COSMIC EVOLUTION SURVEY

COSMOS

2-sq. degree survey

COSMOS-21

Subaru S05B-S06A

Intensive Program

Taniguchi et al.

COSMOS Status

Previous S-cam Runs

COSMOS-21

Key Issues & Key Words

Extragalactic Astronomy

Observational Cosmology

Evolution of Galaxies, AGNs, & DM
as a function of
Large Scale Structure Evolution

Multi-λ Strategy w/ Great Observatories

Current Status of the COSMOS

- **HST (I814): done**
- **Subaru: COSMOS-7**
- **VLT z-COSMOS: ~5,000 object**
- **XMM, VLA, GALEX: done**
- **SST s-COSMOS: going on (GO2)**
- **HST (g'), CXO: not yet**
- ***1st Year Photo-z Catalog released !***
- ***ApJ Special Issue (submit by Sep)***

Science Steering Commitee

- Nick Scoville,
- Alvio Renzini,
- Dave Sanders ,
- Mauro Giavalisco,
- Olivier LeFevre,
- Yoshi Taniguchi,
- Chris Impey,
- Martin Elvis,
- Simon Lilly,
- Mike Rich,
- Eva Schinnerrer

COSMOS Working Groups

- Data Products
- Large Scale Structure
- Star Formation
- AGN
- Morphology
- Lensing
- High-z

1st Year Photo-z Catalog

[1] S-cam r'-selected catalog (r '<26)

664,615 galaxies

[2] S-cam i' -selected catalog (i '<26)

796,494 galaxies

[a] star formation vs. *z*

[b] large-scale structures vs. *z*

[c] morphology vs. *z*

[d] AGNs vs. *z*

[e] x-ray, radio sources IDs

Suprime-Cam Observations in S03B, S04A, & S04B

S03B-239(IP): broad band (Taniguchi+)
S04A-080 : NB816 (Taniguchi+)
S04B-142(IP): COSMOS-21 (Taniguchi+)

g' (lim) = 27.0
B (lim) = 27.5
V (lim) = 27.0
r' (lim) = 27.0
i' (lim) = 27.0
z' (lim) = 25.6
NB816 (lim) = 24.7 (AB, S/N=5)

S04B-142: 30% achievement

THE ASTROPHYSICAL JOURNAL
COSMOS Special Issue

~ 50 papers !!!

Taniguchi et al. : S-cam Observations
Ajiki et al. : LAEs @ z = 5.7
Takahashi et al. : [OII] Emitters @ z = 1.2
Shioya et al. : Hα Emitters @ z = 0.24
Sasaki et al. : Galaxy Threshing System

COSMOS-21

Broad band filters - *5* (*BVr'i'z'*): *done !*

Intermediate band filters – *14* (*IA427-797*)

Narrow band filters – *2* (*NB816*, *921*)

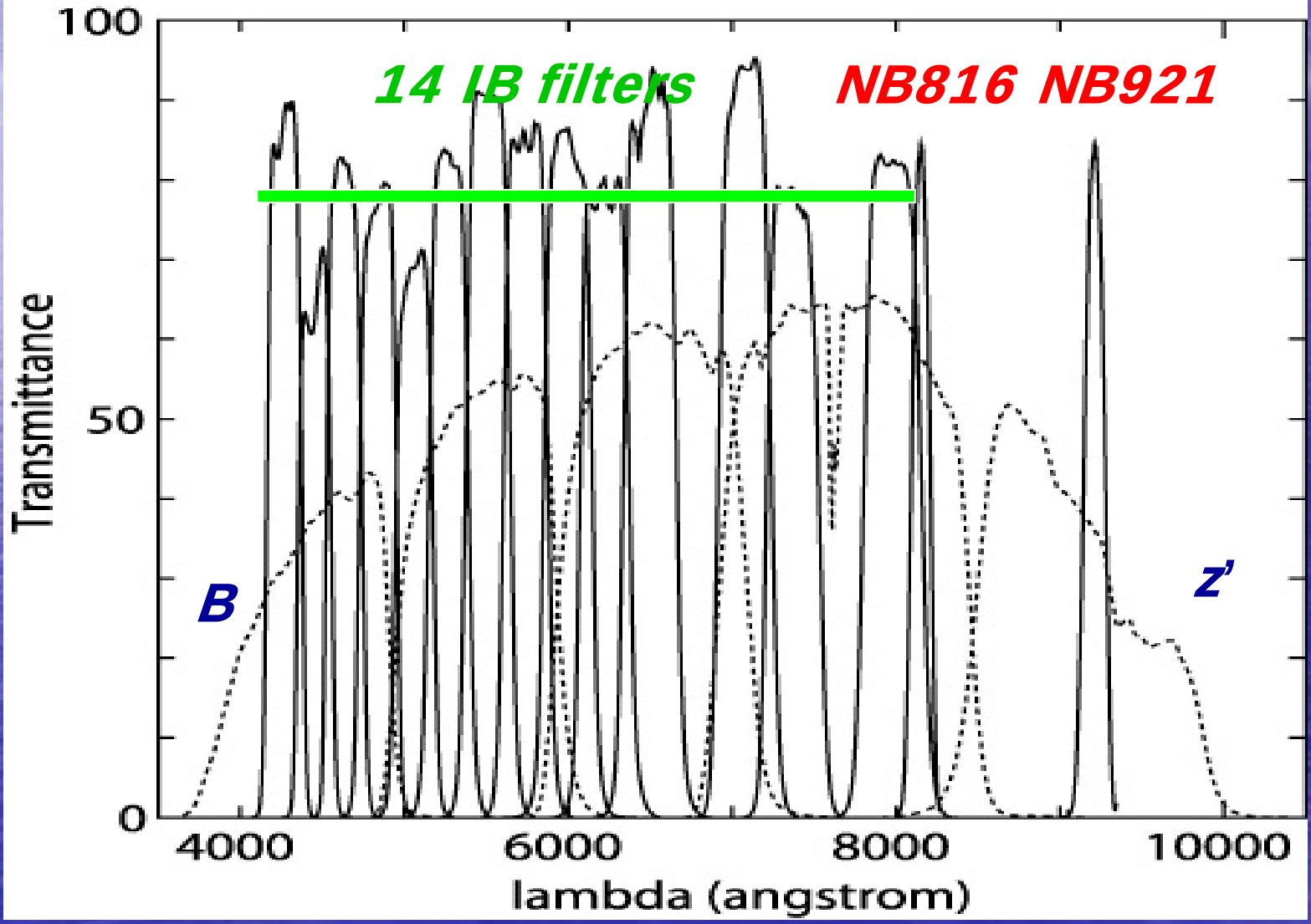
NB816: done

➔ *21* filters !

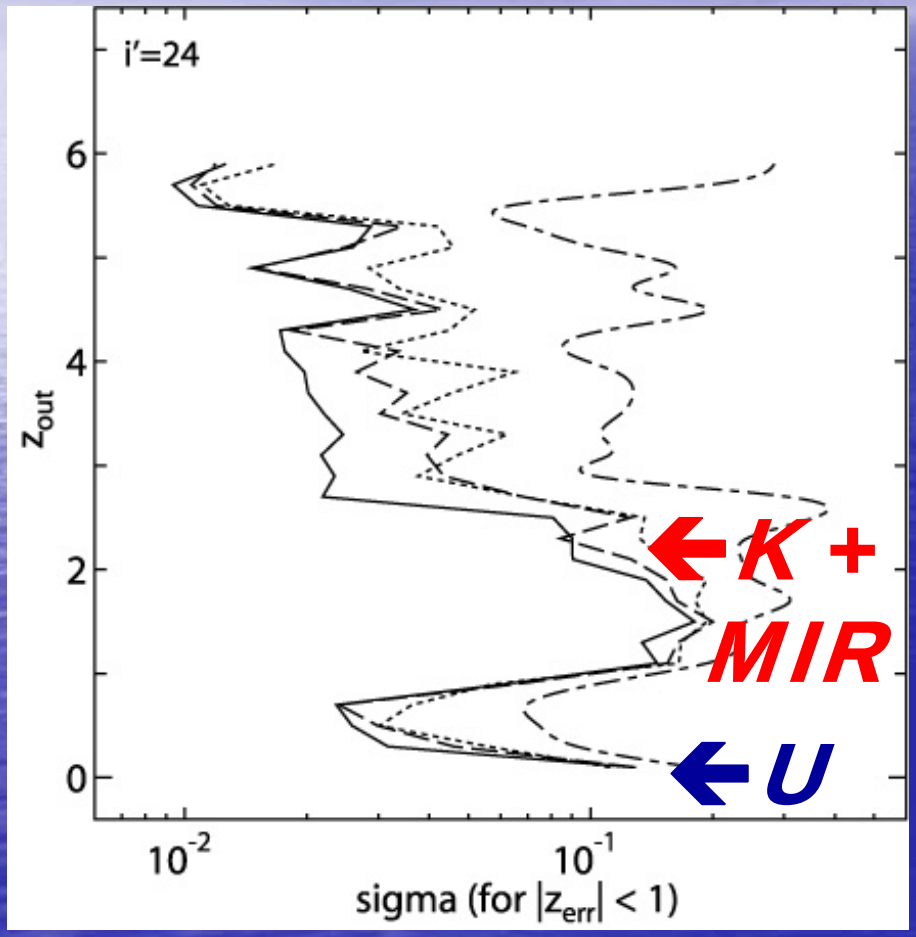
➔ [1] accurate photo-z : $\delta z/(1+z) < 0.02$
（w/ GALEX、CFHT u*、NOAO K'、SST-MIR)

[2] large-scale emitters surveys
between $z \sim 0$ and $z \sim 6.6$

COSMOS-21 FILTER SYSTEM



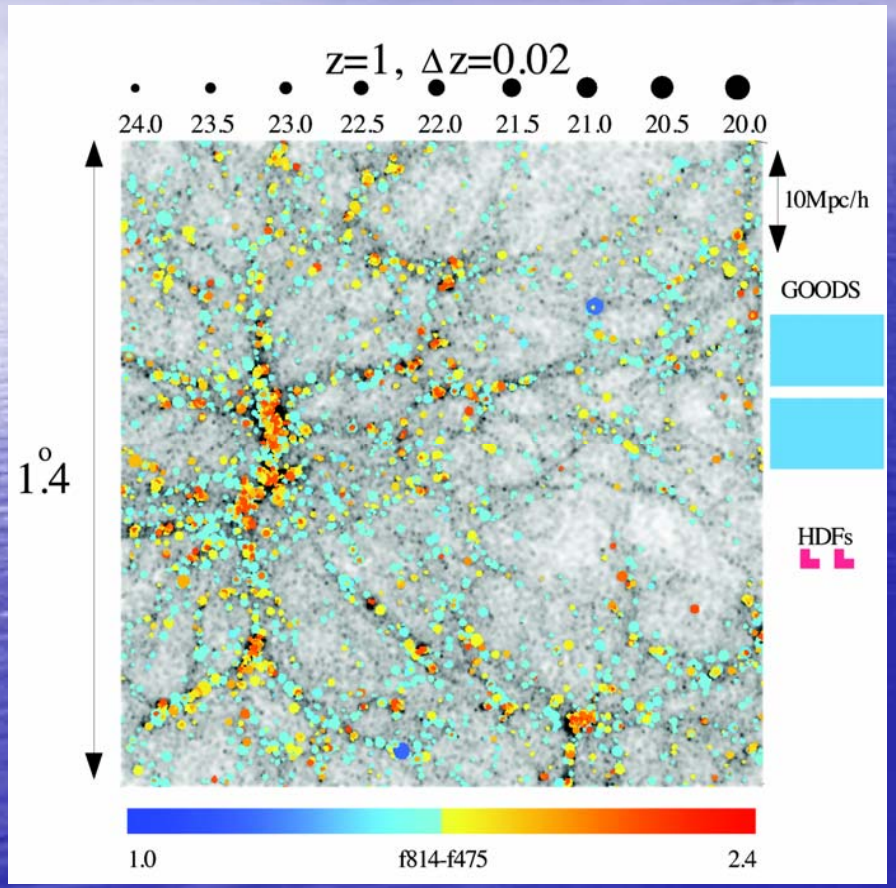
COSMOS-21
Much Accurate Photo-z

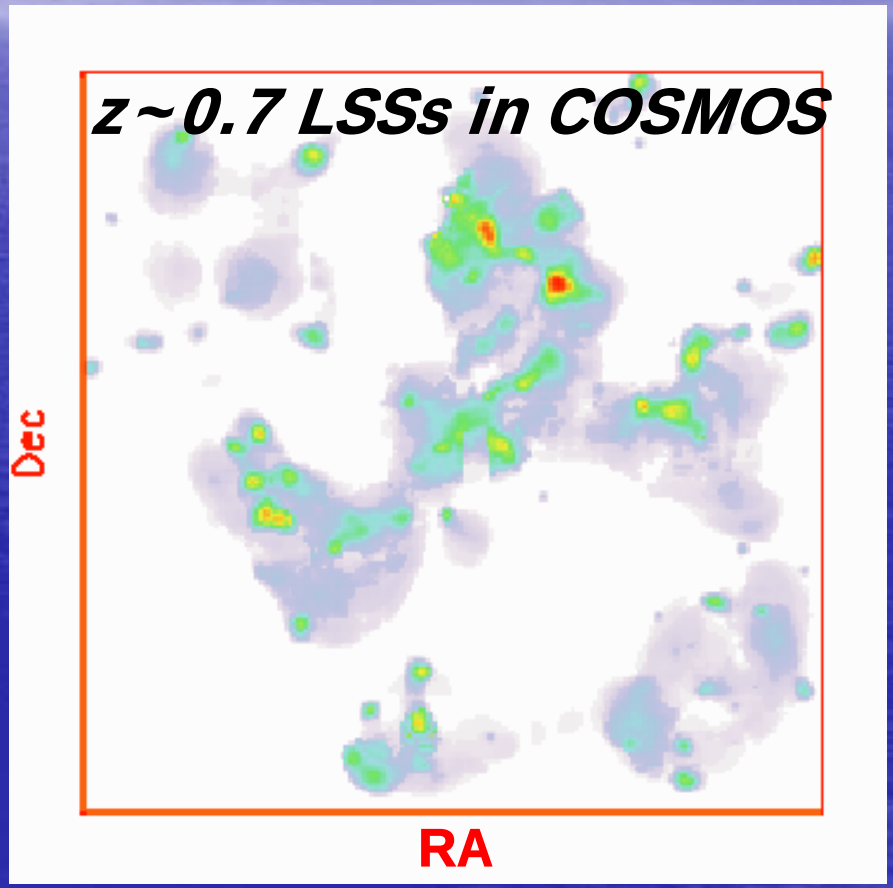


NOAO/CFHT (K)
UH88 (J)
NICMOS (H)
UKIRT-WFCAM
SST-IRAC
➔ *Good for z～2*

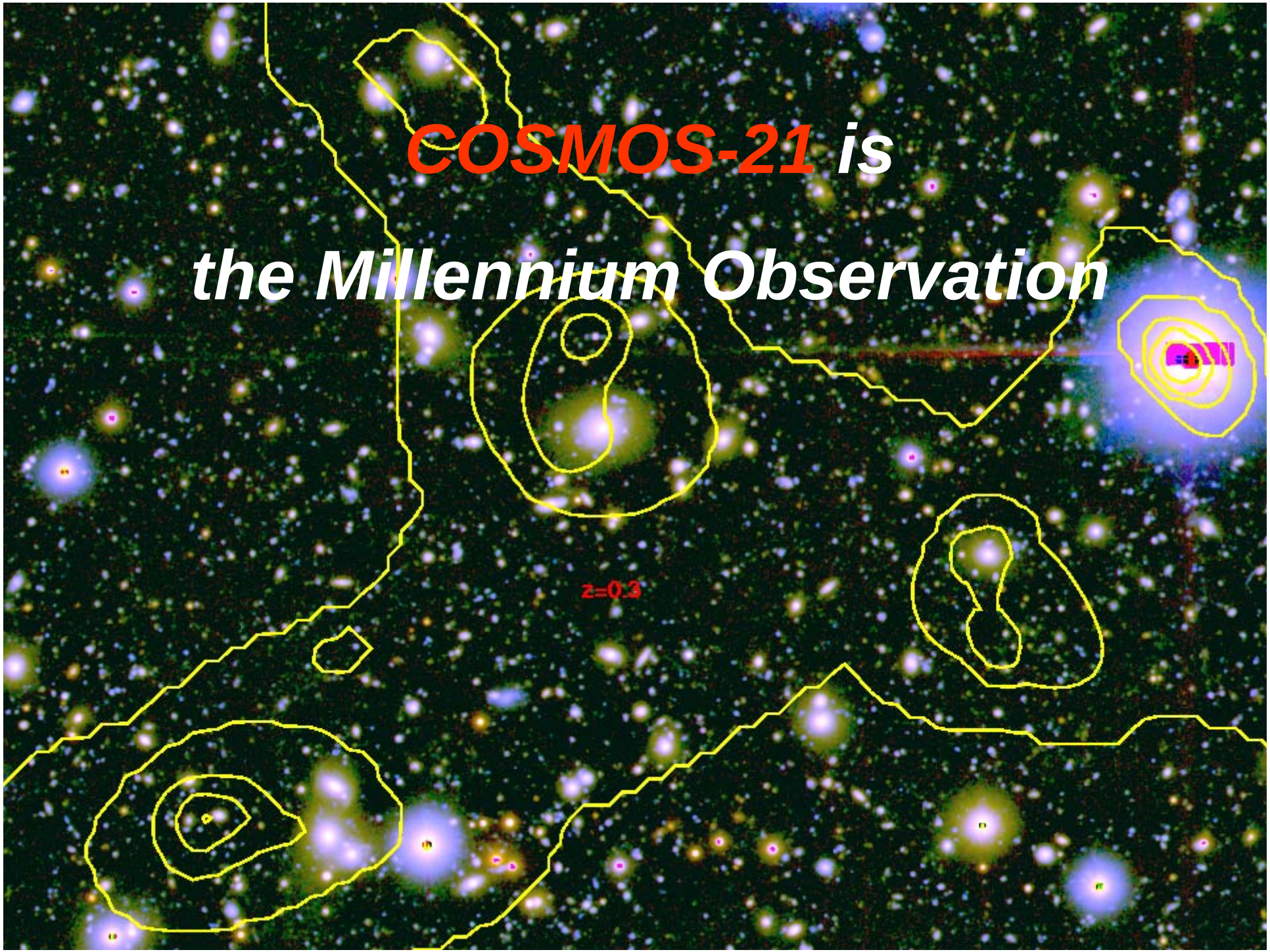
GALEX, CFHT u*
➔ *Good for low-z*

Probe LSS Evolution Accurately !





ΛCDM (Frenck et al.) Current Observations


COSMOS-21 is
the Millennium Observation
z=0.3

Large-scale search for emitters

Lyα z = 2.5 – 6.6
[OII] z = 0.15 – 1.4
Hα z = 0 – 0.41

- **Systematic Search for ～400,000 Emission-Line Objects**
- **Accurate photo-z for ～1,000,000 Objects**

Accurate Photo-z & Emitter Survey
➔ Complementary !!!

Broad & Intermediate+Narrow

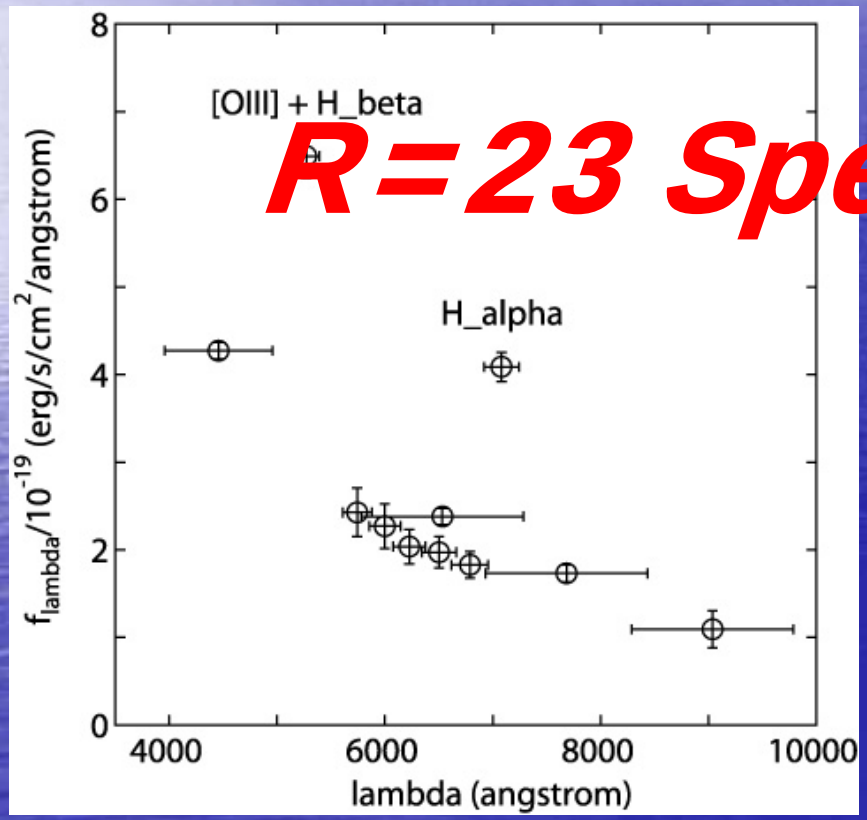
(1) LBG vs. LAE

(2) [Starburst vs. AGN] vs. Normal
Needs AGN SED templates

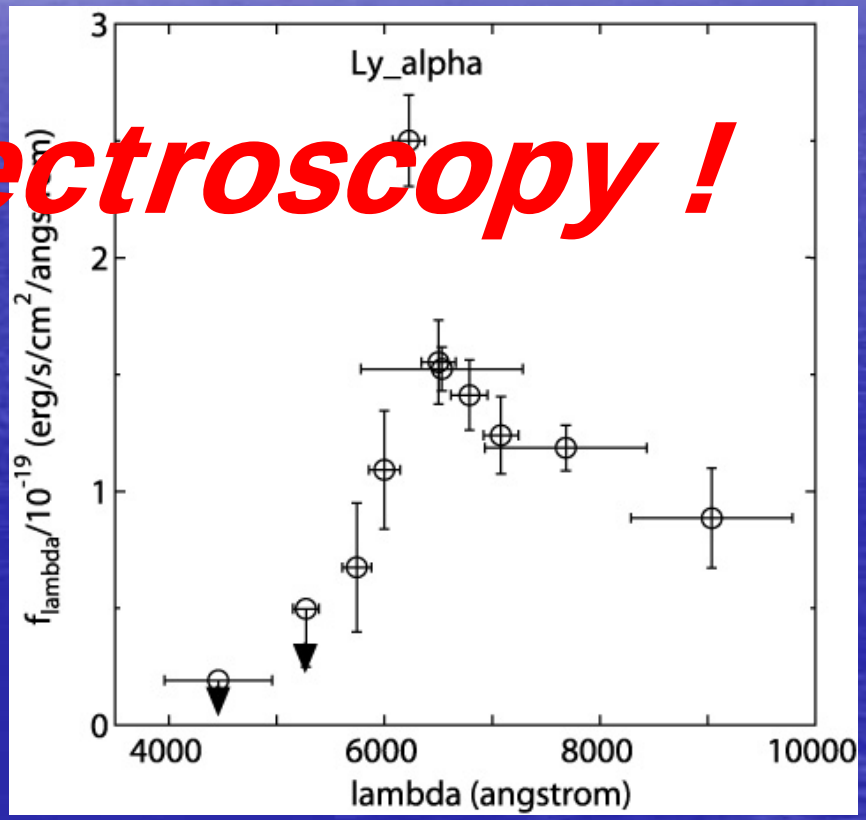
(3) z-COSMOS vs. COSMOS-21
- ➔ 10^5 (sp-z) vs. 10^6 (photo-z)
- ➔ Template tuning
- ➔ Feed back to Photo-z business

MAHOROBA-11

(Yamada F. S. et al. 2005)

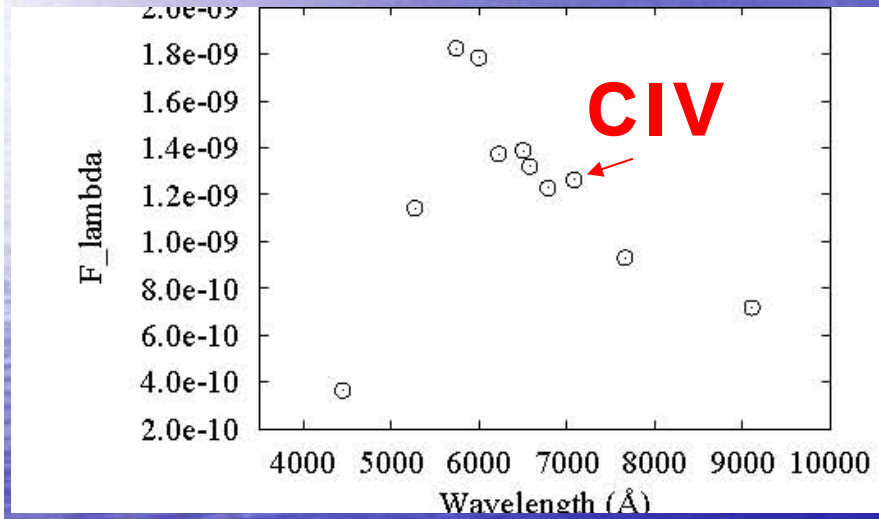


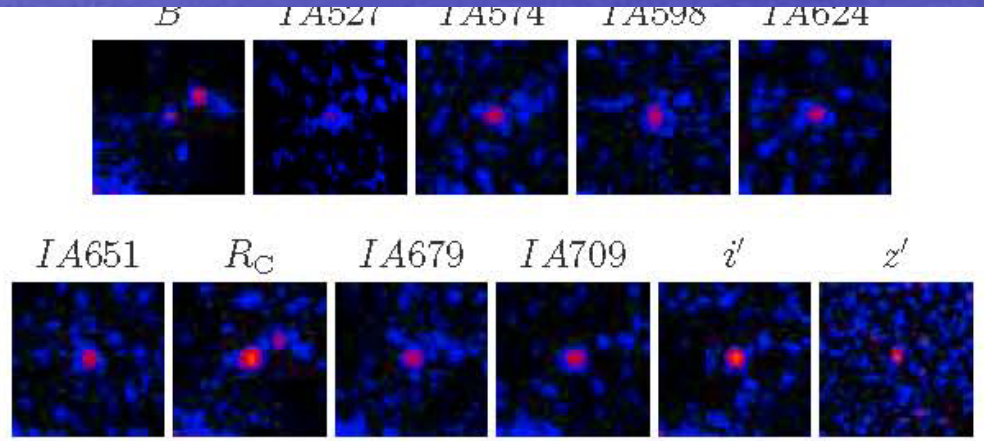
R=23 Spectroscopy !



z (phot) = 0.05 ***z (phot) = 4.13***

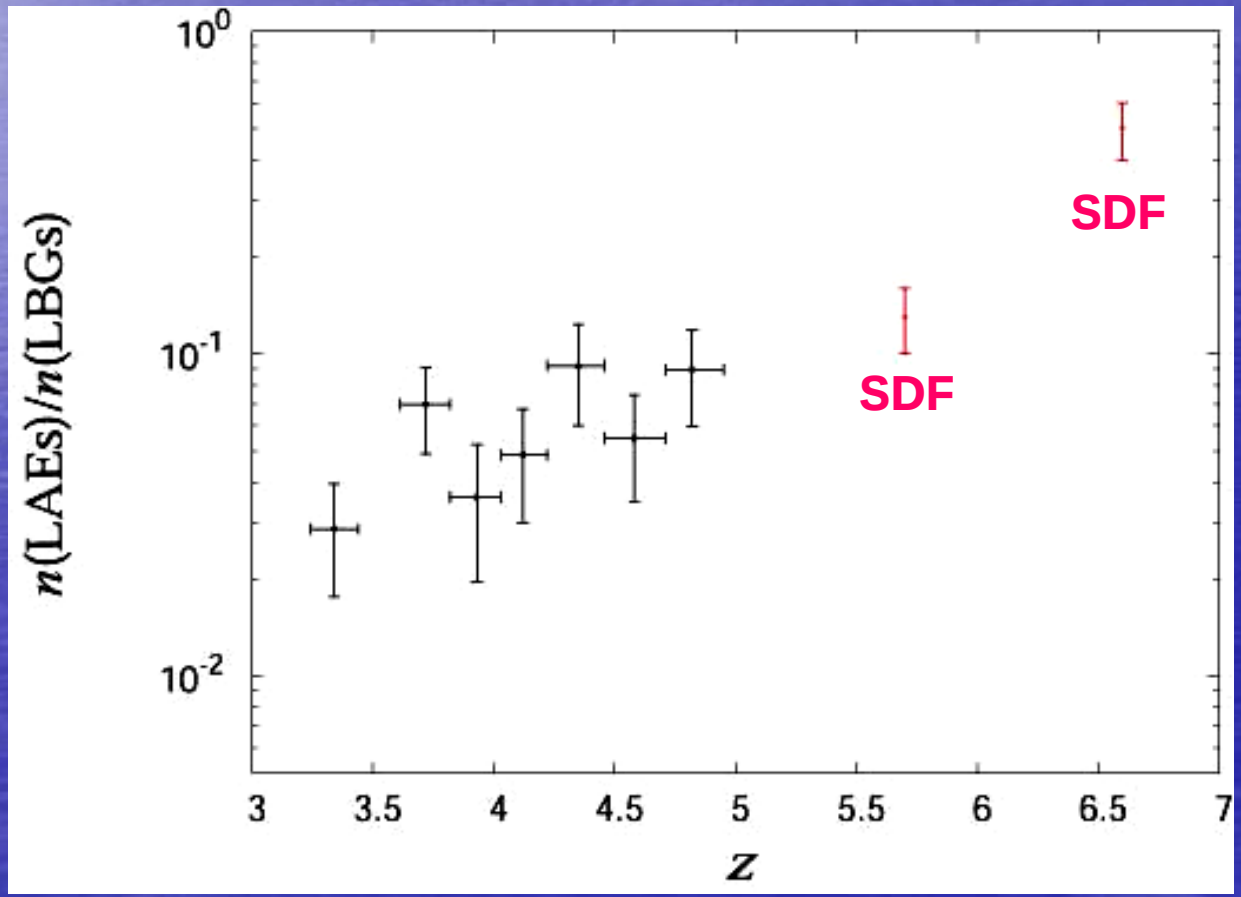
MAHOROBA-11 Quasar Survey (Sasaki et al. 2006)





Quasar @ z=3.62

MAHOROBA-11
LAE to LBG Ratio @ z ~ 3 – 7
(Sumiya et al. 2006)



Summary

1st Comparative Study of LSS Evolution between Observations and Theory w/ accurate photo-*z* mapping

1st Systematic Study of Evolution between LGB & LAE (or Normal vs. Emitters)

The Biggest Survey for Faint AGNs (>>COMBO-17)

➔ Starburst – AGN Connection