The VIMOS Ultra Deep Survey: On the way to a spectroscopy based UV-LF at z~5
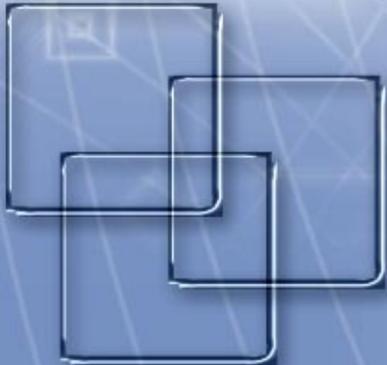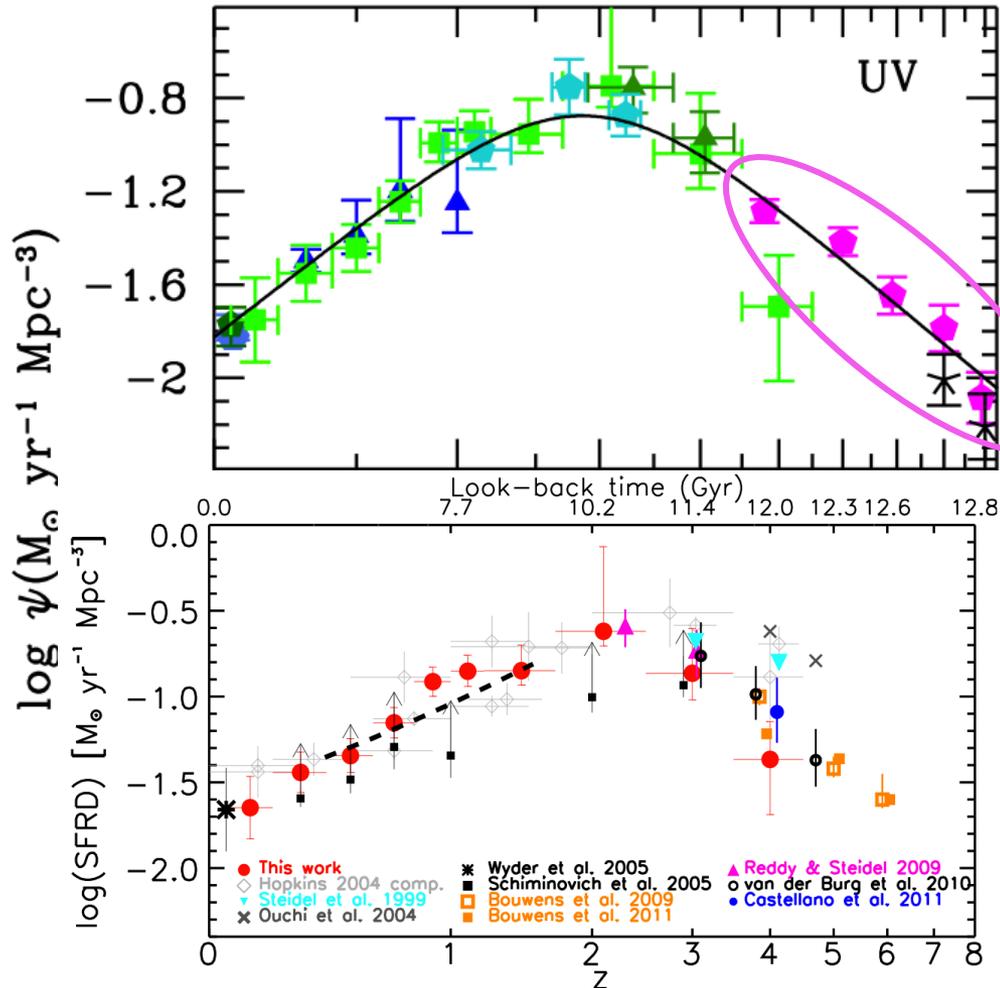
Janine Pforr (LAM), Lidia Tasca, Brian Lemaux, Olivier Le Fevre**,**
and the VUDS team

Sintra, 2015

Cosmic Star Formation Rate Density

Madau & Dickinson 2014

Cucciati et al., 2012

Luminosity functions and star Formation rate densities estimated out to z~10 (e.g. Bouwens et al. 2014) + Monday morning session speakers

-> based on photometric data ONLY!

LFs and SFRDs based on spectroscopic data of VVDS out to z~4.5

Basic Idea:

Following Cucciati et al. 2012 for VVDS

UV Luminosity Function

UV Luminosity Density

Dust Attenuation as a function of redshift

Cosmic Star formation rate density

Contributions of different populations to the SFRD

VUDS in a Nutshell

- Carried out with VIMOS@VLT
- ~10.000 optical spectra (rest-UV) of faint galaxies with 2<z<6
- 3 fields: ECDFS, VVDS-2h, COSMOS (~1 deg^2 total)
- Target selection based on photometric redshifts, color criteria, mostly i_{AB} <=25, but observations down to i_{AB} <=27
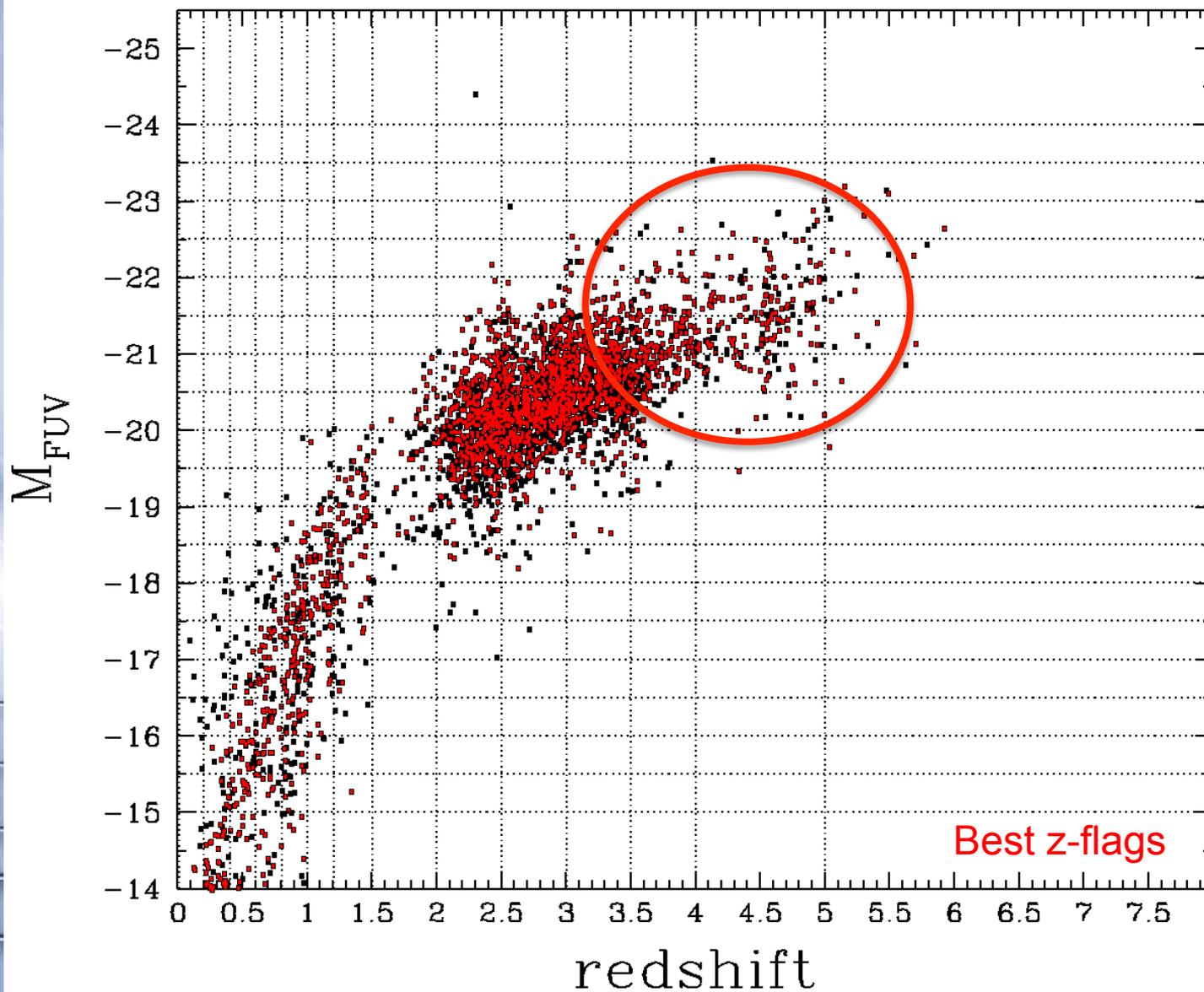- ~75% redshift success rate

VUDS redshift distribution in comparison to pre-existing surveys
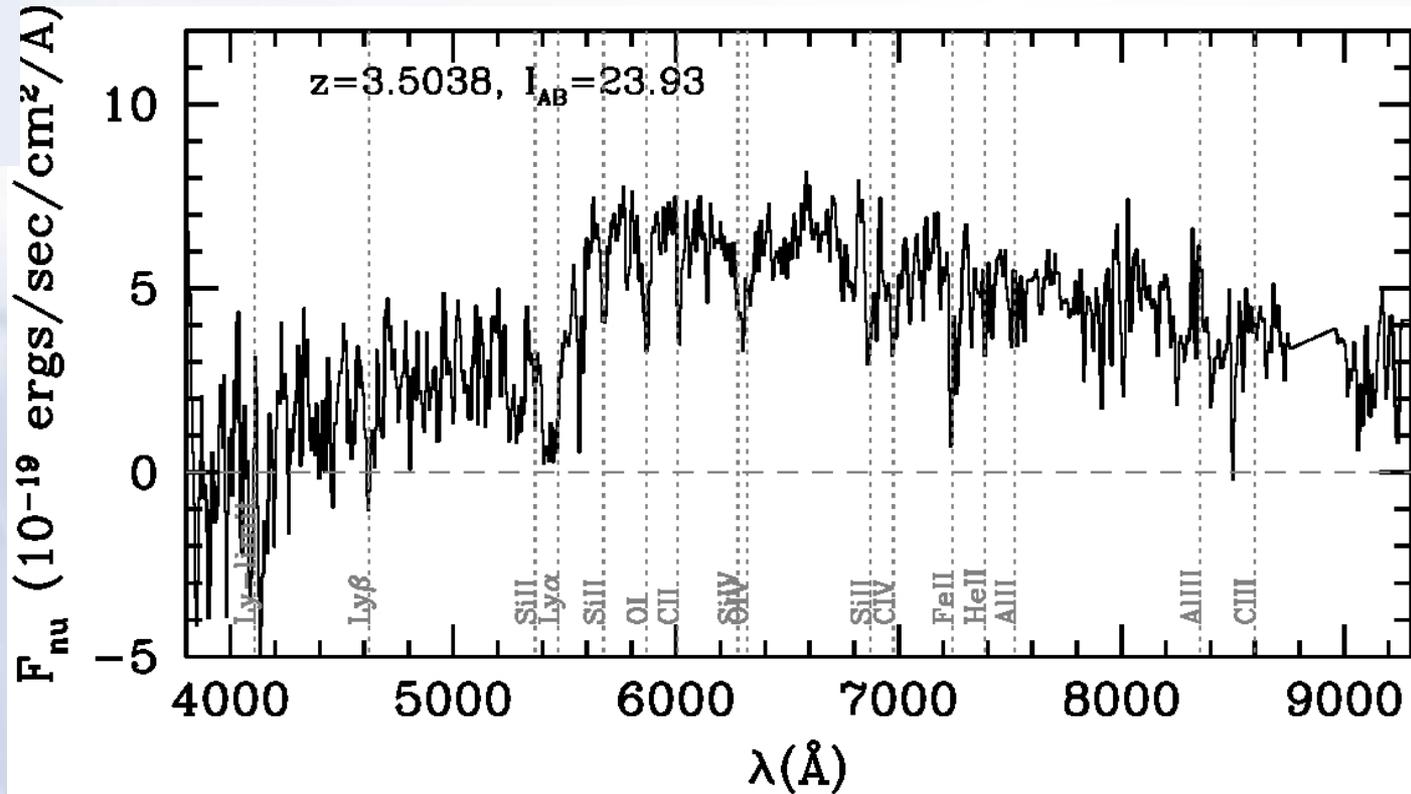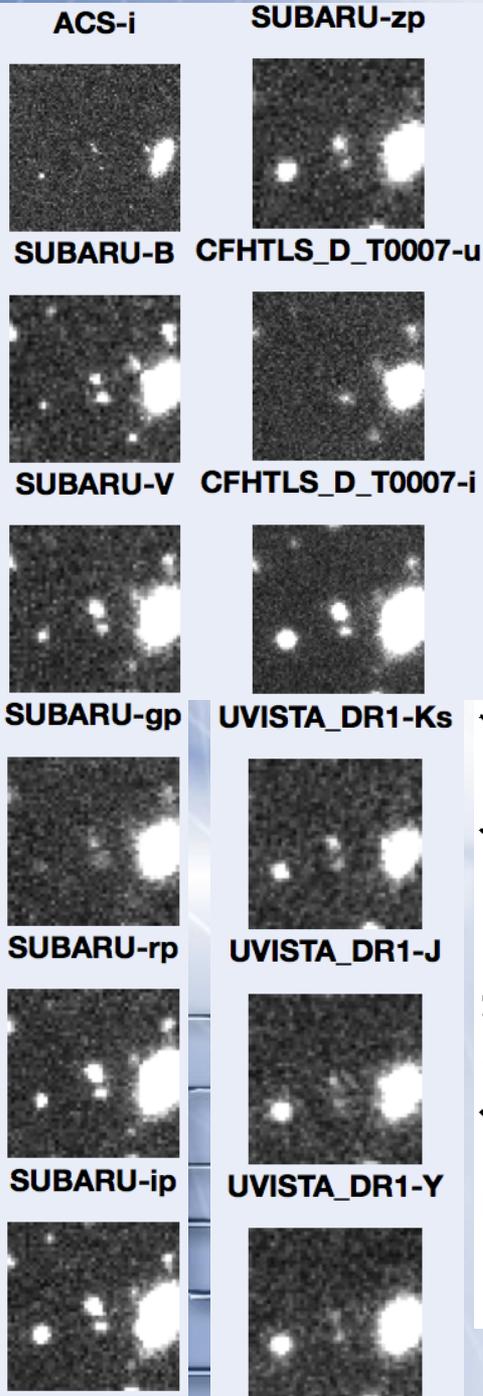

Le Fevre et al. 2014
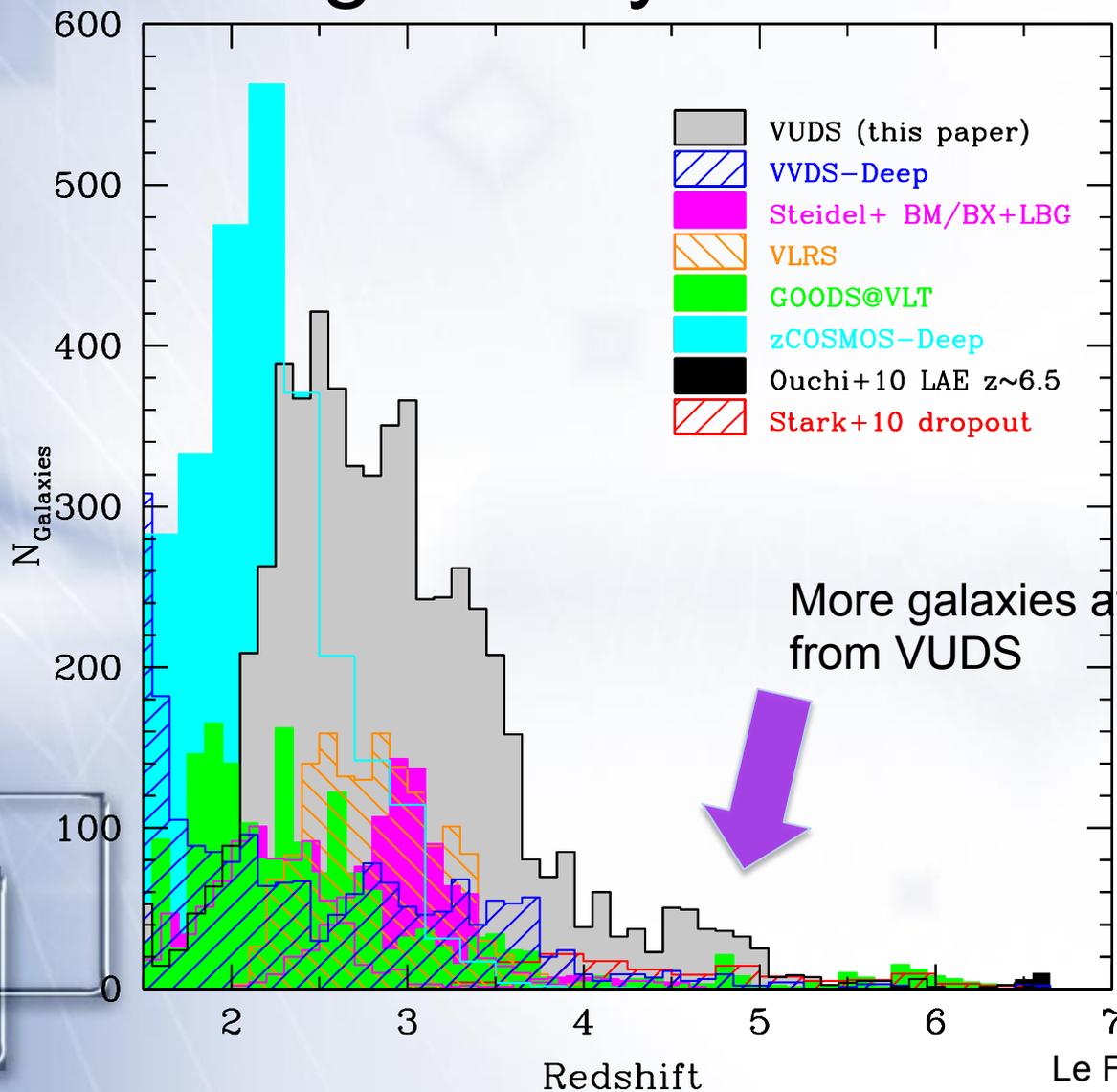
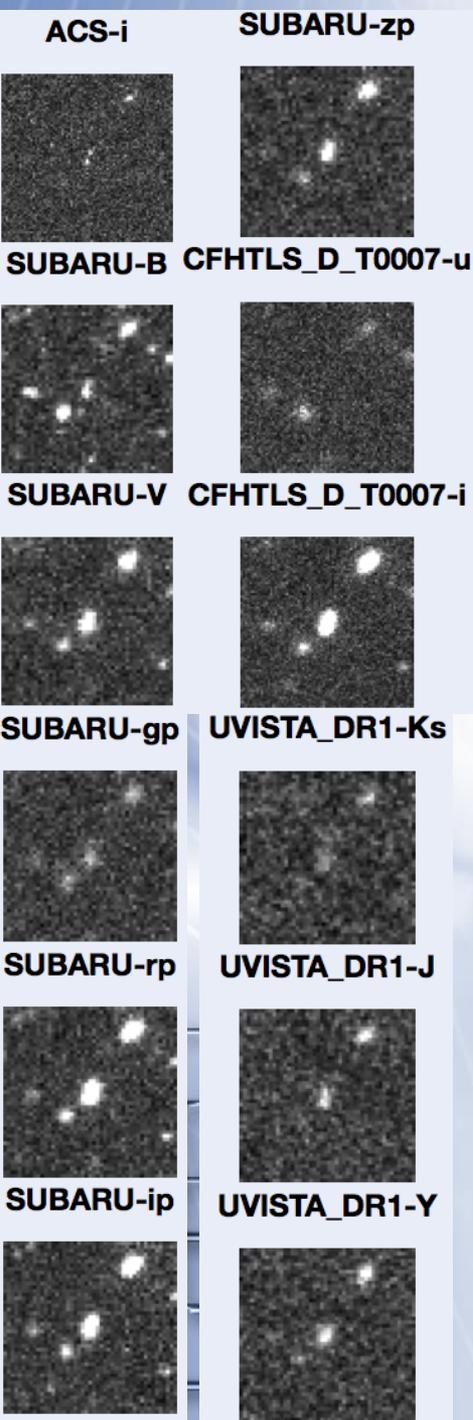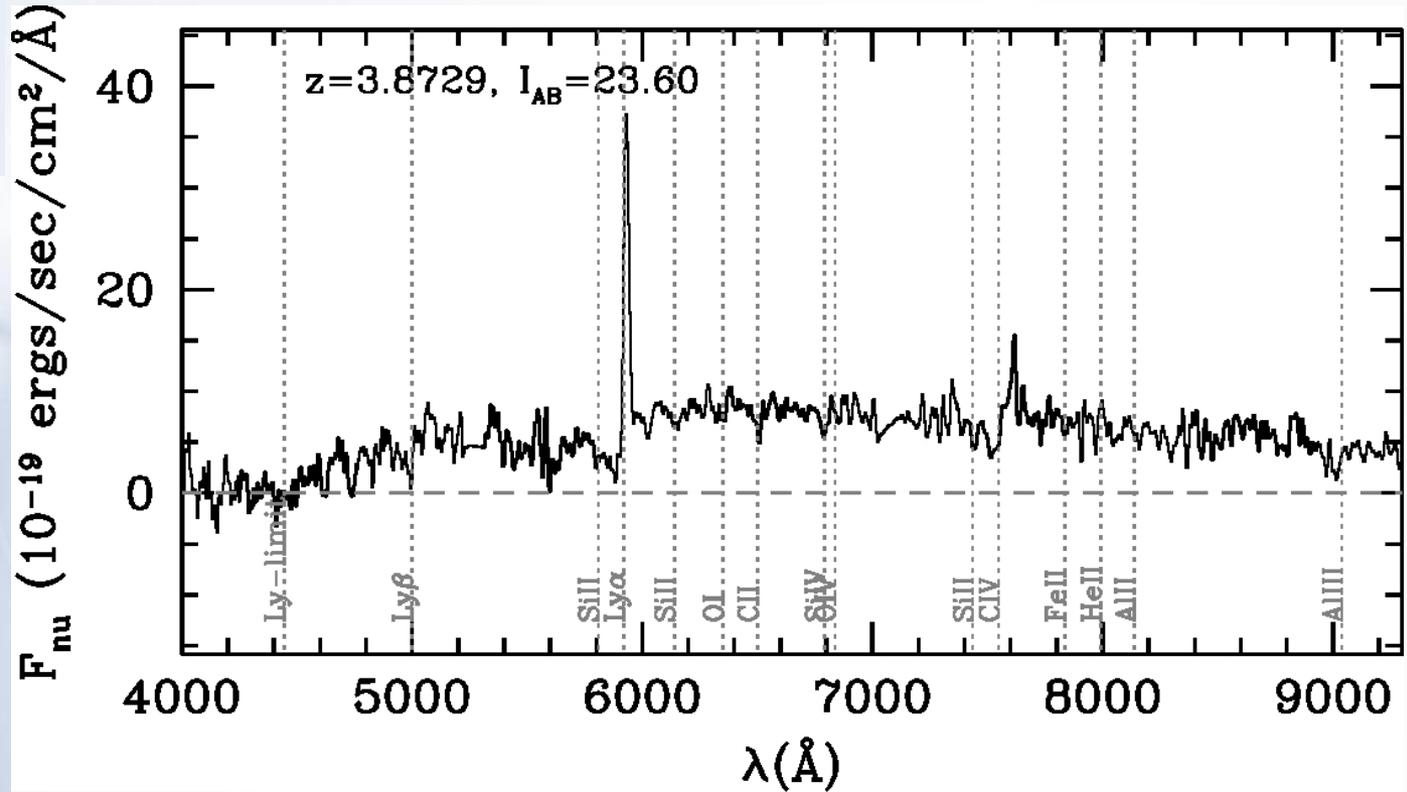# VUDS redshift distribution
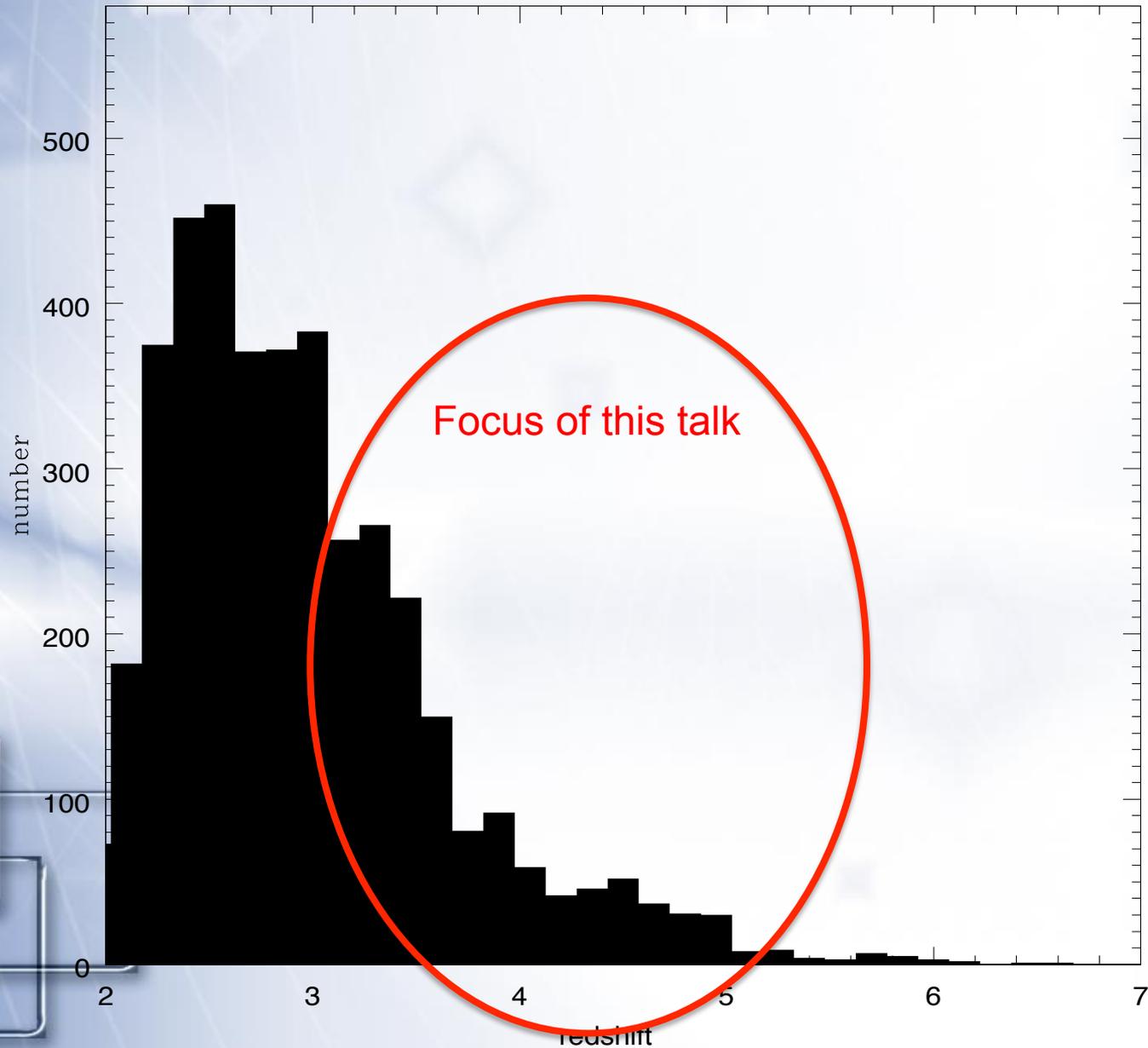
Absolute FUV magnitudes in VUDS

Examples of the brightest galaxies
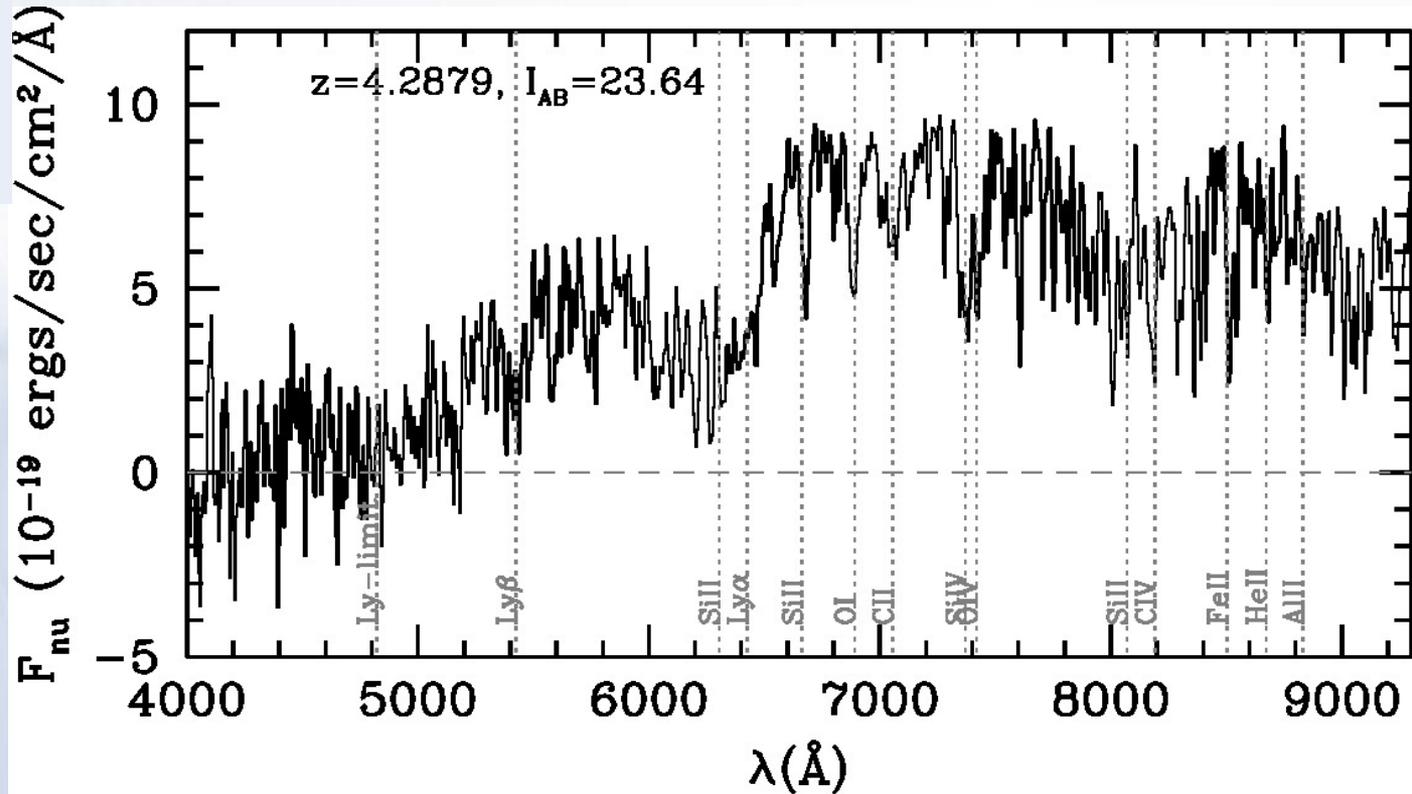

z=3.5038, M_{FUV}=-21.7, log M*=10.6

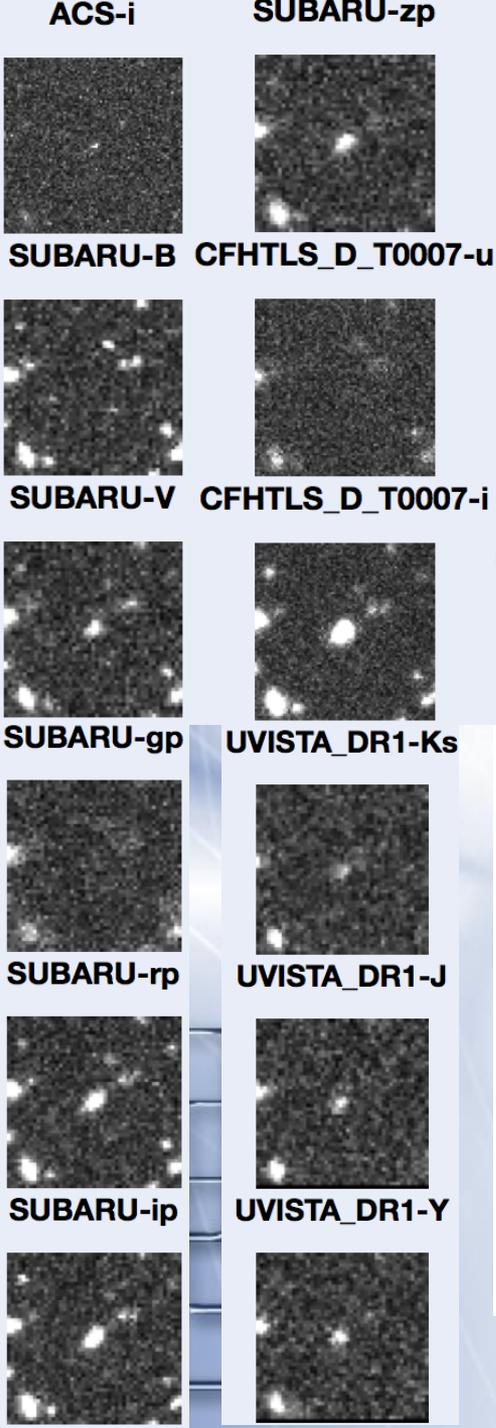# Examples of the brightest galaxies
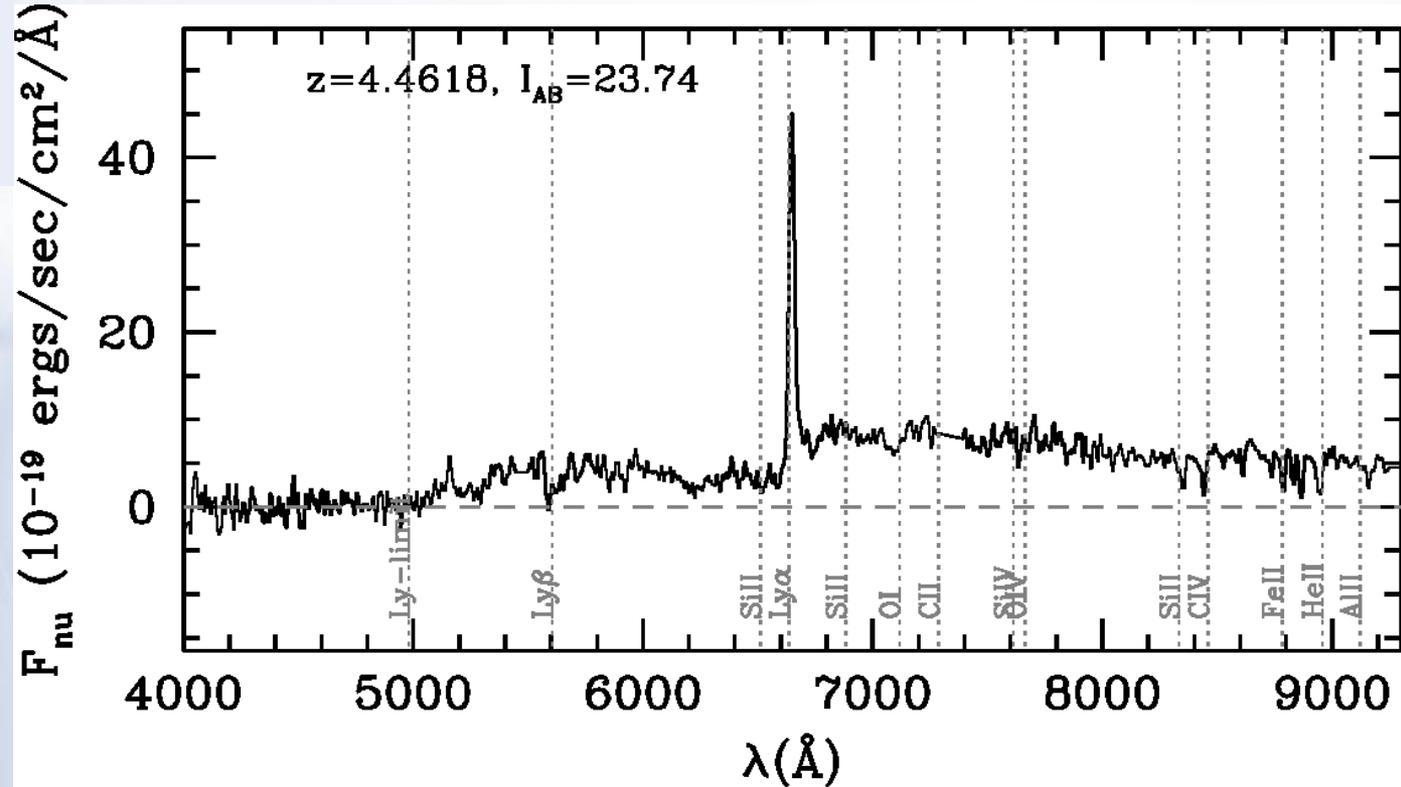
z=3.8729, M$_{FUV}$=-22.3, log M*=10.1

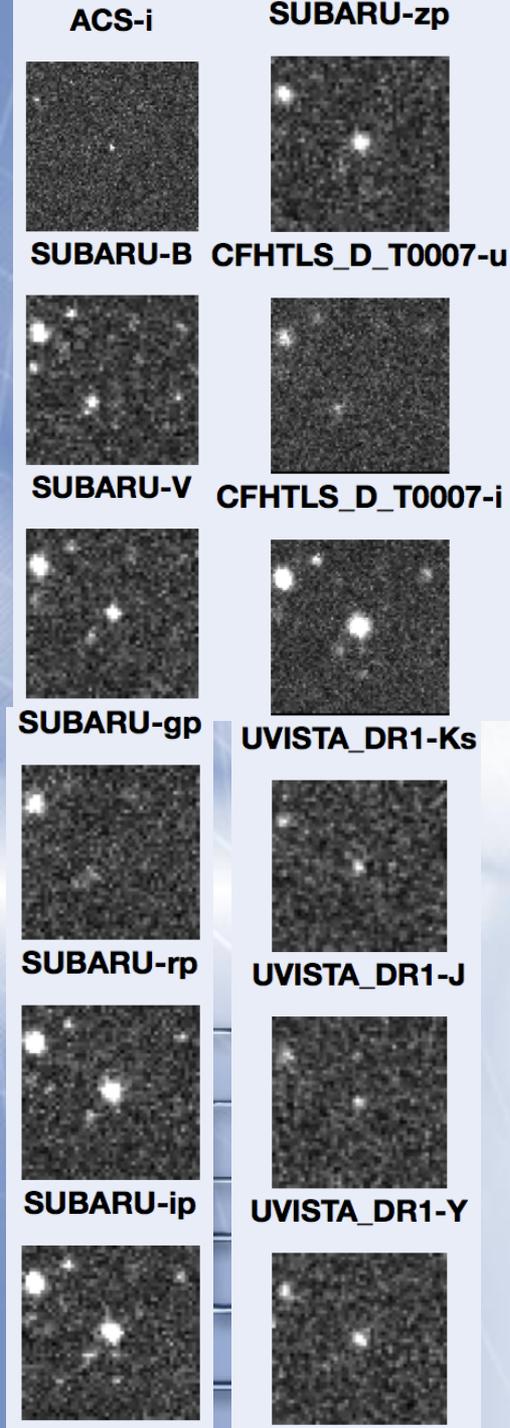# Examples of the brightest galaxies

Z=4.2879, M_{FUV}=-22.6, log M*=10.2

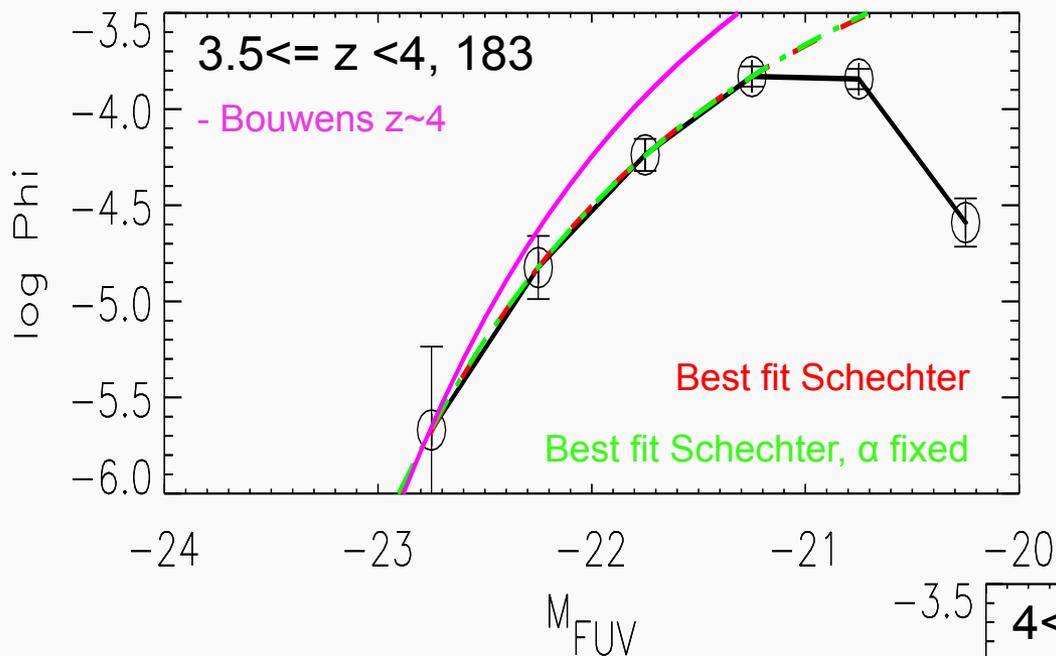# Examples of the brightest galaxies

ACS-i, SUBARU-zp, SUBARU-B, CFHTLS_D_T0007-u, SUBARU-V, CFHTLS_D_T0007-i, SUBARU-gp, UVISTA_DR1-Ks, SUBARU-rp, UVISTA_DR1-J, SUBARU-ip, UVISTA_DR1-Y
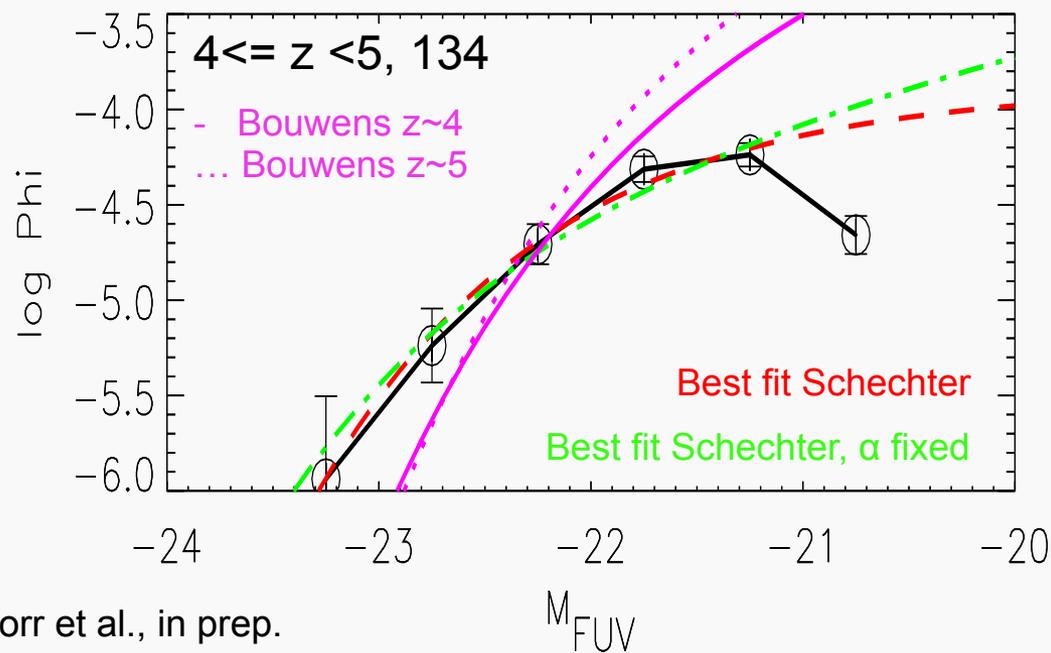
$z=4.4618$, $M_{FUV}=-22.5$, $\log M^*=10.3$

$z=4.4618$, $I_{AB}=23.74$

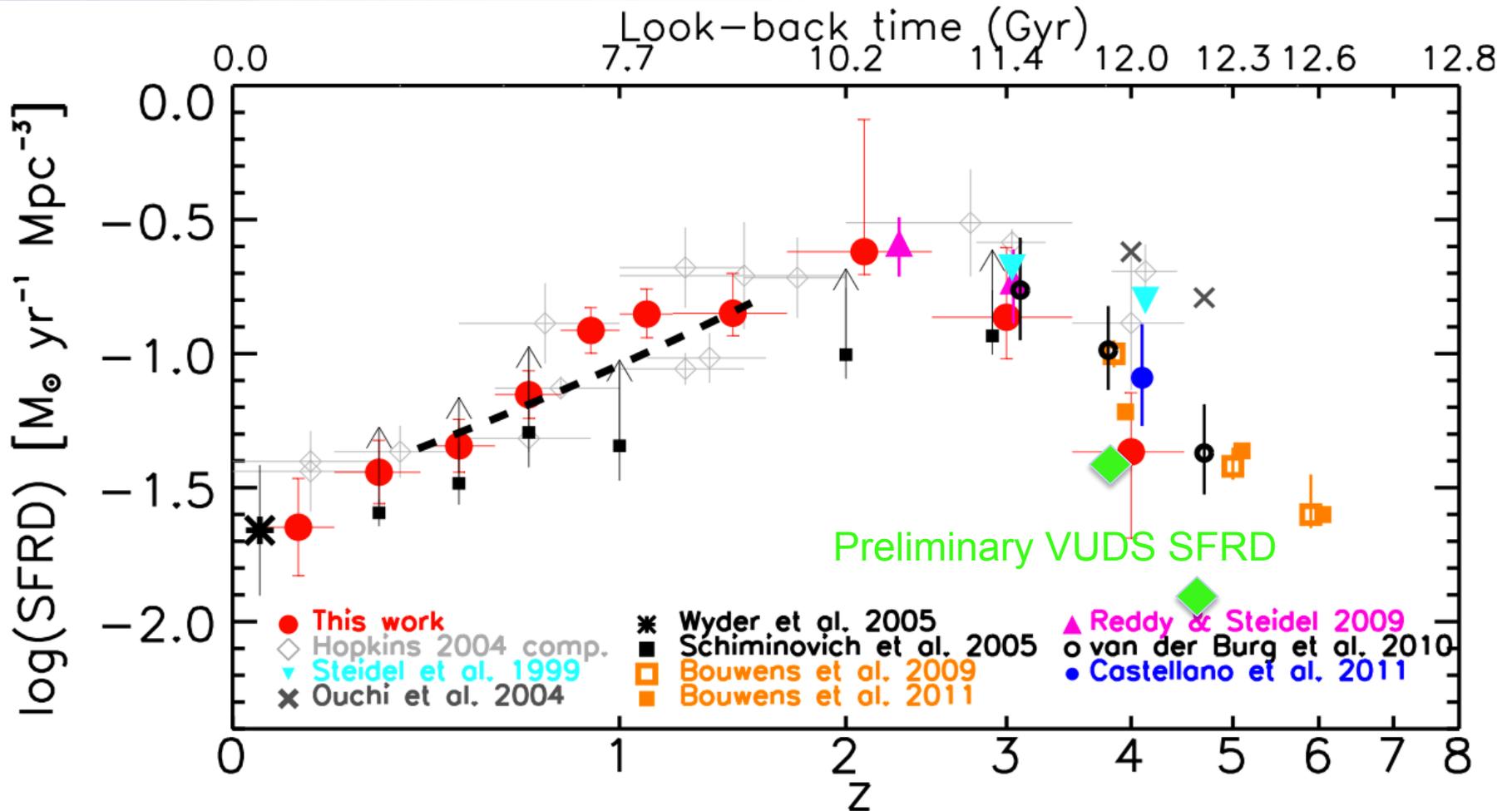# Preliminary spec-z FUV LF at 3.5<z<5

Only COSMOS field for now
Only rough corrections for
spectroscopic sampling etc.
applied at the moment

Great care has to be taken
with the corrections, and we're
working hard on that!

Pforr et al., in prep.

First preliminary estimate of SFRD from VUDS/COSMOS

Cucciati et al., 2012, Pforr et al., in prep.

Summary

- Above z~4 UV LF and SFRD based on photometric data alone

- VUDS significantly increases the number of spectra at z>4

- We will be able to derive LF and SFRD from spectra at z>4 for the FIRST TIME
  -> Still work in progress, but we're working hard!!