Physical properties and metallicities of a sample of dwarf star-forming galaxies located at intermediate redshifts.

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Introduction

Dwarf galaxies play a key role in galaxy formation and evolution:

- They resemble the first structures that hierarchical models predict to form first in the Universe (Dekel & Silk 1986) and that are responsible for the reionization process (Bouwens et al. 2012).
- The way or epoch they form and how they evolve are still open questions of modern astrophysics.
- Their study has been biased to local universe or clusters

Evolved stellar populations hamper accurate estimations of age	Evolution dominated by interactions with near neighbors.

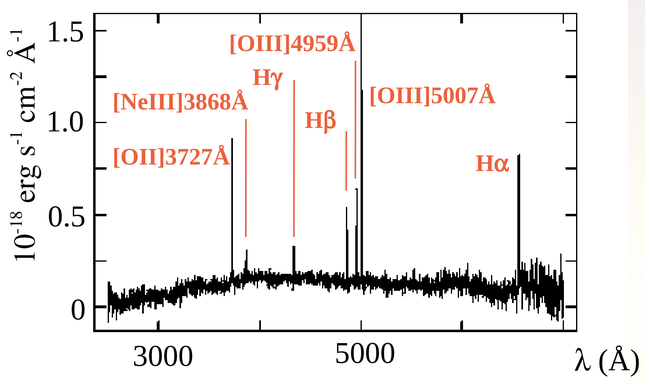
Objective:

- Formation redshift, star formation histories and properties of low-mass dwarf star-forming galaxies at intermediate z.
- Blue Compact Dwarfs (BCDs) at intermediate z as reference sample.

VIMOS spectroscopy

R=580 VLT/VIMOS spectroscopy reduced using VIPGI (Scodeggio et al. 2005) at Laboratoire d'Astrophysique de Marseille (LAM).

Instrument	VIMOS (MOS)
Slits	239
Exposure	4 h
R	580 (MR)
Scale	0.205"/pix



- Mean spectrum for the objects of our sample.
- Stack built using 36 spectra of dwarfs and BCDs in the whole z range covered by the sample.
- The spectrum is characterized by a faint and flat continuum and strong emission lines, revealing that the systems are dominated by an undergoing star formation burst.

The Sample

We build the sample on the CDFS field, covered by numerous multi-wavelength surveys (UV to far-IR) that allow the data base RAINBOW (Pérez-González et al. 2008) to estimate photometric redshifts and stellar masses.

We consider two different galaxy samples selected from the SUBARU NB816 image catalog:

Sample 1: **675 Dwarfs** ⇦ $M_* < 10^8 M_\odot$

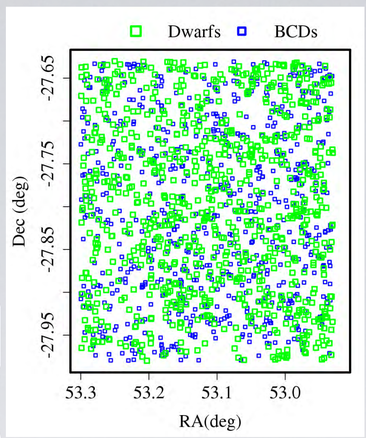
Sample 2: **800 BCDs** Tracers of dwarfs at intermediate z.

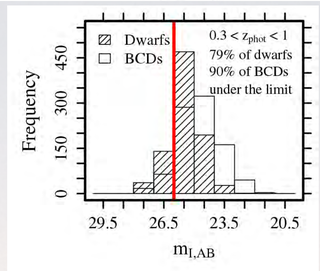
$M_{B,0} > -18.5$; $(B-V)_{B,0} < 0.6$;

$\mu_{eff,B,0} < 23$ mag arcsec^{-2}

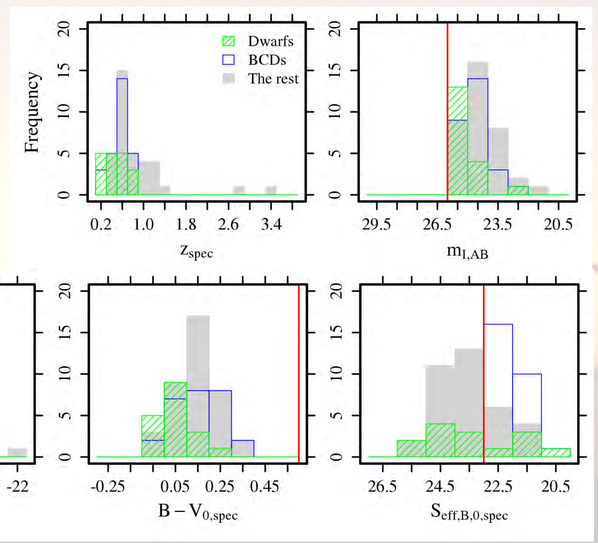
$0.3 < z_{phot} < 1$

$m_{I,AB} < 26$



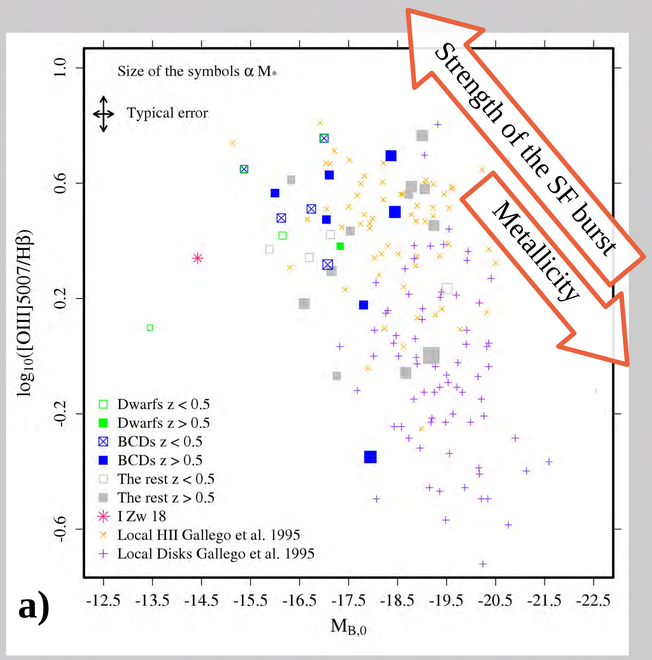


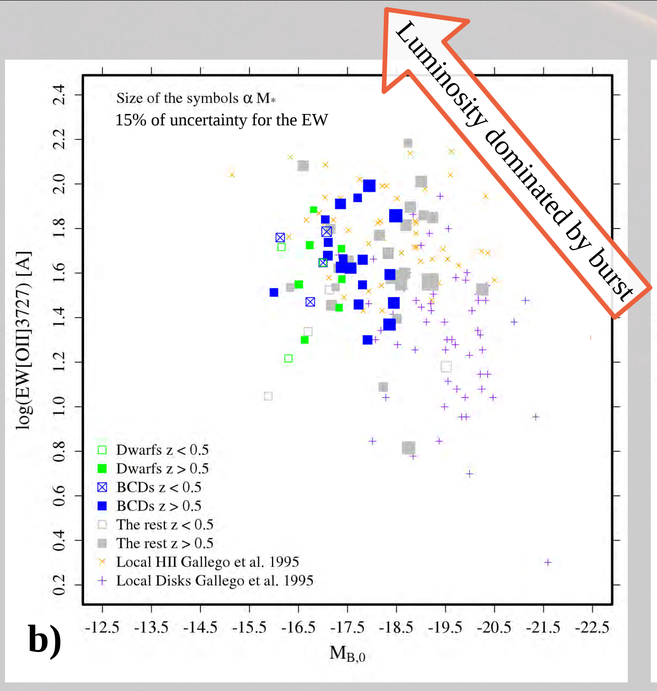
- z_{spec}-based properties of the sample of objects confirmed spectroscopically in VIMOS/VLT survey (54 dwarfs and 25 BCDs).

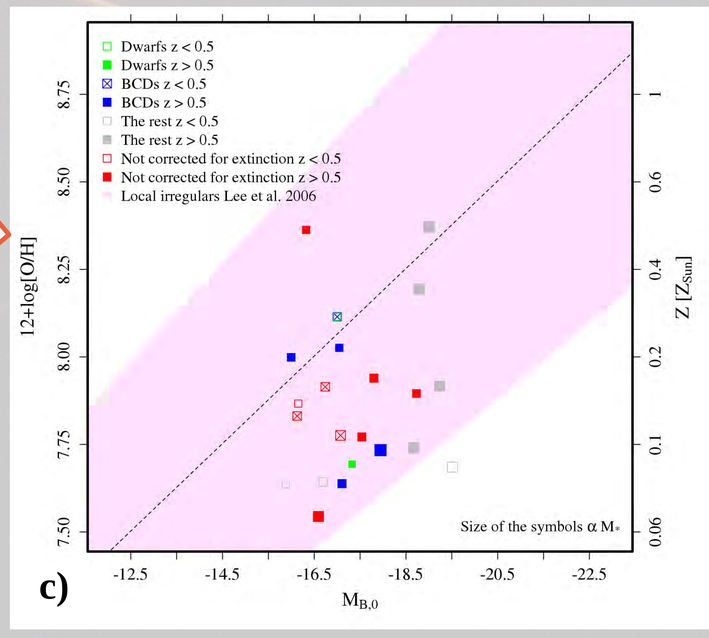


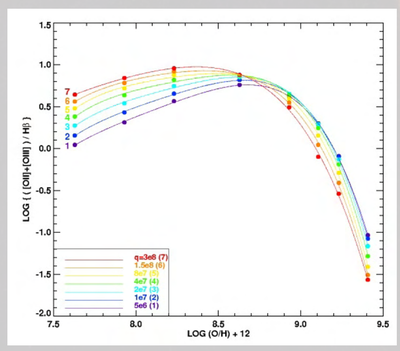
- For more information about the sample please check poster Rodríguez-Muñoz et al.

Spectroscopic Properties









Values of metallicity obtained considering high ionization (Kewley & Dopita 2002).
Extinction correction from Calzetti 2000 and Kong et al. 2002.
$Z_\odot$ =8.69 (Allende-Prieto 2001)

Conclusions

a) Dwarfs and BCDs at intermediate z follow the overall star-forming sequence in the excitation-luminosity diagram, populating the high excitation, low metallicity and high strength of the star-formation burst region.
Worth to notice: Candidate to low metallicity dwarf star-forming galaxy ($M_{B,0}$ =-13.4, log[OIII]5007Å/Hβ=0.1, z_{spec}=0.12).

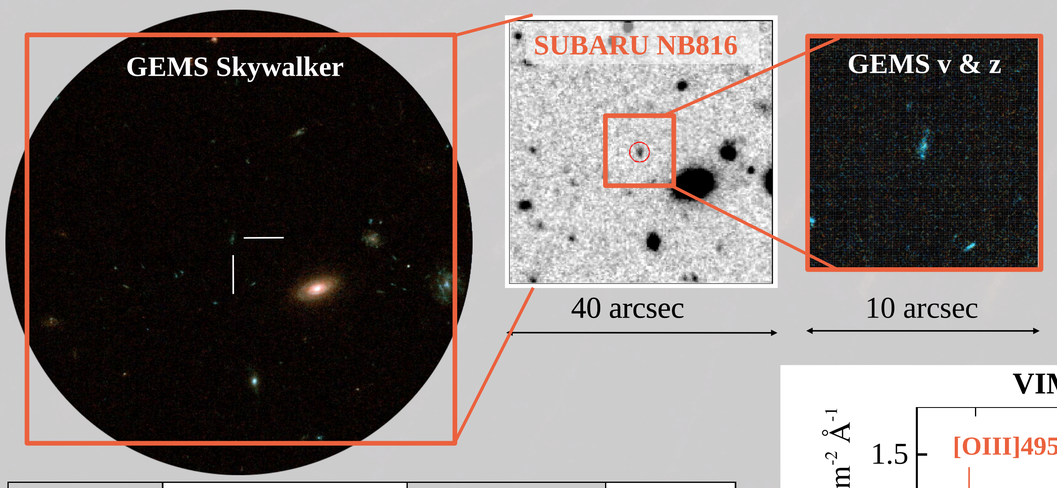
b) Dwarfs and BCDs at intermediate z populate the high EW region, revealing that the luminosity of these systems is dominated by the star-formation burst

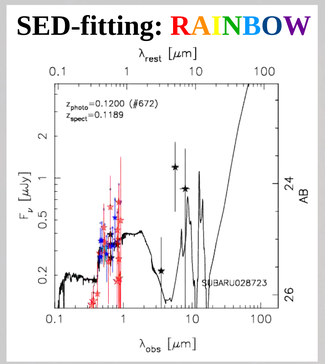
c) Our sample show low metallicity values in a wide range between ~1/15 and 1/2 $Z_\odot$

References

- Allende Prieto et al. 2001, ApJ, 556, 63
- Bouwens et al 2012, ApJ, 752, 5
- Calzetti 2000 ApJ, 533, 682
- Dekel & Silk 1986 ApJ 303, 39
- Gallego et al. 1995 ApJ 455, 7
- Kewley & Dopita 2002 ApJS 142, 35
- Kong et al. 2002 A&A 396, 503
- Lee et al. 2006 ApJ 647, 970
- Pérez-González et al. 2008 ApJ 675,234
- Scodeggio et al. 2005 PASP 117.1284

Dwarf candidate to extremely low metallicity





Type	Irr	Z_{spec} (±0.0001)	0.1189
m_{NB816}	25.11±0.05	$(B-V)_0$	0.06±0.20
$R_{eff,GEMS}$	0.9±0.1 kpc	$M_{B,0}$	-13.5±0.1
$S_{eff,B,0}$	25.3±0.1mag arcsec^{-2}	$LogM_*$ [$M_\odot$]	6.3±0.3