COSMOS -- 2 sq deg survey

Propose : IRAC ch 1& 2 from 0.3 hr ==> ~ 15 hrs

==> ~7 X current sens.

do entire 2 deg field !!!

w/ Giavalisco, Sanders, Capak, Yan, Aussel, Ilbert, Salvato, Mobasher, LeFloc'h

+ many others on cosmos team -- esp. Sheth, Surace, Frayer, Fazio, Huang, …

Major features of COSMOS survey :

- **large area -- 1.4 x 1.4 deg**
  => cover largest large scale structures

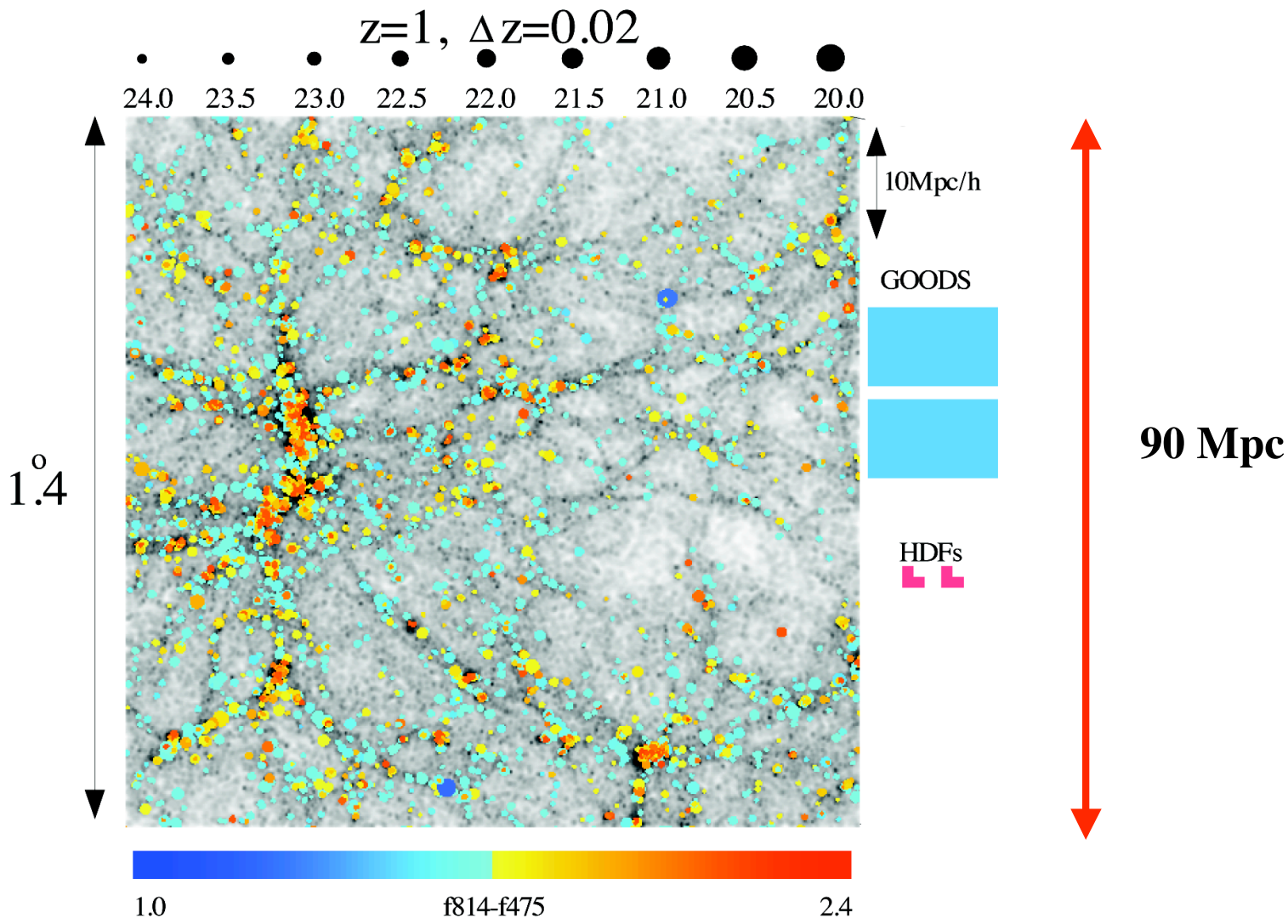
- **high sensitivity**
  => morphology of L_* galaxies at $z < 2$

- **sensitivity + area**
  => 2×10^6 galaxies ==> like SDSS at $z > 0.5$

- **equatorial => multi-λ obs. from all tel.**

Coupled evolution of LSS, galaxies, star formation, AGN w/ z

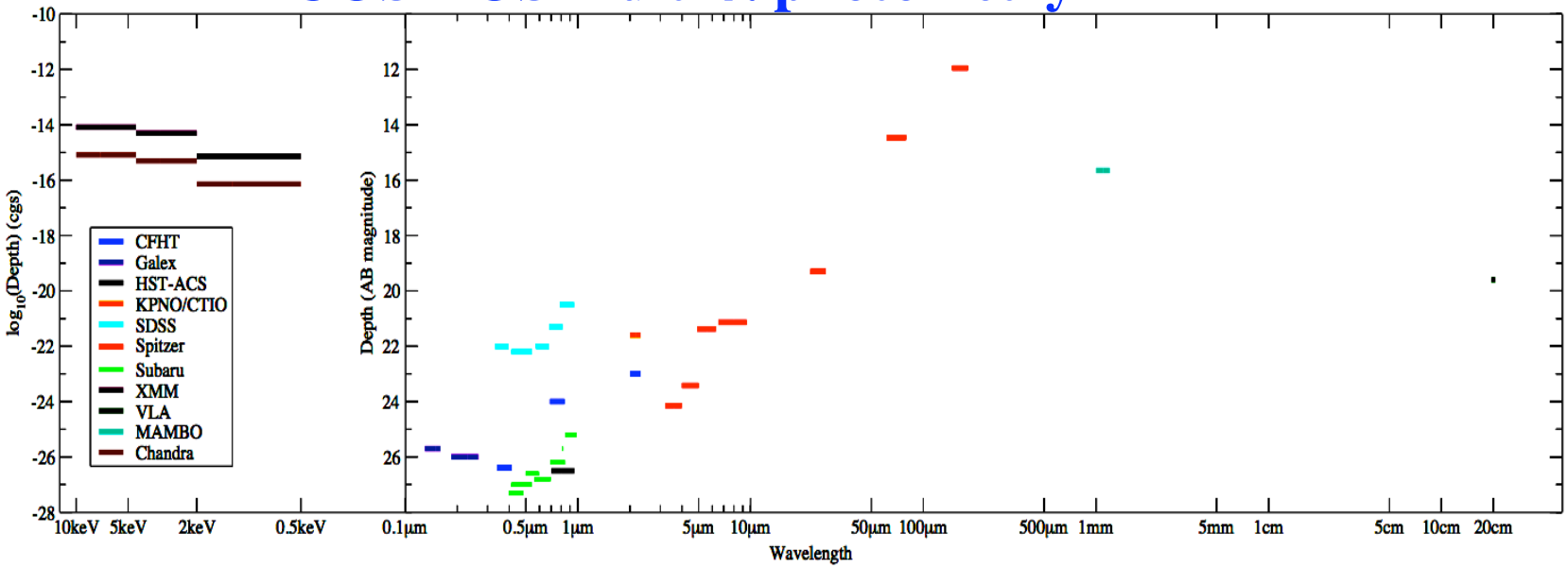
redshift slice from Λ CDM sim.



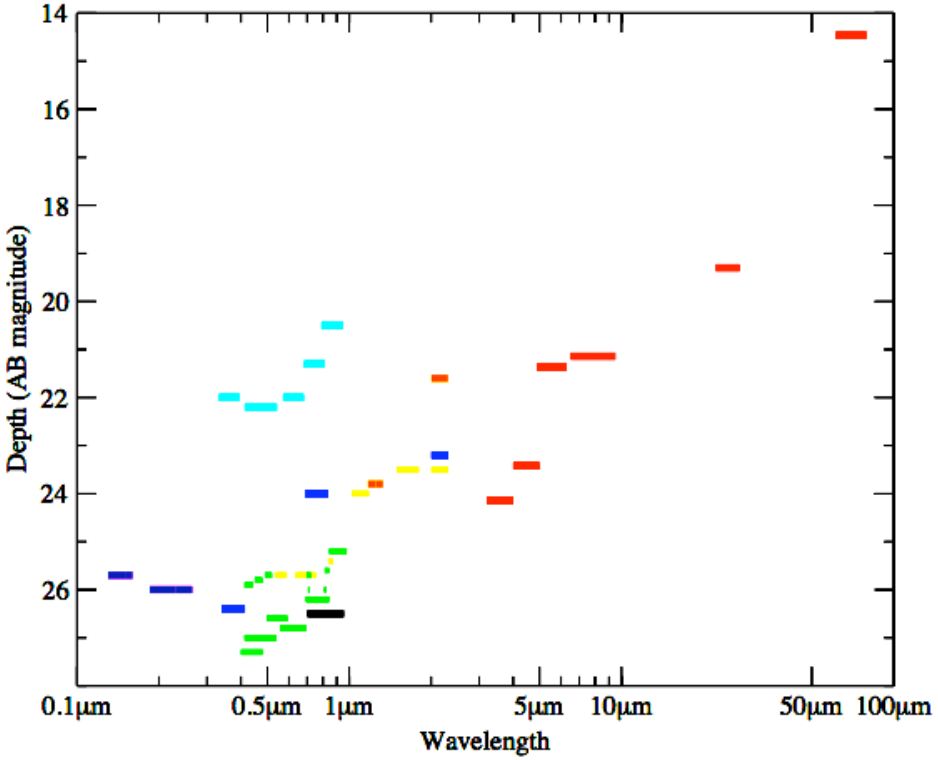
Spitzer IRAC
PI : Sanders
600 hrs w/ MIPS
σ(3.6μm) = 2μJy

8 x zoom

COSMOS multi-λ photometry



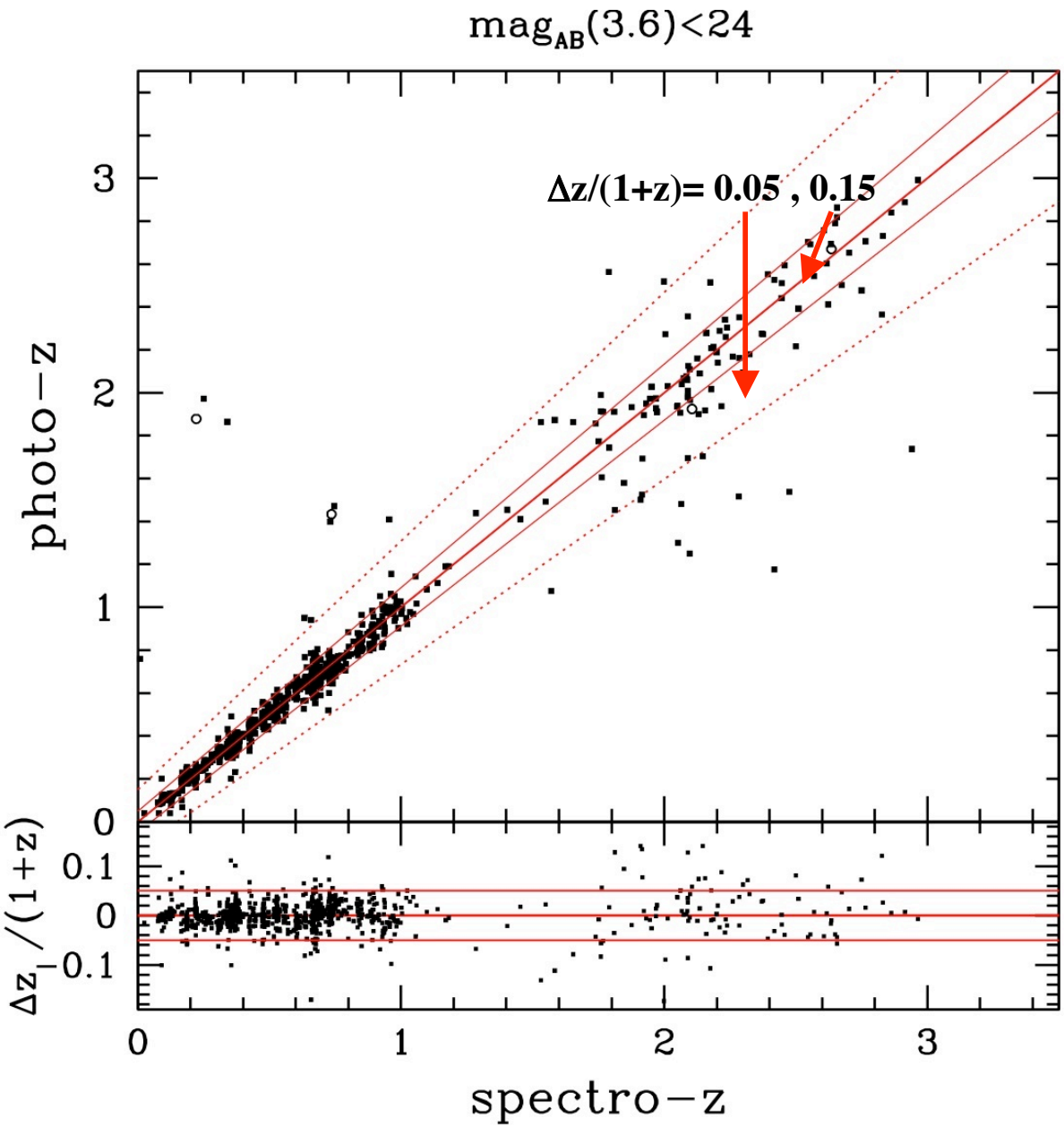
5 σ
3" apert.



Capak etal

photometric redshifts
==>

COSMOS 20 band photometric redshifts :



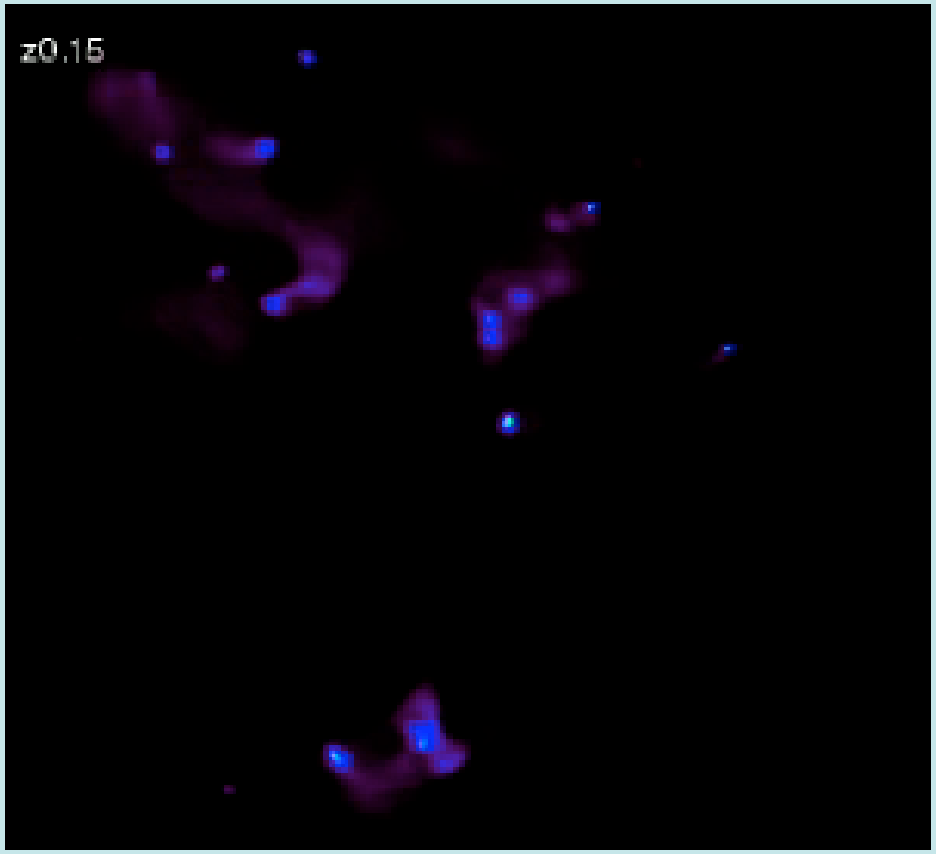
spect-z from :

VLT- zCOSMOS -- Lilly etal
Magellan -- Impey
Keck -- Capak , …

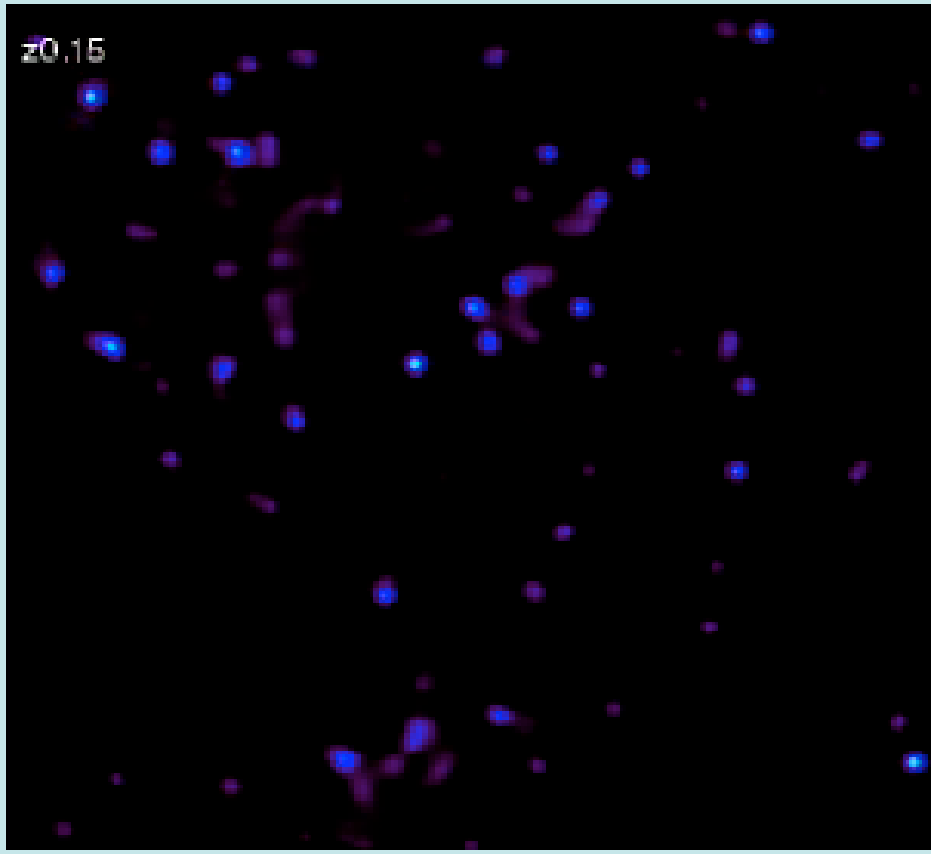
Original photz
σ_z / (1+z) = 0.03-0.04
Mobasher etal 07

σ_z / (1+z) = 0.019 !!!
to z ~1.2 at 24 mag
Ilbert etal 2007
==> 0.01 this yr.

 # gal. / area



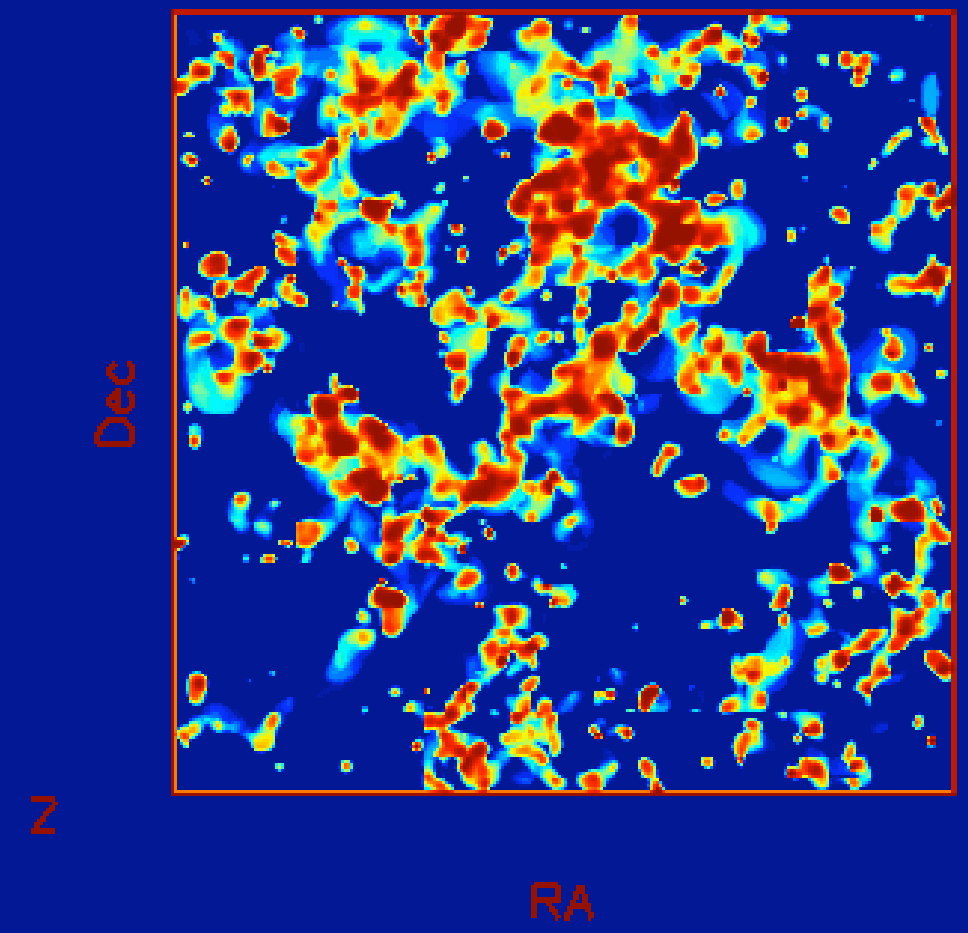
gal. mass / area



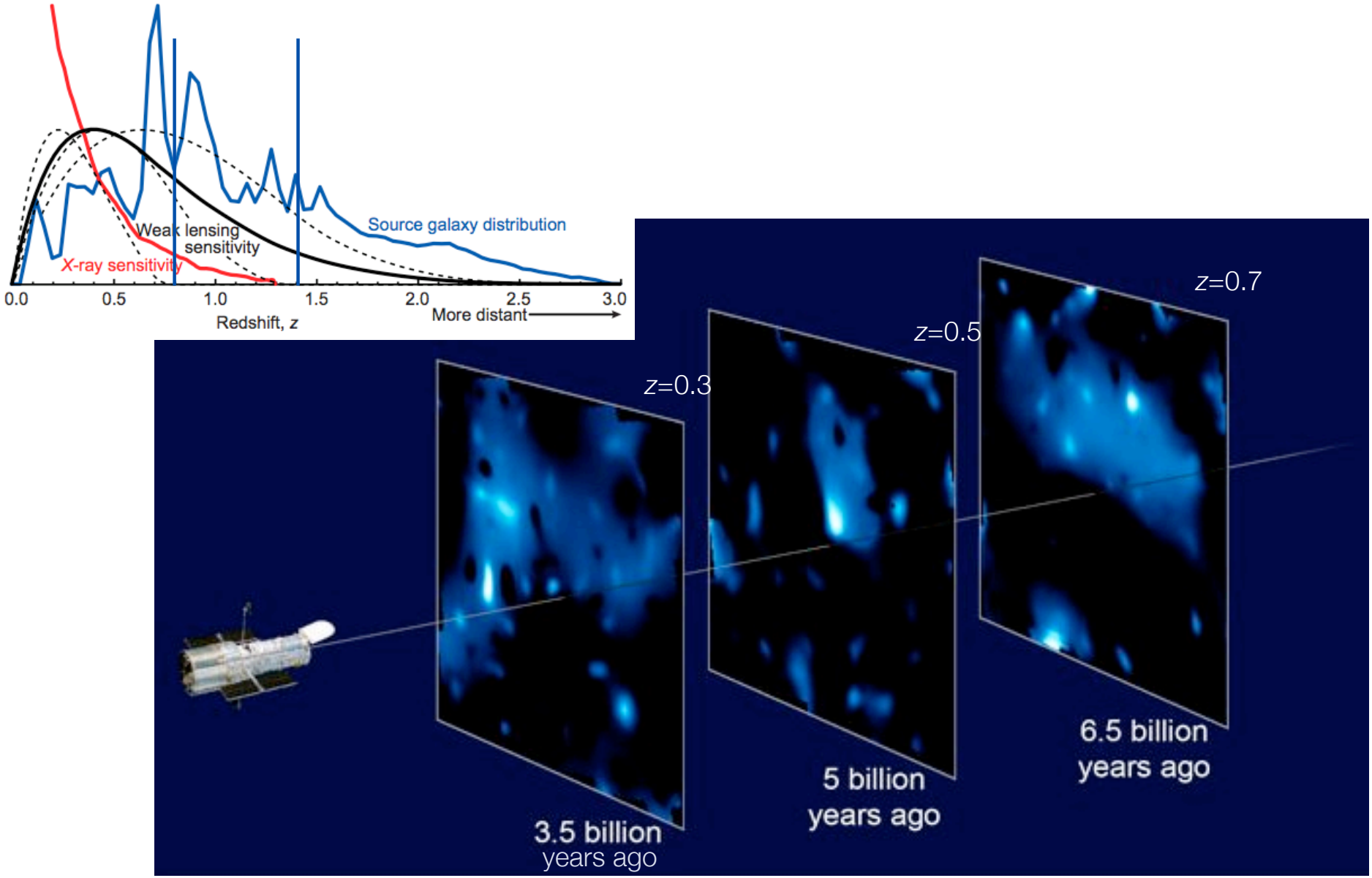
Most massive structures :

2×10^{15} M_{sun} , 30 Mpc across

LSS in 3-d
Galaxy overdensities
z = 0.1 to 1.5



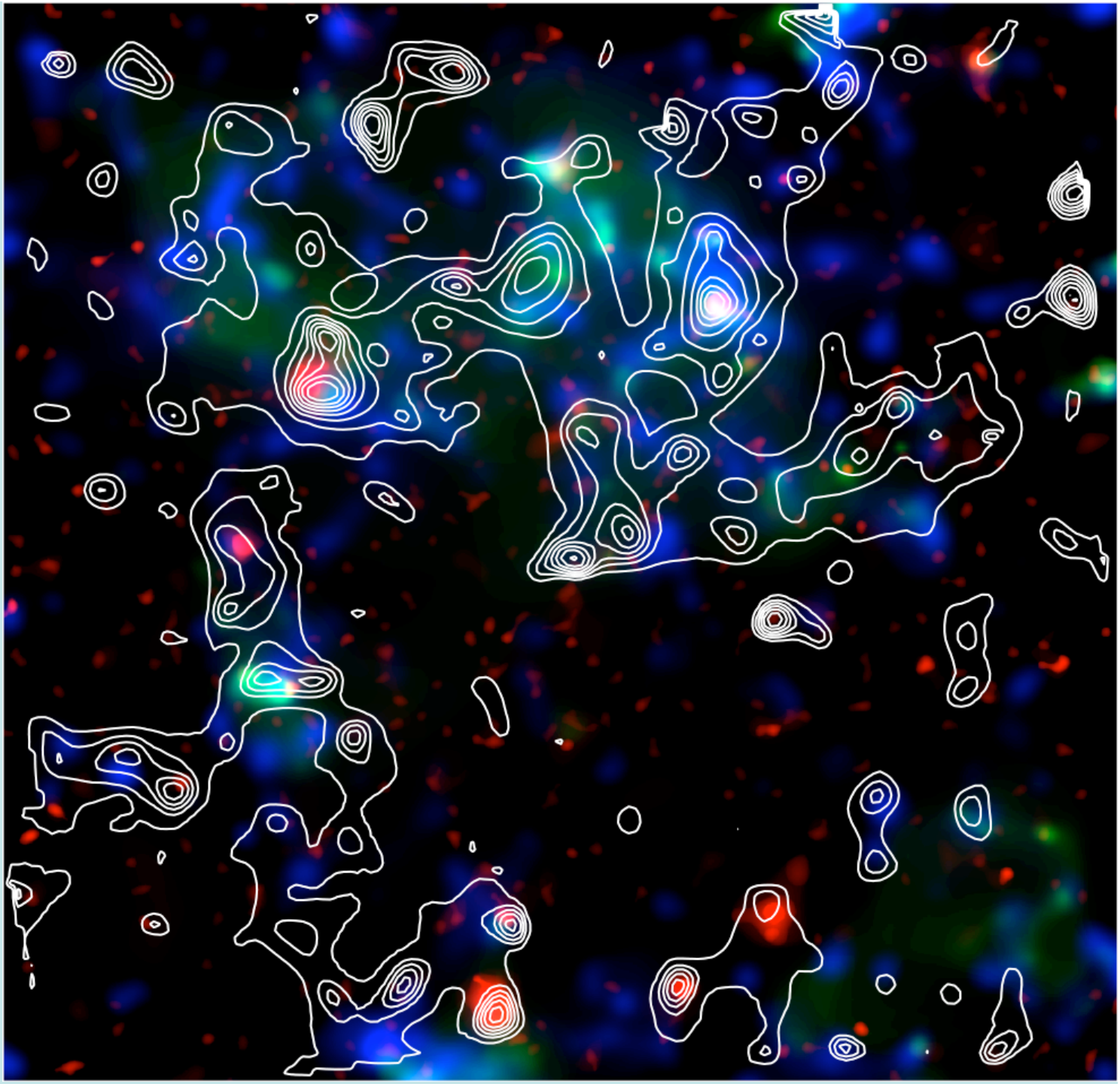
Weak Lensing -- Redshift tomography (Massey etal 2007)



Contours :
lensing DM

Red : x-ray

Blue : galaxy
mass density



COSMOS -- Dec & May visibility periods

Table 1: **IRAC Sensitivities – 5σ (AB)**

$\lambda_{\mu m}$	current (0.3 hr/pt)	2.5 hr/pt = 1 yr	5 hr/pt = 2 yr	7.5 hr/pt = 3 yr	12.5 hr/pt = 5 yr
3.6	24.0	25.2	25.5	25.7	26
4.5	23.3	24.4	24.8	25.0	25.4
total time	166 hr	1250 hr	2500 hr	4750 hr	6250
$\lambda_{\mu m}$	GOODS deep	GOODS ultra-deep			
3.6	26.4	27.2			
4.5	25.6	26.4			
total time	23 hr	100 hr			

science enabled :

z = 6 to 10 galaxies ==> expect ~1000 (truly unique science)

z = 0.5 to 6 ==> improved photz, stellar masses

==> LSS and gal. evol at z > 1

Time domain (up to ~7 yrs)

HiRes imaging (increase typically 2X)

Why COSMOS ?

Unmatched ancillary data -- deep photometry (26 mag AB)
-- complete coverage radio to xray
-- ultra-vista K coverage
-- WFC3 hopefully

Equatorial field -- accessible to ALL unique/large facilities

Low background field -- lowest for equator & uniform

Large field -- needed to probe large scale structure
-- provide enormous samples
-- should do entire 2 deg field !

Large (open) team actively producing public data archive & science