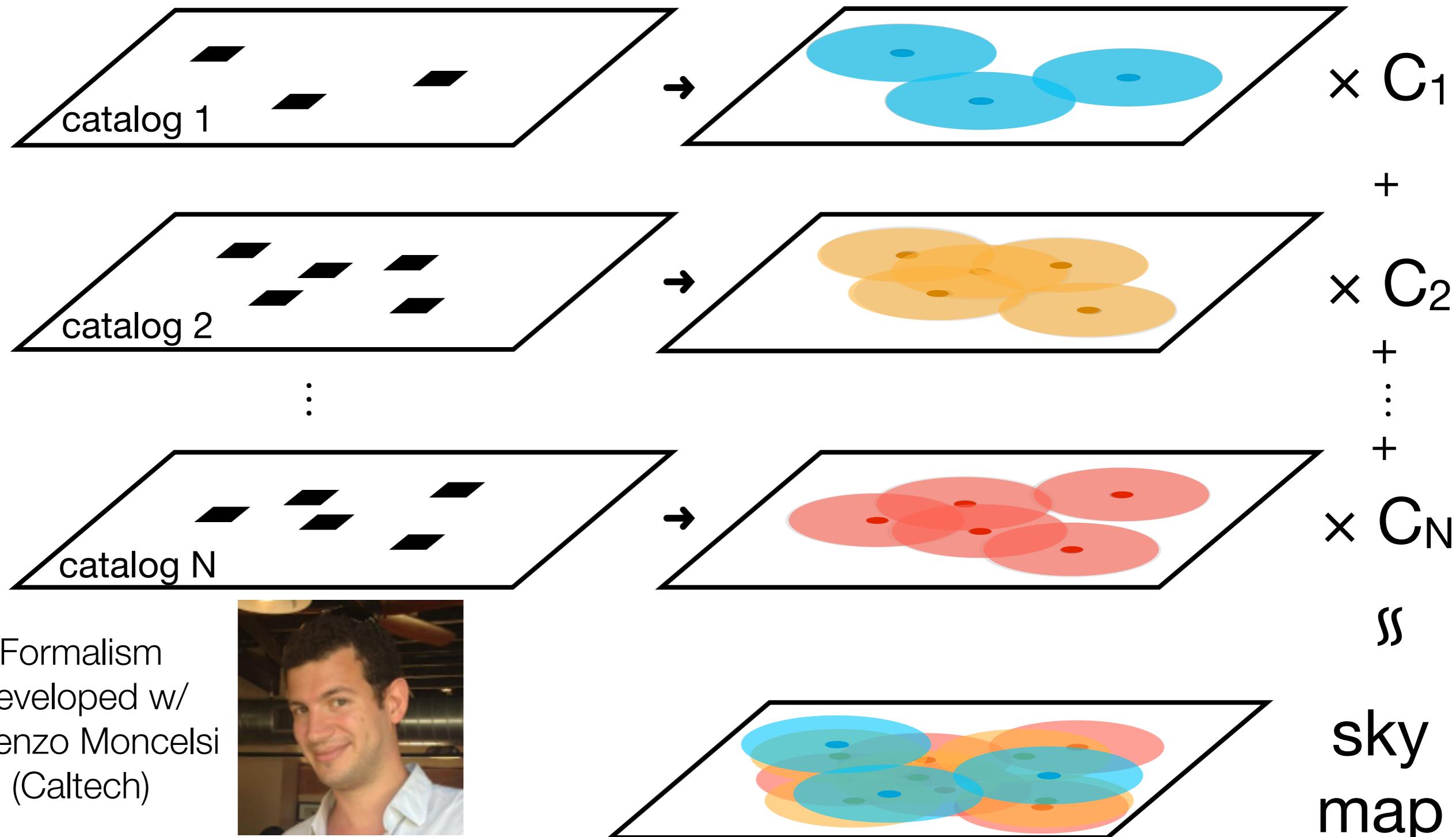
SIMSTACK: Simultaneous Stacking Algorithm



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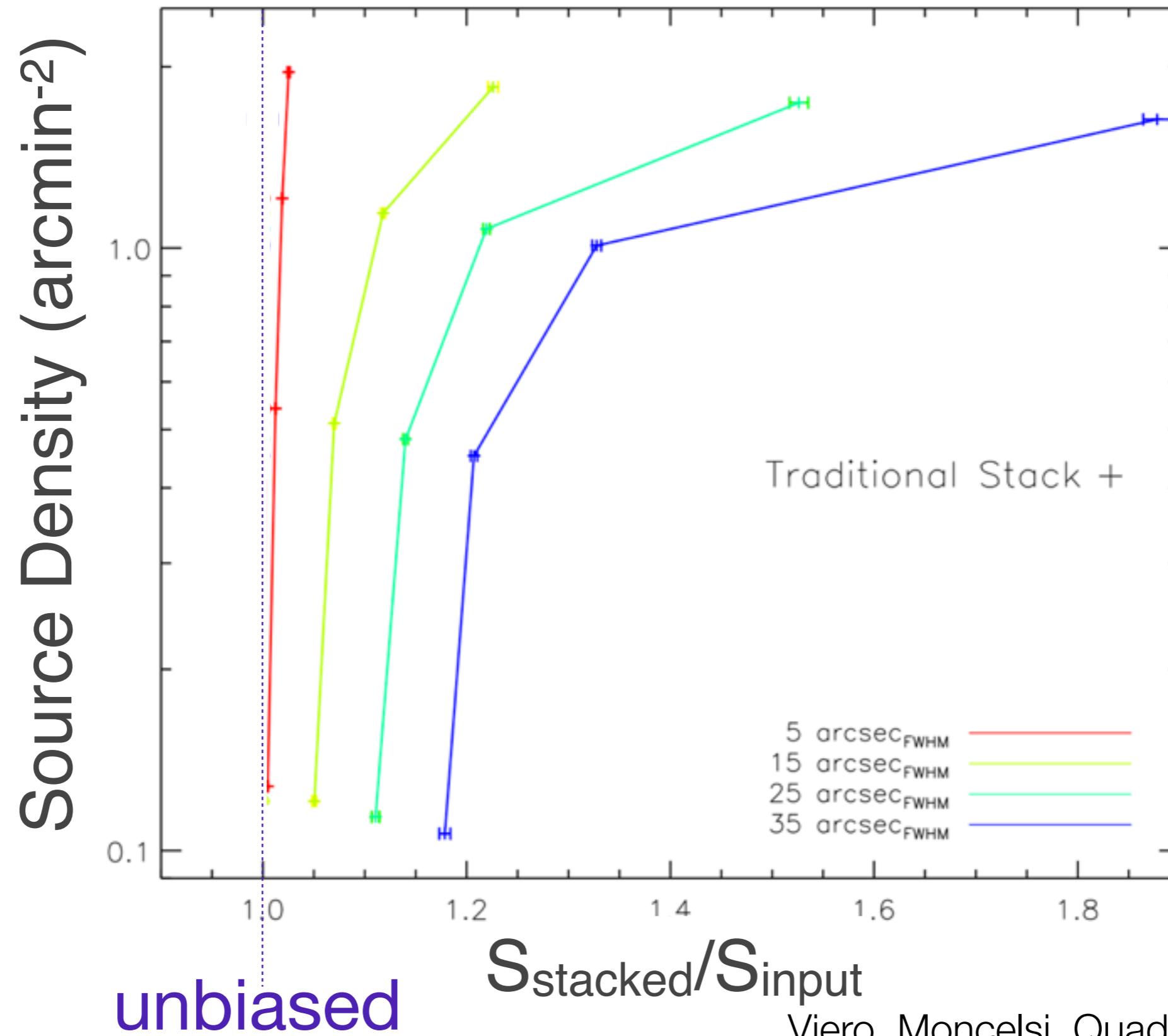


Formalism
developed w/
Lorenzo Moncelsi
(Caltech)



SIMSTACK code publicly available
see arXiv:1304.0446

SIMSTACK: Simultaneous Stacking Algorithm



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

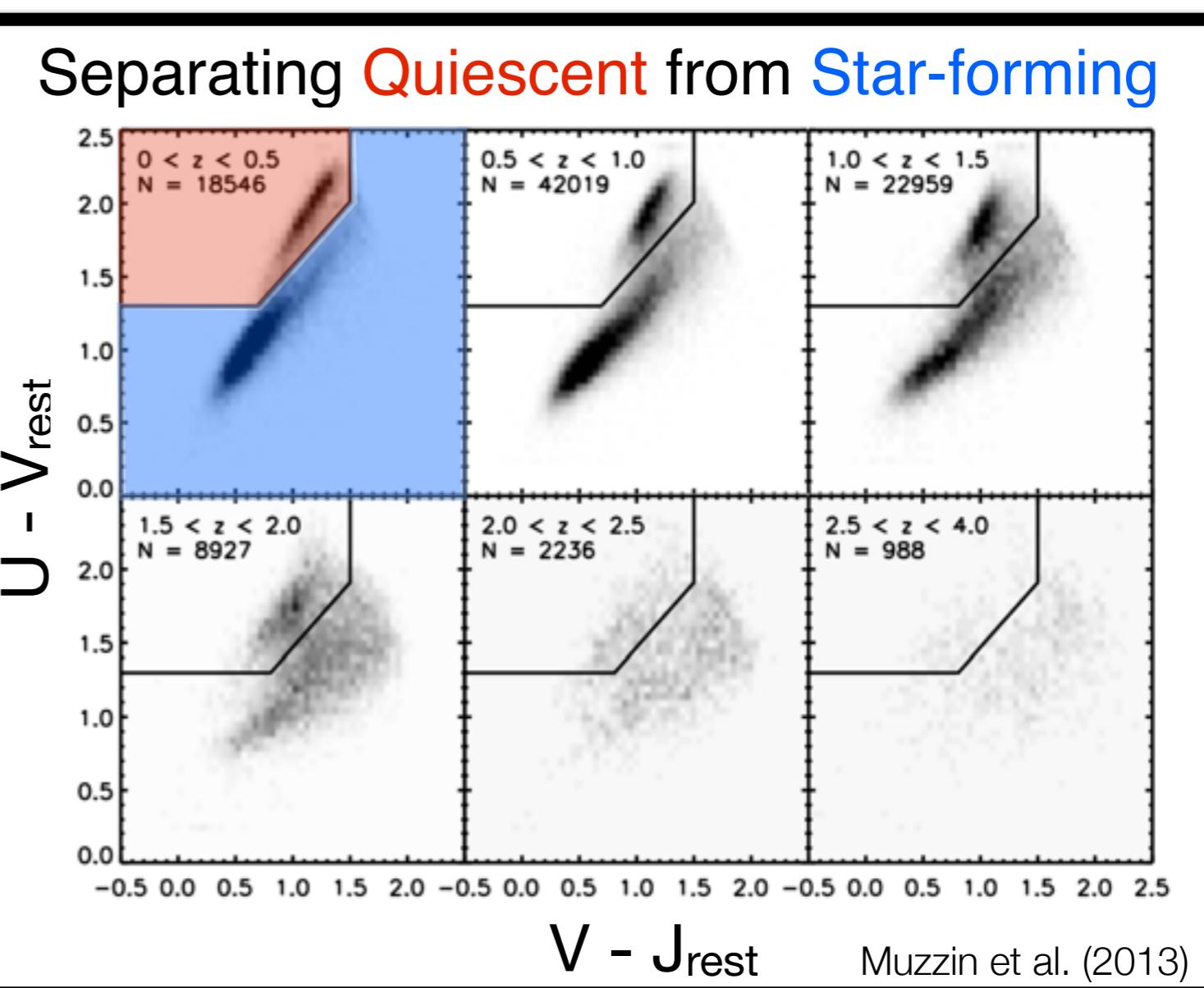
SIMSTACK of Galaxies by Stellar Mass and Redshift

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



SIMSTACK of Galaxies by Stellar Mass and Redshift

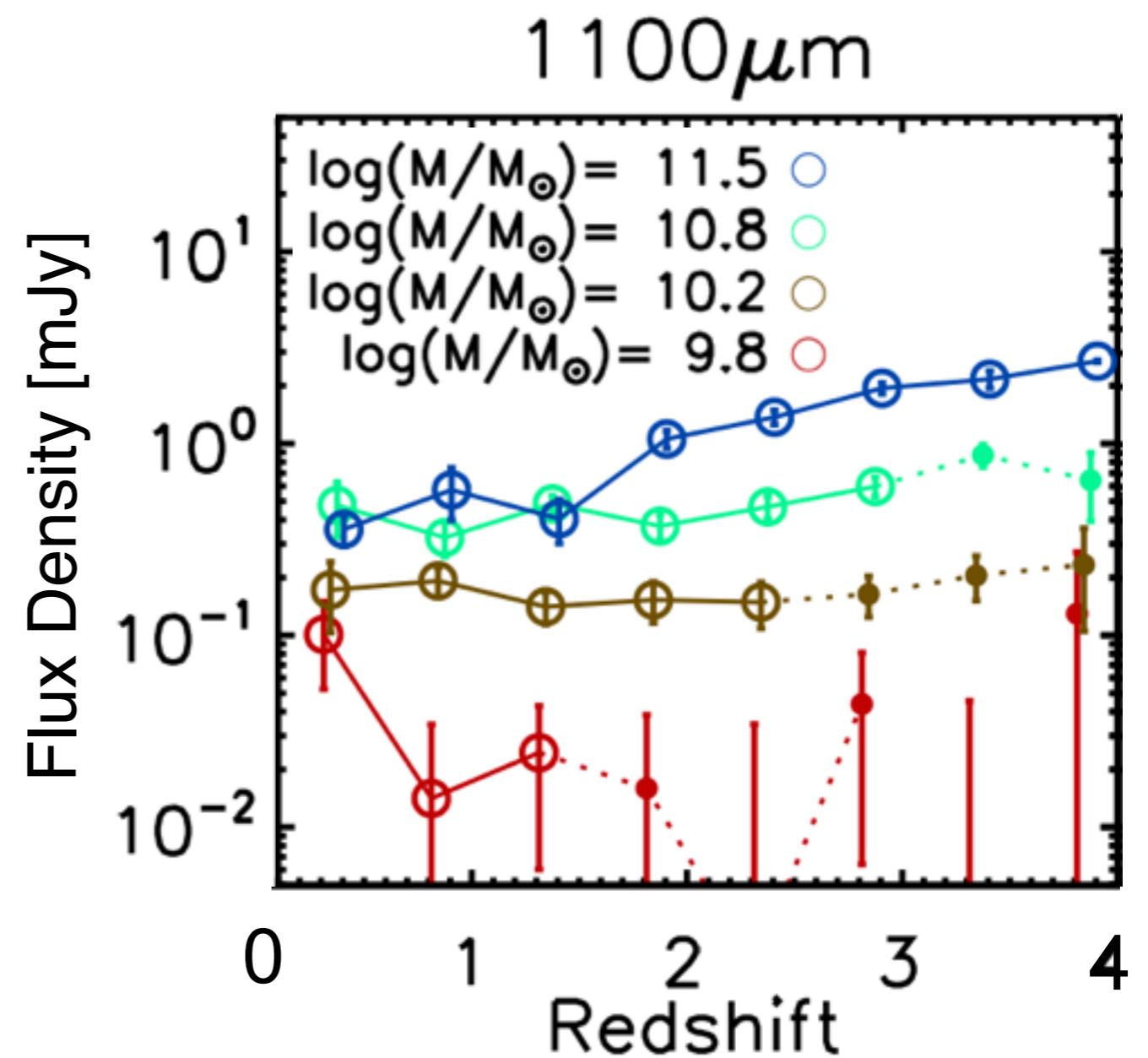
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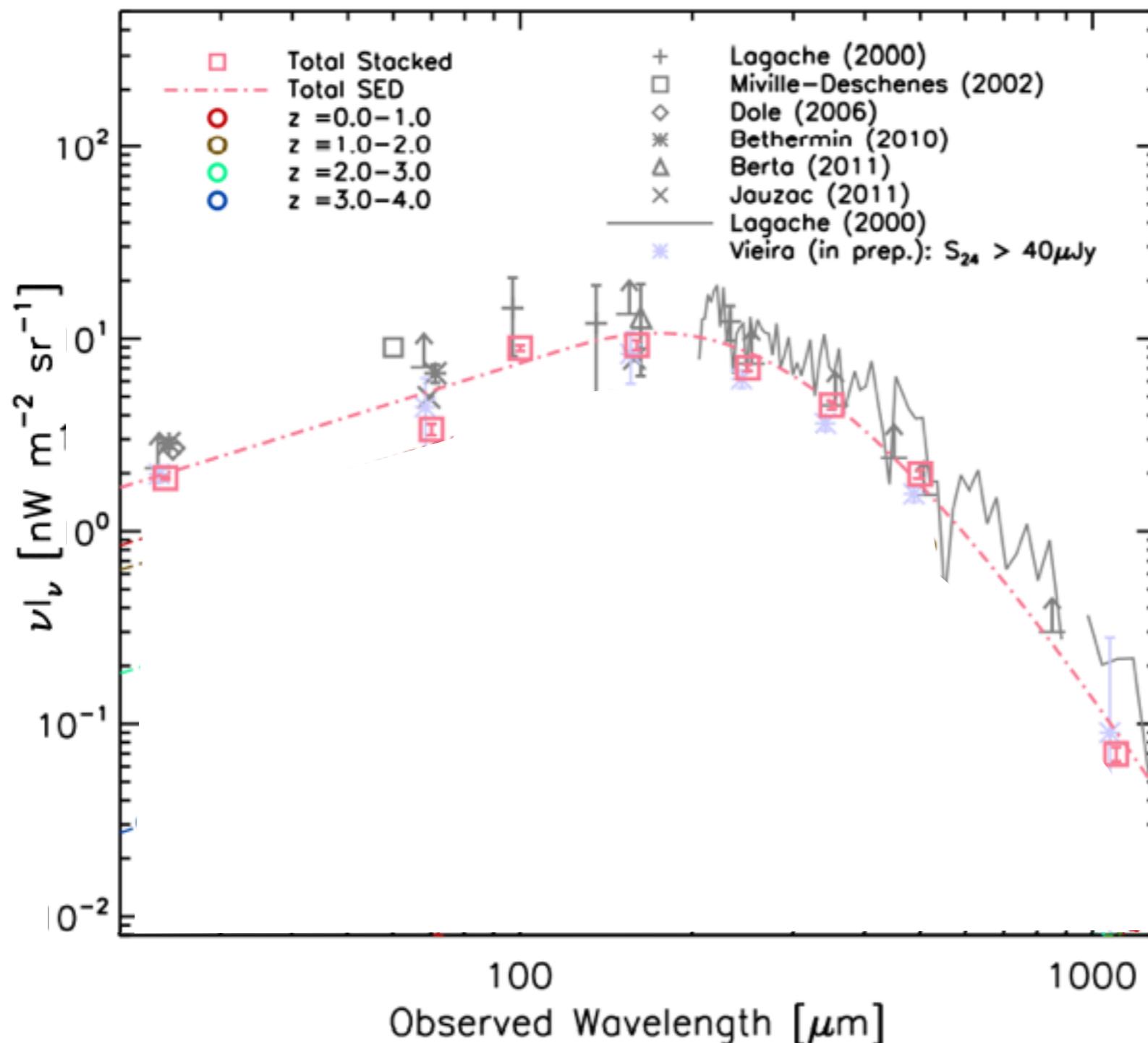
 HERMES



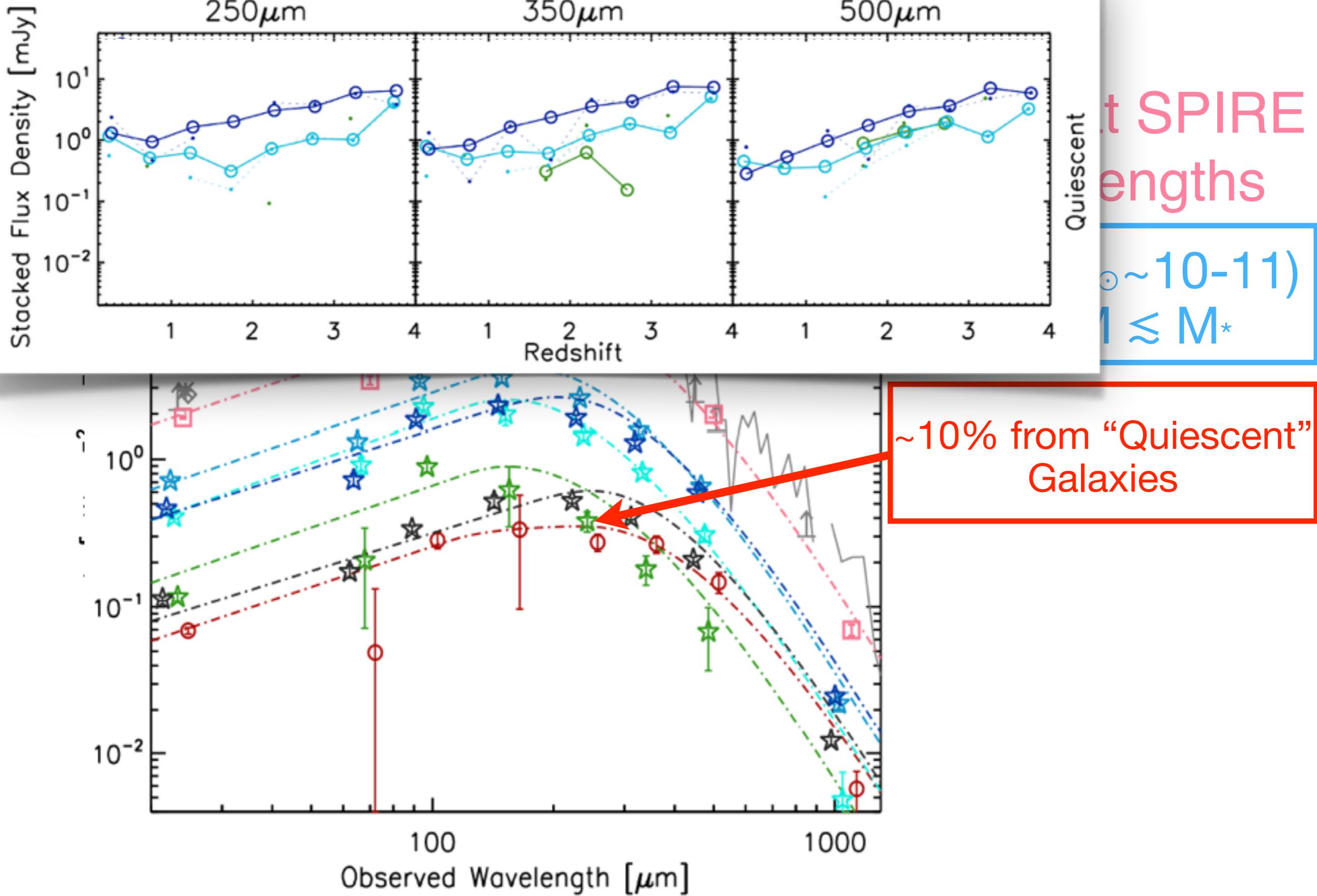
Viero, Moncelsi, Quadri et al. (2013)
arXiv:1304.0446

Stacked CIB

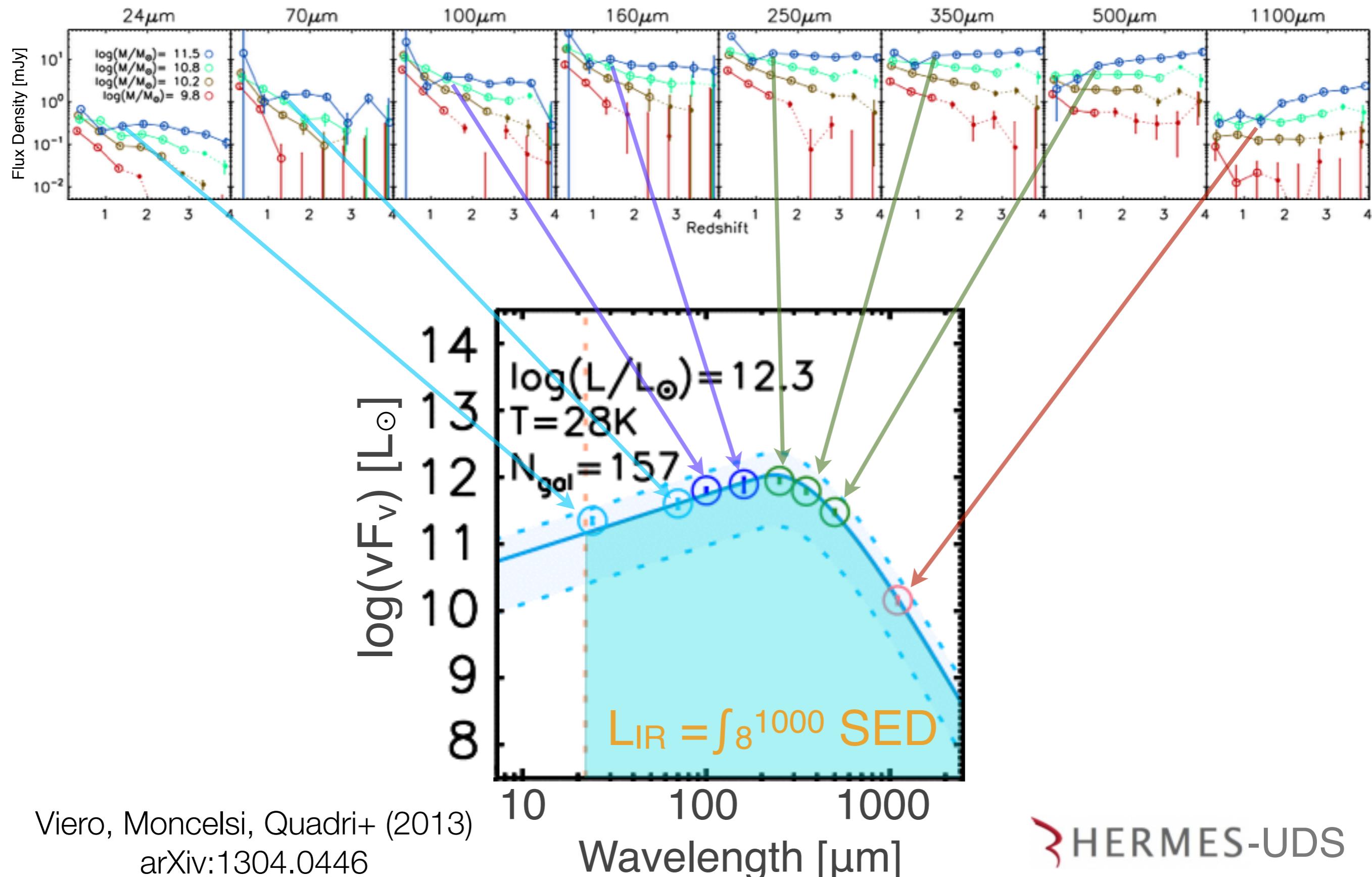
~70% at SPIRE wavelengths



at SPIRE
lengths

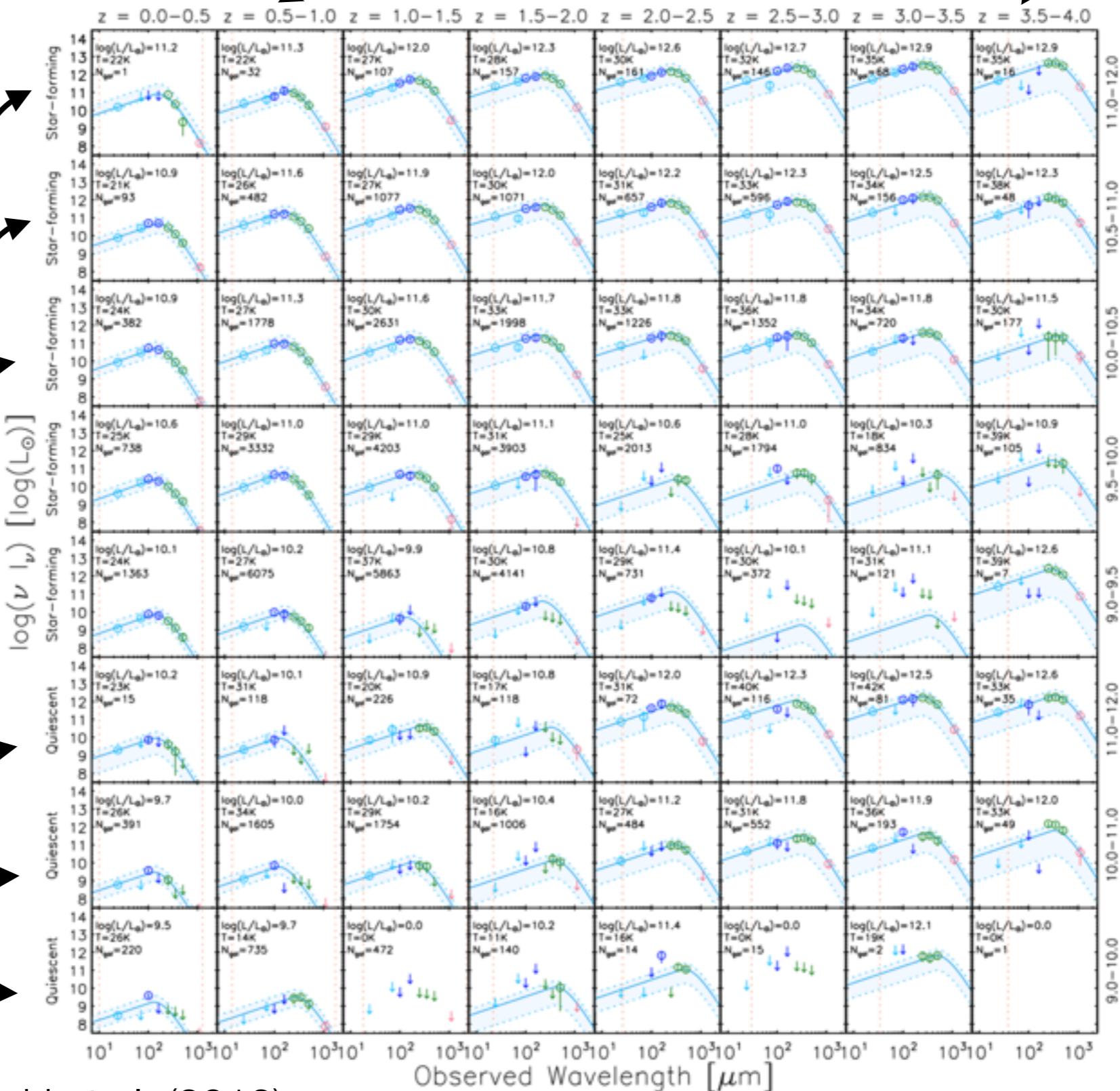


SIMSTACK of Galaxies by Stellar Mass and Redshift

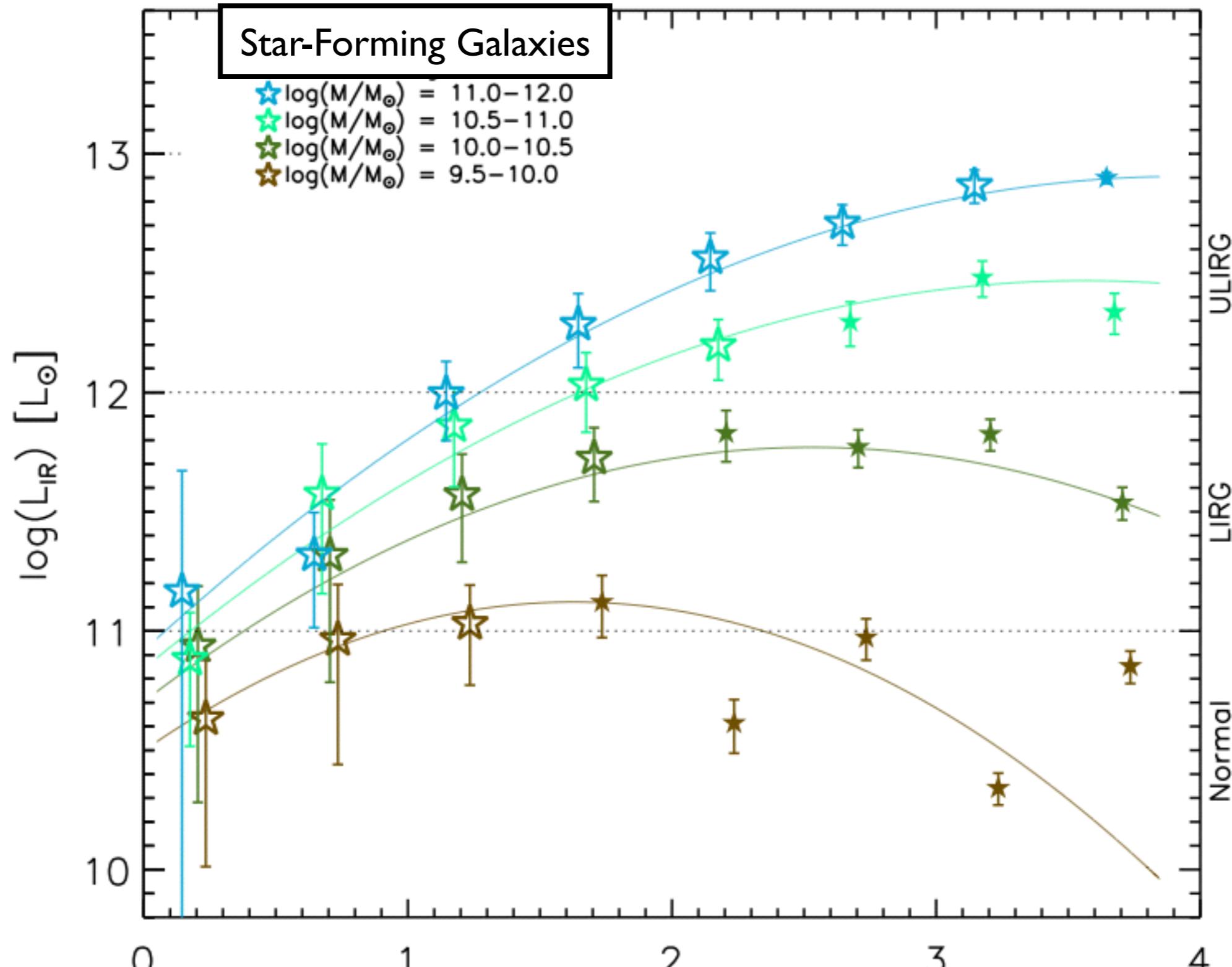


SEDS

stellar
mass
slices



Average Galaxy Infrared Luminosity by Stellar Mass and Redshift



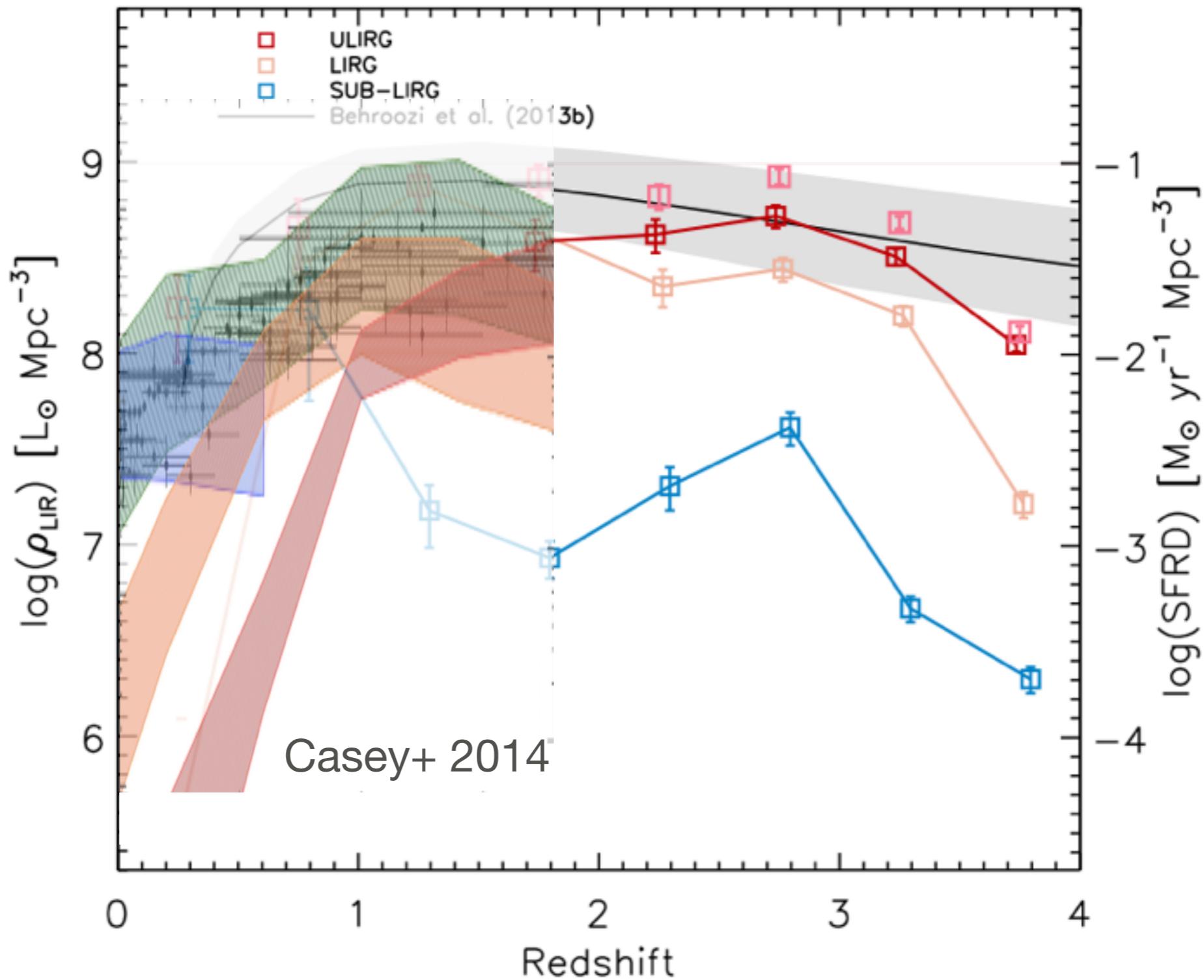
Viero, Moncelsi, Quadri et al. (2013)

arXiv:1304.0446

Redshift

HERMES-UDS

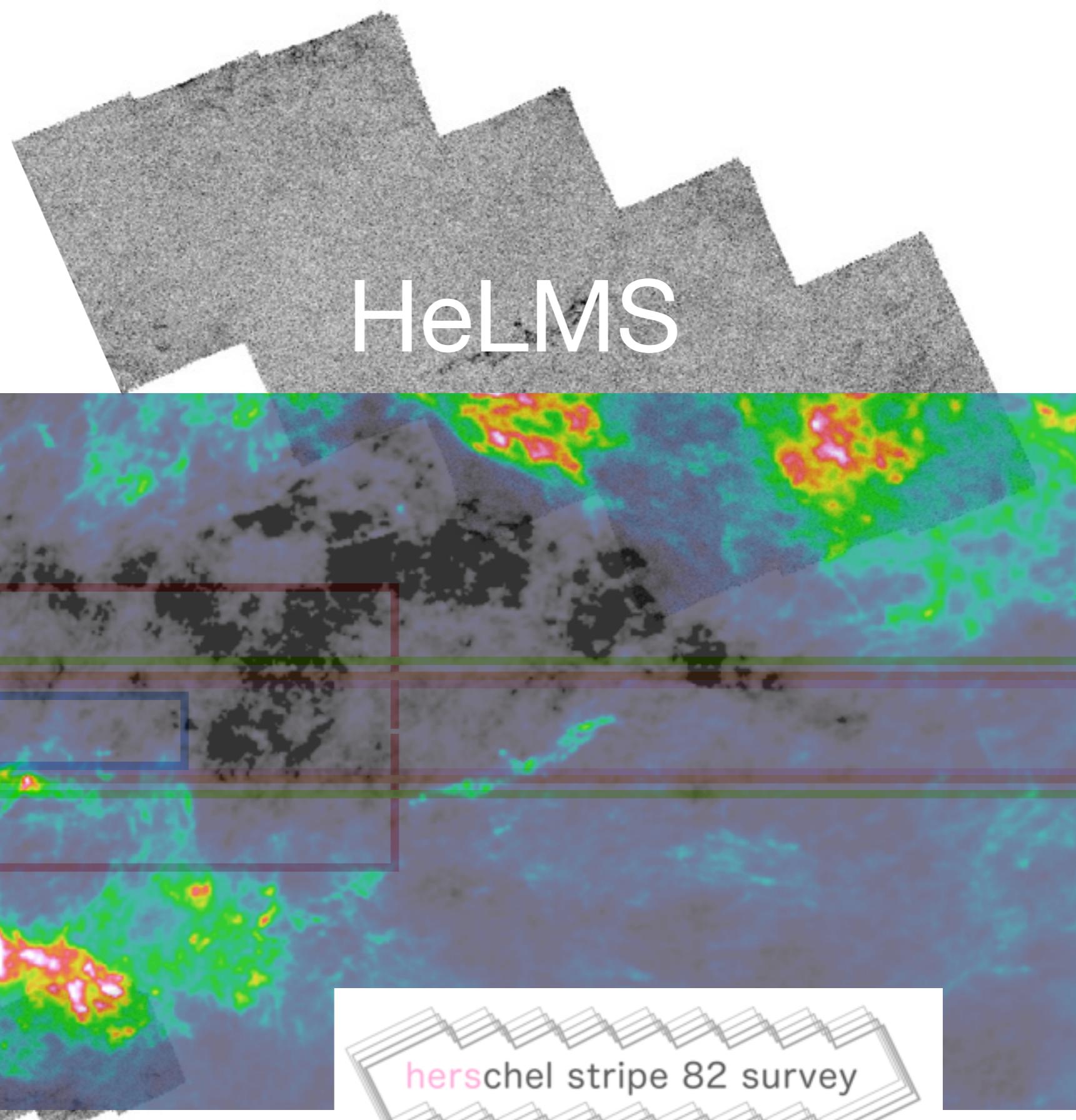
Stacked Infrared Luminosity Density



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





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/>