

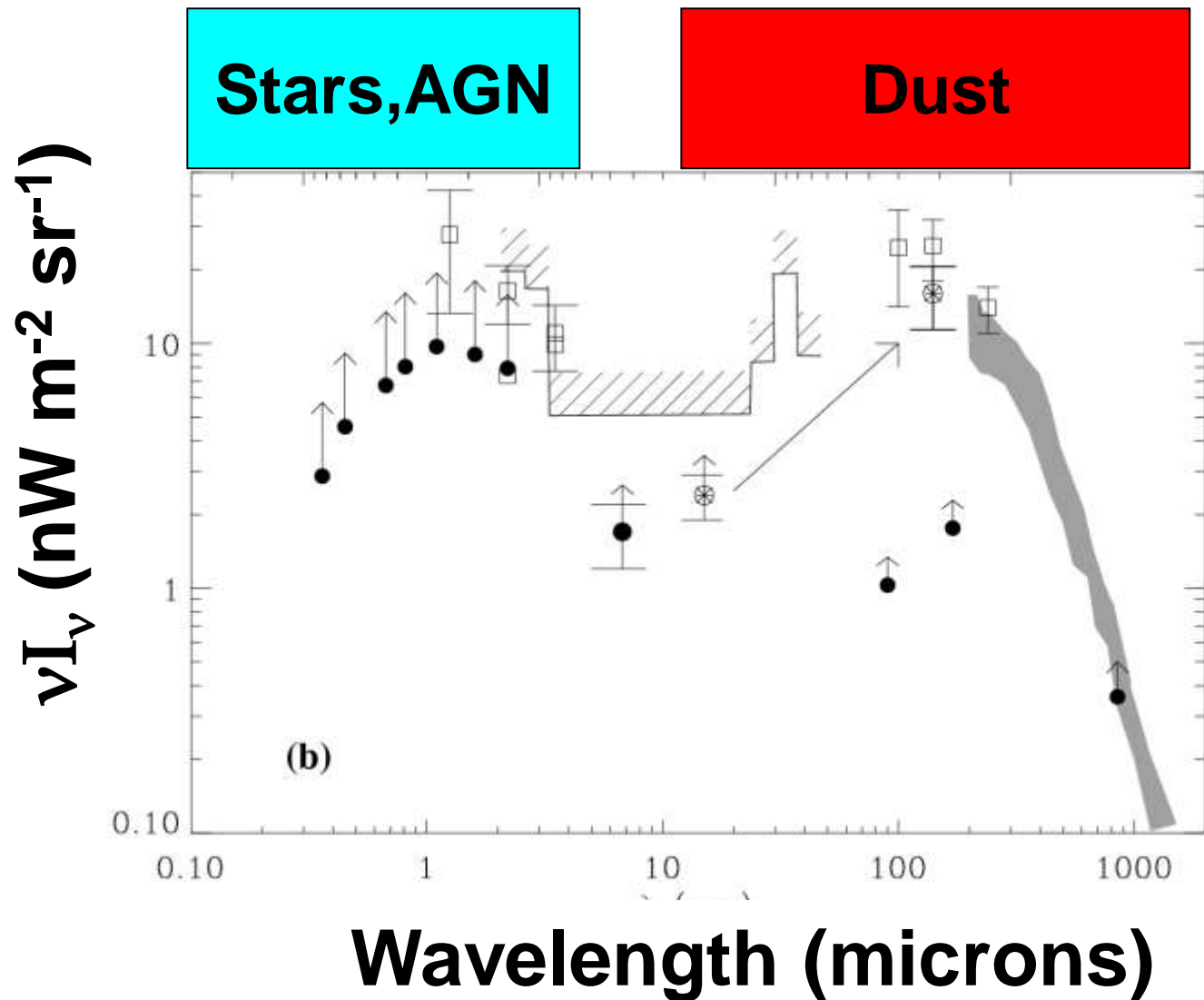
Optical and mid-infrared spectroscopy of MIPS sources in the NDWFS Bootes field

Vandana Desai



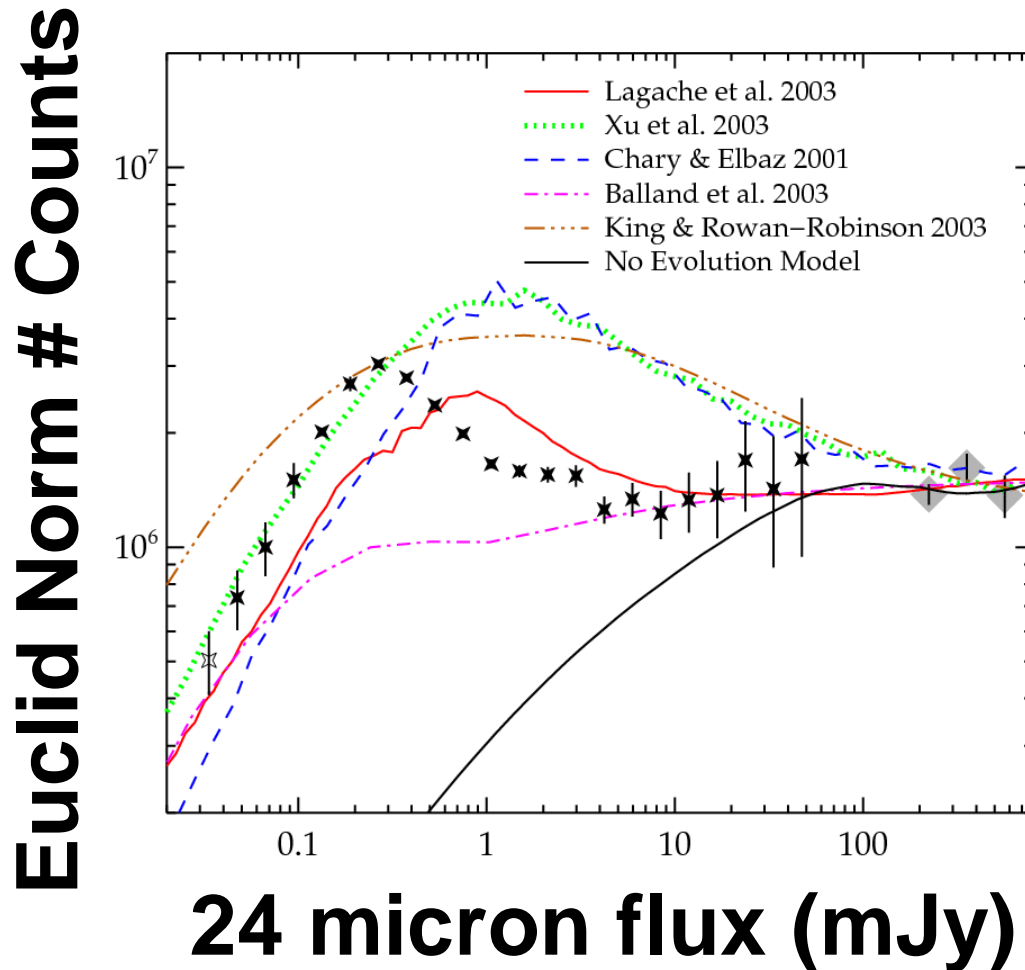
T. Soifer, C. Bian, L. Armus, H. Teplitz (Pasadena)
A. Dey, B. Jannuzi, E. Le Floc'h, K. Brand (Tucson)
D. Weedman, S. Higdon, J. Higdon, J. Houck (Ithaca)
IRS, IRAC, MIPS Instrument Teams

What is the role of infrared sources in galaxy evolution?



Elbaz et al. 2002

IR galaxies are not significant today, but they were in the past



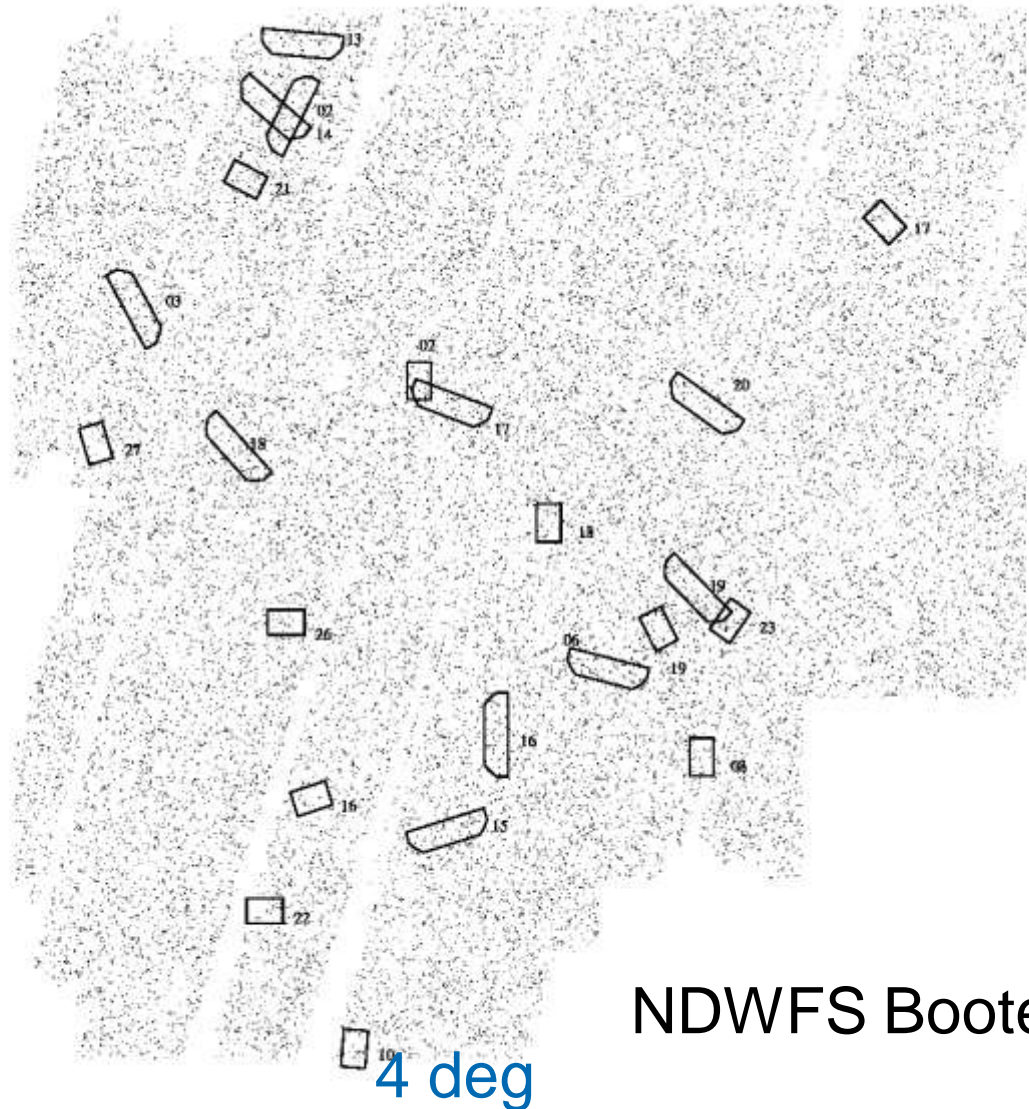
Optical Spectroscopic Survey

Flux limit = 0.3 mJy

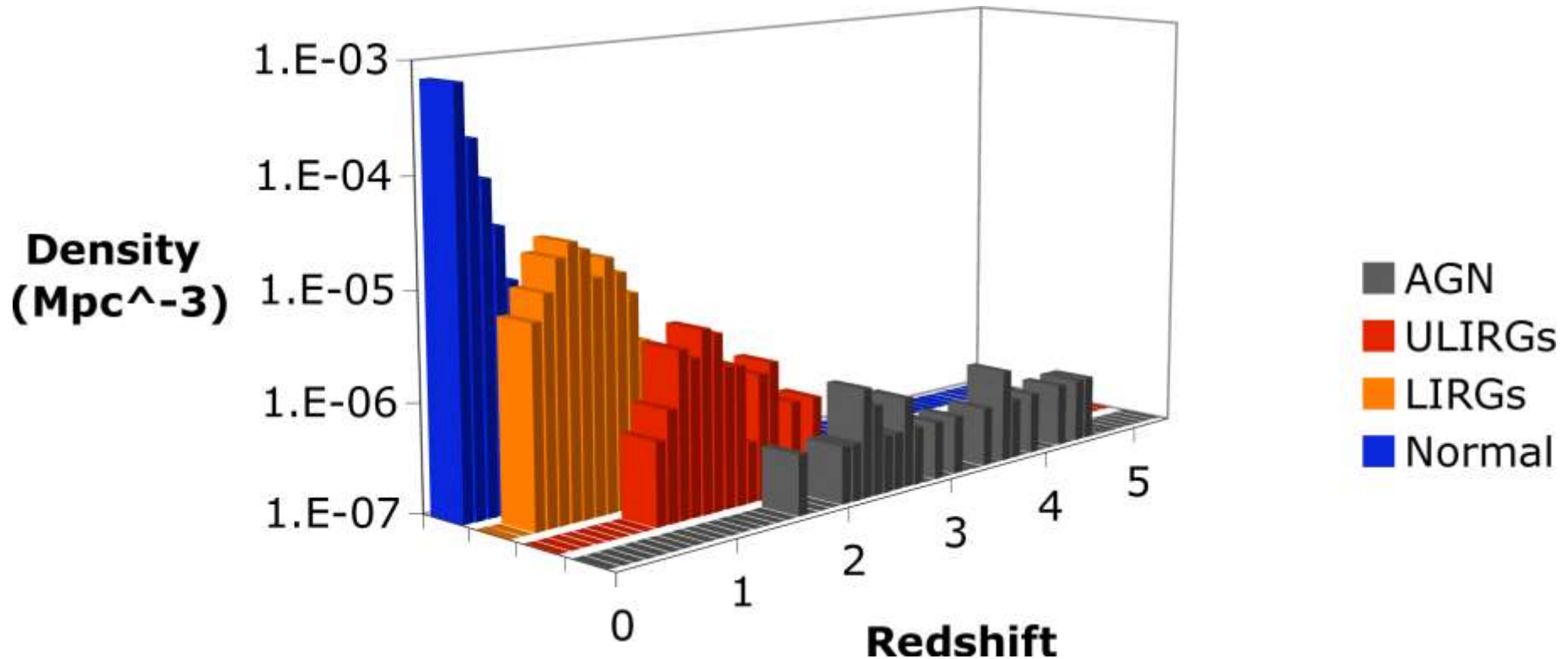
Area = 0.33 deg²

Targeting
completeness = 60%
(548 targets)

Redshift
completeness = 70%

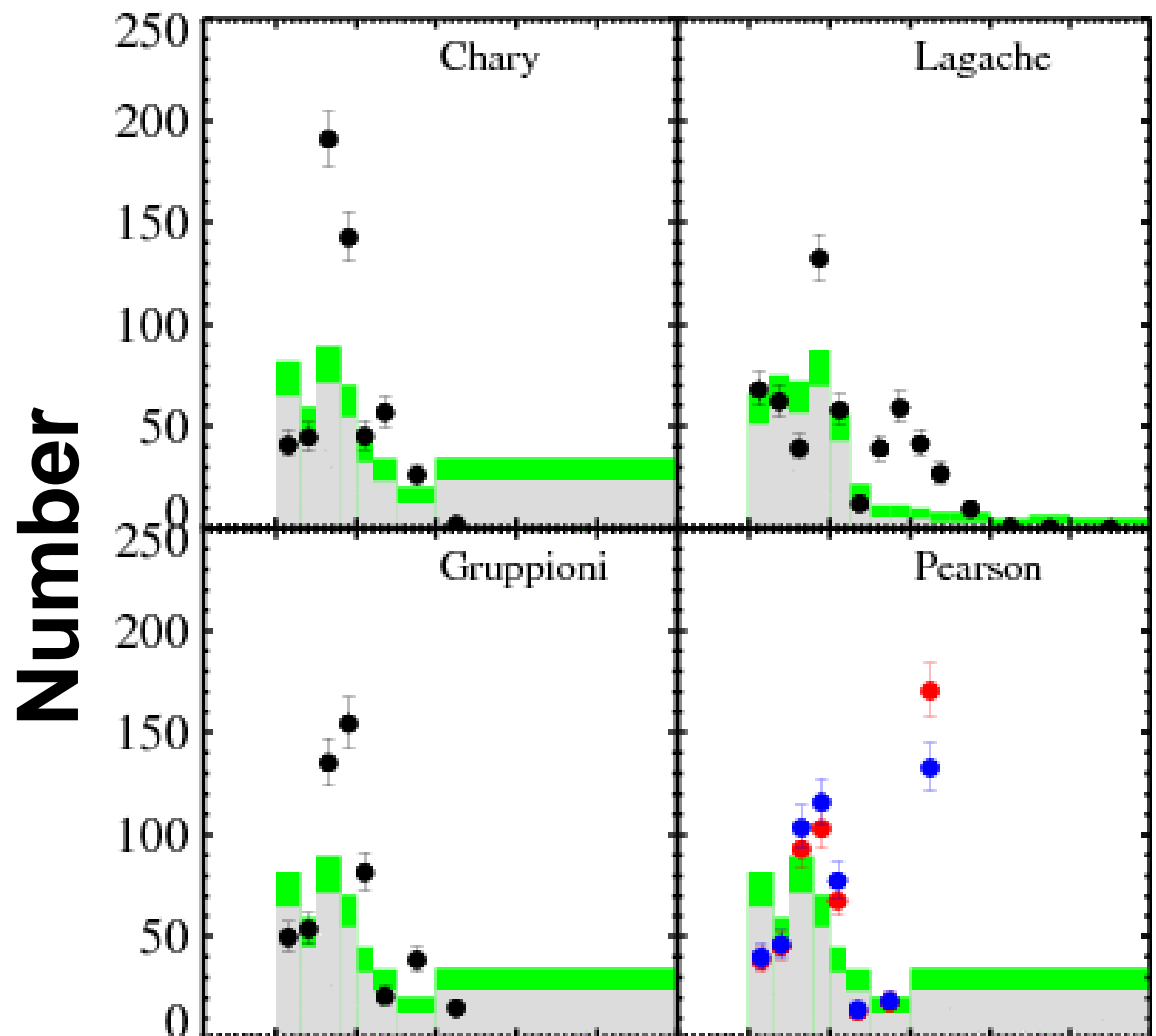


Space density as a function of LIR and redshift



*Also see Le Floch et al. 2005,
Perez-Gonzalez et al. 2005;
Caputi et al. 2006*

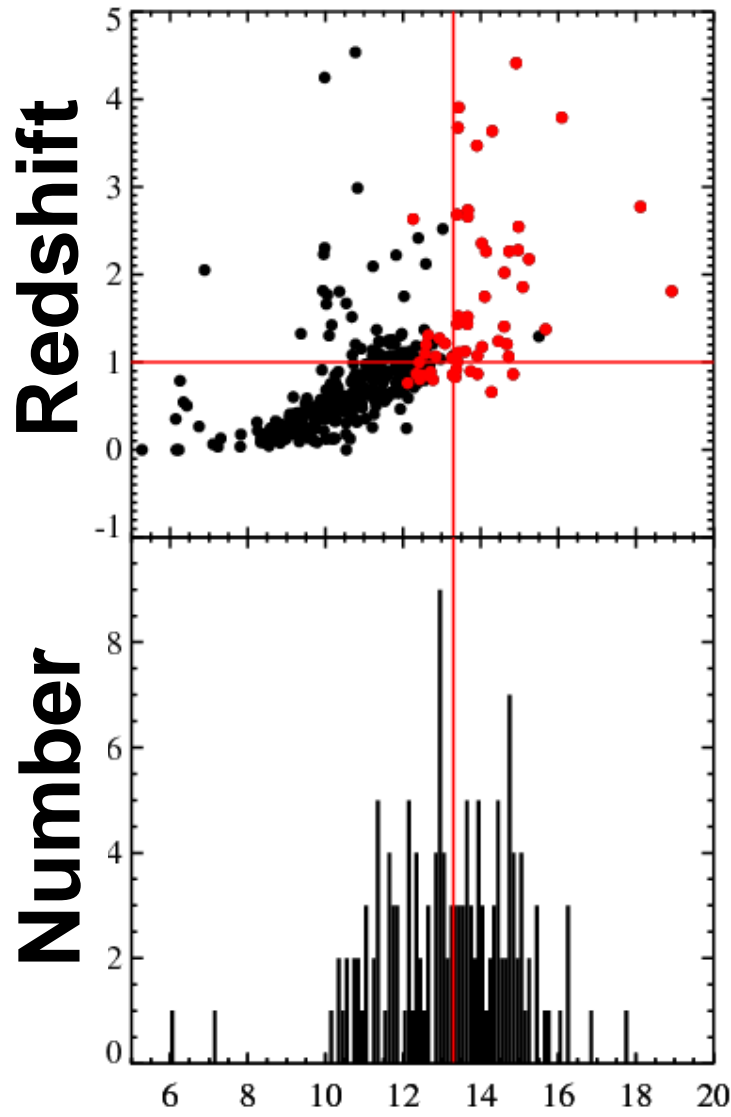
What are the sources without redshifts?



LIRGs at
 $z = 1$

Redshift

ULIRGs
at $z > 1.5$

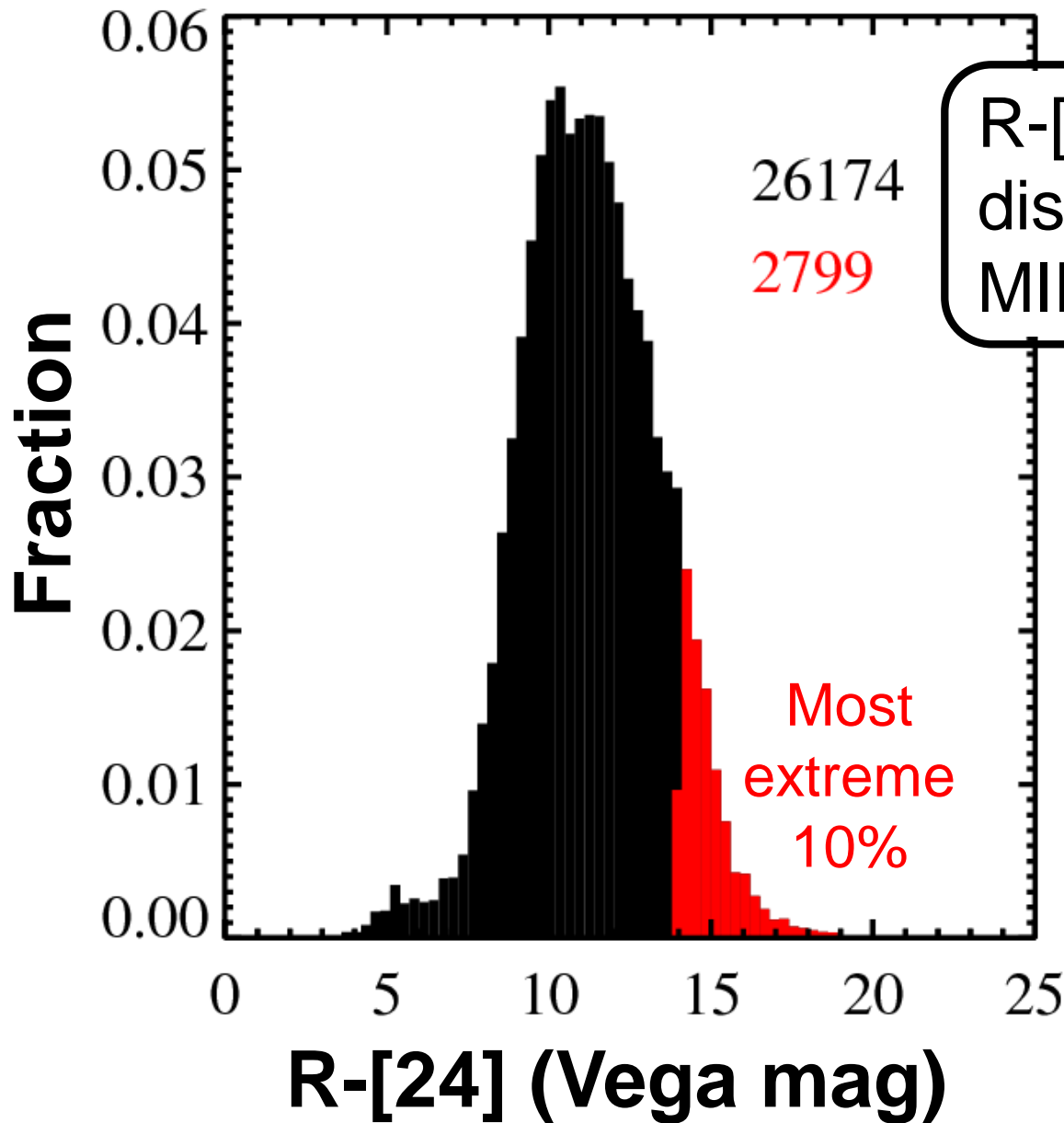


Sources with redshfts

Sources without redshfts

R-[24] (mag)

“Extreme” sources



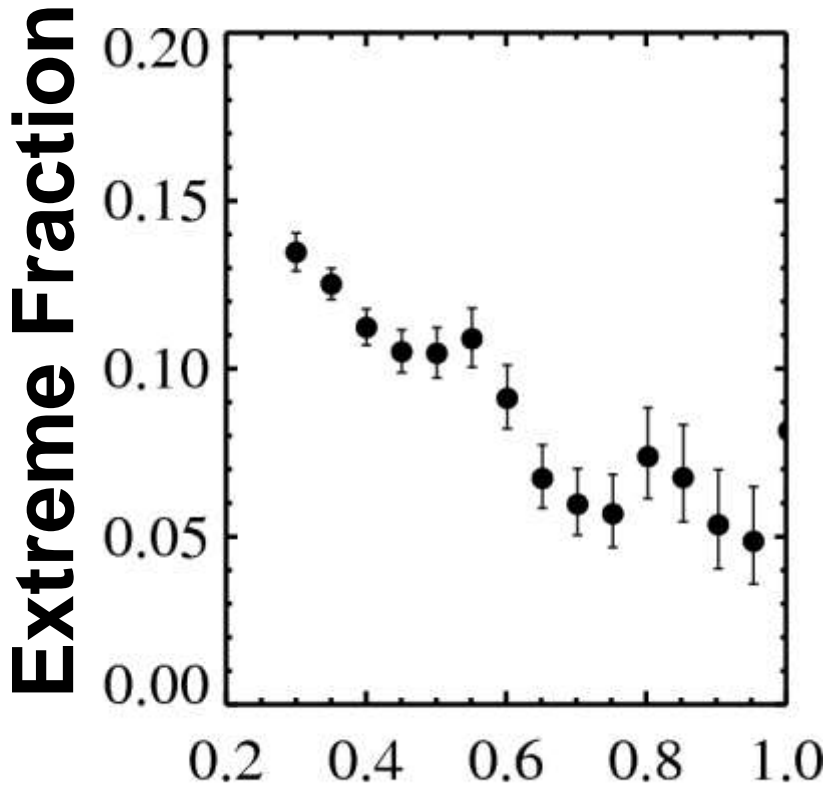
R-[24] color
distribution for Bootes
MIPS sources

$$R - [24] \geq 14$$

$$\frac{f_v(24)}{f_v(R)} \geq 1000$$

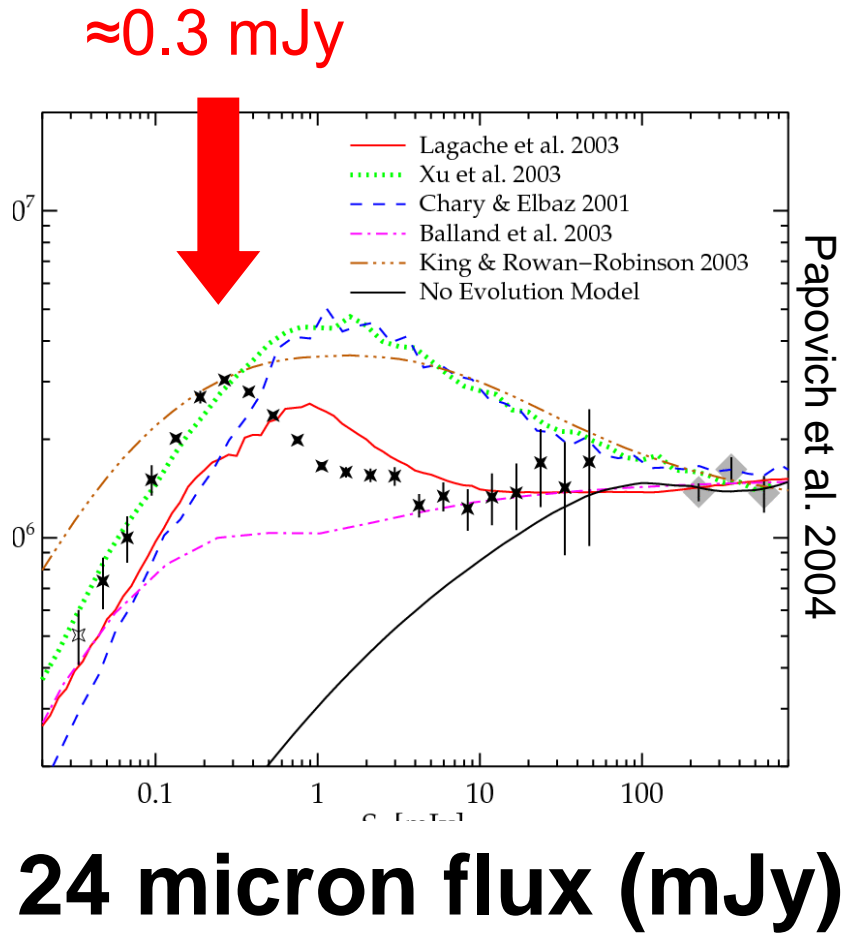
$$\frac{vf_v(24)}{vf_v(R)} \geq 27$$

increasingly significant numbers at fainter fluxes...



24 micron flux (mJy)

Euclid Norm # Counts

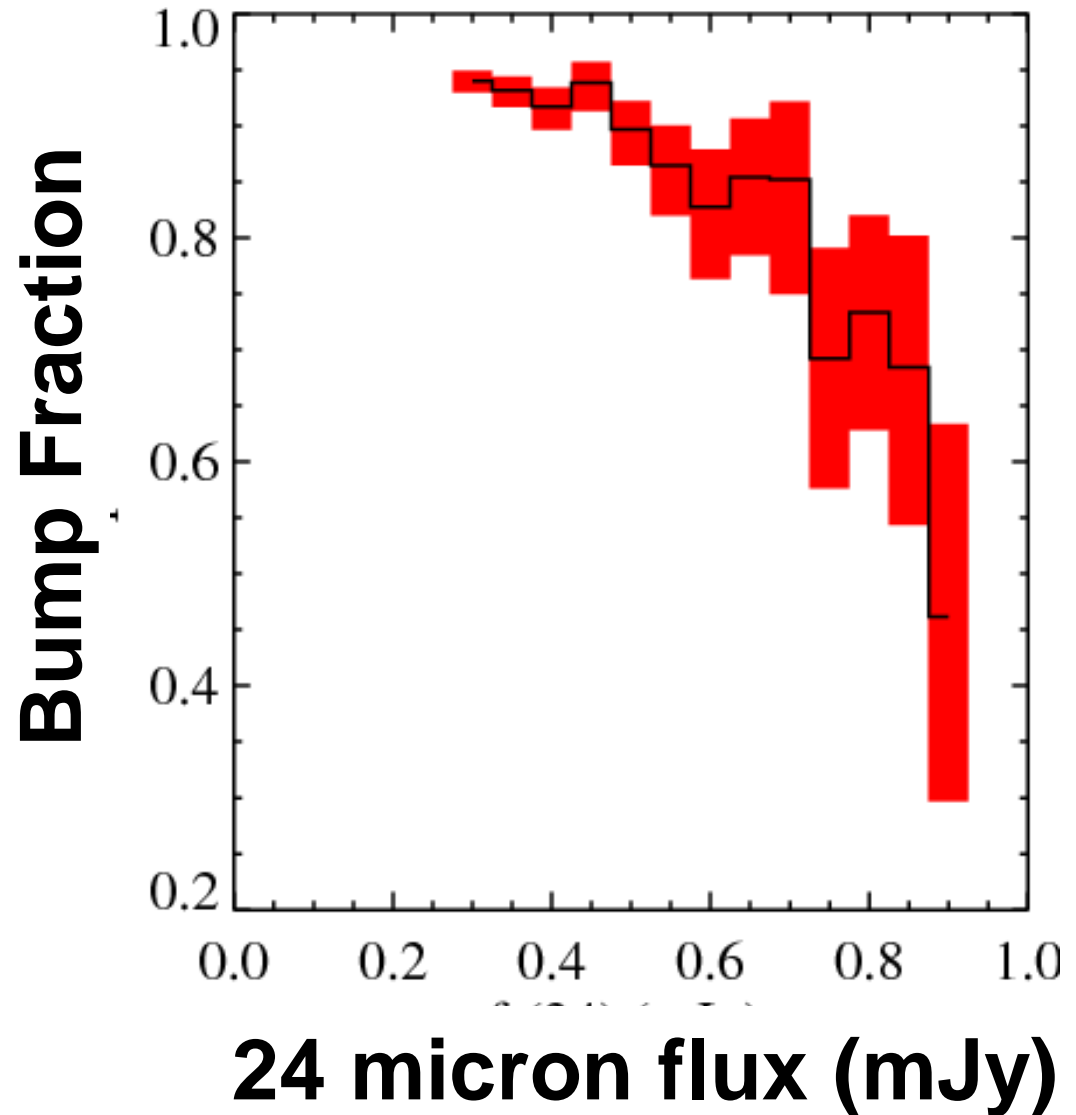


...where we find the peak of the 24 μ m counts!

SEDs of Extreme Sources

Bump sources =
SF-dominated?

Z_{phot} (bumps) =
1 - 2.5



IRS results on extreme sources

1. IRS GTO Team: 58 sources with
 $f_{\nu}(24) > 0.8 \text{ mJy}$

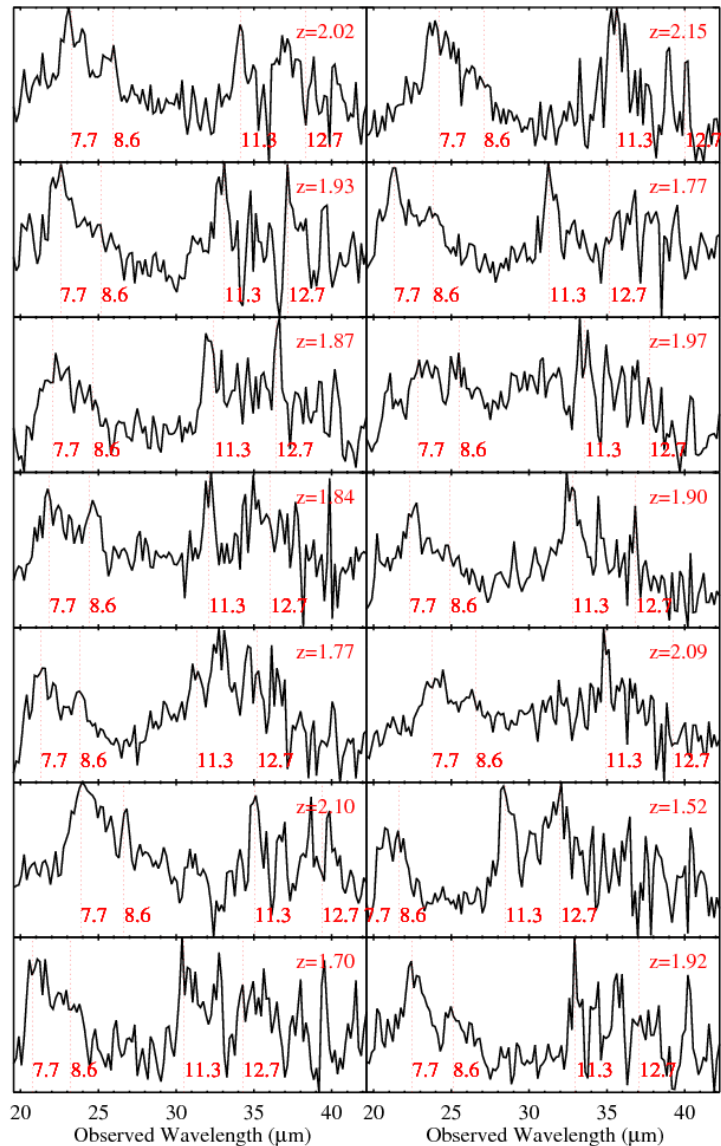
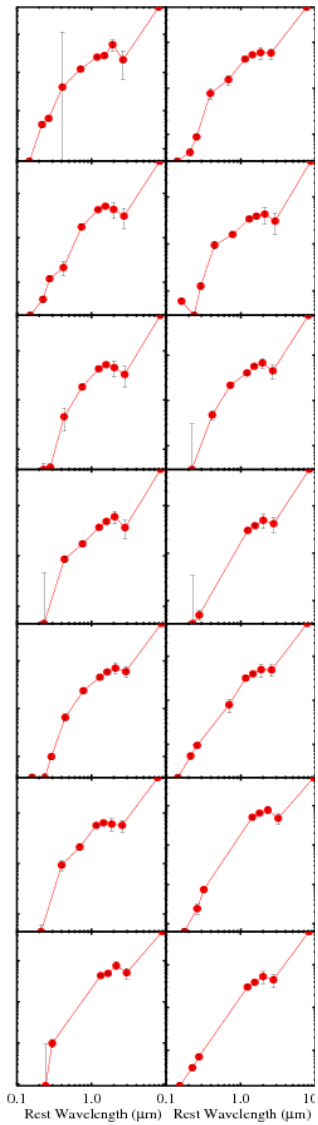
$z \sim 2$; Few PAH-dominated sources

2. Yan et al. GO1: 52 sources with
 $f_{\nu}(24) > 1 \text{ mJy}$ AND $R(24:8) > 0.5$

$z \sim 2$; 1/3 PAH-dominated sources

The brightest 24 micron sources tend to be AGN-dominated

What about the PAH-rich sources at z~2?



$f_{\nu}(24) = 0.5 - 0.75$ mJy
ULIRGs

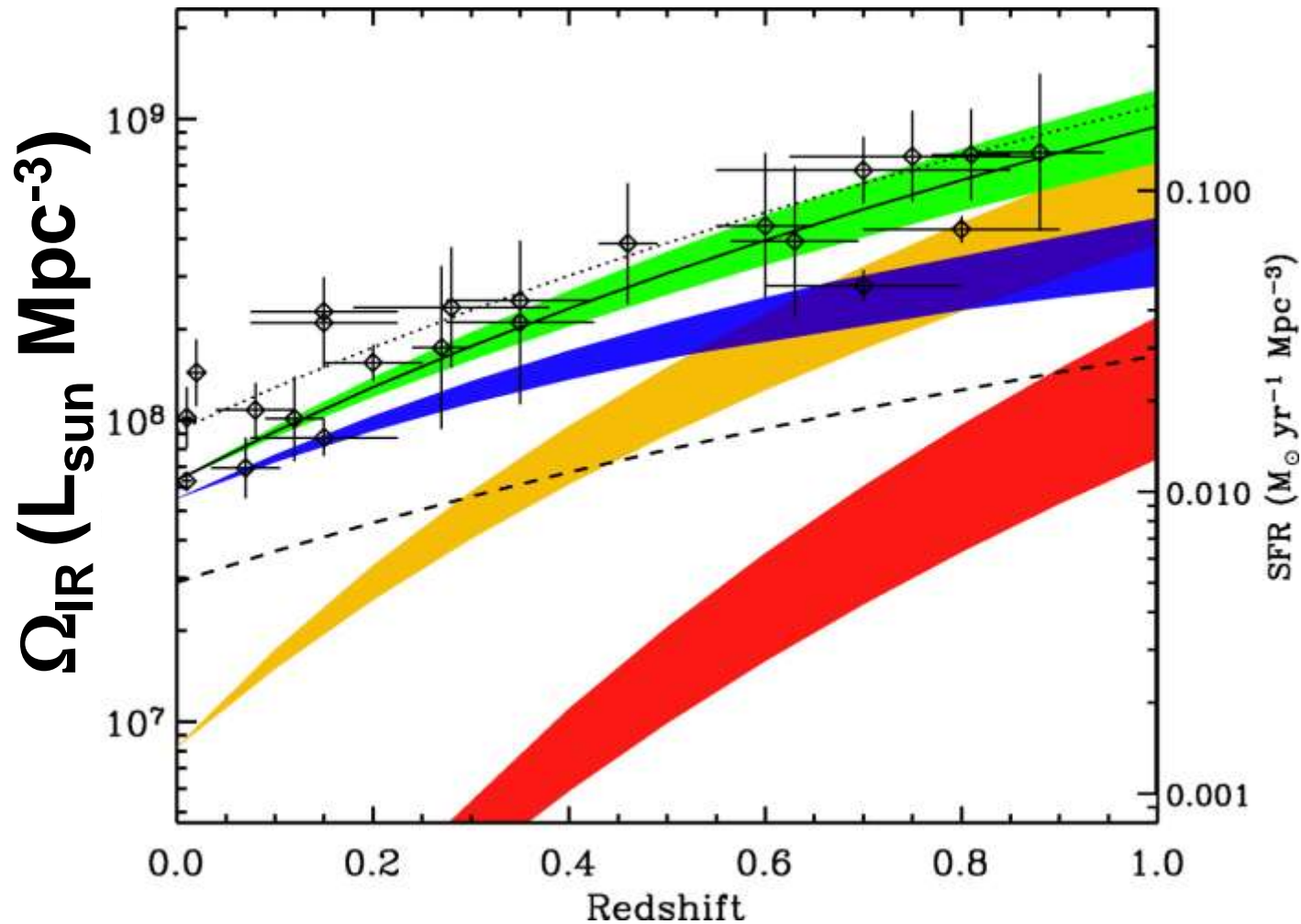
Far-IR SED:
70, 160, 350 micron
observations
pending

How well can we
convert 24 micron
flux to LIR at z=2?

Lots more data on this active phase coming down the pipe!

- Lin Yan's GO2 and GO3 IRS spectra
 - GO2: Flux-limited > 1 mJy
 - GO3: $z=1$ and $z=2$ faint samples
- Jiasheng Huang's $z=3$ sample

IR galaxies are not significant today, but they were in the past



Redshift

Le Floch et al. 2005

Are extreme sources are off the chart?

