GOODS-Herschel

The Great Observatories Origins Deep Survey : far infrared imaging with Herschel

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Collaborators (39):
France, USA, Germany, UK, Greece, Italy, Canada
ESO, ESA

362.6 hours (100μm & 160μm PACS, including 31 h SPIRE)

Major goals of GOODS-Herschel

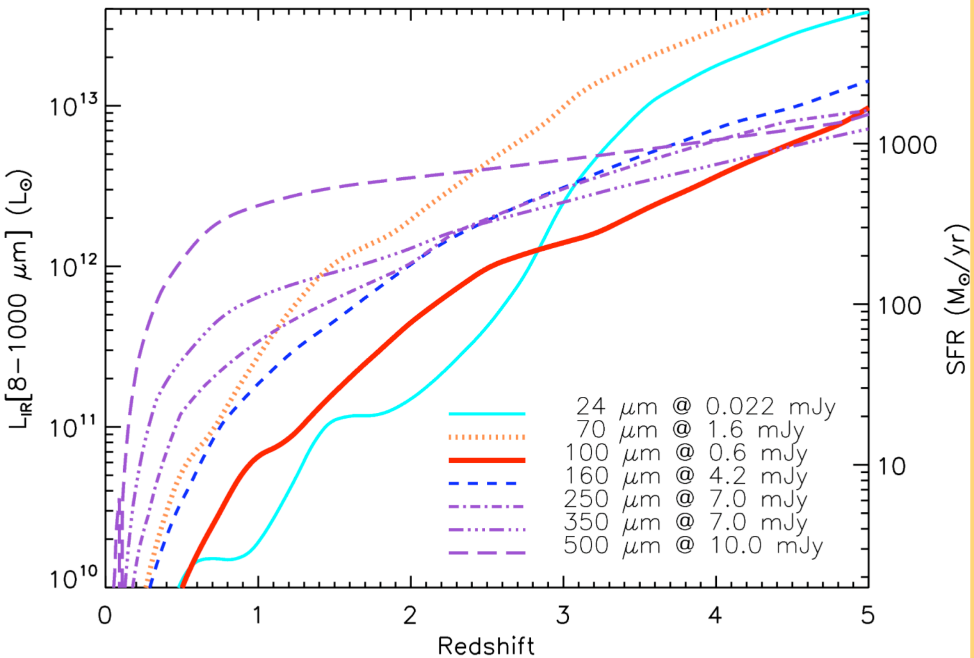
1. to resolve most of the cosmic SFR density up to z ~ 4, by detecting ~ 2000 galaxies in the unexplored regimes of normal galaxies up to z ~ 1, LIRGs up to z~ 2, ULIRGs to z~4
2. to bridge IR and UV selected galaxies down to the level where both SFR agree up to z ~ 1.5 and potentially up to z ~ 4
3. to identify and study the buried Compton Thick AGNs responsible for the still unresolved 30% fraction of the cosmic X-ray background (CXB), which peaks at 30 keV

An ultradeep survey at 100μm (0.6 mJy) + superdeep (1.5mJy)

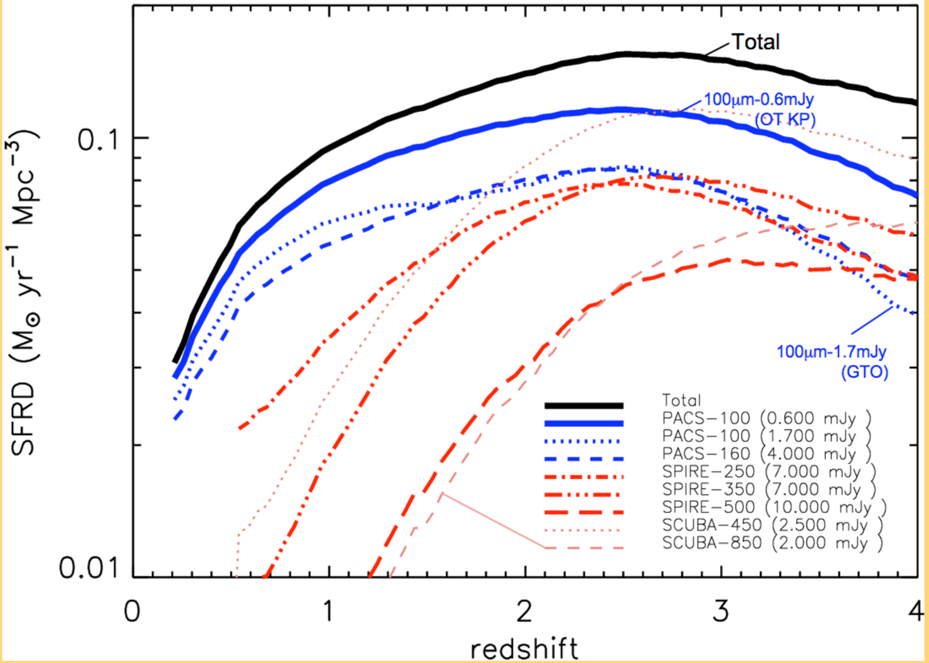
- Trade-off between k-correction, which favors the longest wavelengths, and source confusion, increasing with beam size:

PACS-70μm requires 9x longer integrations to reach same SFR than PACS-100μm

Longer wavelengths are limited to >8x shallower depths than PACS-100μm due to their larger beam sizes and steeper source counts.

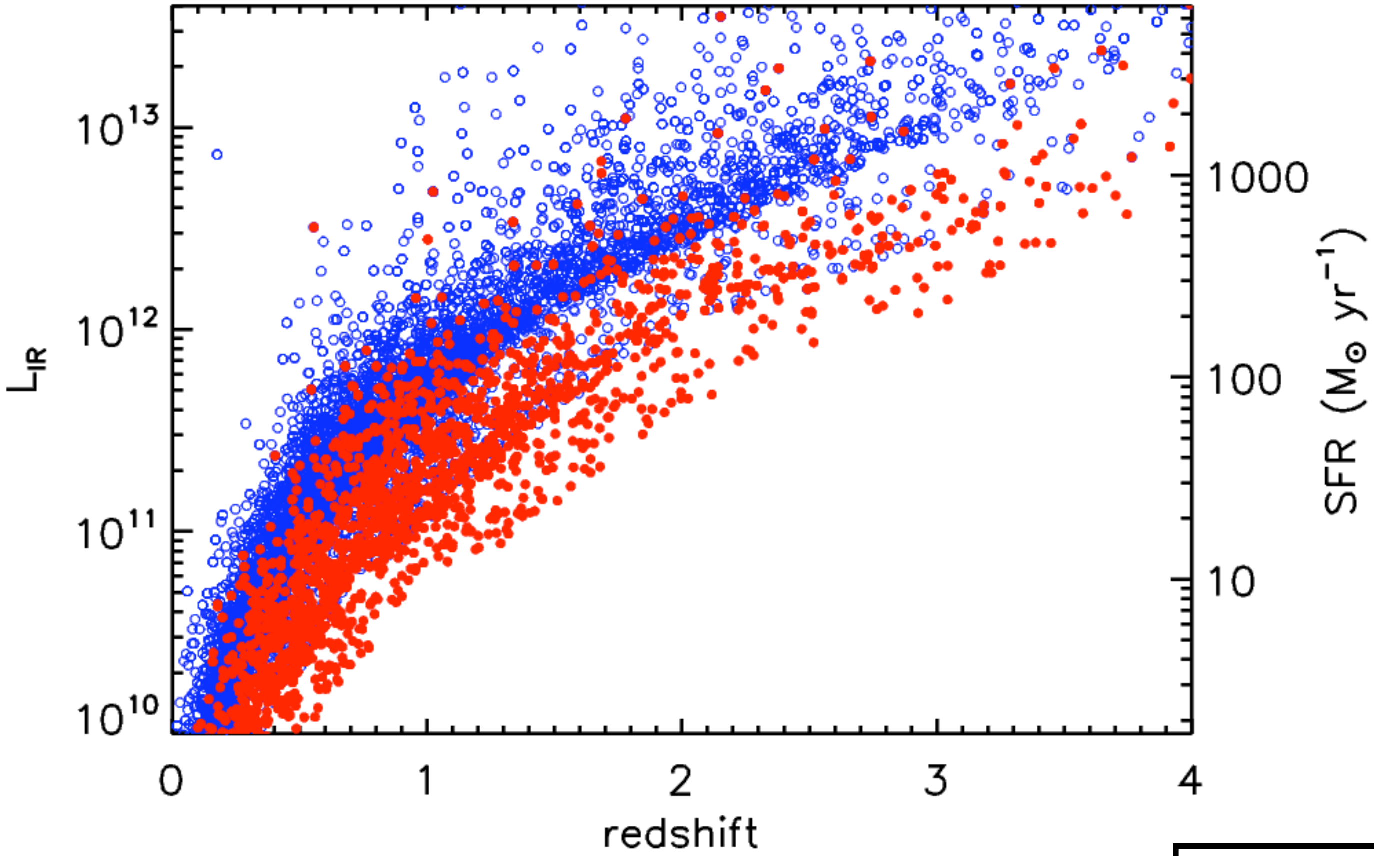


$L_{IR}>6x10^{10}L_{\odot}$ up to z~1
$L_{IR}>4x10^{11}L_{\odot}$ up to z~2
$L_{IR}>10^{12}L_{\odot}$ up to z~3 ; $L_{IR}>3x10^{12}L_{\odot}$ up to z~4



Resolve 75% of global SF density out to z~4 by measuring 20-50μm rest-frame at 1<z<4 model Le Borgne et al. (2008)

Comparison between GOODS-Herschel (red) and GTO KP (blue)

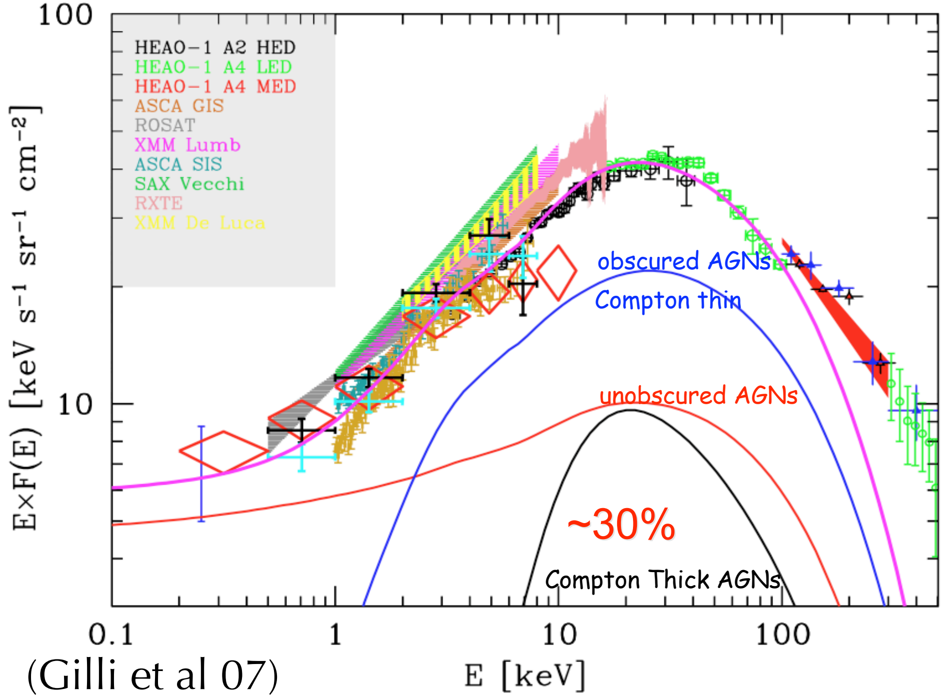


from mock Herschel catalogs

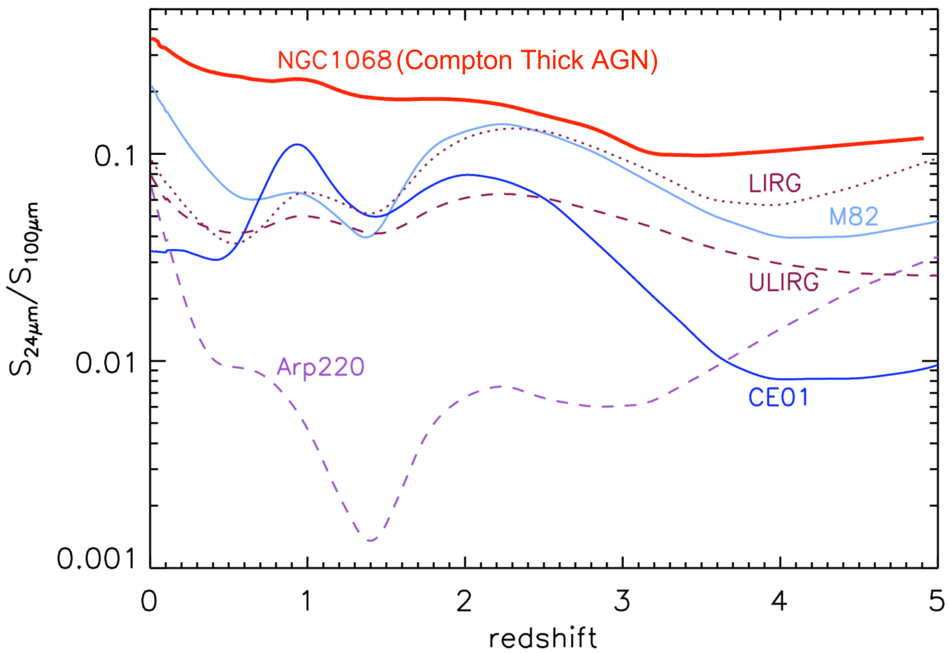
generated by Damien Le Borgne (see afternoon talk)

# gals	z_{min}	z_{max}	<Lir>	<SFR>
1148	0	1	10.63	7
551	1	2	11.59	66
149	2	3	12.31	354
52	3	4	12.70	861
10	4	5	13.19	2692
1910	**0**	**5**	**11.11**	**22**

Detecting the Compton Thick AGNs making the missing part of the hard X-ray background



(Gilli et al 07)



GOODS-Herschel (0.6mJy-100μm) will trace CT AGNs over z~0.5-3 (below knee of X-LF at z<2)

Synthesis models (Gilli et al 07) => ~70% *(20-30%)* of X-ray undetected AGNs are at z~1 *(z~2)*

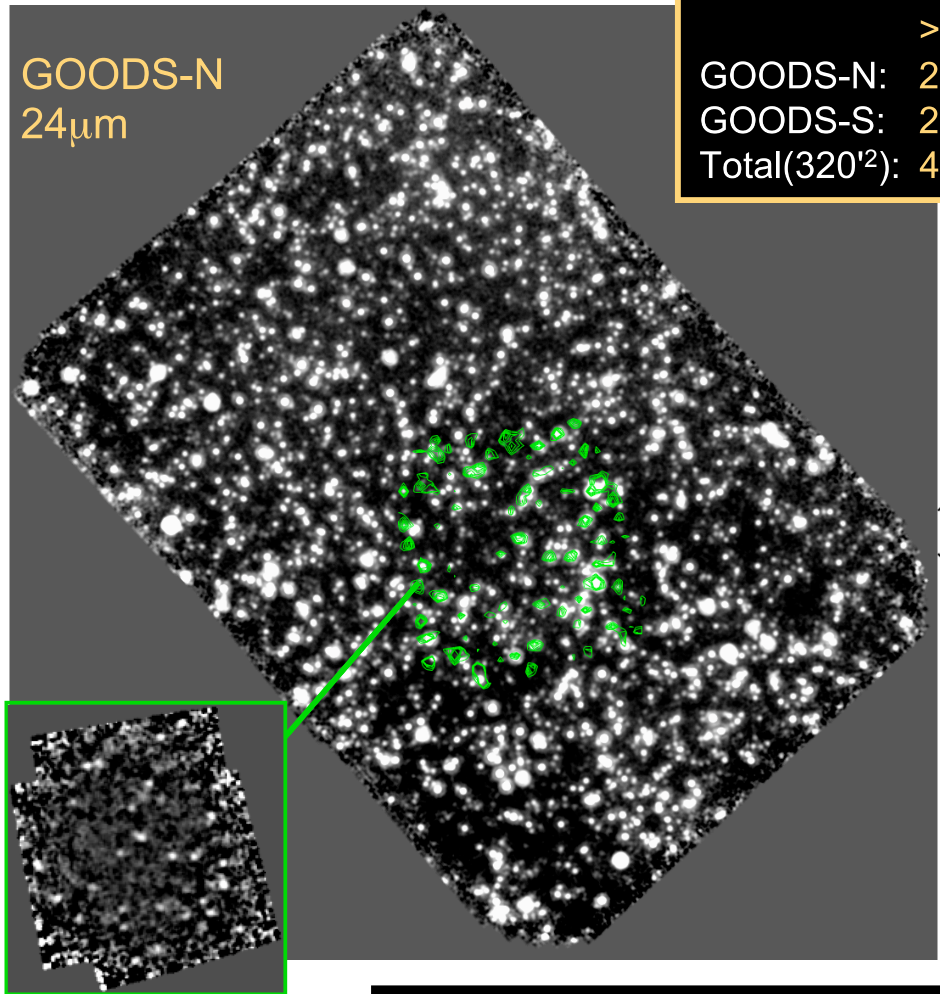
From the results of Daddi et al. 07 (3200 CT AGNs/sq.deg at z~2):

→ detect ~70 X-ray undetected AGNs with 45% z~0.5-1.5 and 55% z~1.5-2.5

→ provide constraints on the expected ~150 X-ray detected AGNs.

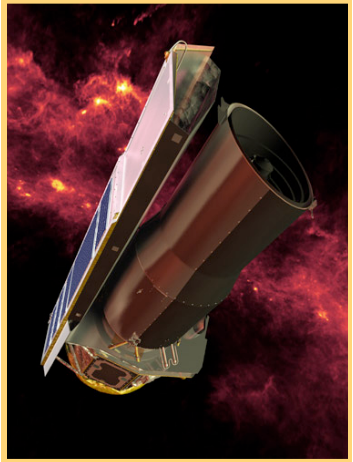
→ study of coeval growth of massive BH and bulges and building of M_{BH}-M* relation.

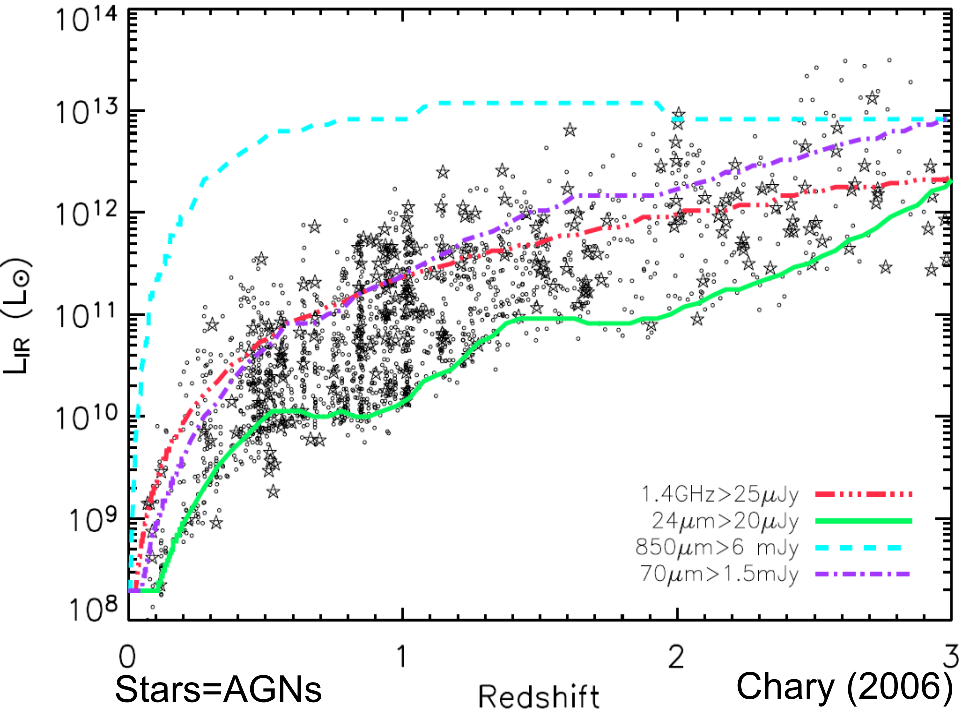
GOODS *(P.I. M.Dickinson)*
Great Observatories Origins Deep Survey



HDFN by ISOCAM
@ 15 μm

GOODS: 4200 z(spec), 60% complete to z_{AB}=23.5
>20μJy@24μm (S/N>3)
GOODS-N: 2648 src , 988 z(spec)
GOODS-S: 2054 src , 654 z(spec)
Total(320'²): 4702 src, 1642 z(spec)



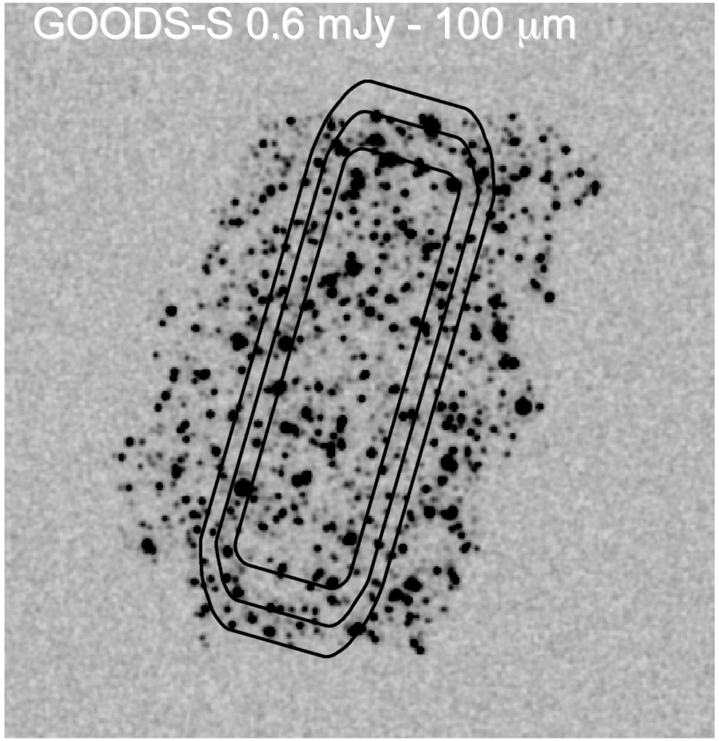


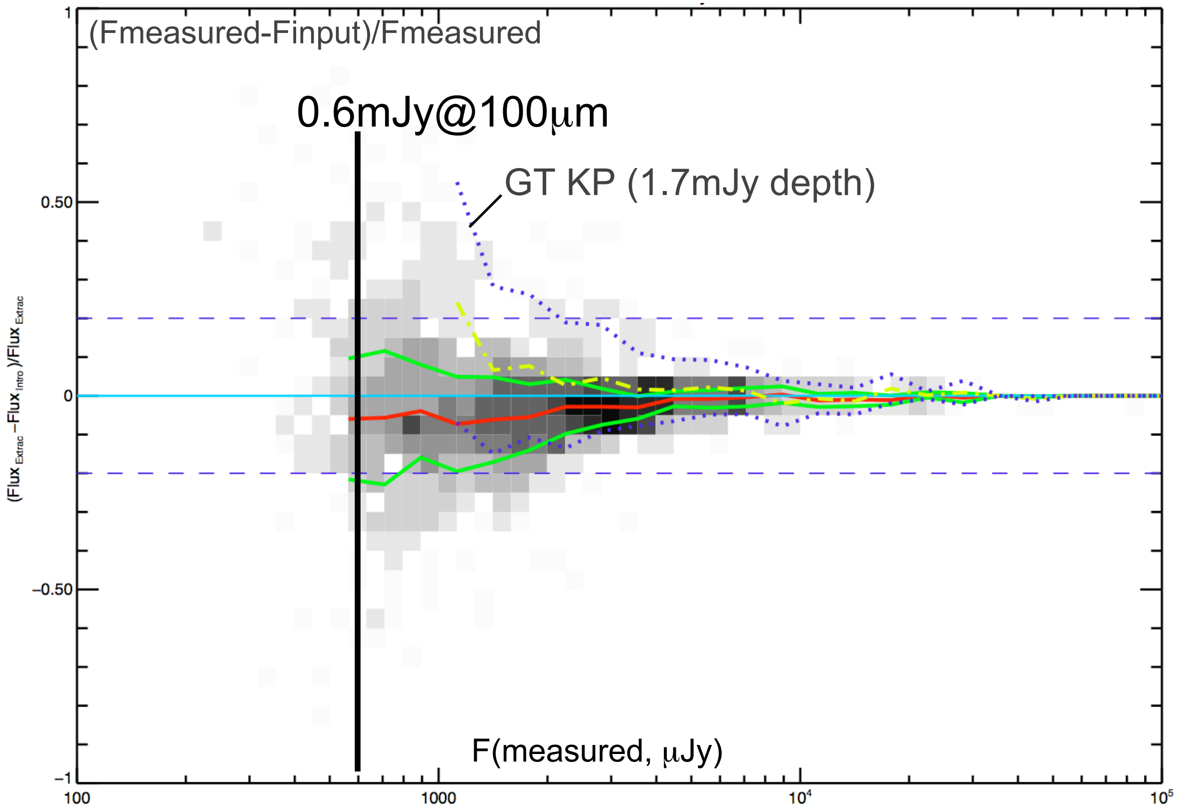
Stars=AGNs

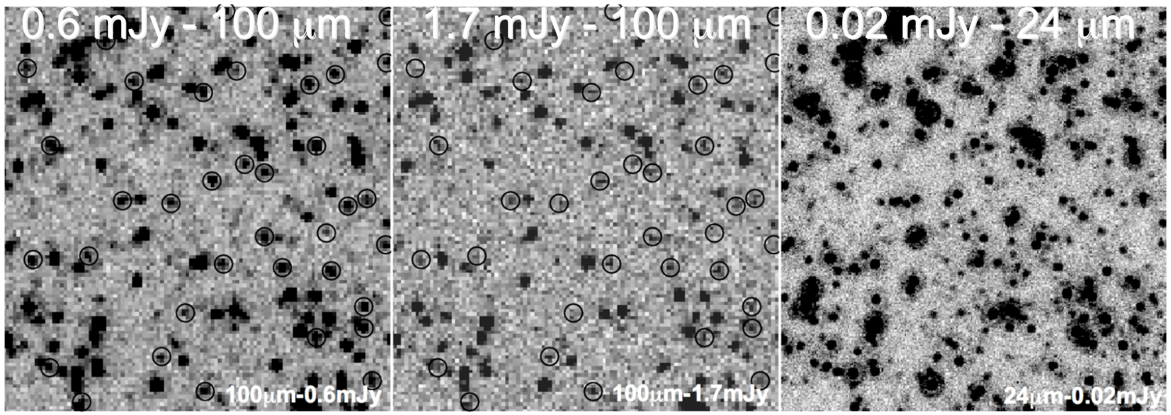
Chary (2006)

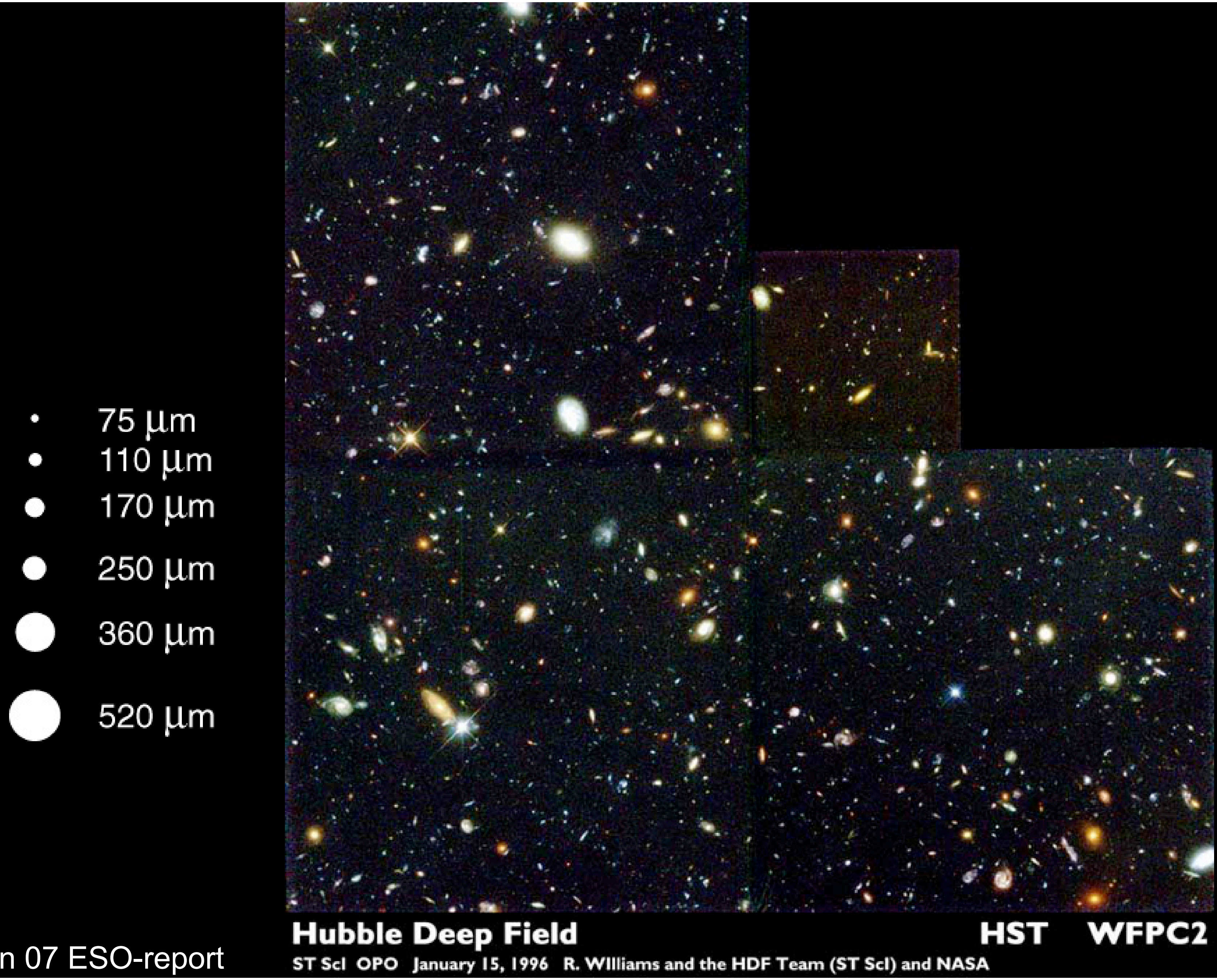
X	UV U B V I Z J H K	3.6μm 4.5μm 5.8μm 8μm	IRS16	MIPS24	MIPS70	radio
$2x10^{-16}$erg/s/cm²	~28AB 22AB	~1μJy	50μJy	20μJy	~1.8mJy	12μJy

Simulations & confusion limit (by Benjamin Magnelli)









Wilson 07 ESO-report