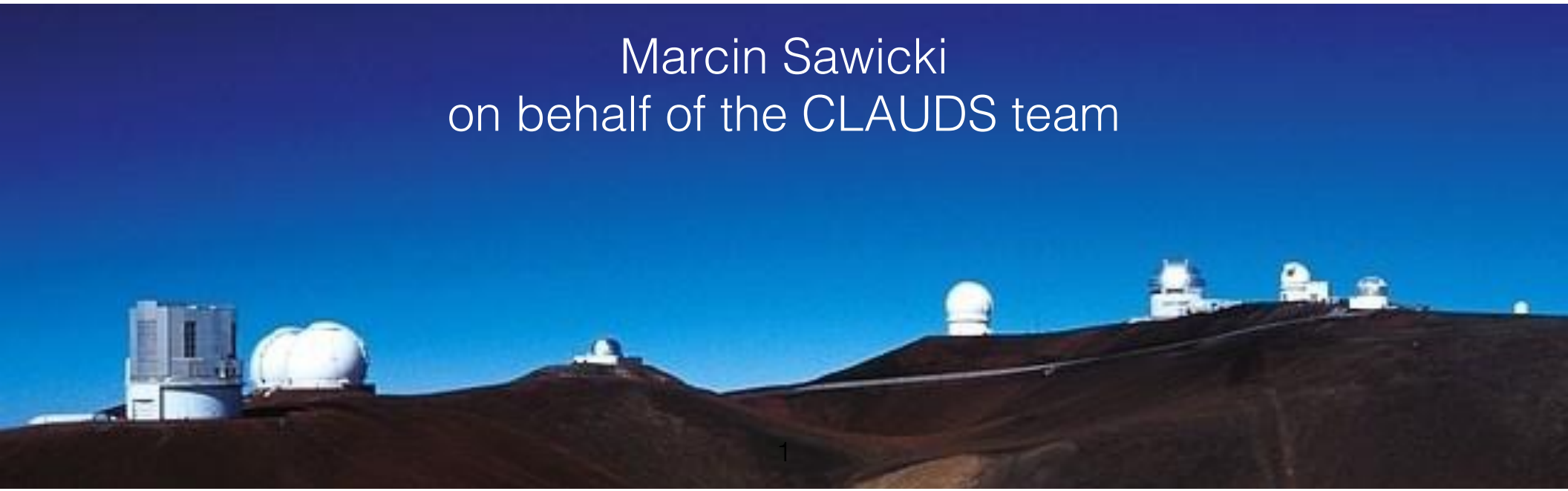
CLAUDS + HSC SSP

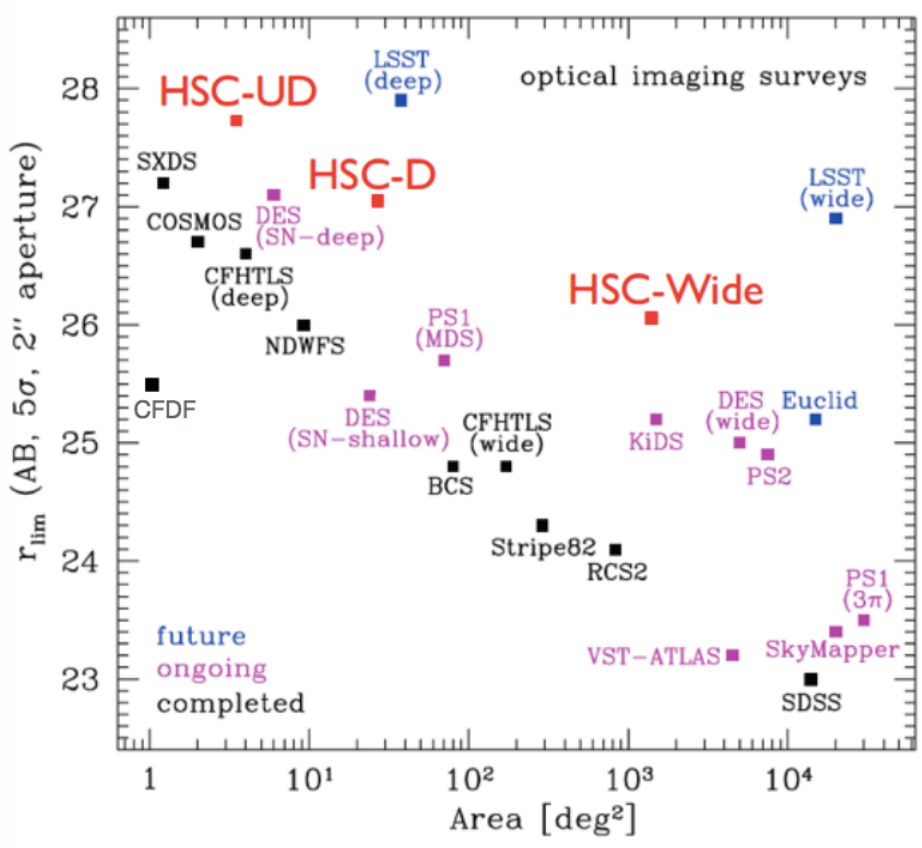
CFHT Large Area U-Band Deep Survey

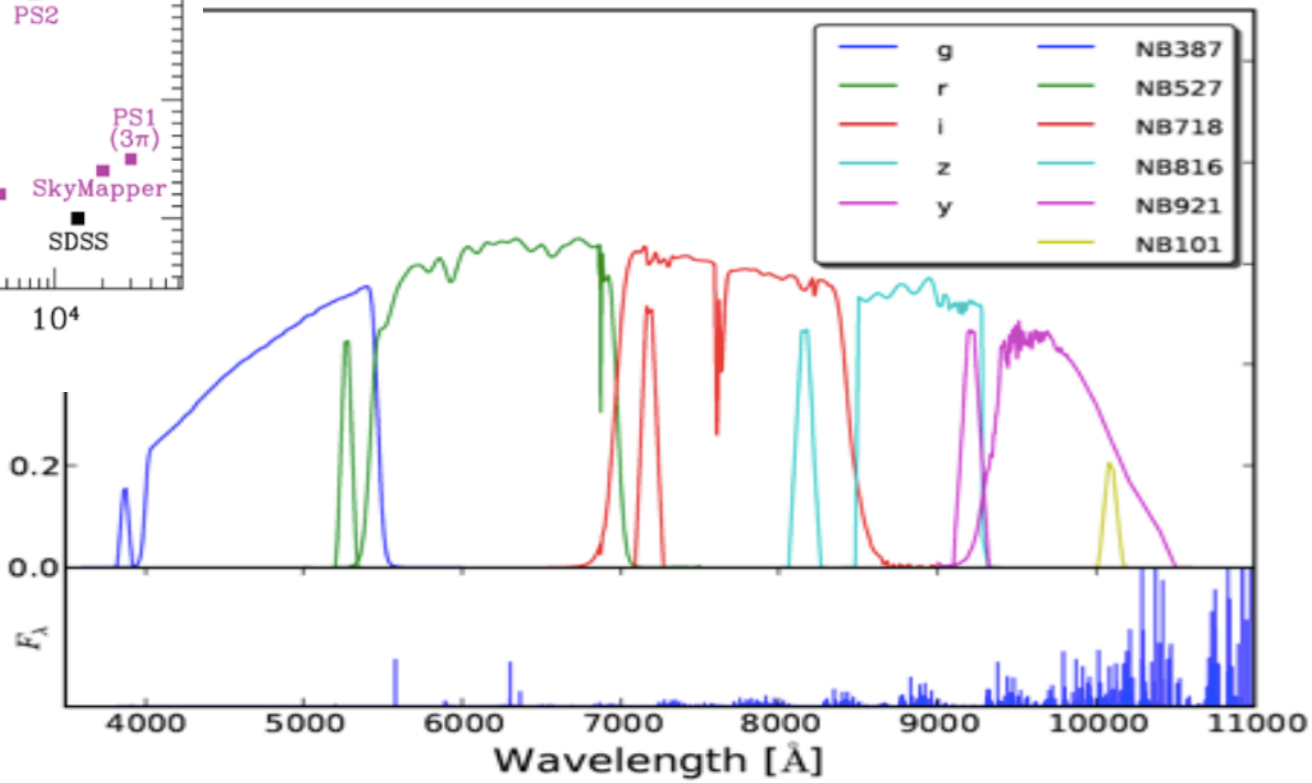
20 deg^2 of u=27AB CFHT imaging in the HSC Deep Layer

Marcin Sawicki
on behalf of the CLAUDS team



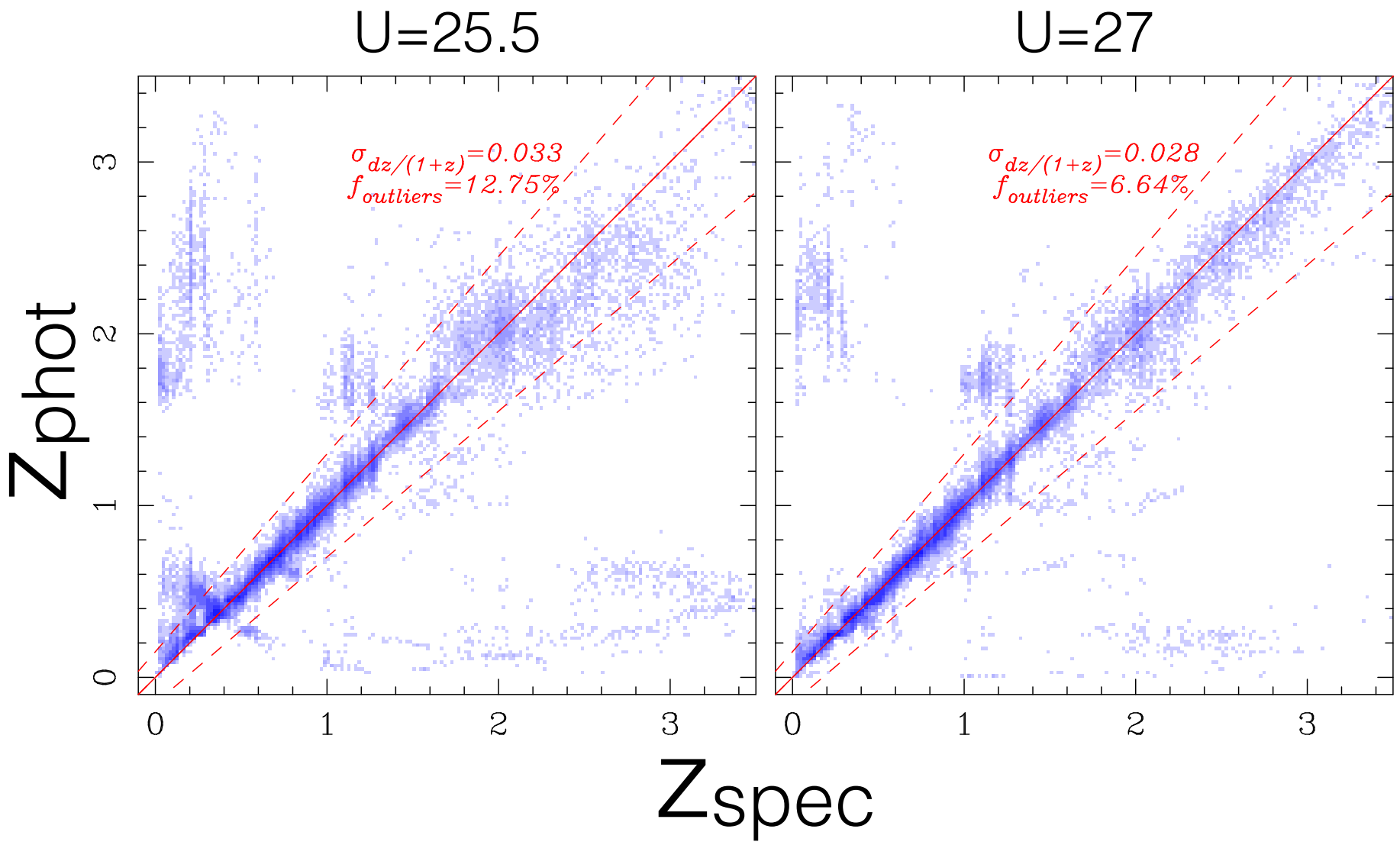
HSC Strategic Survey Program





The power of U

photo-z simulations by Masayuki Tanaka:



The power of U

U-band gives:

1. **better photometric redshifts** (especially at z<0.5 and z~2–3): reduced scatter and catastrophic failure rates

2. **z~2-3 U-dropout/BX/BM galaxy selection**

3. **improved SFR estimates** (SFR=dM/dt) from massive young (blue) stars —> improved SED fits

4. **continuum for NB387** better than g-band —> LAEs, Ly-alpha blobs at z~2.2

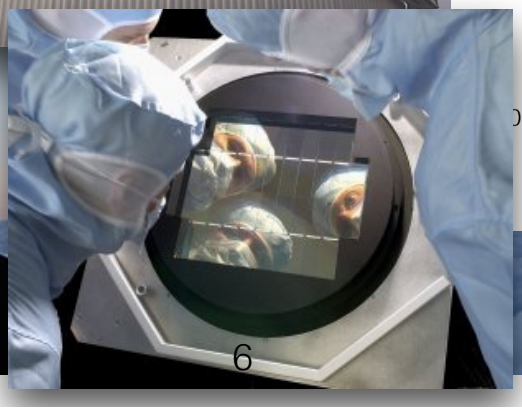
CLAUDS: the survey

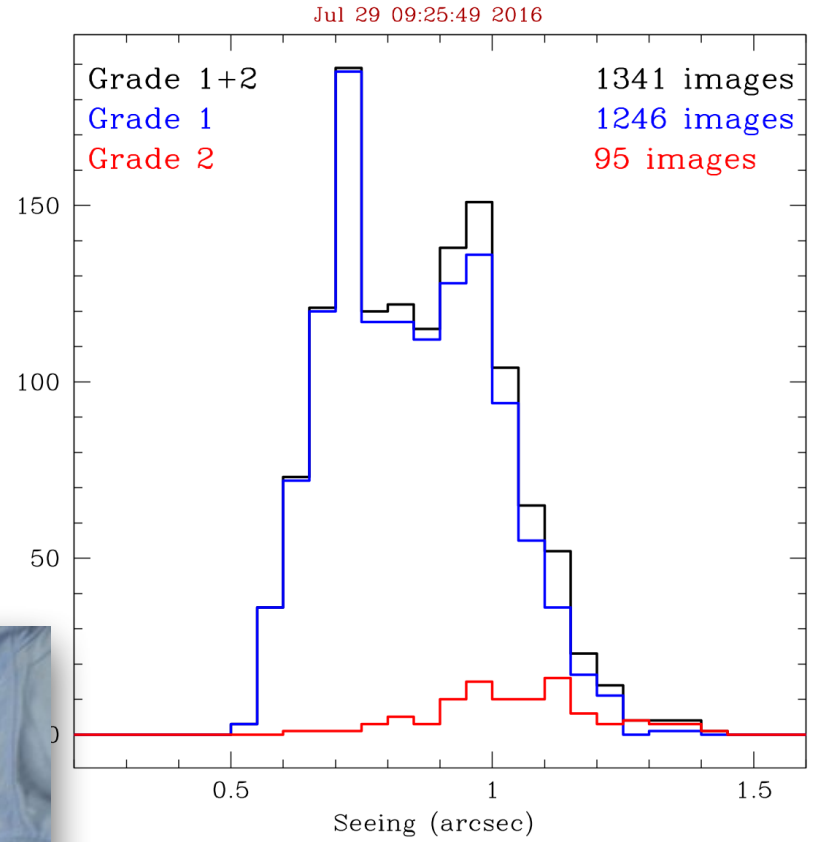
- Goal: match HSC-Deep in u-band
    - depth (U~27 AB, 5σ, 2”)
    - seeing (<1”)
    - area (20 deg^2)

- Project: CLAUDS (CFHT Large Area U-band Deep Survey)
    - MegaCam on CFHT
    - Canada + France + China
    - awarded 375 hrs = 68 dark-time nights

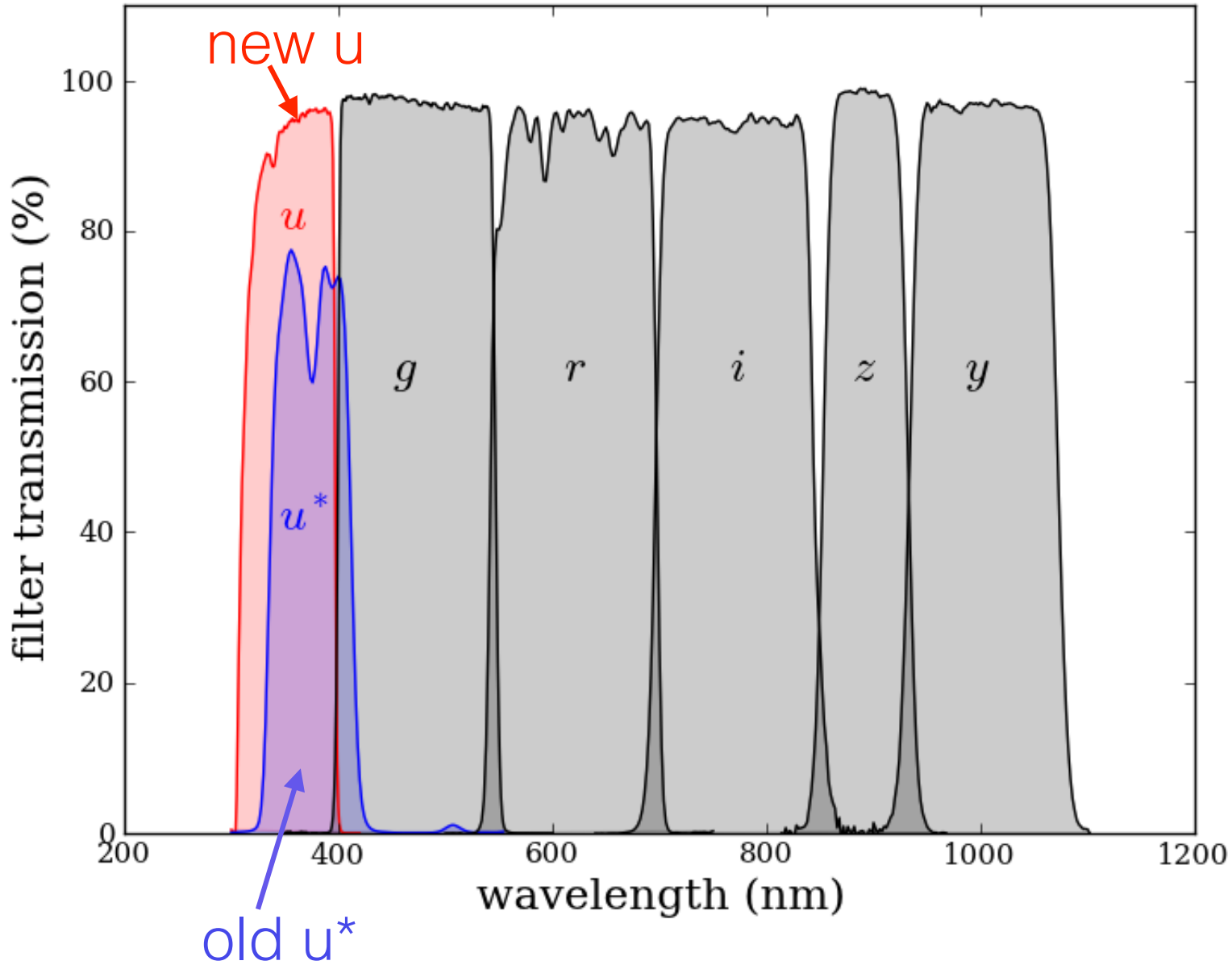
MegaCam on 3.6m CFHT

- FOV = 1 deg^2
- UV-sensitive CCDs (unlike most wide-field imagers)
- Superb site —> great seeing (~0.85”, in u-band)
- new high-throughput filters





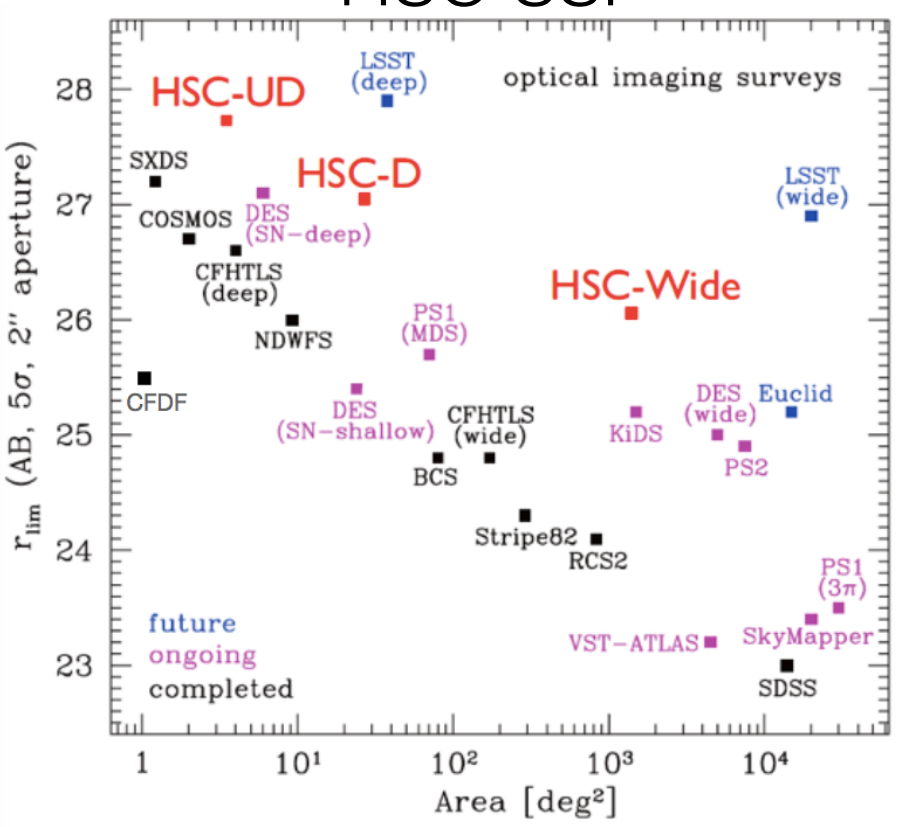
HSC + CLAUDS filters



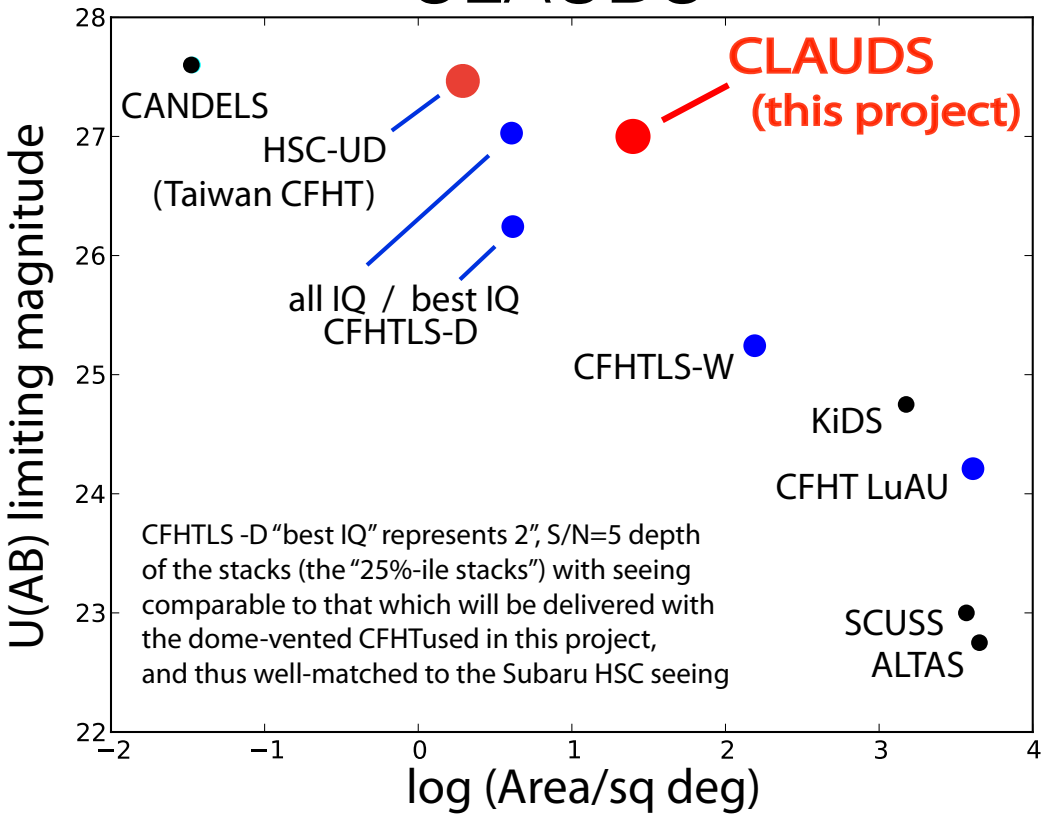
CLAUDS: the survey

combination of area & depth unmatched until LSST

HSC SSP



CLAUDS

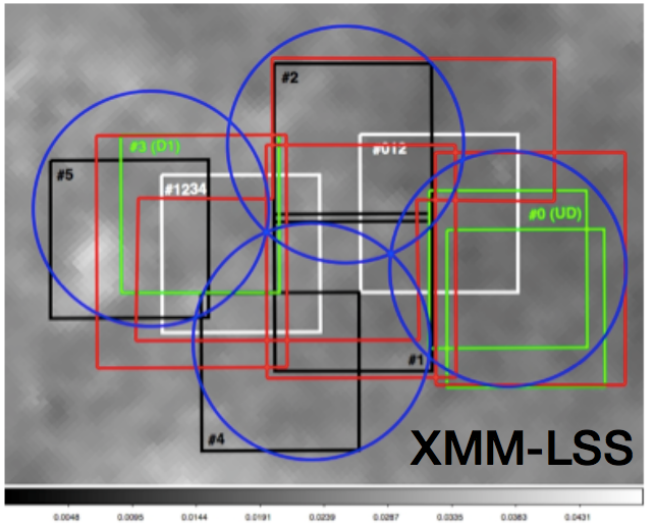


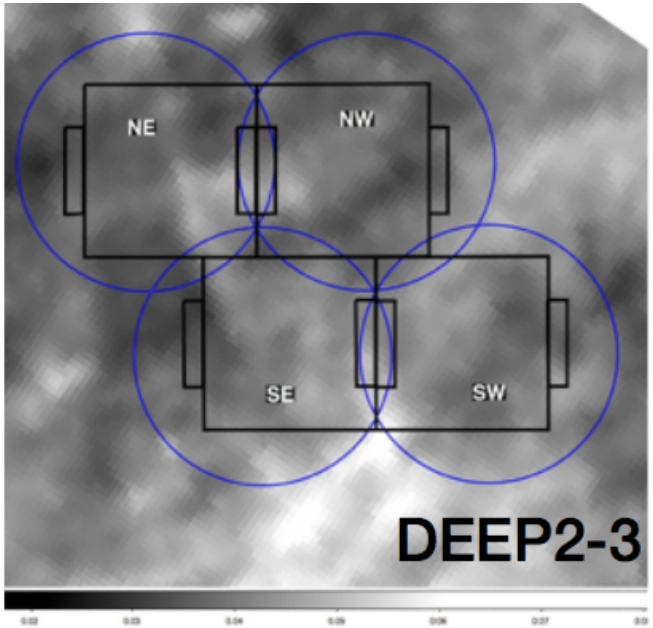
CLAUDS: the survey

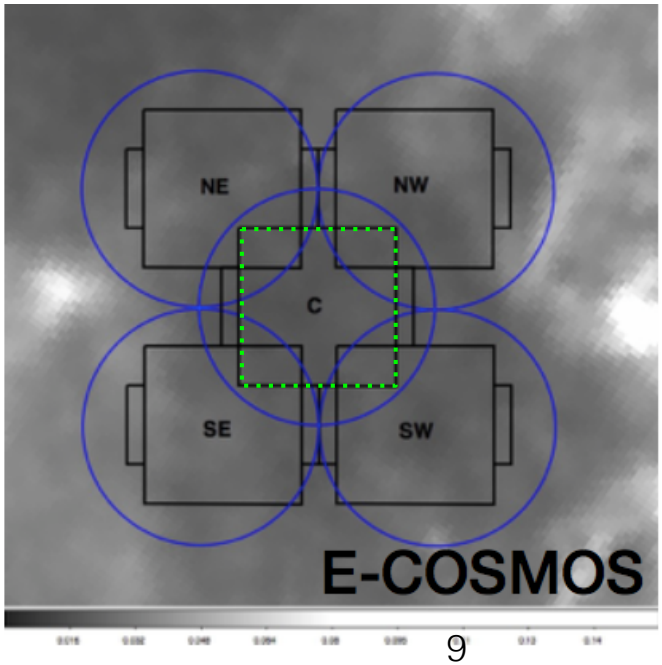
new (CLAUDS)

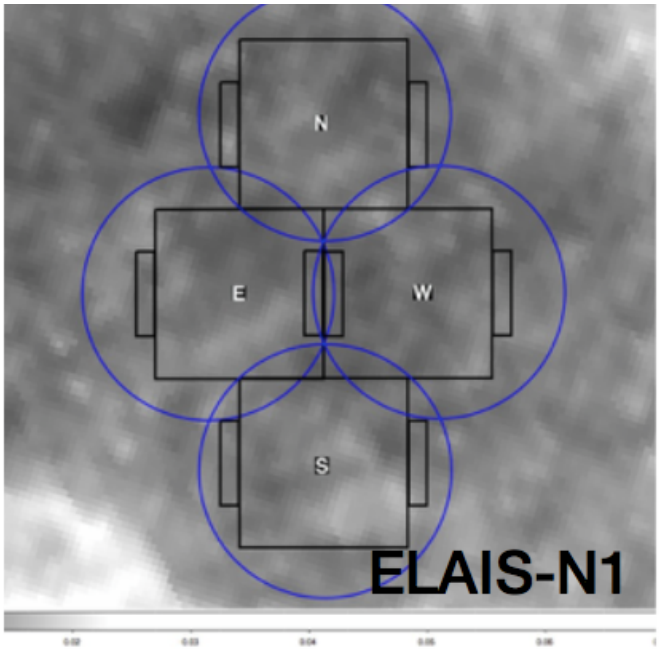
archival u data

HSC Deep









CLAUDS: progress with data

	allocated	allocated	observed &
		= 68.2 nights	

- ☑ Observations completed in 2016B
- ☑ Images stacked & photo calibrated
- ☑ Aligned with HSC data (astrometry, pixels)
- ☑ Partial catalogs

TO DO:

- ☐ Full HSCpipe-style catalogs

Data processing

STEPHEN GWYN

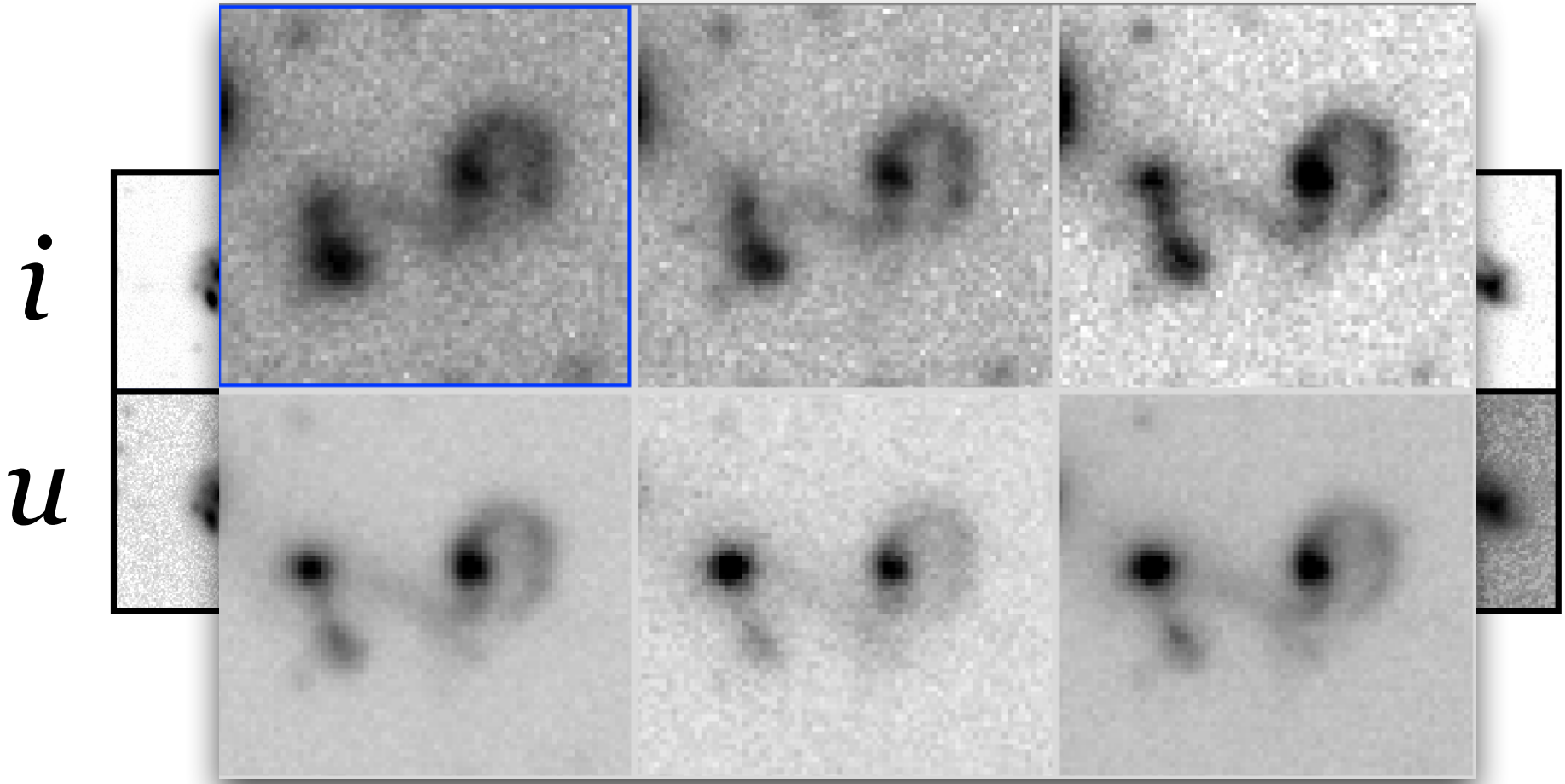
JEAN COUPON

ANNEYA GOLOB

- **Image processing (modified MegaPipe software)**
  - photometrically and astrometrically calibrated images in the HSC tract/patch format
- **Photometry & catalogs**
  - HSC-like u+grizy catalogs (cModel mags etc.)

  — AND —
  - SExtractor catalogs
- **Data validation**
  - tests to validate data, assess quality etc.

CLAUDS: data examples



This is ~ what the final Deep Layer data will be like

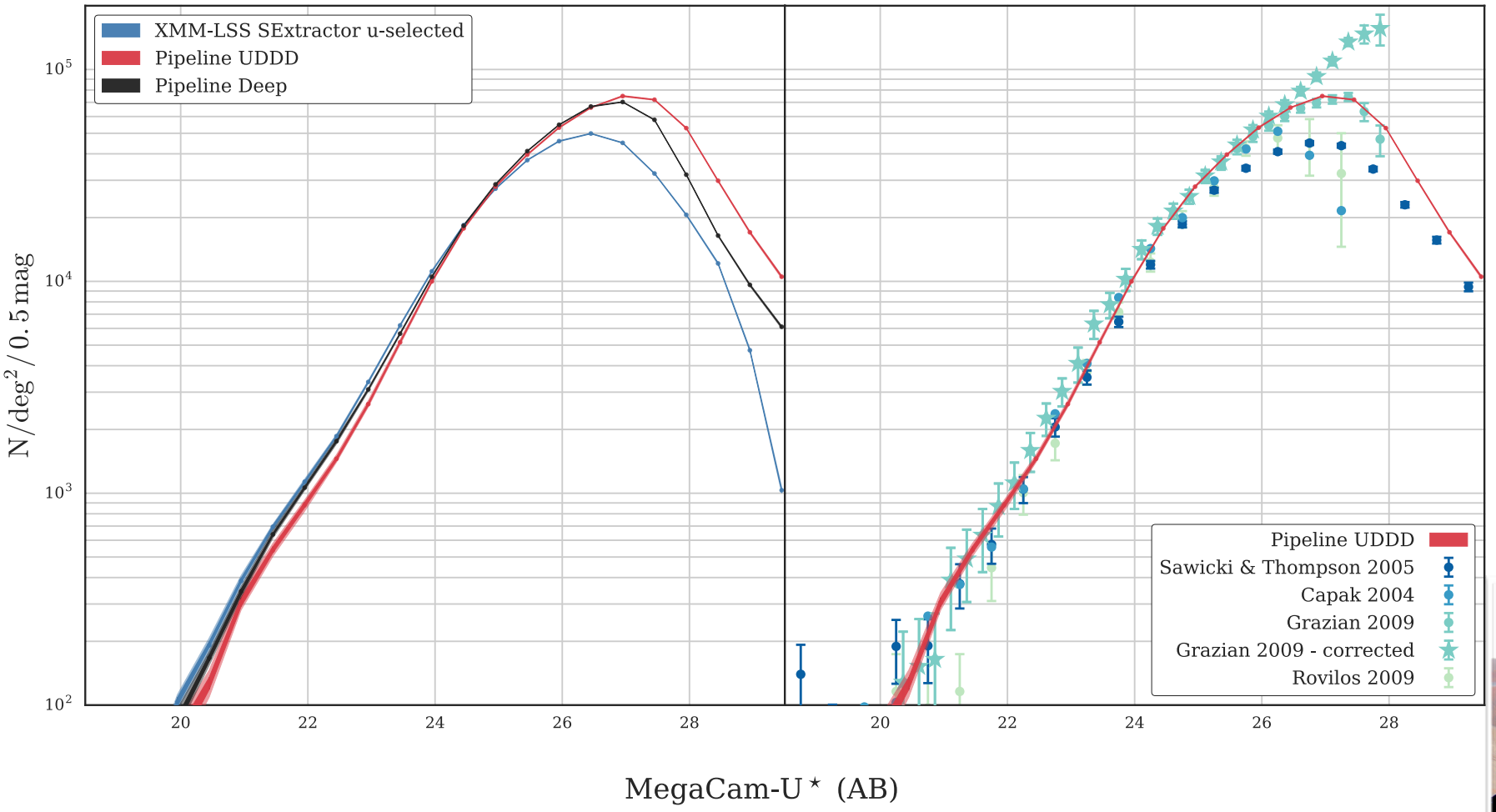
U-band number counts

u-band counts

4.5 deg^2 in Deep
1.5 deg^2 in UDDD

CLAUDS done different ways:

CLAUDS vs previous work:



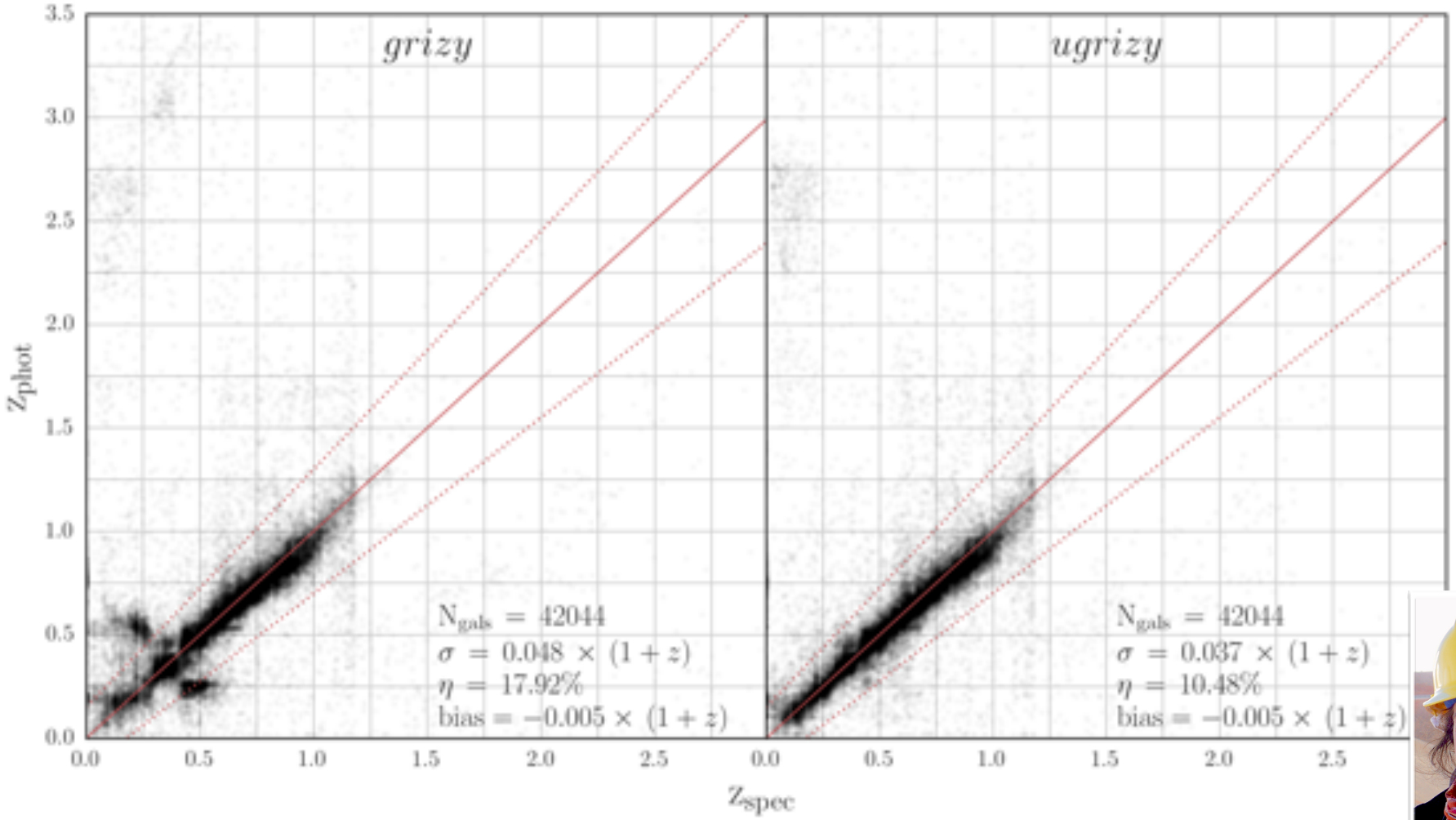
ANNEYA GOLOB

Photometric redshifts

photo-z's vs spec-z's

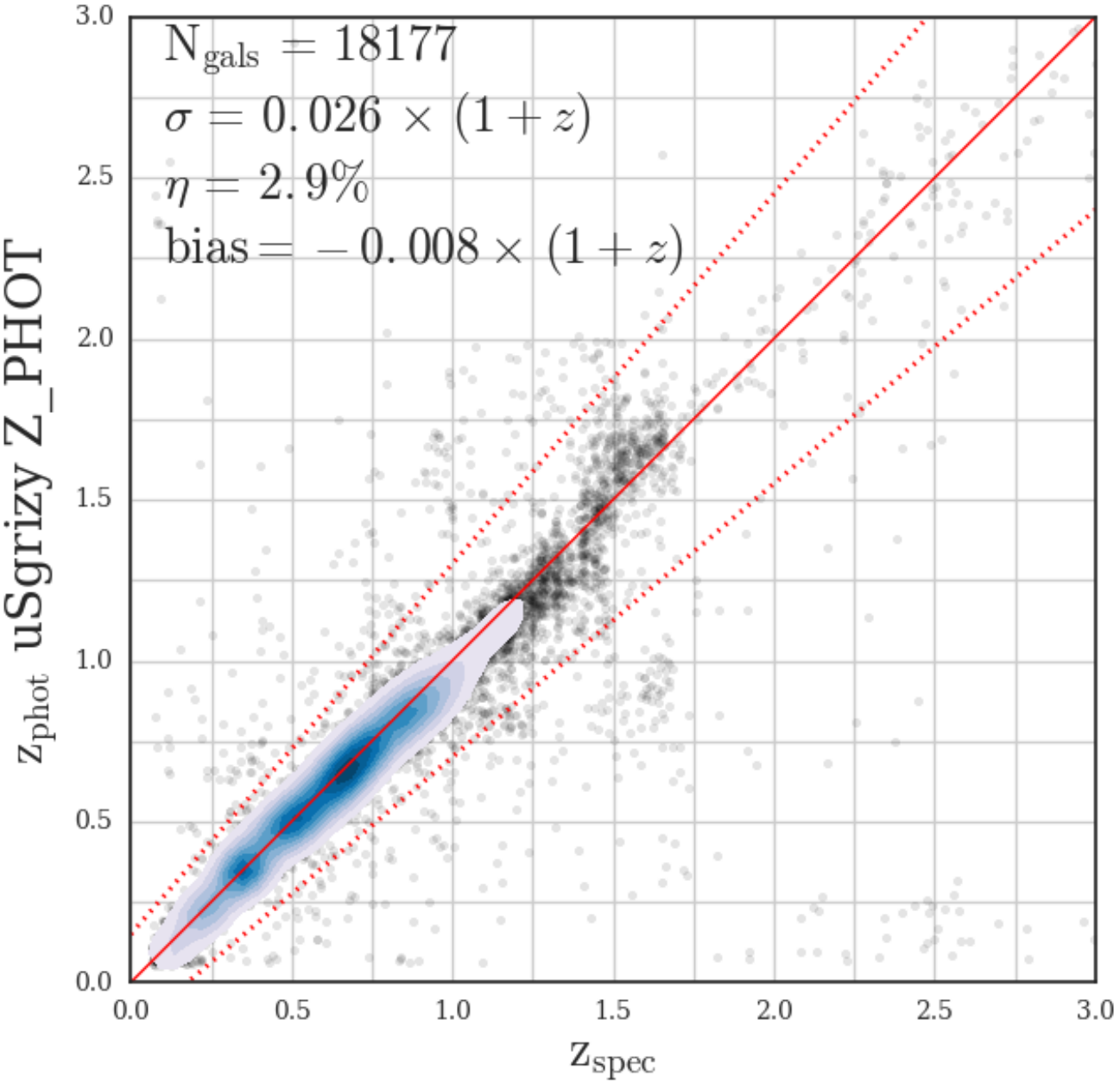
XMM-LSS + E-COSMOS

without u: with u:



ANNEYA GOLOB

Photometric redshifts

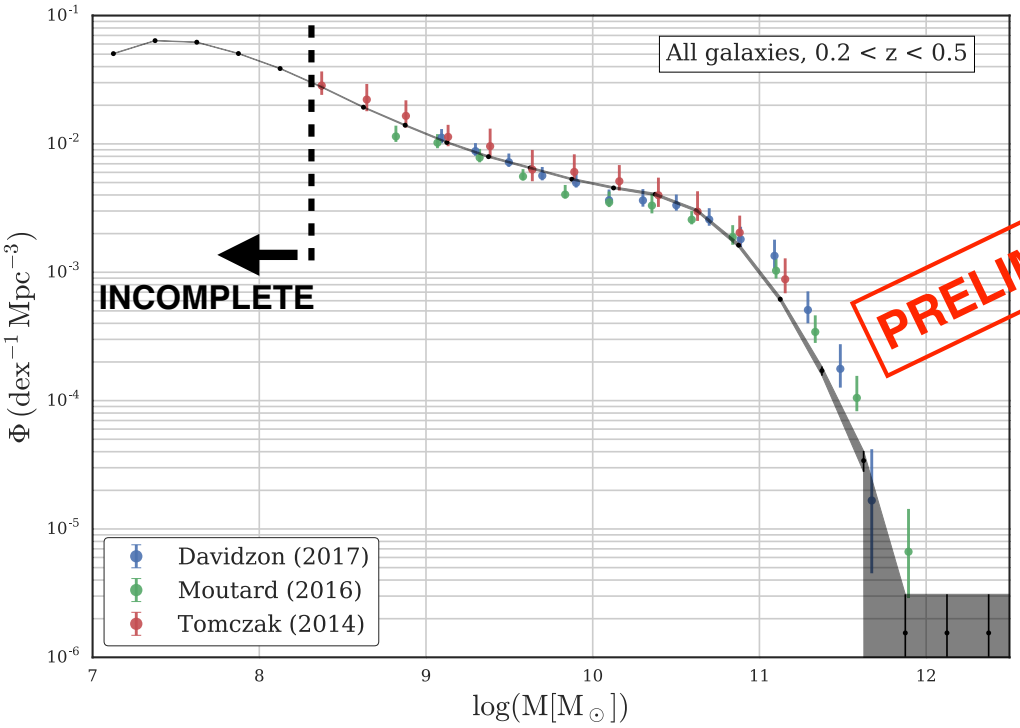


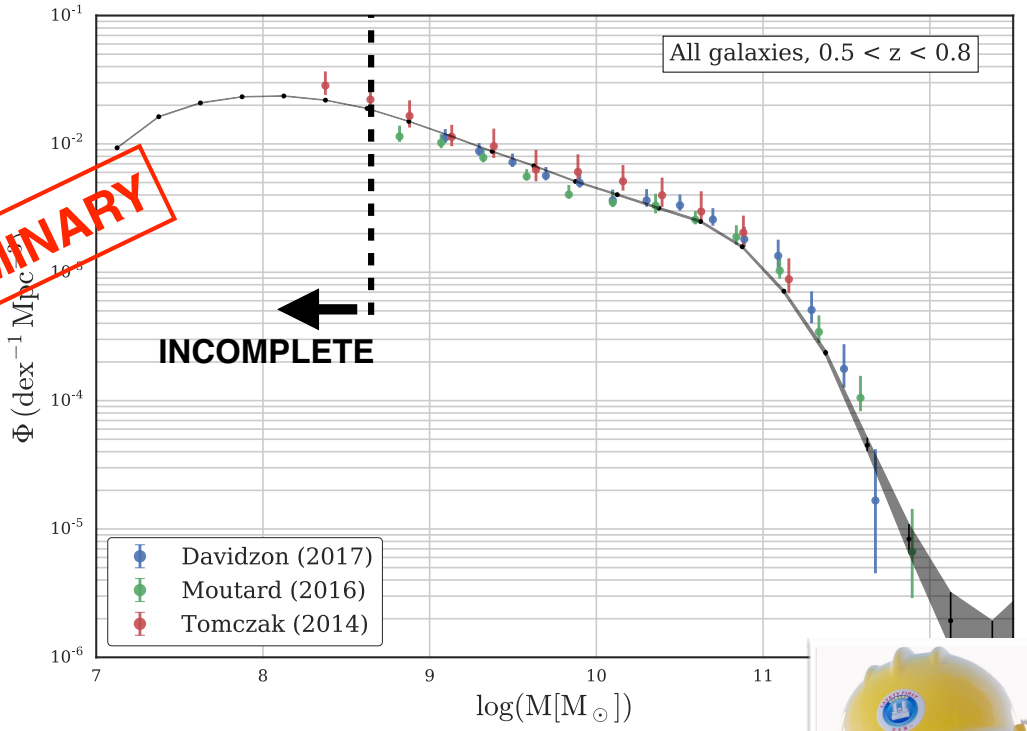
ANNEYA GOLOB

Stellar mass functions

- 4 sq deg of data (so far)
- not incompleteness corrected yet

Total galaxy stellar mass functions





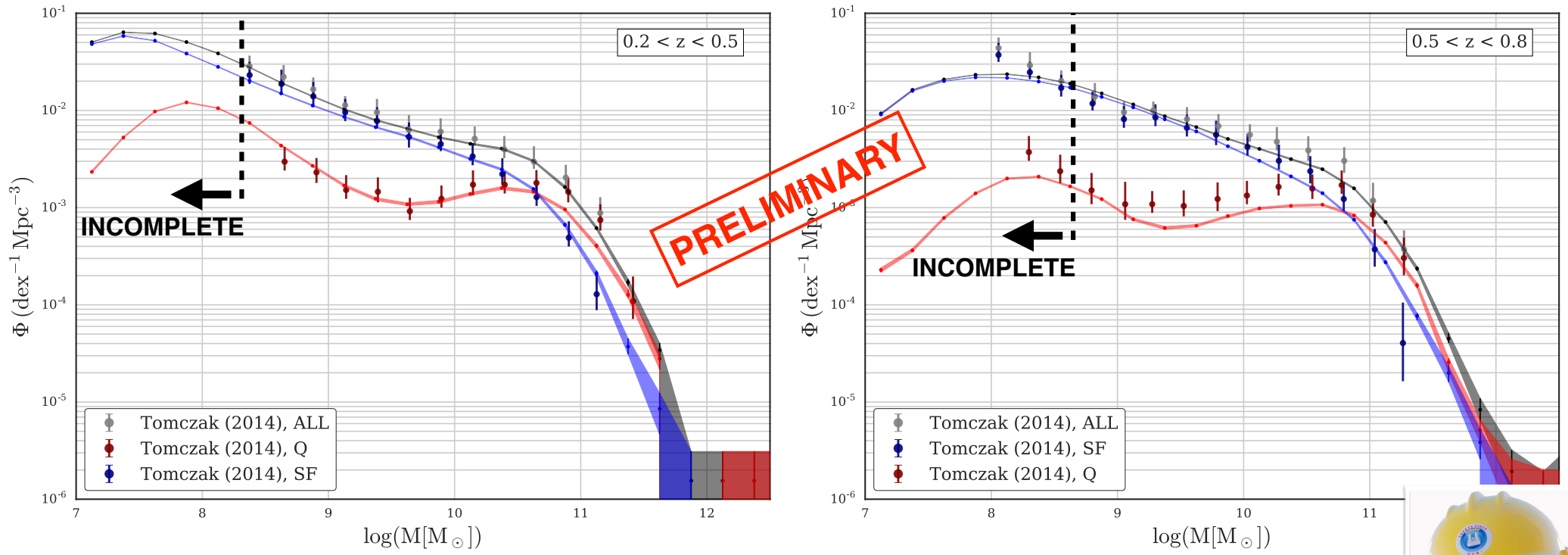
PRELIMINARY

ANNEYA GOLOB

Stellar mass functions

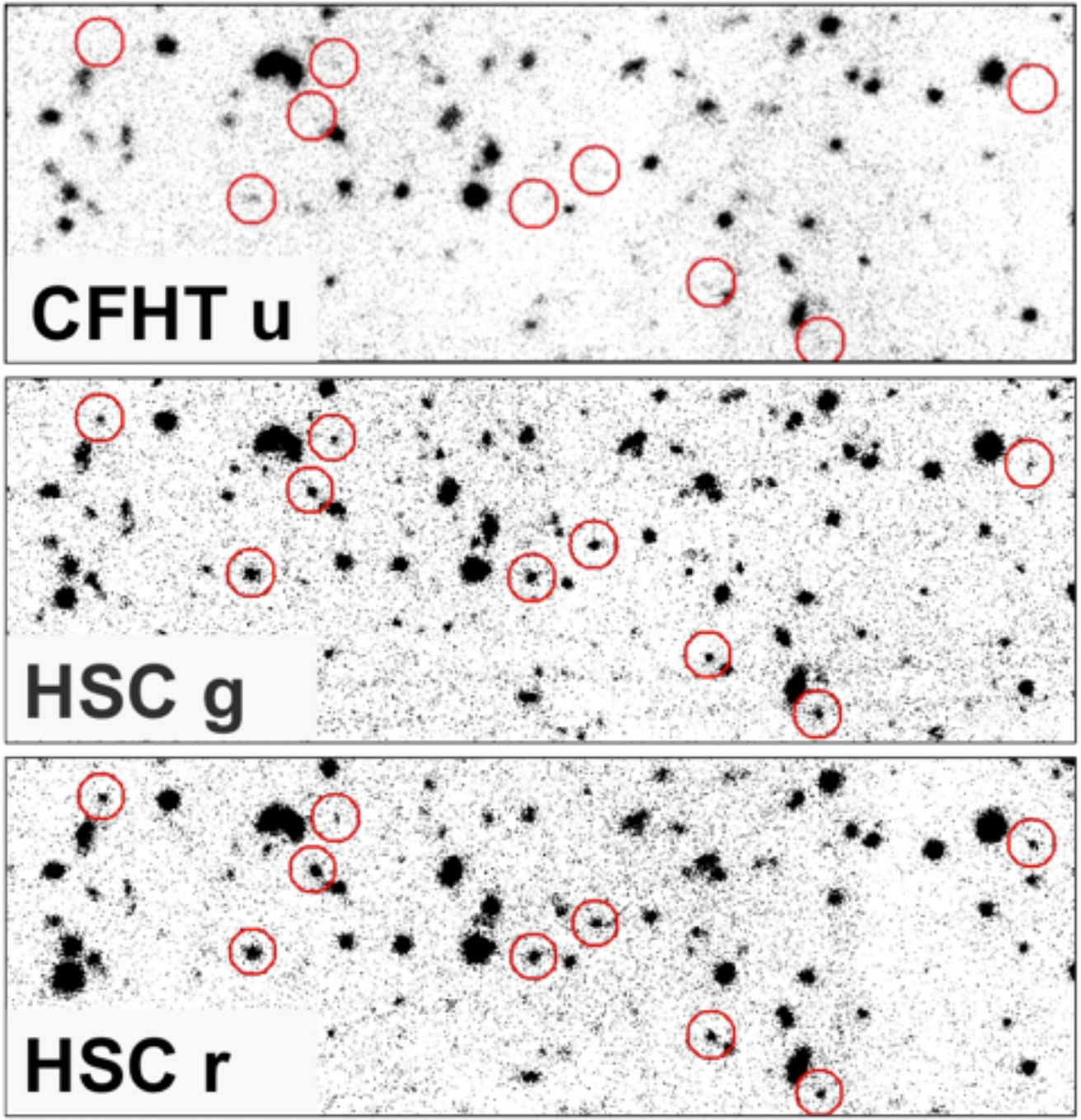
- 4 sq deg of data (so far)
- not incompleteness corrected yet

By type: **total**, **SF'ing**, **Quiescent**



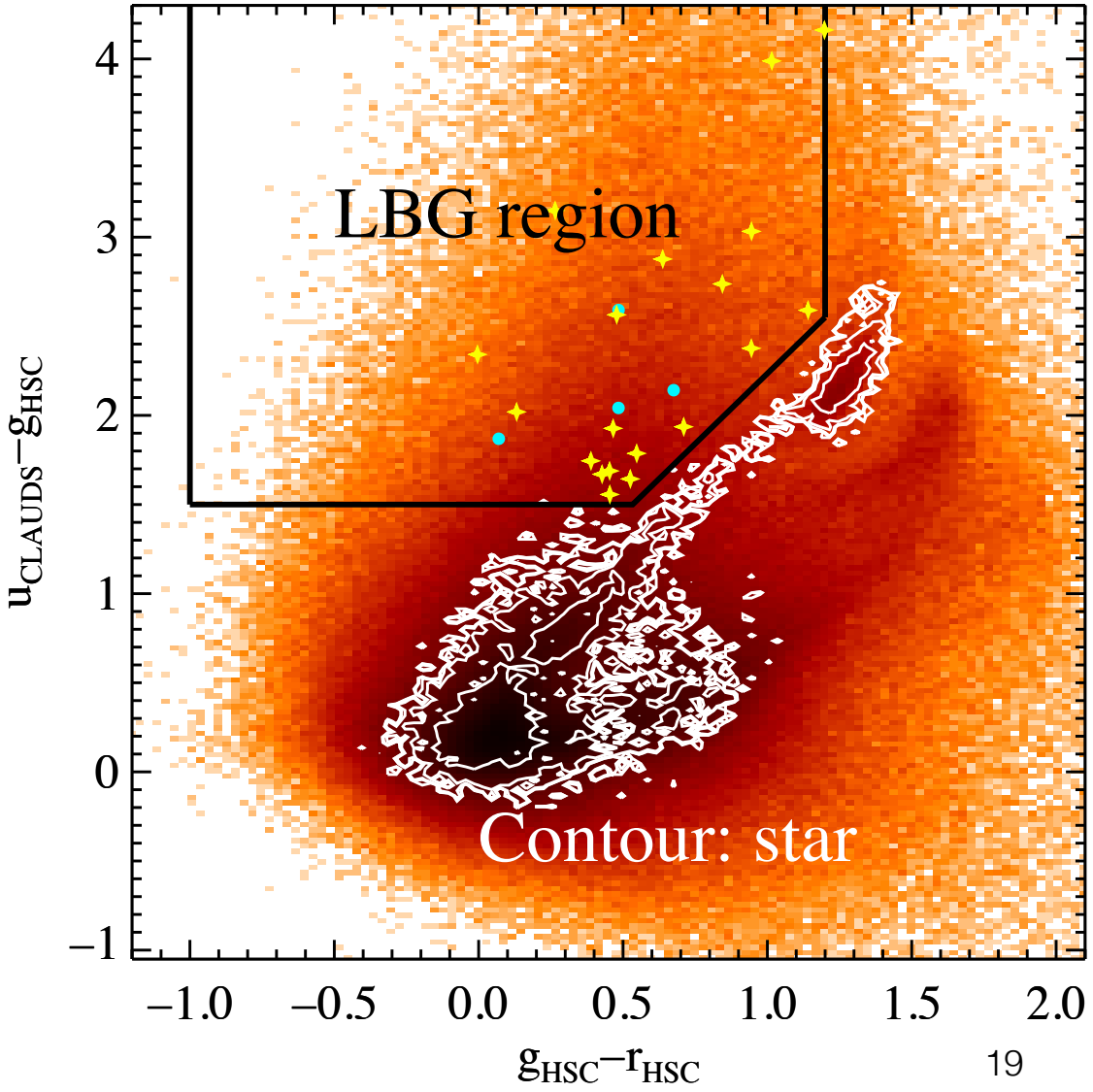
ANNEYA GOLOB

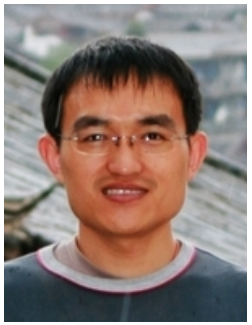
z~3 LBGs in CLAUDS+HSC



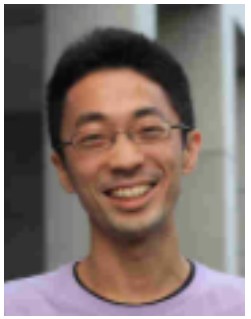
z~3 LBGs in CLAUDS+HSC

here: 4.8 sq deg (XMM-LSS field) ~100,000 LBGs
=> 0.5M z~3 LBGs in whole 20 sq deg survey




CHENGZE LIU


YUICHI HARIKANE

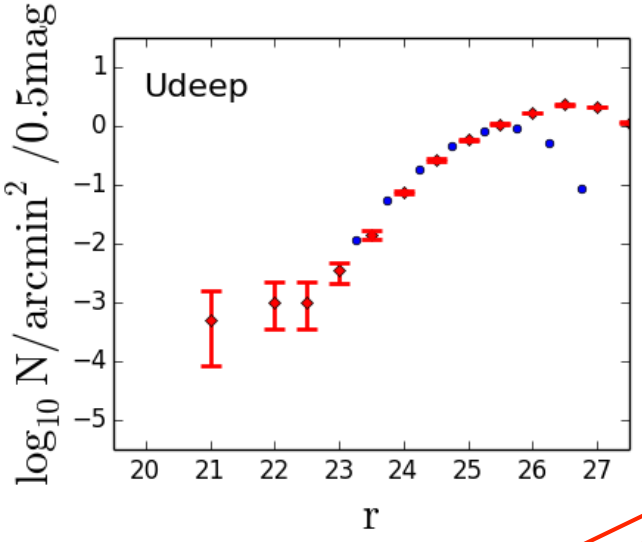

YOSHIAKI ONO

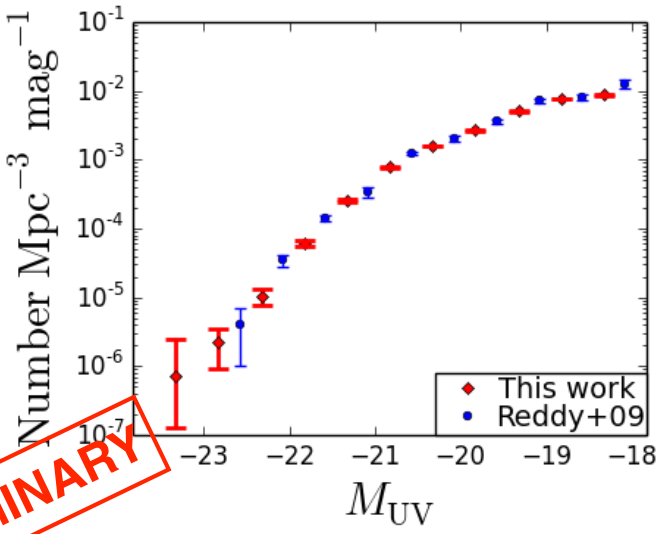

MASAMI OUCHI

z~3 LBGs in CLAUDS+HSC

Here: 0.6 sq deg in UDDD
(we will have 30x more objects over whole survey)

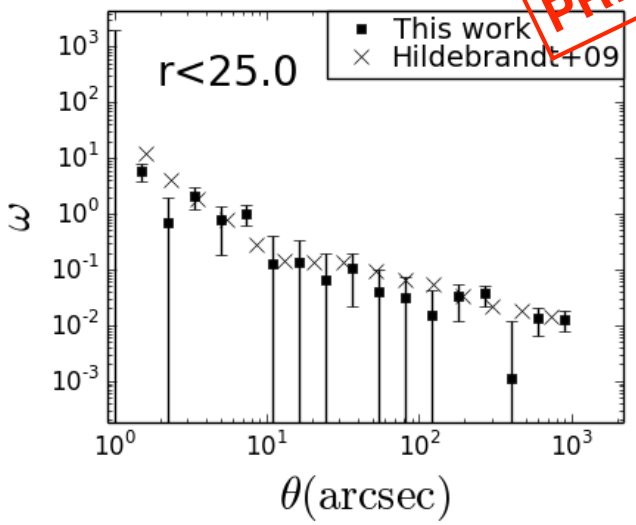
LFs:

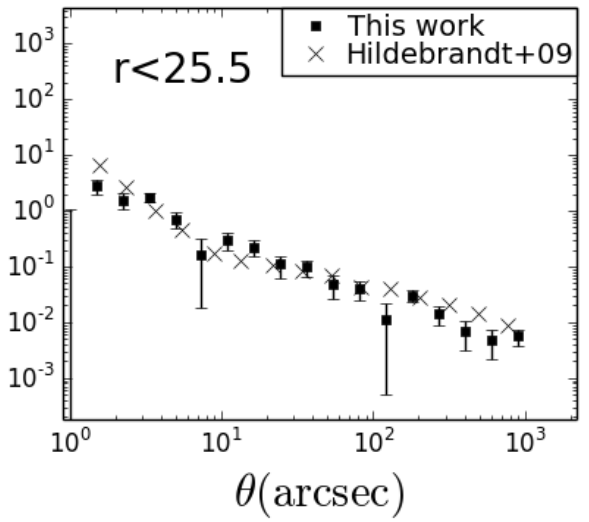




PRELIMINARY

Clustering:





Summary

- CLAUDS is u-band (AB~27) that complements HSC-Deep
- We have recently completed observing @CFHT
- Data quality tests are ongoing; data look very promising
    - u-band depth is good, number counts good
    - u-enhanced photo-z's performing well
    - LBG selection looks good

- With the data in hand and largely reduced, we are now looking forward to doing science.

Taddy's questionnaire

Q1. Science interests?

Galaxy evolution at intermediate and high redshifts

Q2. Ongoing collaborations with Subaru / other partner countries?

Yes! (See this talk)

Q3. Interest / potential for future collaborations?

PFS SSP

WF IR everything — WF complement to JWST

Q4. Size of Subaru projects?

I am mostly interested in large, community-driven surveys such as HSC, PFS, and future ULTIMATE SSPs

Q5. Subaru instruments?

Wide-field everything

Q6. Any request to Subaru science operation?

None at present