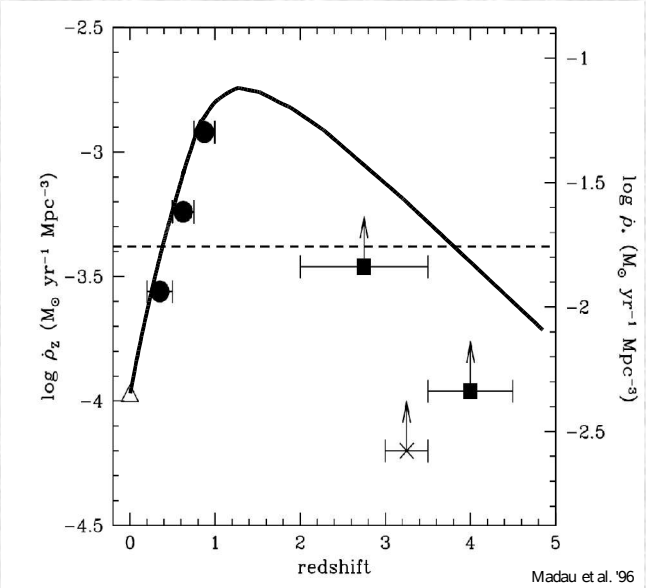
The VIMOS-VLT Deep Survey impact on measuring the LF-LD SFR

The VVDS Luminosity Function Working Group

The SFR plot a decade before

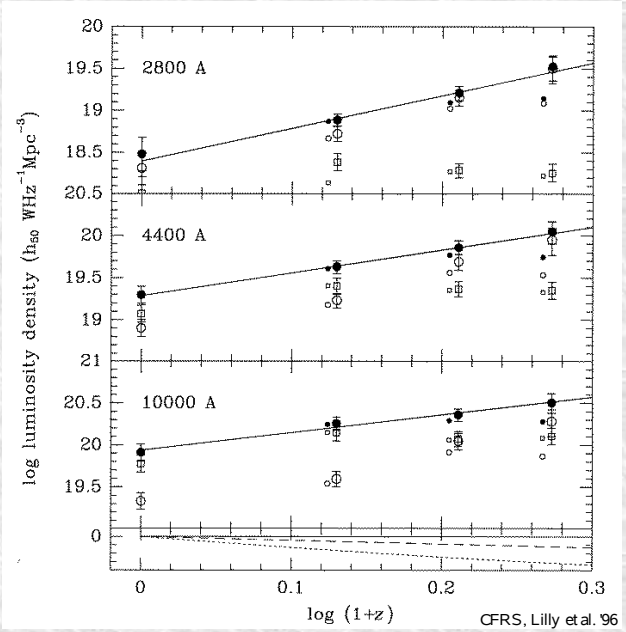
SFR, 1996



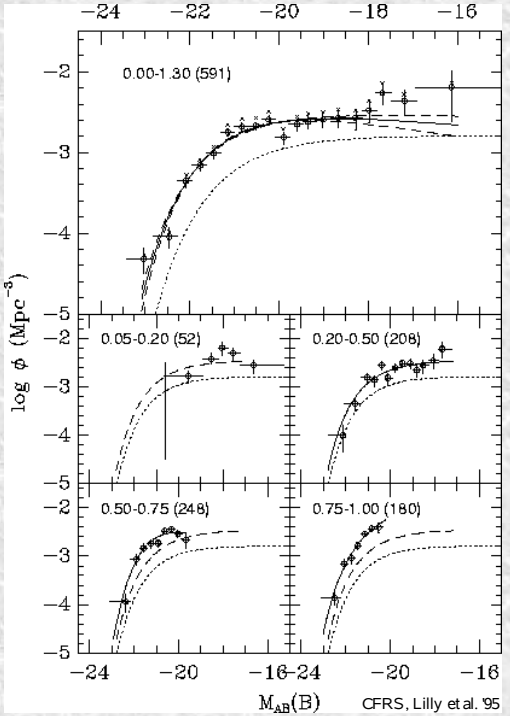
The questions were:

- Is there a peak at 1.3 < z < 2.7?
- By how much interstellar dust attenuates the UV light?
- Is it so steep at z<1?
- Is the hi-z UV population representative?

LD, 1996



LF, 1995



The Tool ALF: Algorithm for Luminosity Function Thesis of Olivier Ilbert

Four estimators: Vmax,SWML,C^+ & STY

Parametric and non-parametric estimators

Different behavior when a type is not anymore visible in the faintest bins

--> give the absolute magnitude limit for non-biased studies

Multi-λ approach = Easy Adaptable Tool to Different Surveys

First Papers based on First Epoch Data

VVDS-0226-04 1700 arcmin^2 9842 spectra

VVDS-CDFS 500 arcmin^2 1722 spectra

Total = 11564 spectra

Target Sampling rate ~25 %

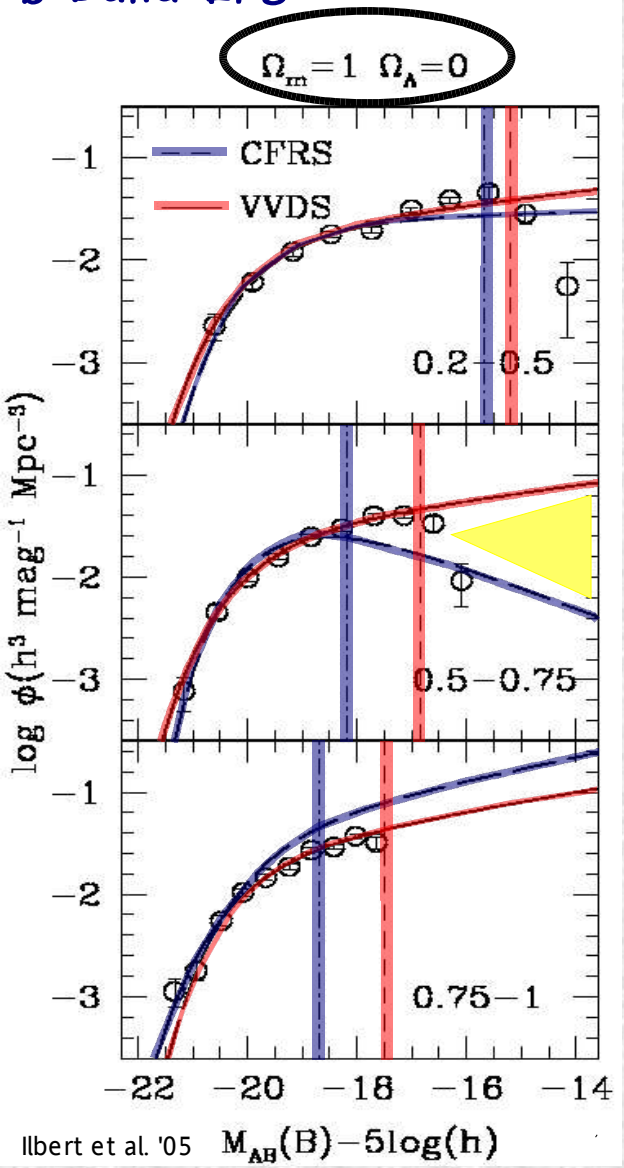
Papers	Subject	Status
Ilbert et al.	The Global LF	In press
Zucca et al.	The LF per type	Submitted, referee report received
Tresse et al.	The Cosmic SFR history from z=0 to 5	Draft distributed
Ilbert et al.	The LF per morphological types	Submitted
Arnouts et al.	The FUV LF with VVDS-GALEX	2005,ApJ,619,L43

The LF per density environnement	Work on-going
The K-band LF from VVDS-SWIRE	Work on-going
The LF with photometric redshifts	Work on-going

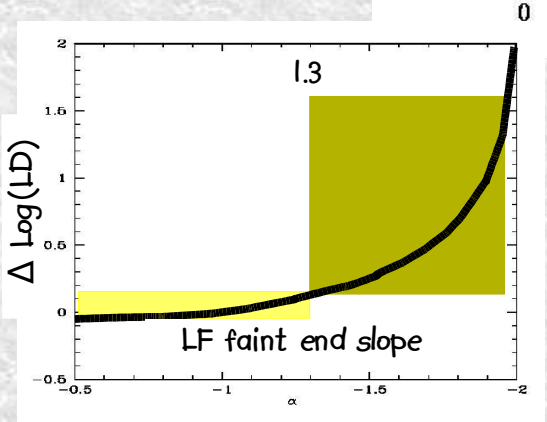
I-selected VVDS & CFRS

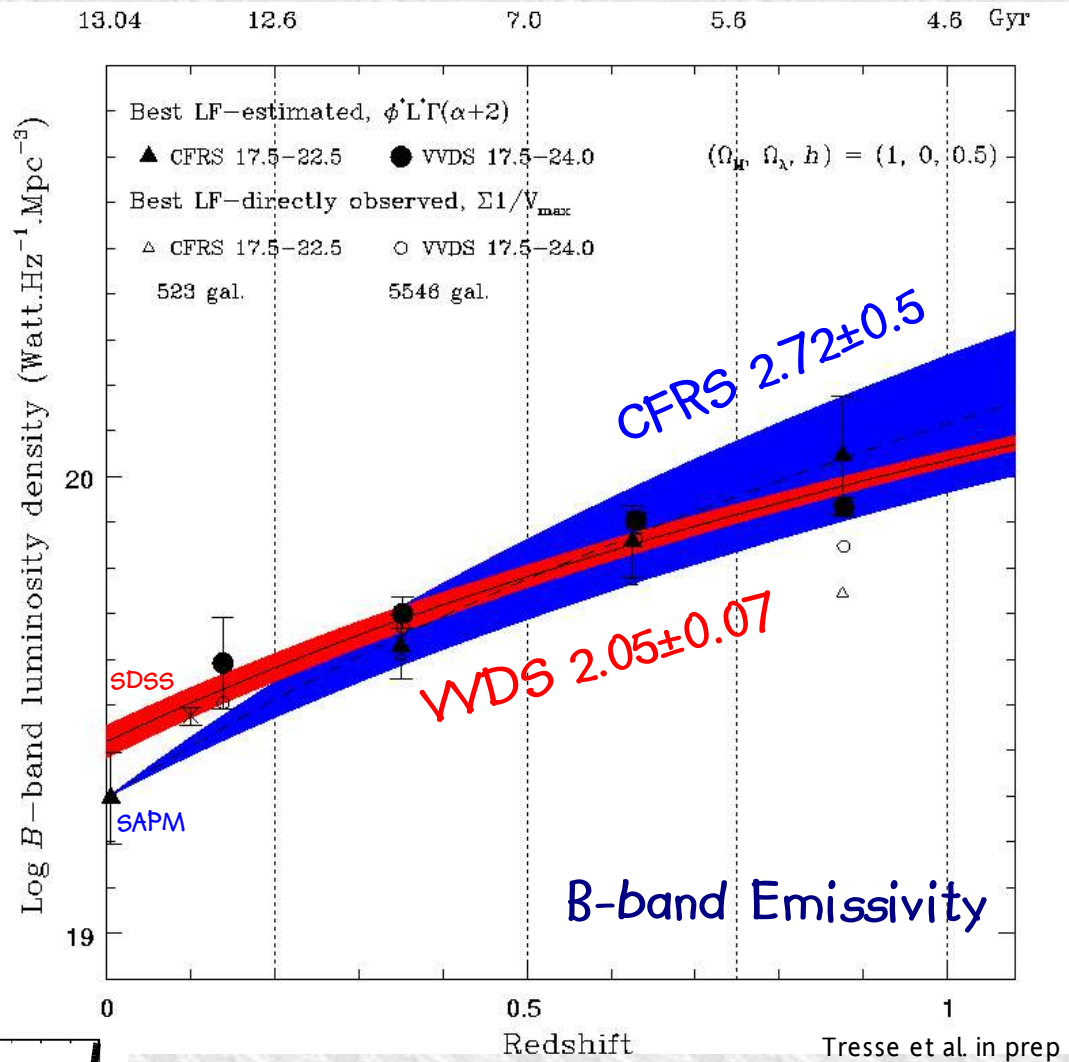
1.5 mag fainter, FOV 10 x larger

B-band LFs



Ilbert et al. '05





Tresse et al. in prep

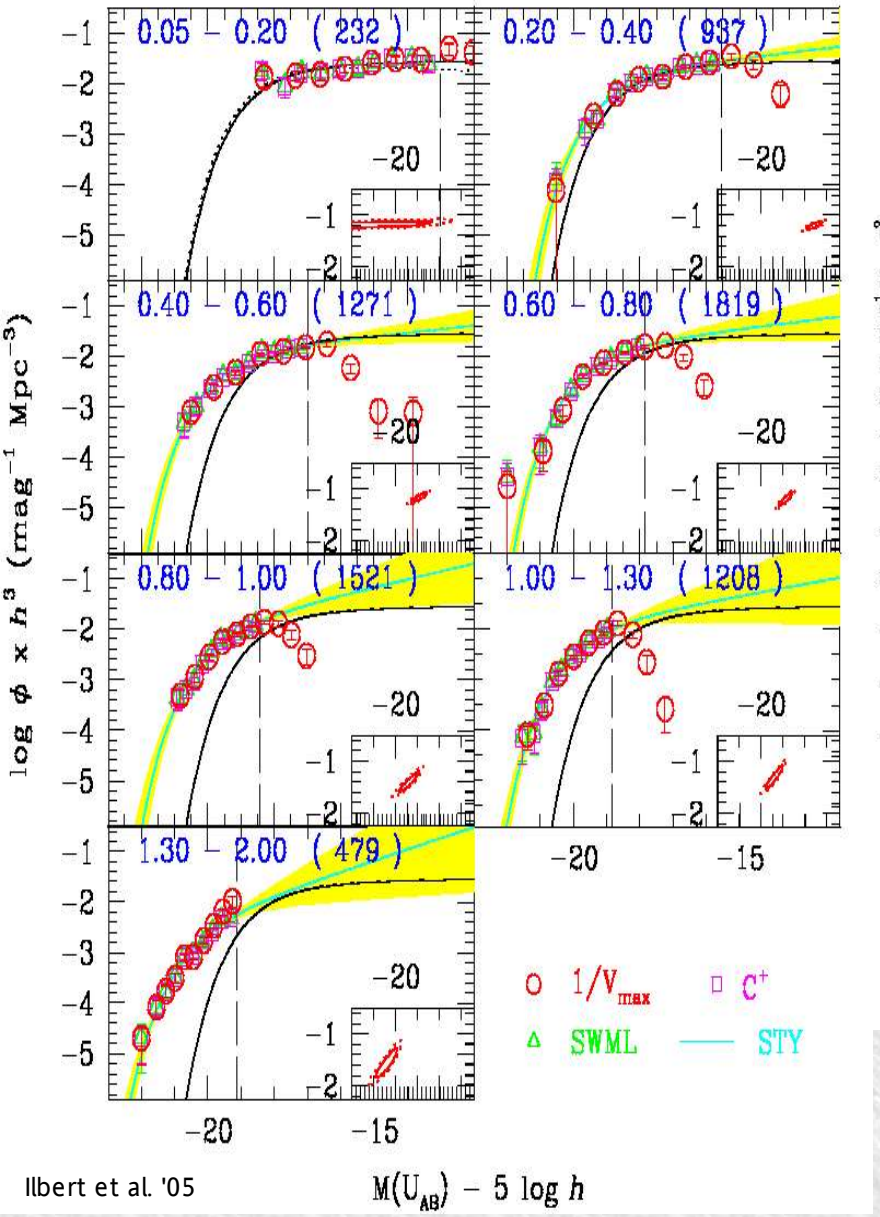
Local point higher by ~0.1 in log

At z <0.7, α < 1.3 ==> small change in LD

M* and ϕ* better constrained at z>0.7

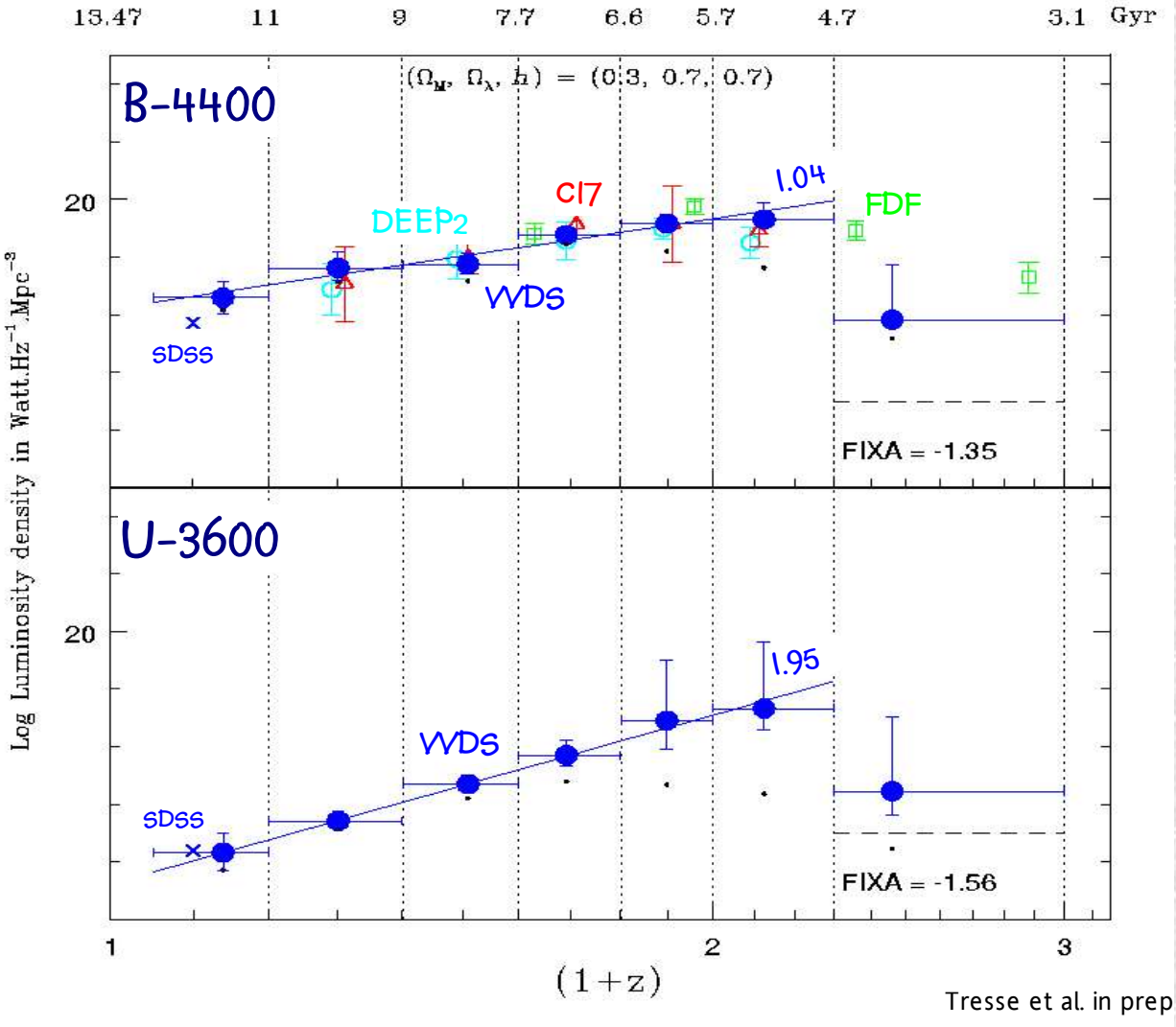
The galaxy population at z < 2

U-band LFs



Ilbert et al. '05

B- and U-band LDs

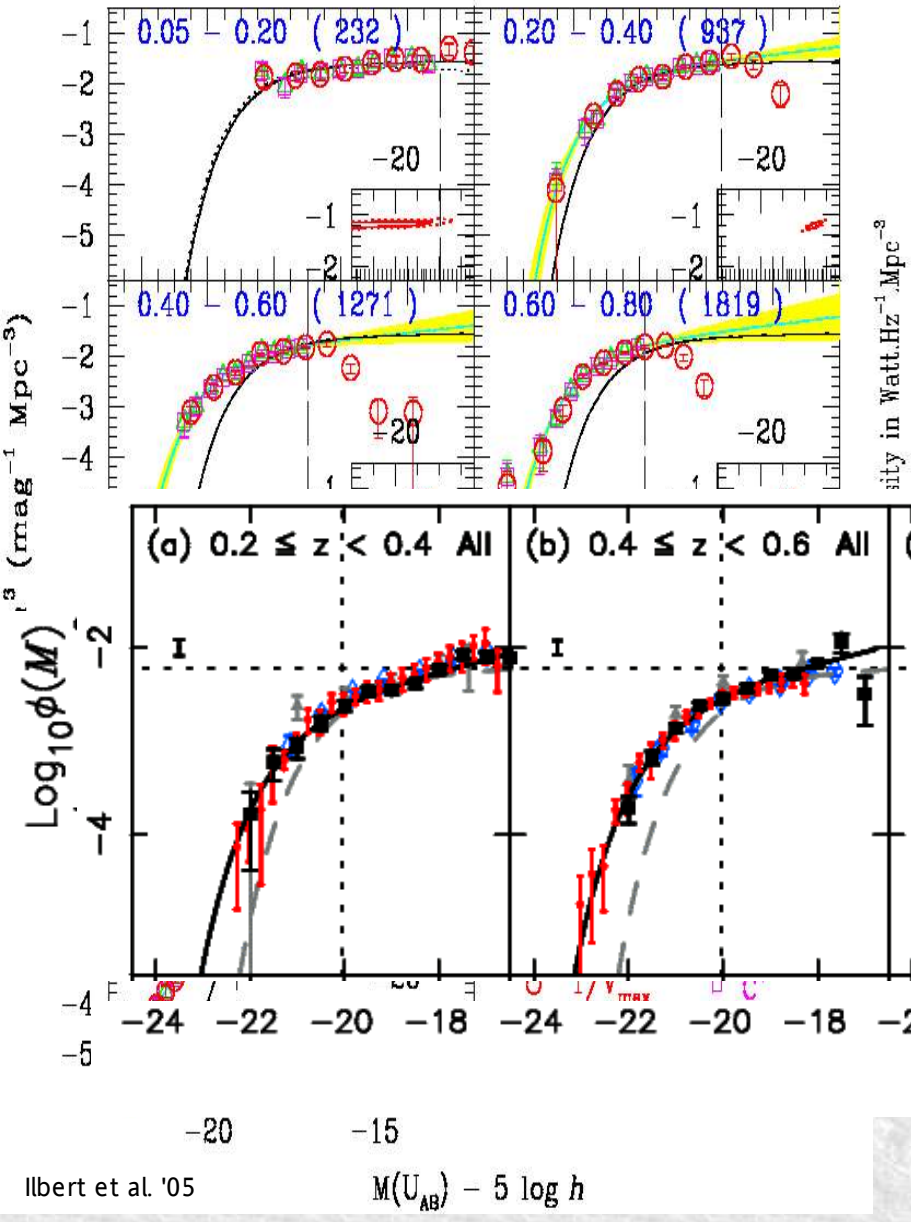


Tresse et al. in prep

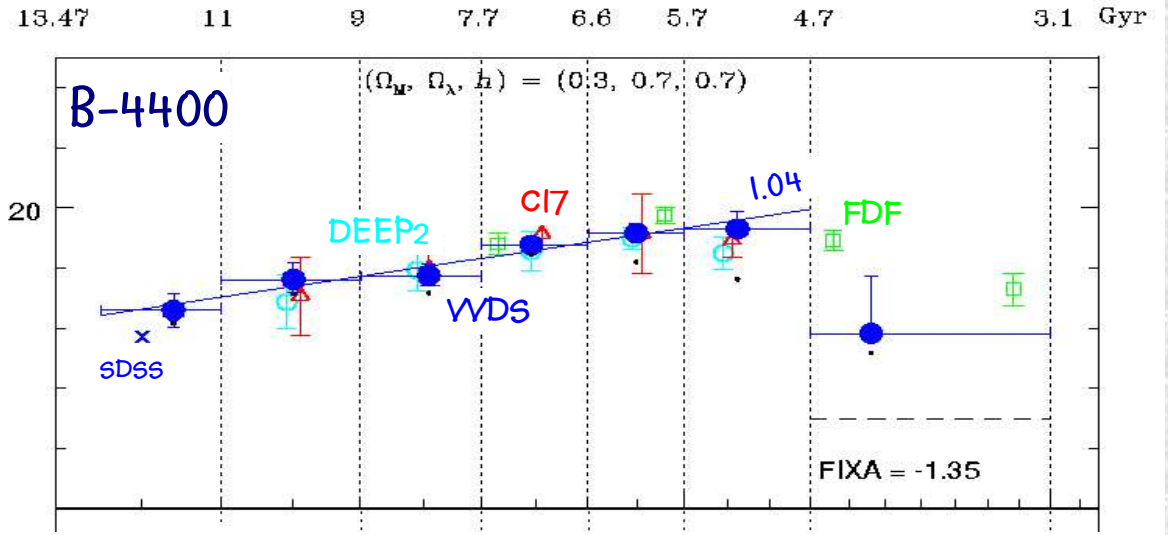
The total blue emissivity is tightly determined to z~1.3

The galaxy population at z < 2

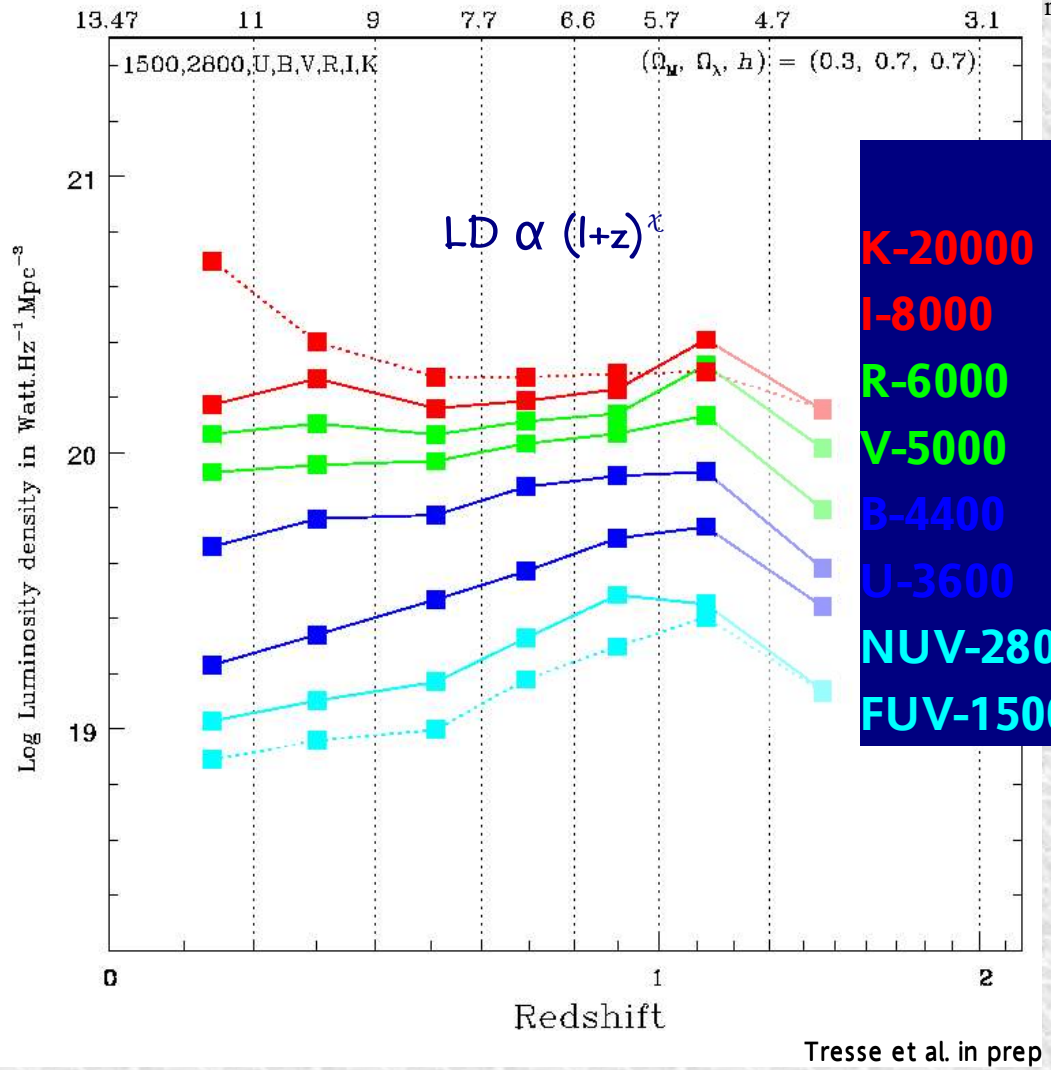
U-band LFs



B- and U-band LDs



Multi-wavelength emissivities



	χ
K-20000	
I-8000	0.21
R-6000	0.49
V-5000	0.69
B-4400	1.04
U-3600	1.95
NUV-2800	1.95
FUV-1500	2.18

Differential color evolution

At z <1.3, rest-FUV evolves rapidly and strongly (x5) while rest-NIR is almost constant (x1.2)

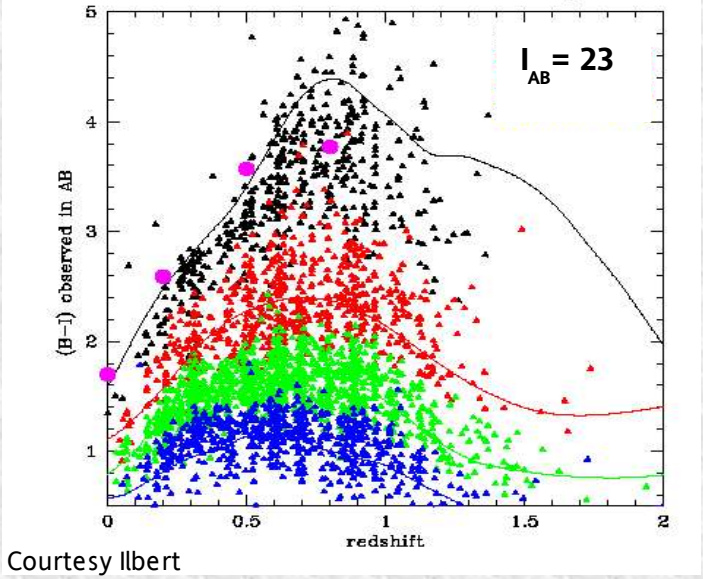
That is, for the dominant population, L>0.2L*,
- the old, massive long-lived stellar population is in place at z>1.3
- the young, short-lived stellar population is less & less active

The total (FUV-I) emissivity becomes 4x redder from z=1.1 to 0

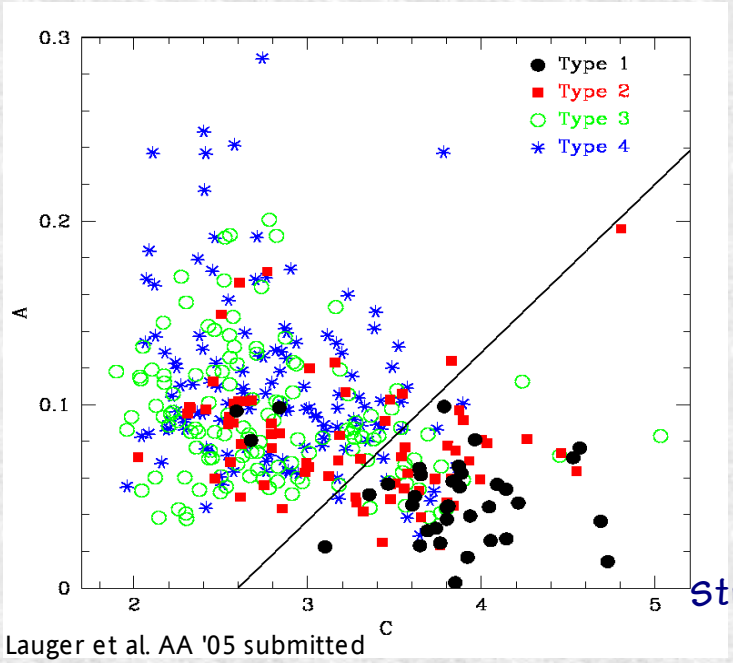
The total mass-related K emissivity is nearly constant to z=.5 and then increases by a factor 2.5

The detailed NNG population at z < 1.5

Best fit Pegase templates on U, B, V, R, I data

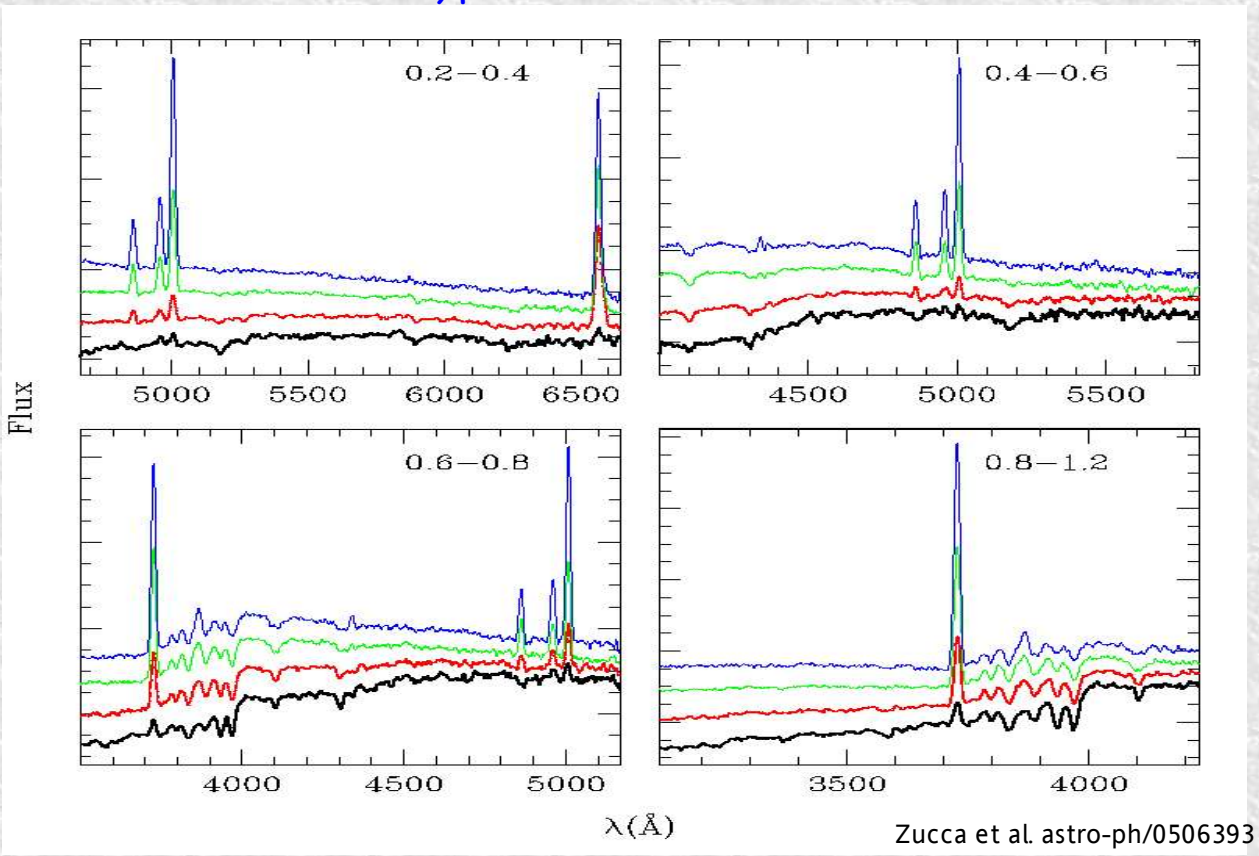


Courtesy Ilbert



Lauger et al. AA '05 submitted

			Rest-$(B-I)_{AB}$
Type 1	CWW-Ell	9%	1.58
Type 2	CWW-Sbc	17%	1.11
Type 3	CWW-Scd	34%	0.79
Type 4	CWW-Irr+SB	40%	0.57



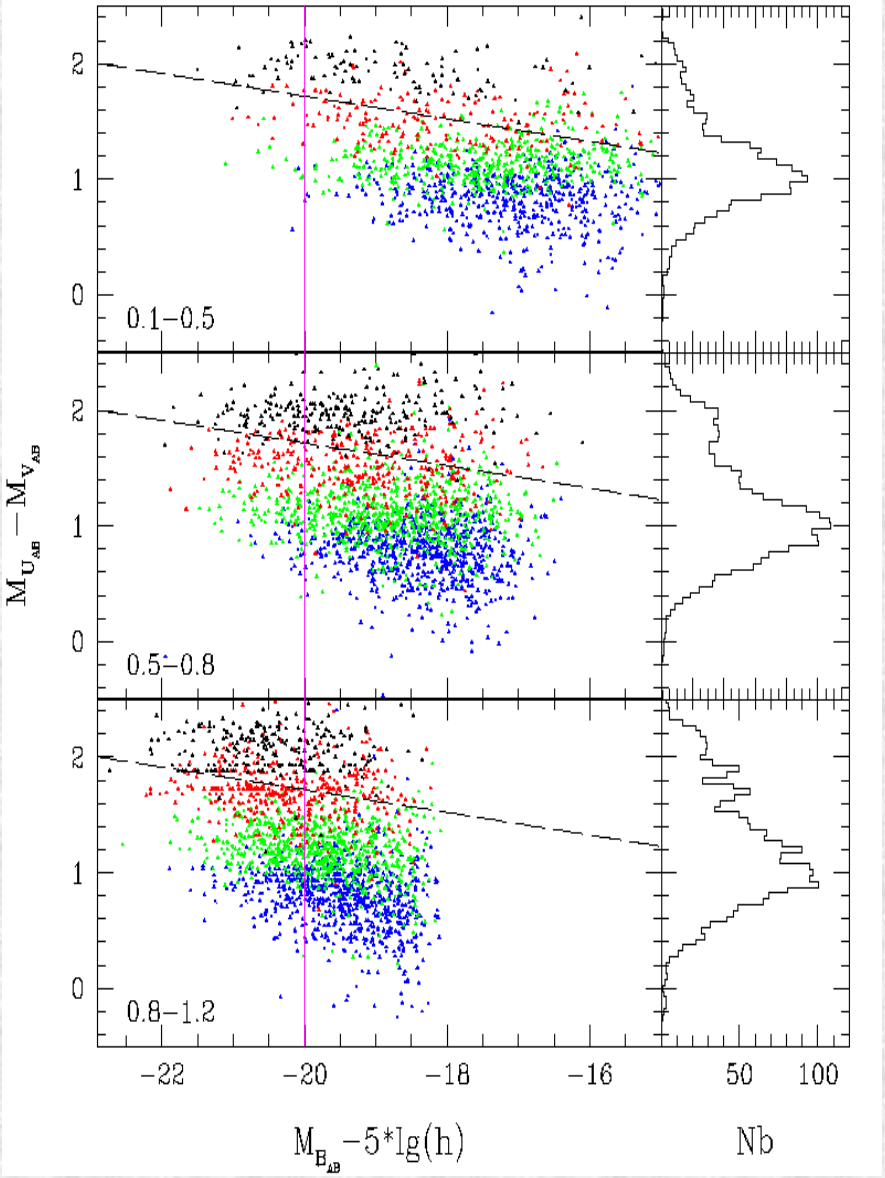
Zucca et al. astro-ph/0506393

Late types have the strongest EL, and bluest continuum
Early types exhibit star formation D4000, Hδ and [OII]

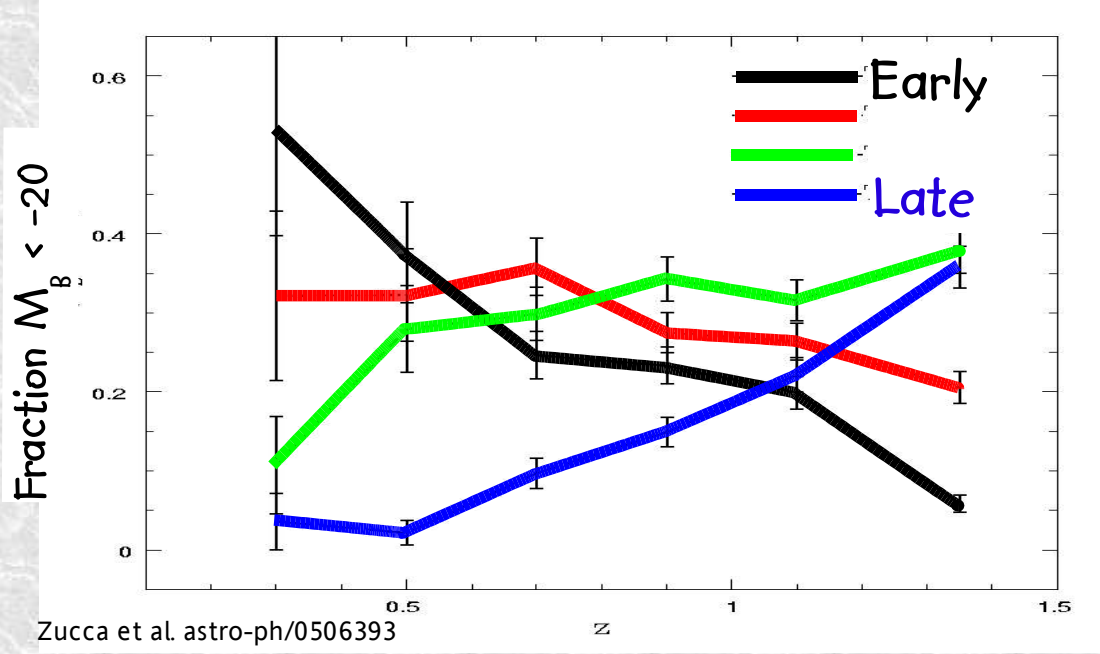
Strong correlation between the bimodality and A-C morphology

The spectro-photometric-morphological properties are well correlated at z< 1.5

Franzetti et al. in prep



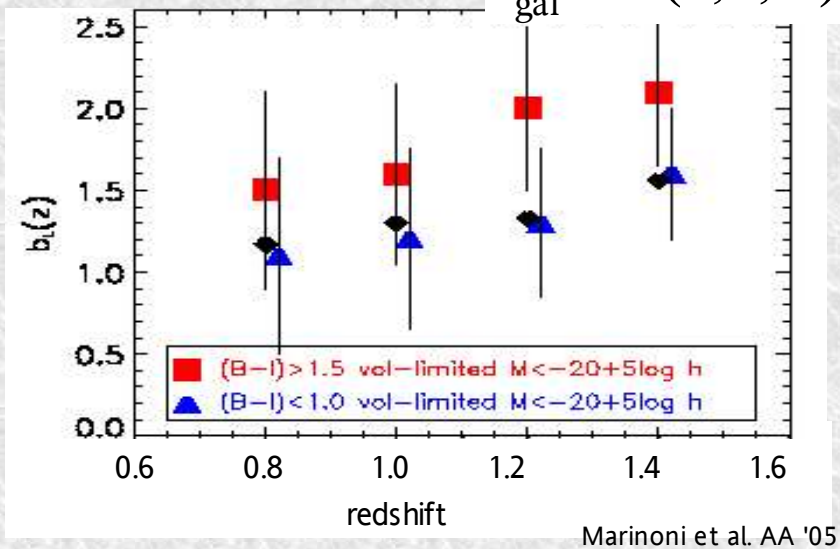
Bimodality clearly present up to z=1.5



Zucca et al. astro-ph/0506393

Fraction of bright late types decreases by a factor 7
Fraction of bright early types increases by a factor 11
Bright late types dominate at z>1.1

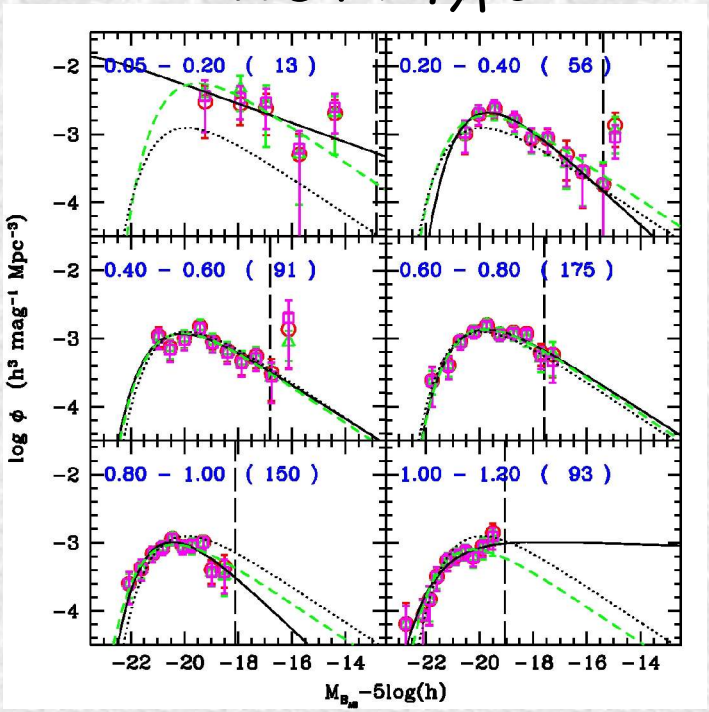
$$\delta_{gal} = b(z,\delta,R)\delta$$



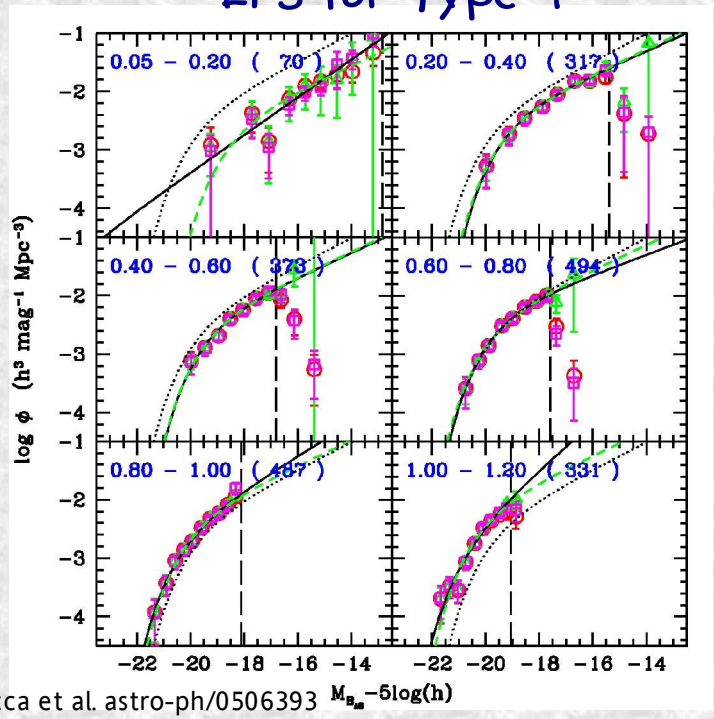
Marinoni et al. AA '05

Bright types are not formed below a mass overdensity whose threshold amplitude decreases with z

LFs for Type 1

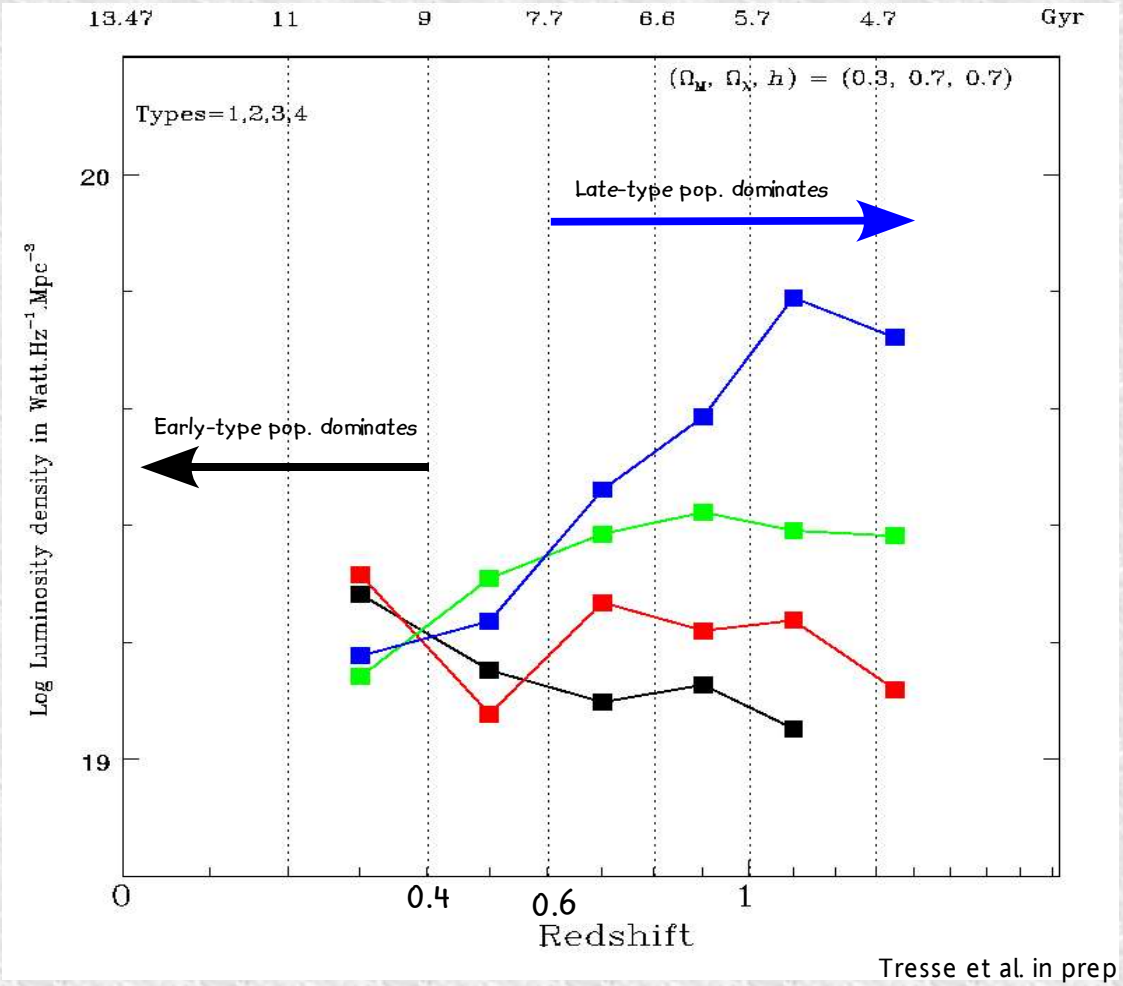


LFs for Type 4



Zucca et al. astro-ph/0506393

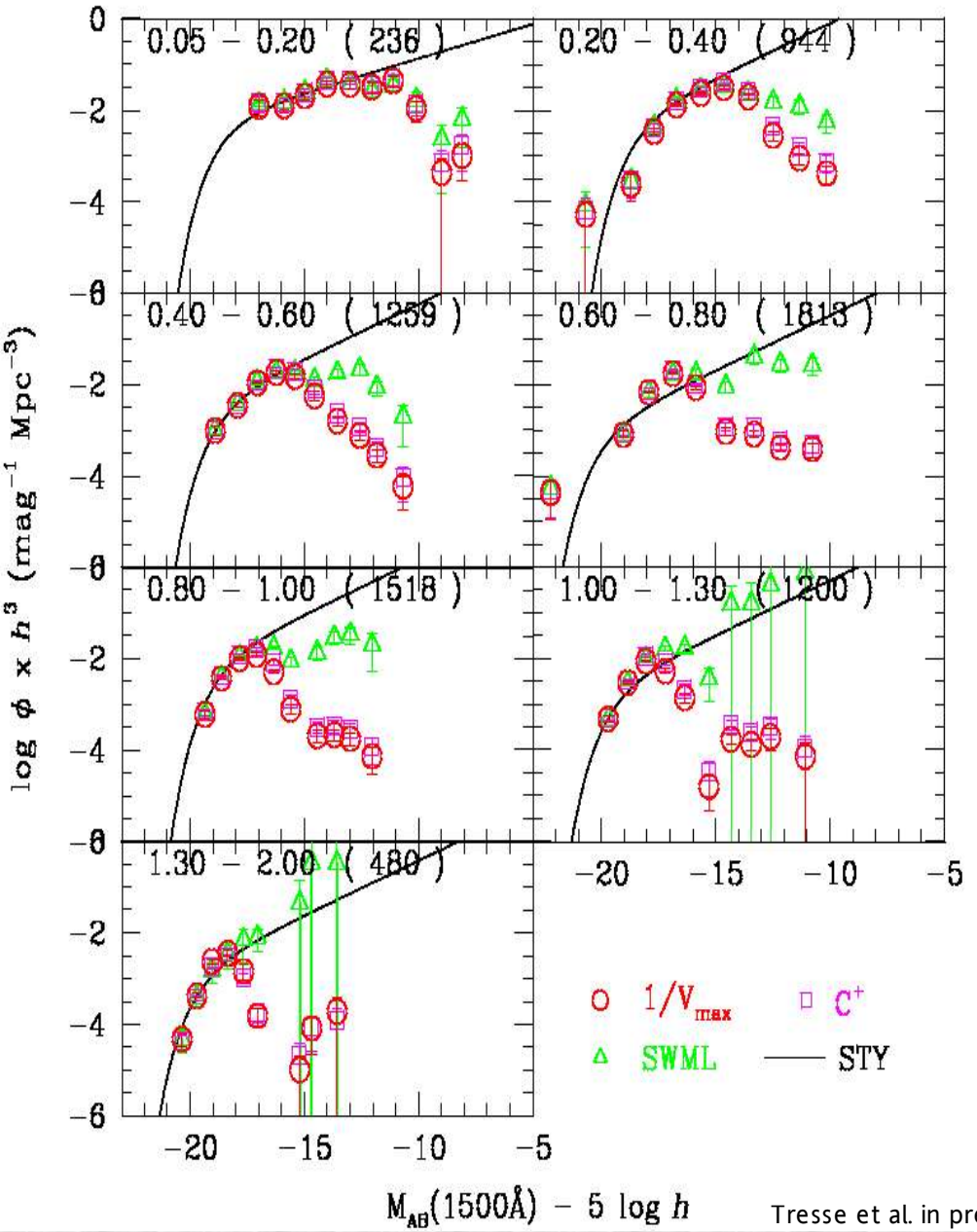
LF-LD/type



Tresse et al. in prep

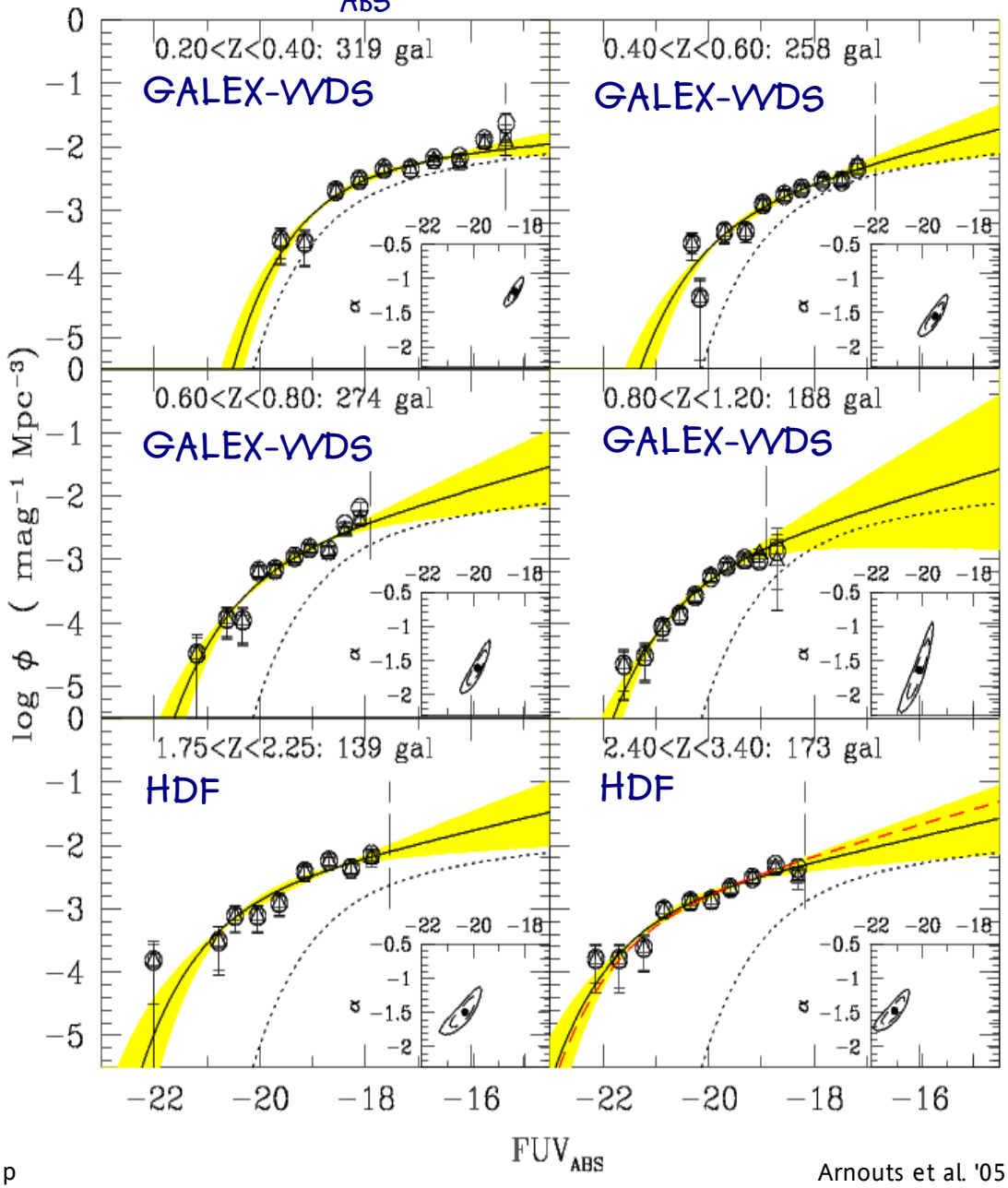
FUV LFs at z < 2

FUV from UBVRI mag



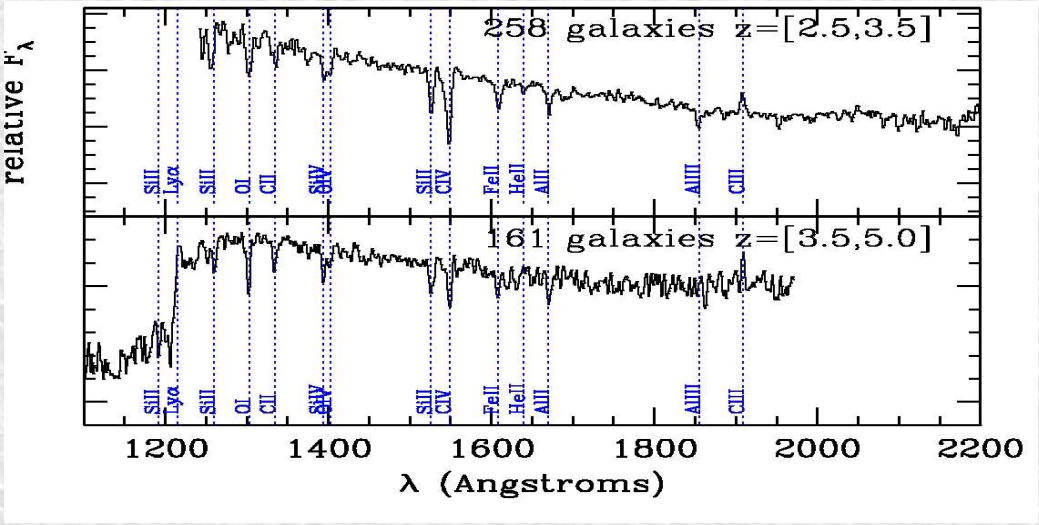
Tresse et al. in prep

FUV$_{ABS}$ from NUV-2000 mag

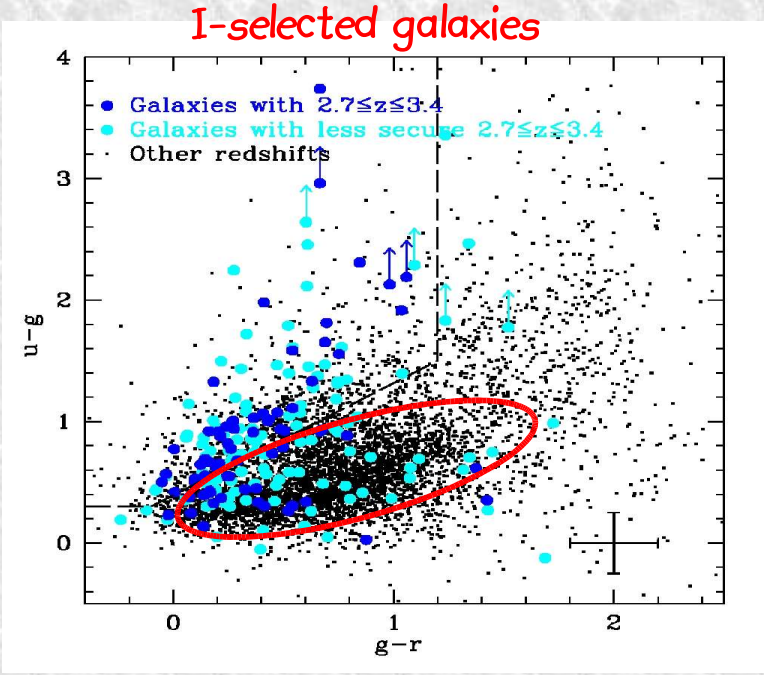


Arnouts et al. '05

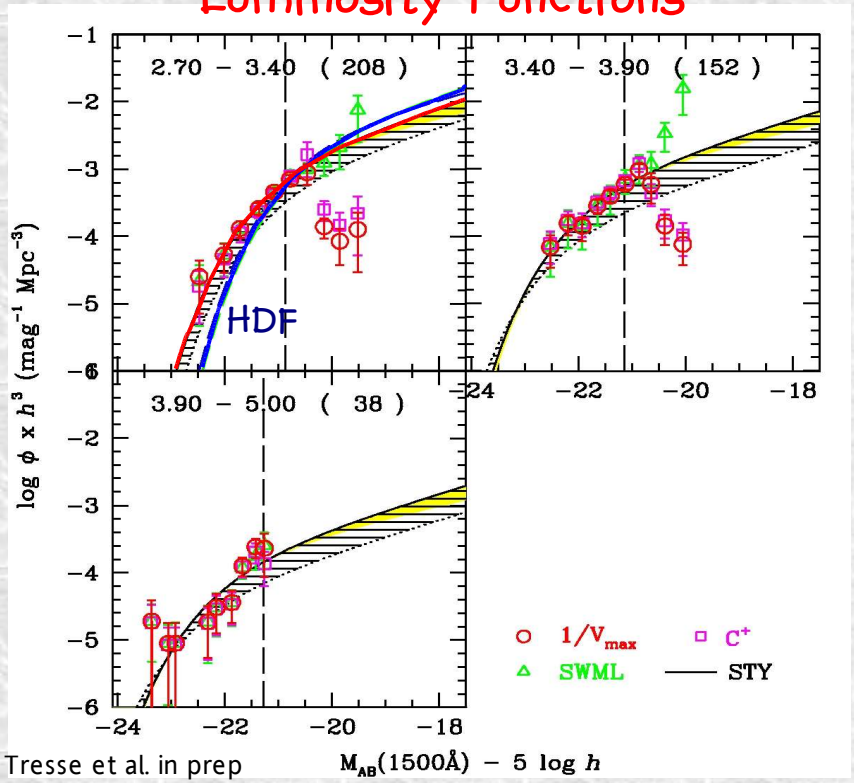
The VVDS high-z population



I-selected galaxies

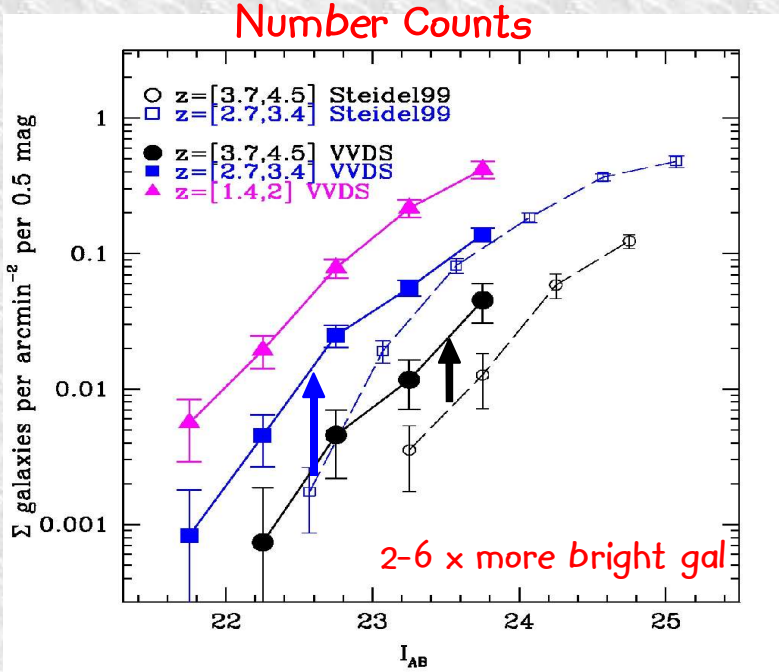


Luminosity Functions



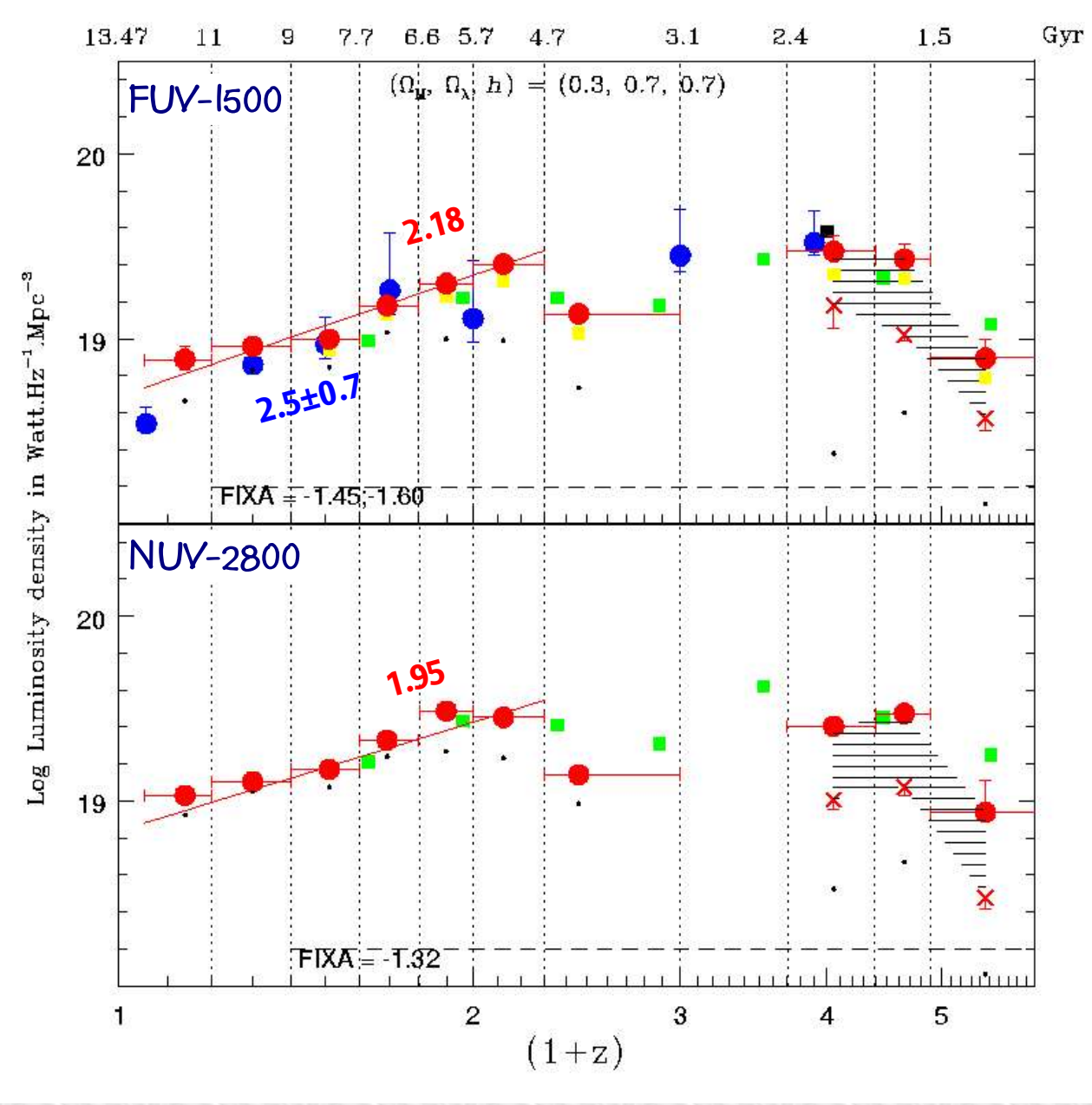
Tresse et al. in prep

Number Counts



Le Fèvre et al. Nature in press

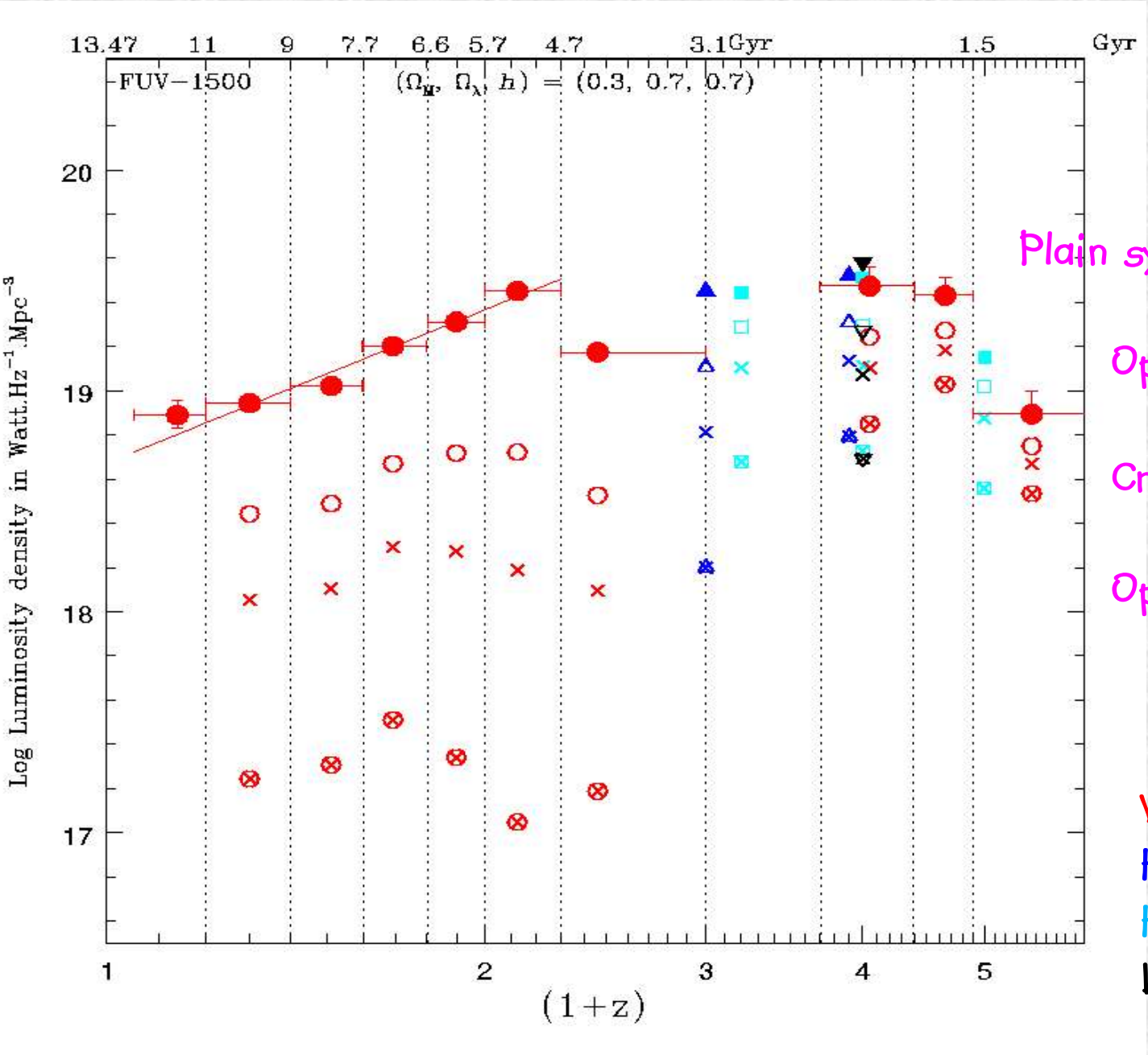
Luminosities Densities at 1500Å and at 2800Å



- VVDS, Tresse et al. in prep
- GALEX-SDSS, Wyder et al. '05
  GALEX-VDDS, Schiminovich et al. '05
- Steidel et al. '99 (1700Å)
- FDF Gabasch et al. '04

At z < 1 factor 1.4-1.5 between LD-1500 and LD-2800

Luminosities Densities derived over various ranges of M_{AB}(FUV)



Plain symbols: all luminosities

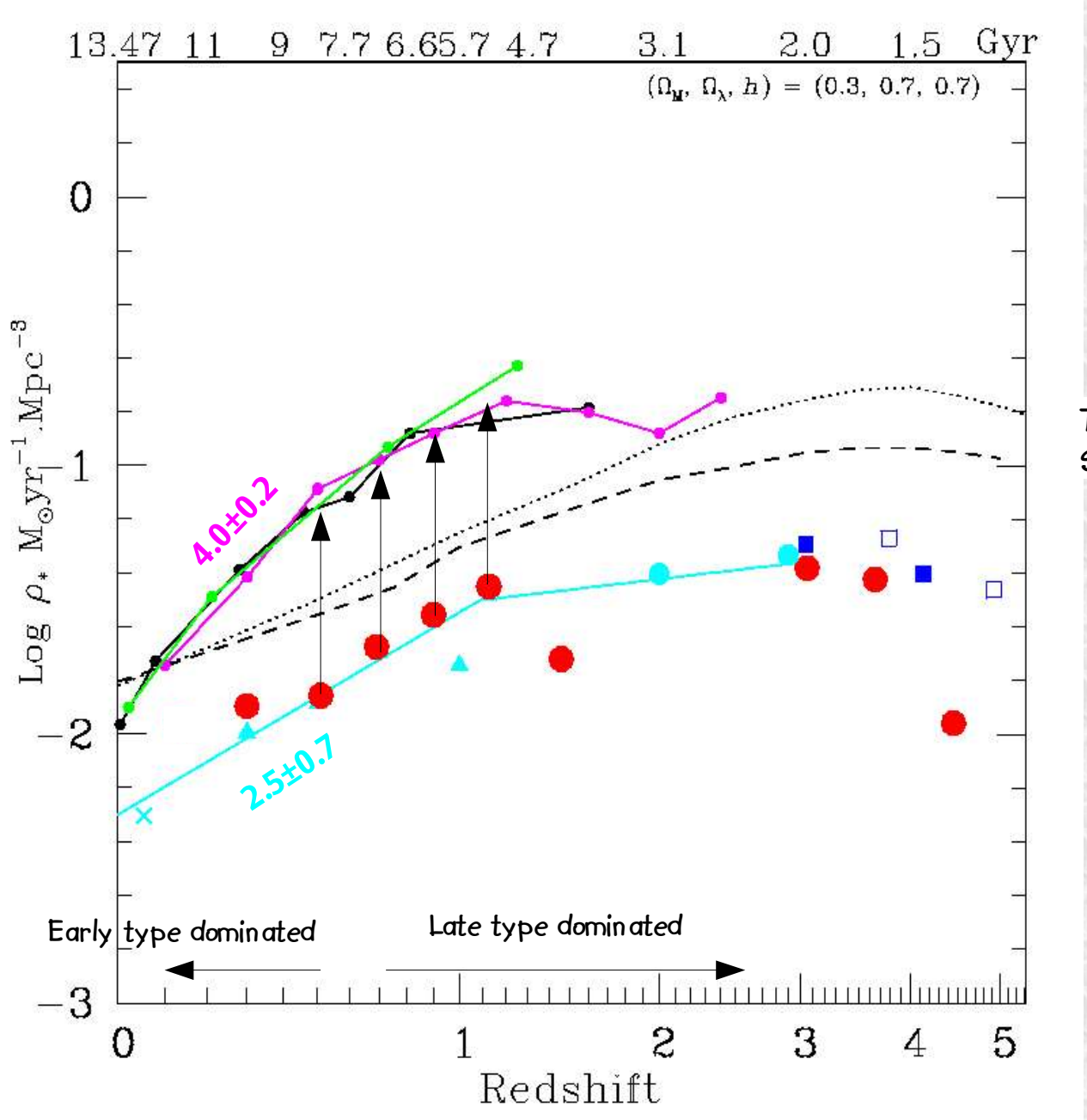
Open symbols
Brighter than -18

Cross symbols
Brighter than -20

Open-cross symbols
Brighter than -21

WDS, this work
HDF, Arnouts et al.
HDF, Sawicki&Thompson
LBG, Steidel et al.

The Cosmic SFR History a decade after



--- Hα, Tresse et al. '02
--- 12μm, Perez-Gonzalez et al. '05
--- 1.4Ghz, Haarsma et al. '00

The Millennium run, Croton et al. '05
Somerville, Primack, Faber '01

Directly observed ionizing UV flux
--- 1500, Schiminovich et al. '05
● 1500, This work
□ 1500, Giavalisco et al. '04
■ 1700, Steidel et al. '99

Dust attenuation increases up to z~0.4 then it is constant. It is related to the change of the dominant population.