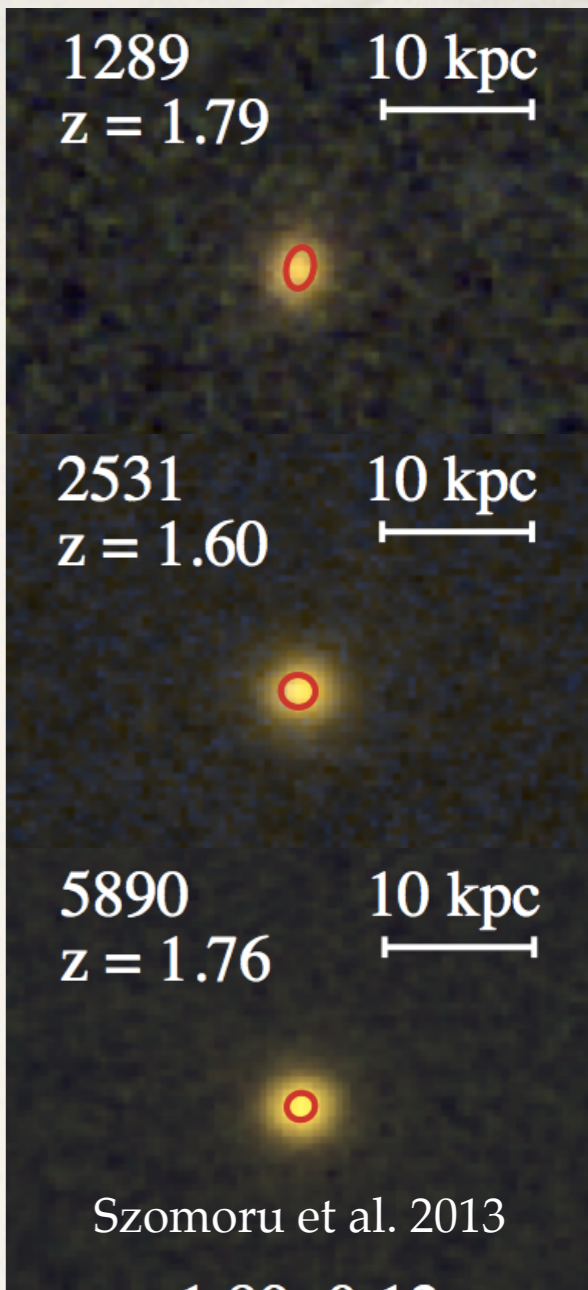
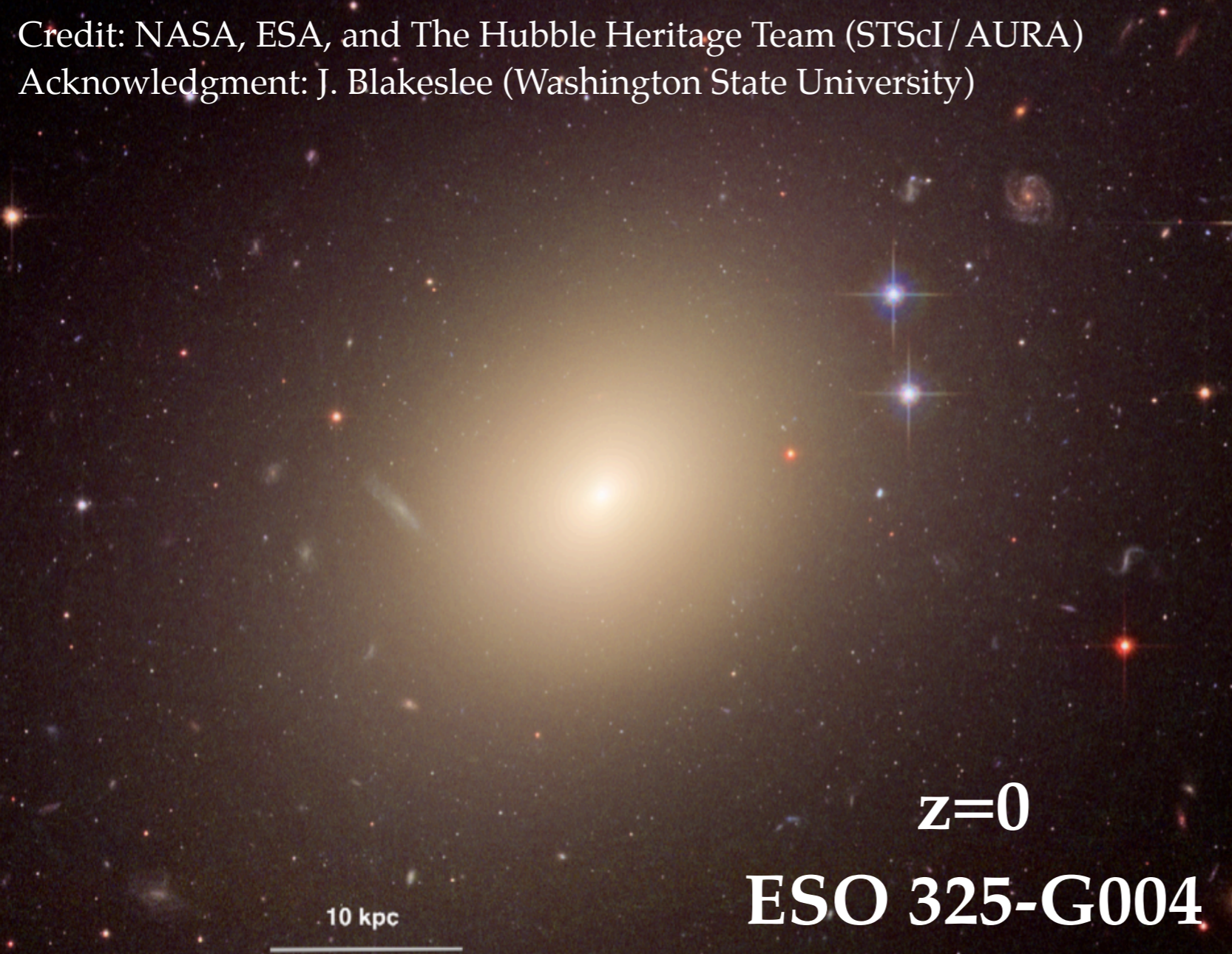
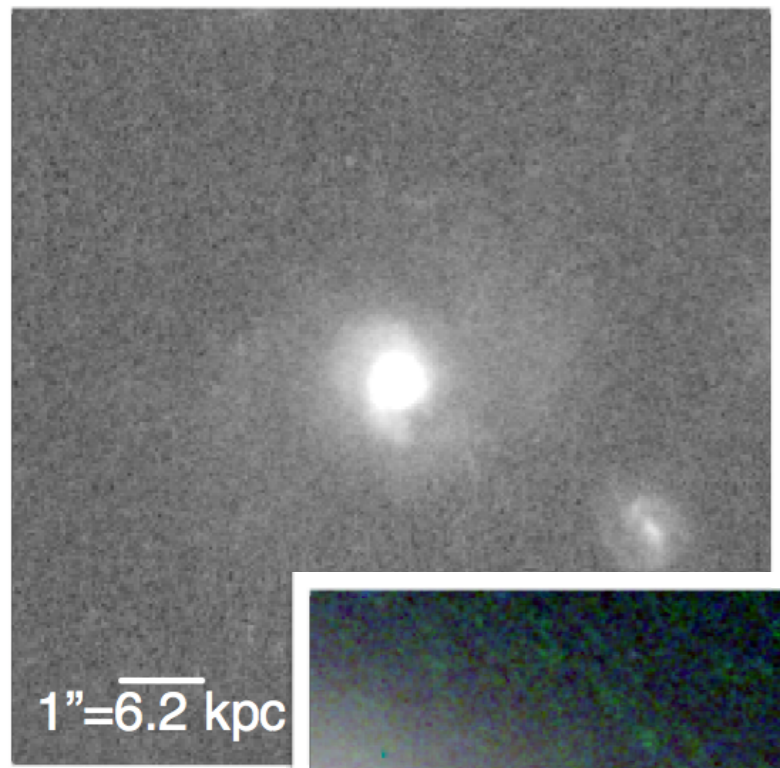


Credit: NASA, ESA, and The Hubble Heritage Team (STScI/AURA)  
Acknowledgment: J. Blakeslee (Washington State University)

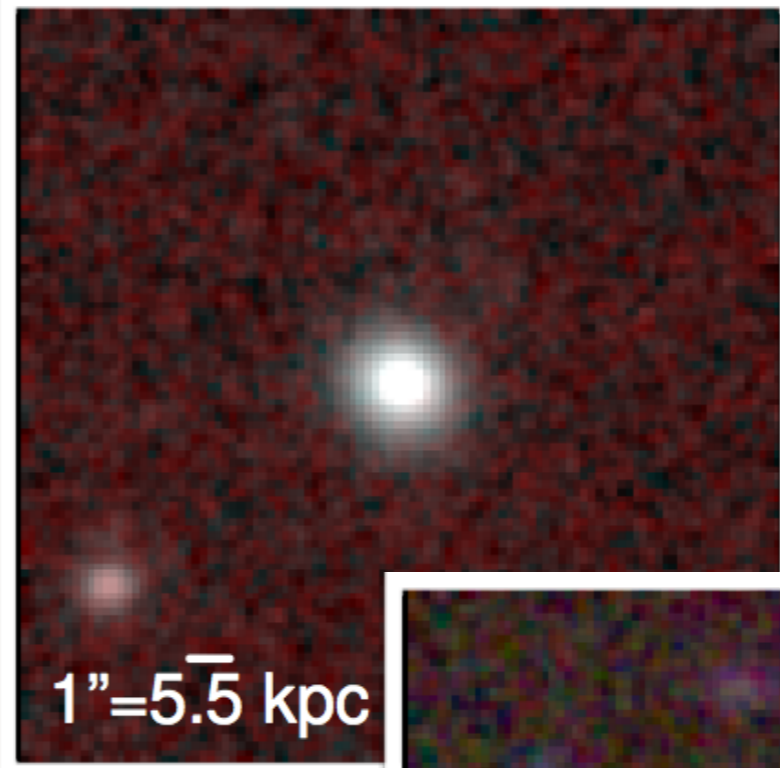


# Intermediate-redshift compact quiescent galaxies

**Ivana Damjanov (Harvard-Smithsonian CFA)**  
(with Margaret Geller (SAO), H. Jabran Zahid (SAO), and Ho Seong Hwang (SAO/KASI))

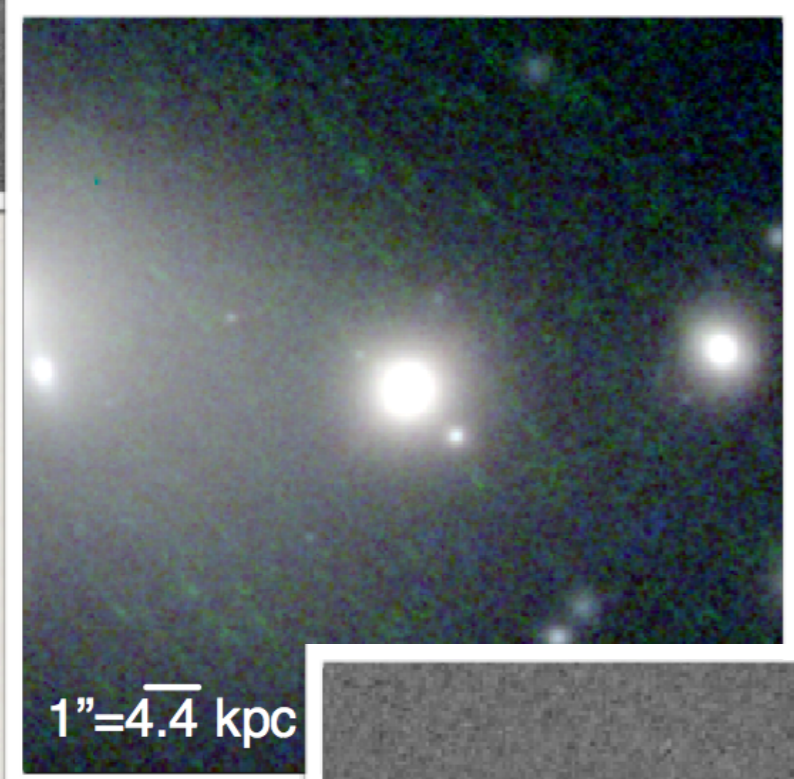


1" = 6.2 kpc

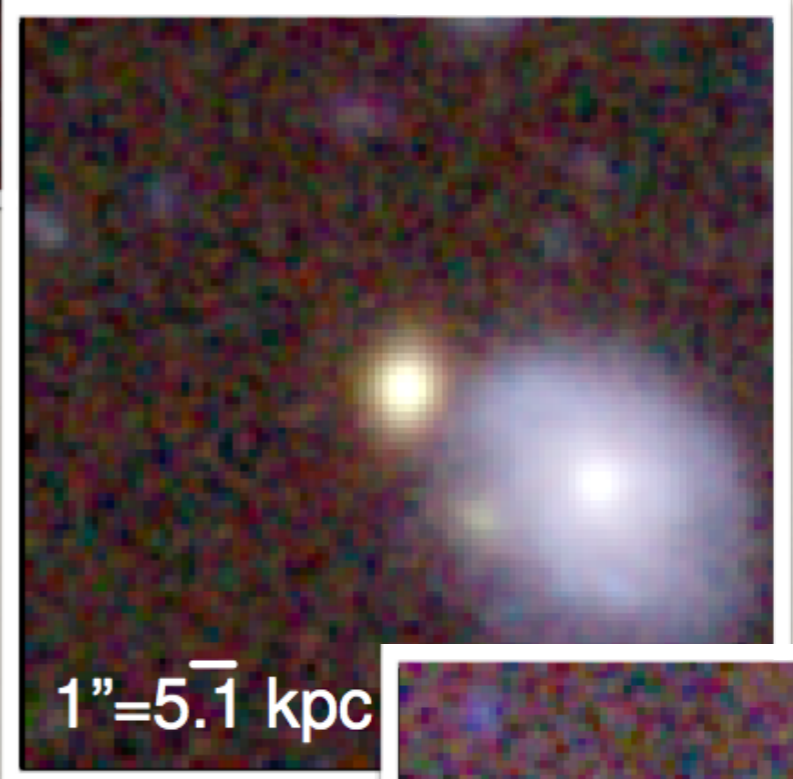


1" = 5.5 kpc

CFHT  
Damjanov  
et al. 2014

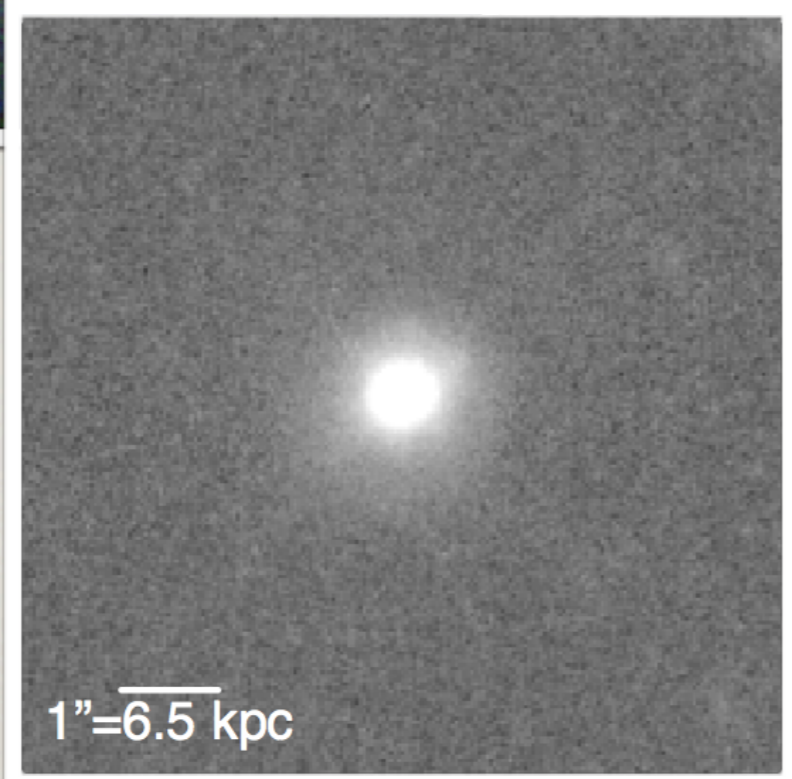


1" = 4.4 kpc

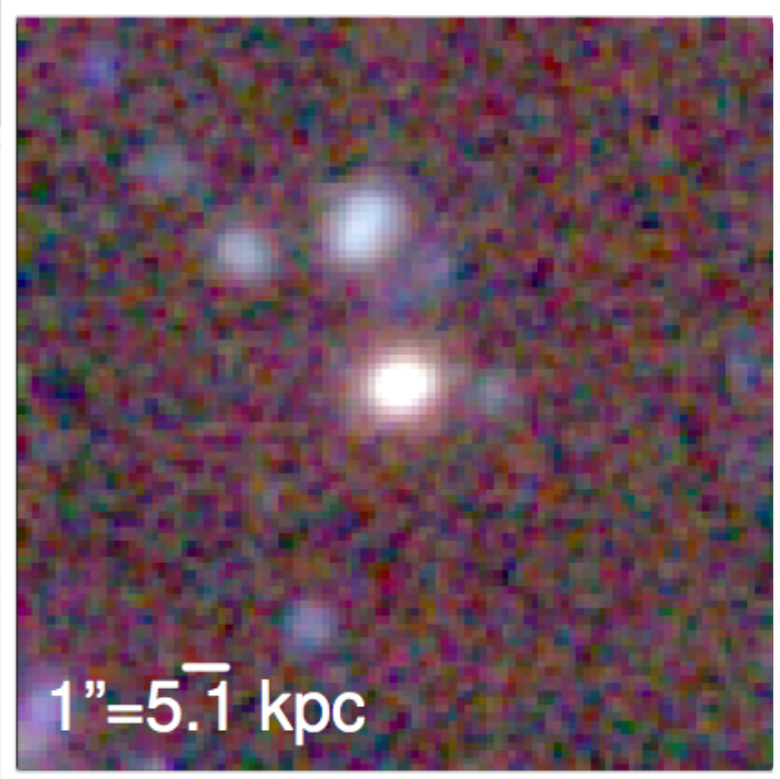


1" = 5.1 kpc

HST  
Damjanov  
et al. 2013



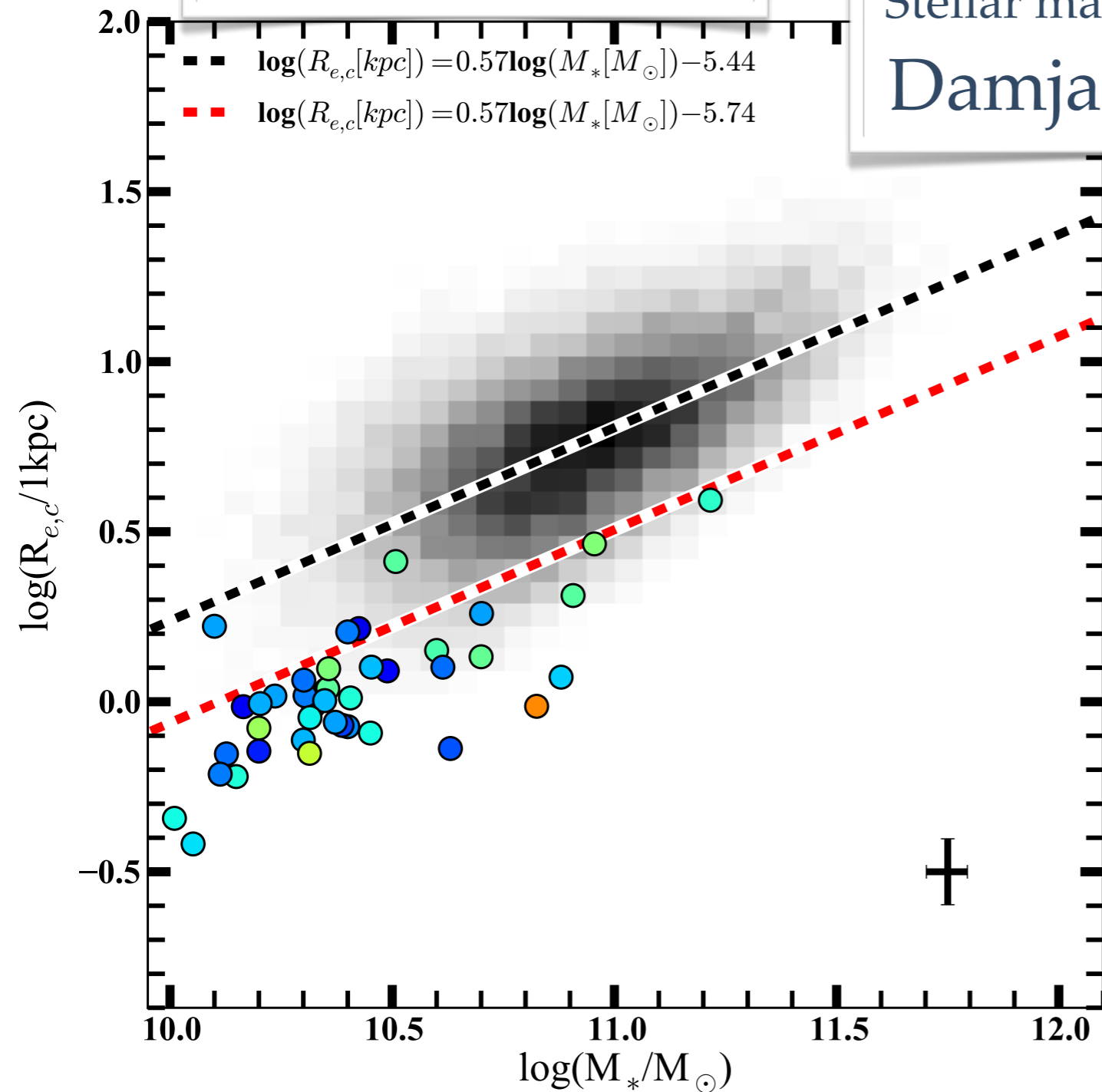
1" = 6.5 kpc



1" = 5.1 kpc

# COSMOS field

SDSS point sources



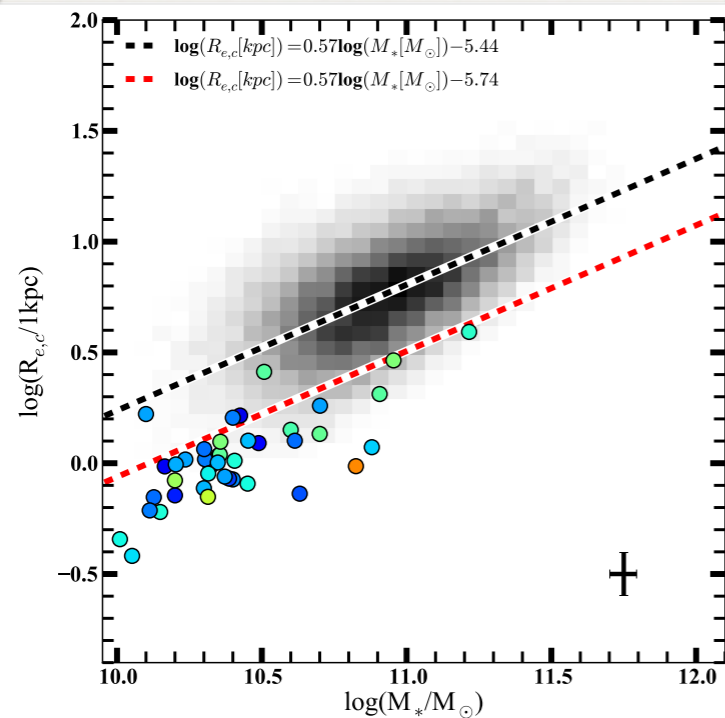
Sizes - GALFIT, single Sérsic profile

Stellar masses - UltraVista catalog (Ilbert et al. 2013)

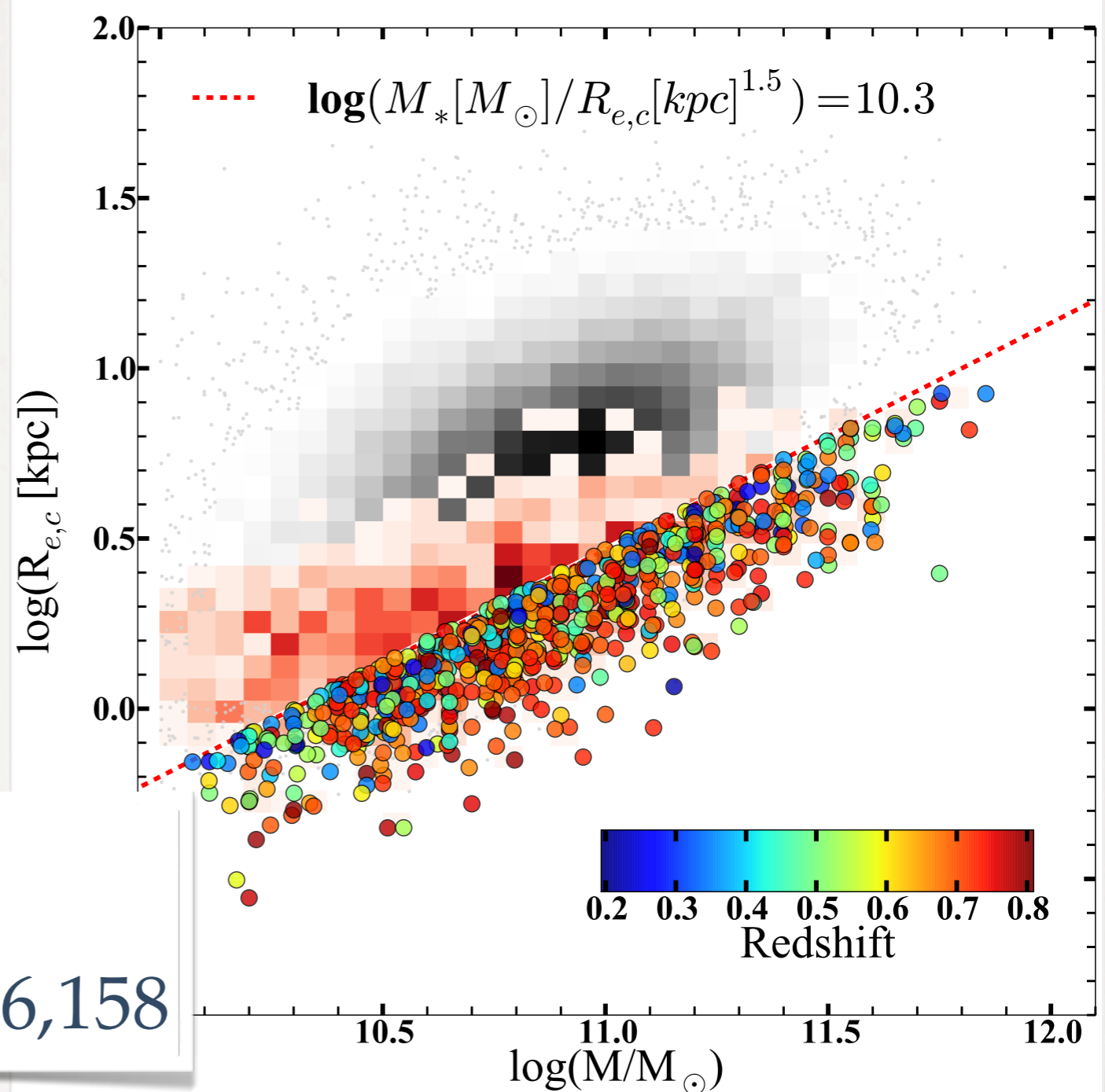
Damjanov et al. 2015, ApJ, 806,158

# COSMOS field

SDSS point sources

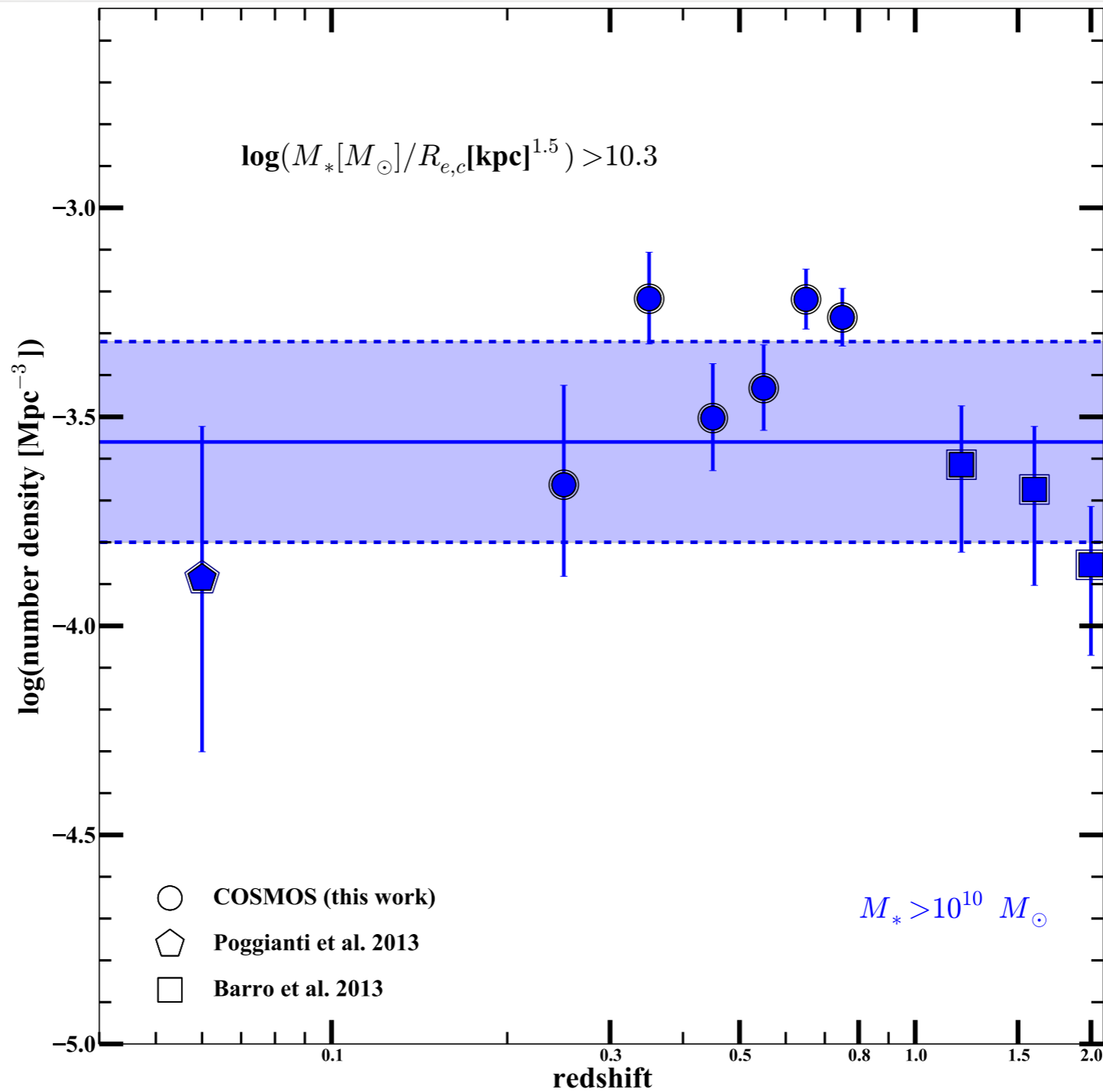


All quiescent galaxies



Sizes - GIM2D, Zurich catalog  
Stellar masses - UltraVista catalog

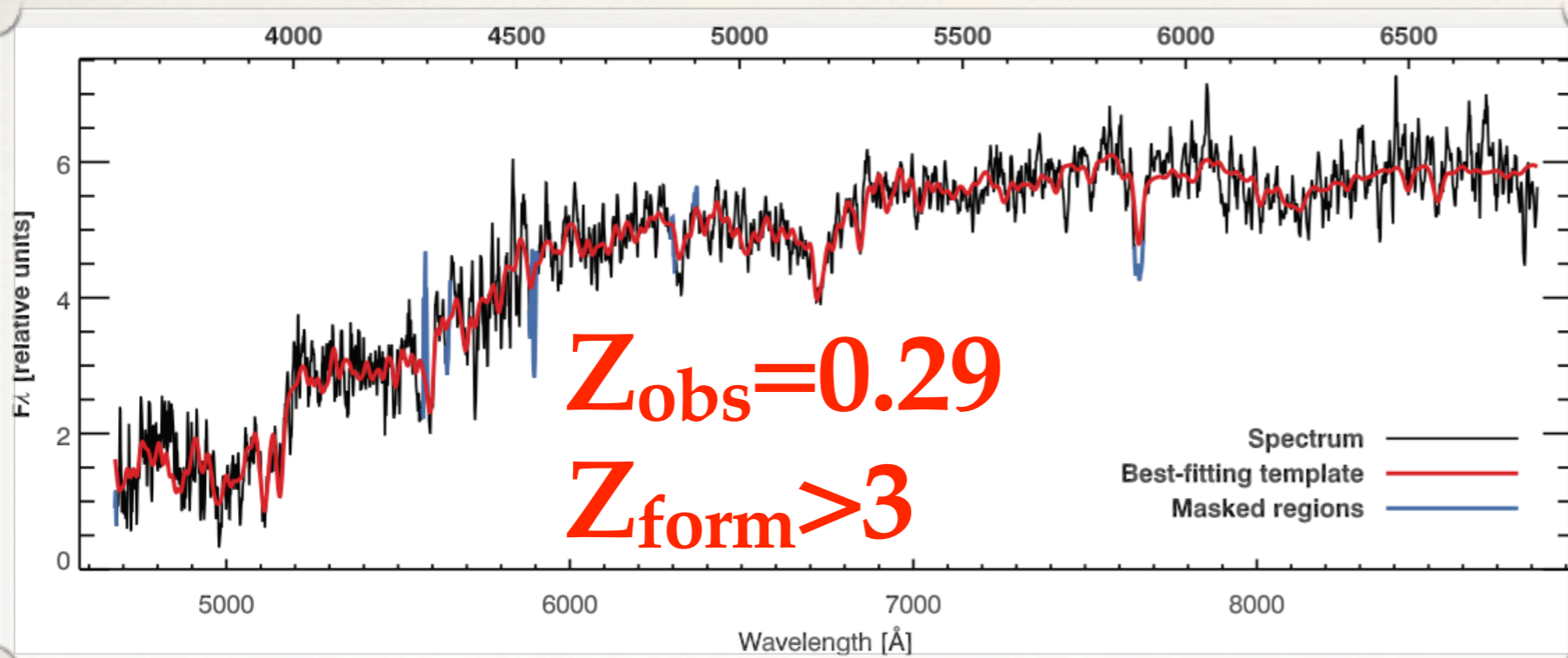
Damjanov et al. 2015, ApJ, 806,158



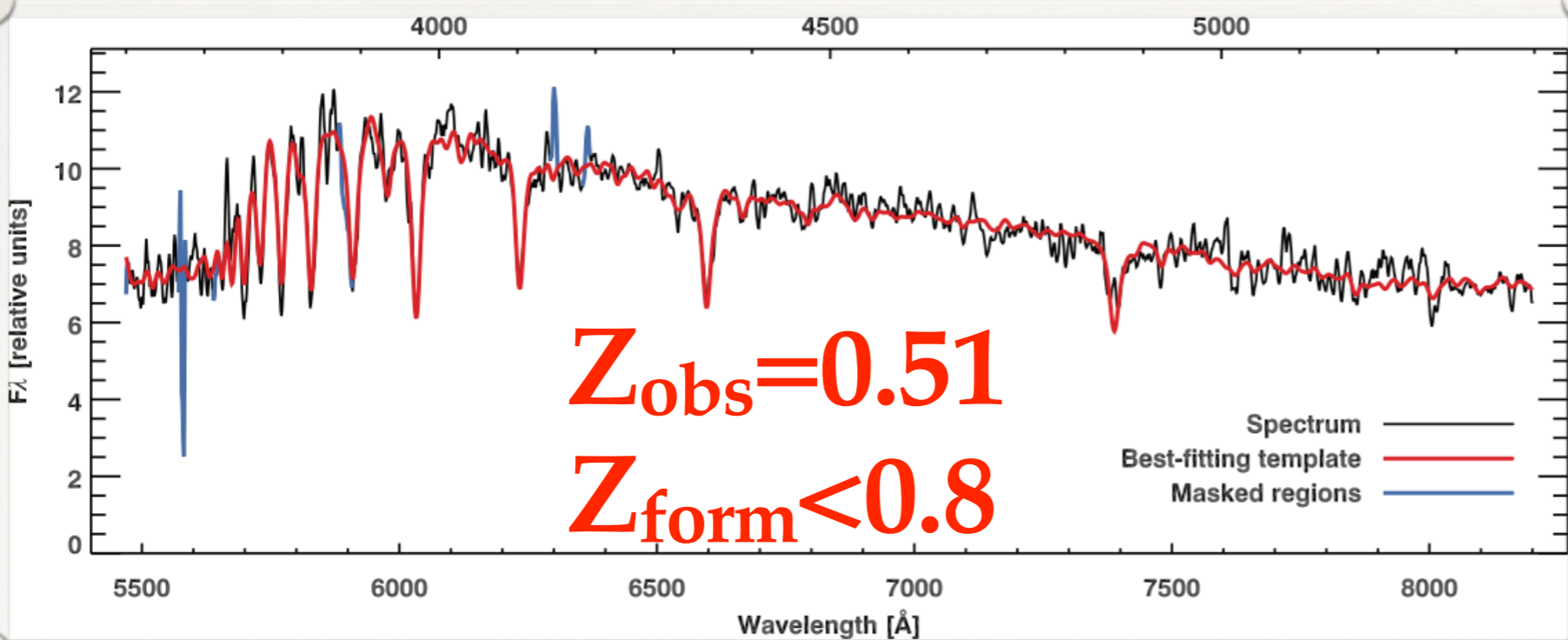
## Constant number density

Damjanov et al. 2015, ApJ, 806, 158

# Interpretation?

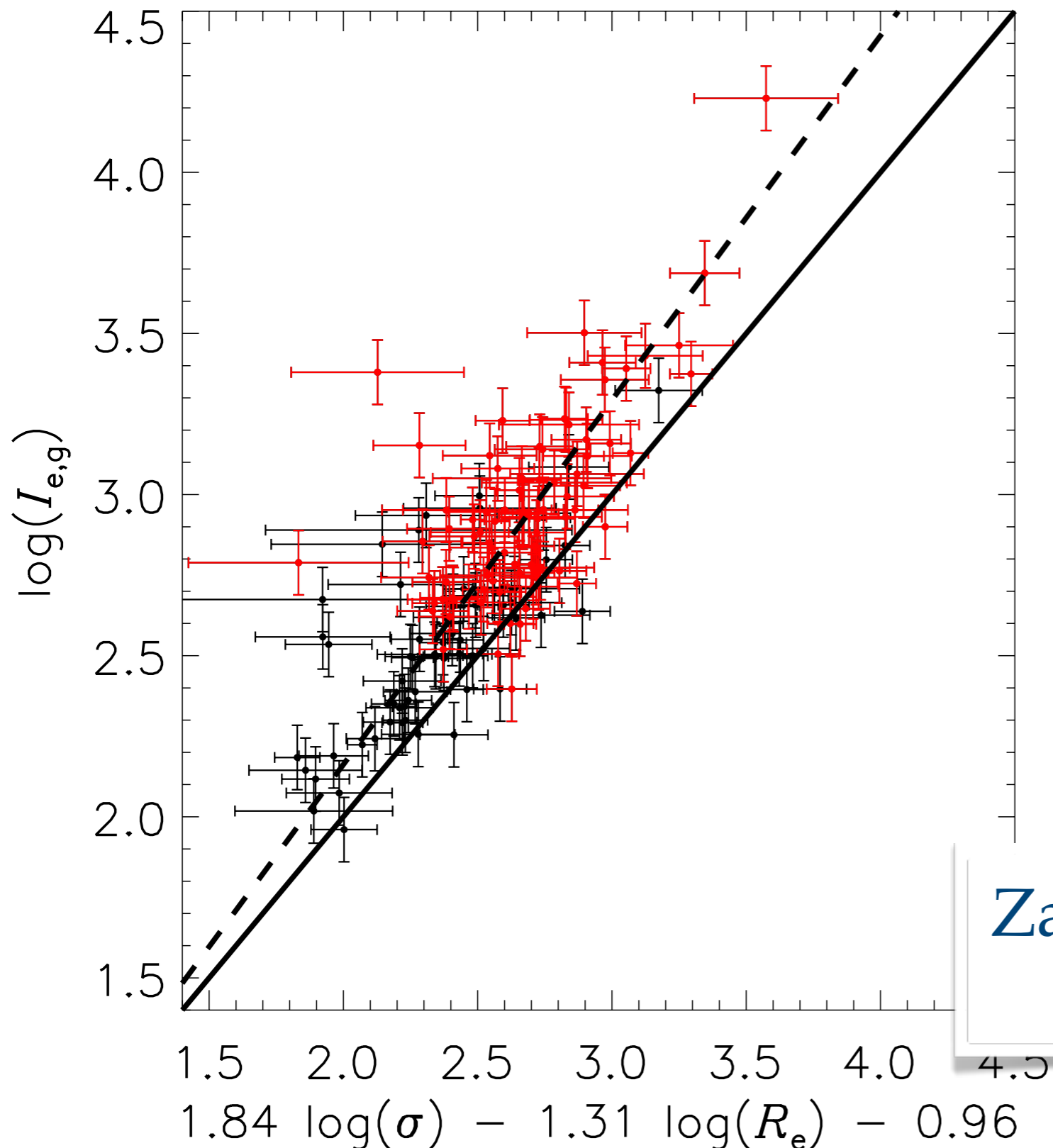


## Relics



## Analogs

# Fundamental plane



observed

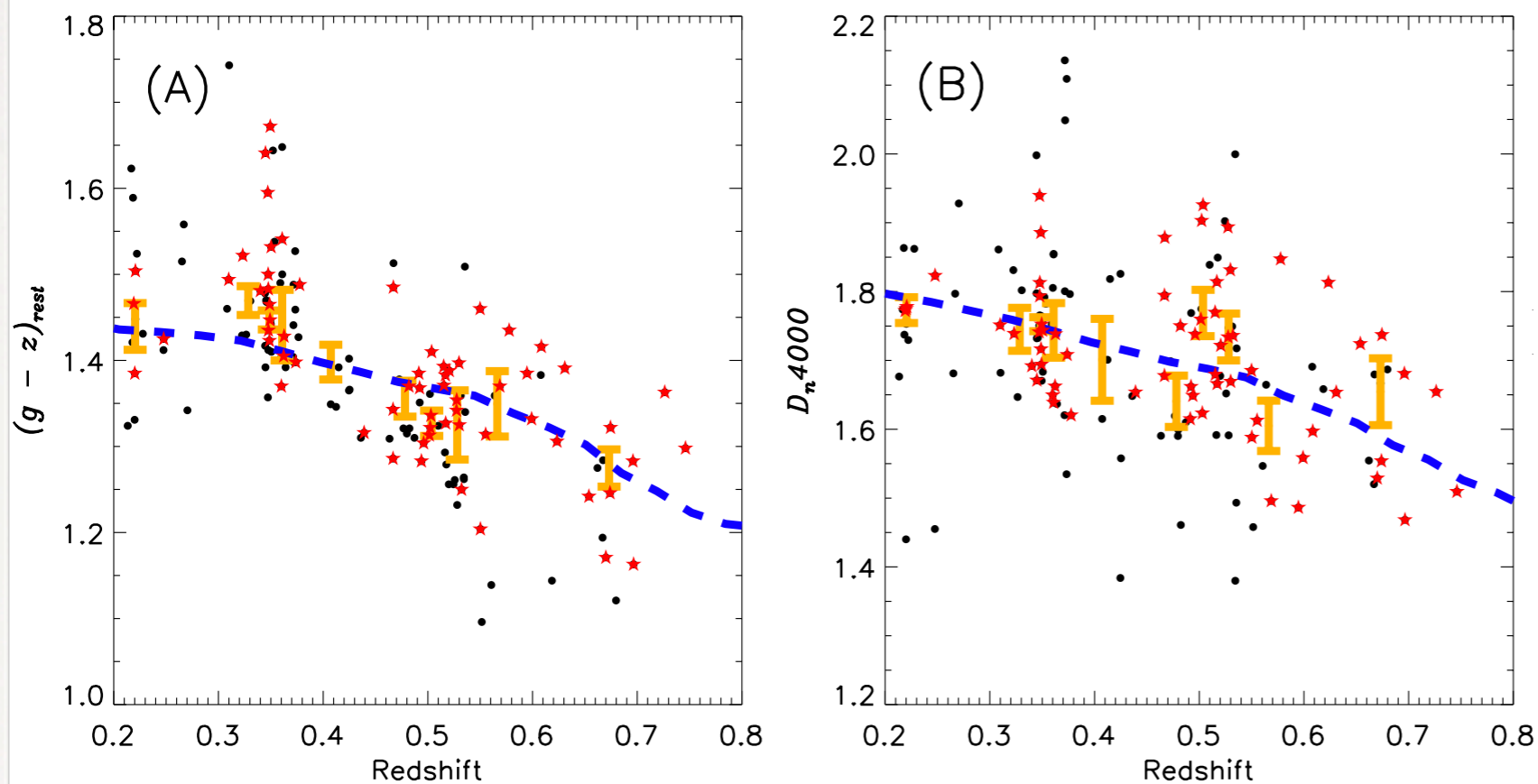
**+** compacts at  $0.2 < z < 0.8$

**+** quiescent at  $z=0$   
(Hyde & Bernardi  
2009)

COSMOS field

Zahid, Damjanov et al. 2015,  
ApJ, 806, 122

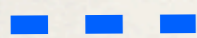
# Fundamental plane - passive evolution



compact quiescent galaxies at  $0.2 < z < 0.8$  in the COSMOS field



quiescent galaxies at  $0.2 < z < 0.8$  in the COSMOS field



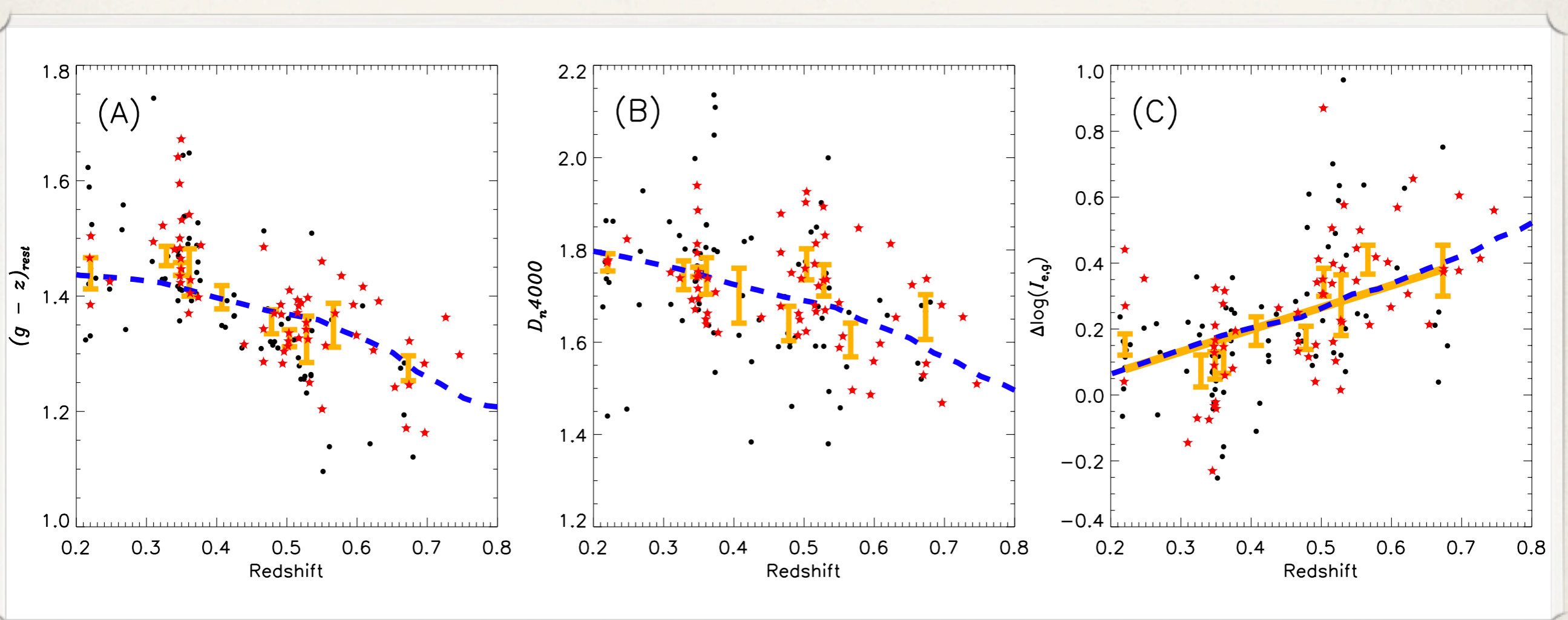
Quiescent model with  $z_{form}=1.7$  and quenching at  $z=1.3$



Median observed values in redshift bins



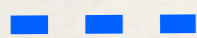
# Fundamental plane - passive evolution



compact quiescent galaxies at  $0.2 < z < 0.8$  in the COSMOS field



quiescent galaxies at  $0.2 < z < 0.8$  in the COSMOS field

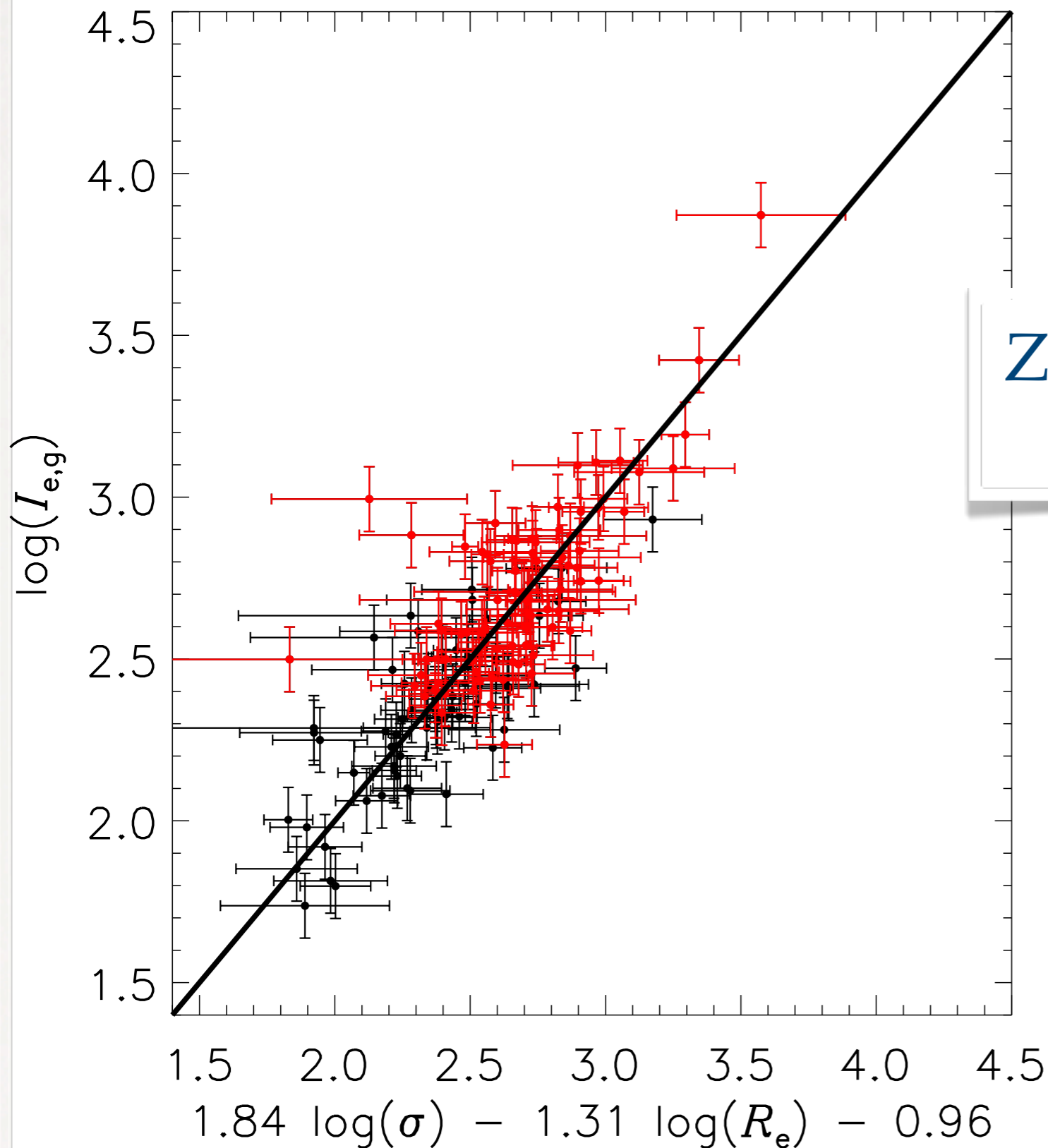


Quiescent model with  $z_{form}=1.7$  and quenching at  $z=1.3$



Median observed values in redshift bins

# Fundamental plane

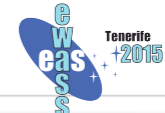


after correction

COSMOS field

Zahid, Damjanov et al. 2015,  
ApJ, 806, 122

Compacts are on  
the  $z \sim 0$   
Fundamental  
Plane



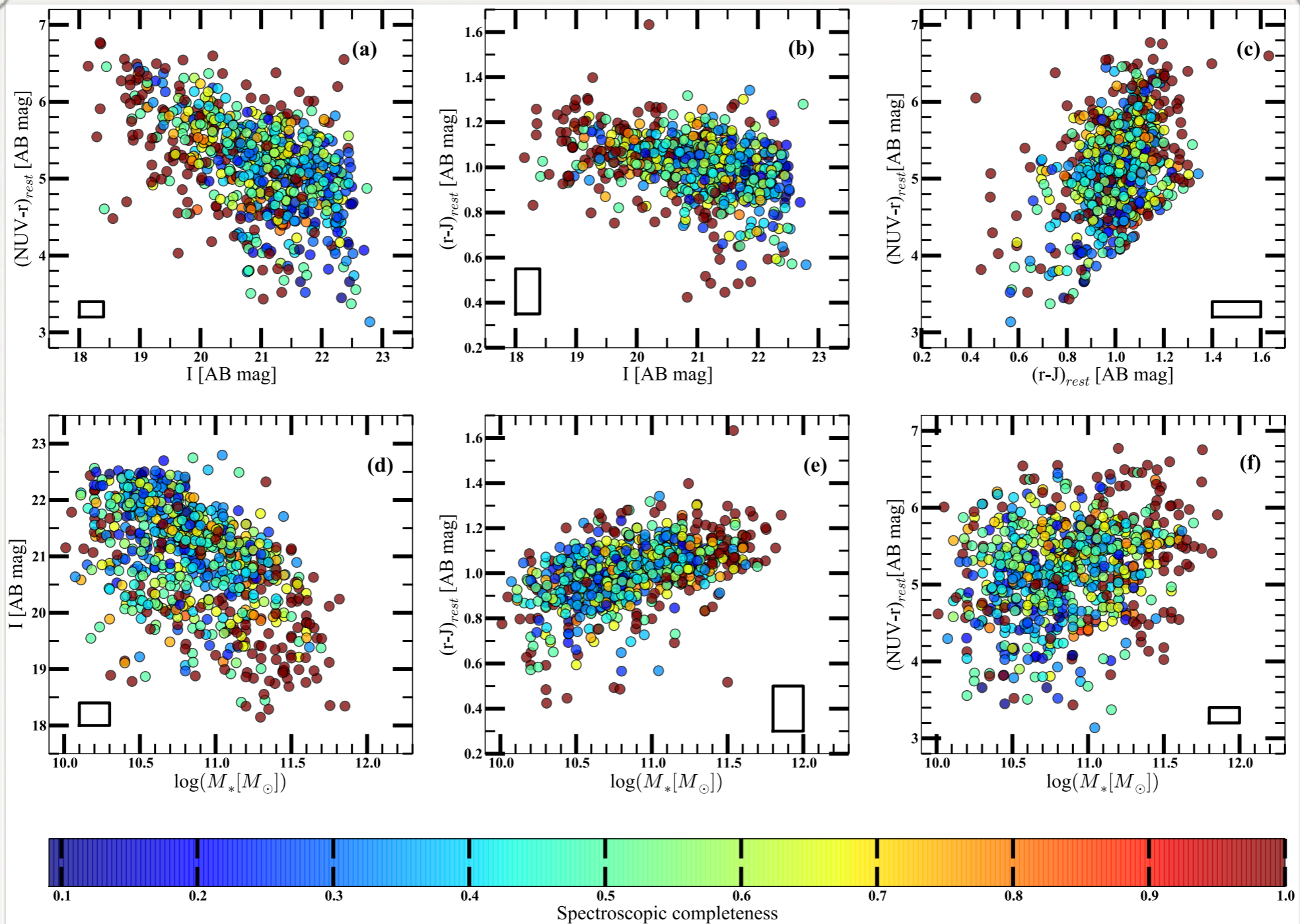
# Conclusions

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- ❖ Compact quiescent galaxies are abundant at intermediate redshift.
- ❖ The number density is approximately constant.
- ❖ Variations in the abundance correspond to known galaxy structures.
- ❖ Compacts lie on the fundamental plane of local quiescent population.

# The number density of compacts

## Observational effects - spectroscopic incompleteness



# Number density

**Observational effects**

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# Number density

## Observational effects

---

### Corrections:

1. spectroscopic incompleteness
2. magnitude limit of redshift surveys and reliable size measurements

# Number density

## Observational effects

---

### Corrections:

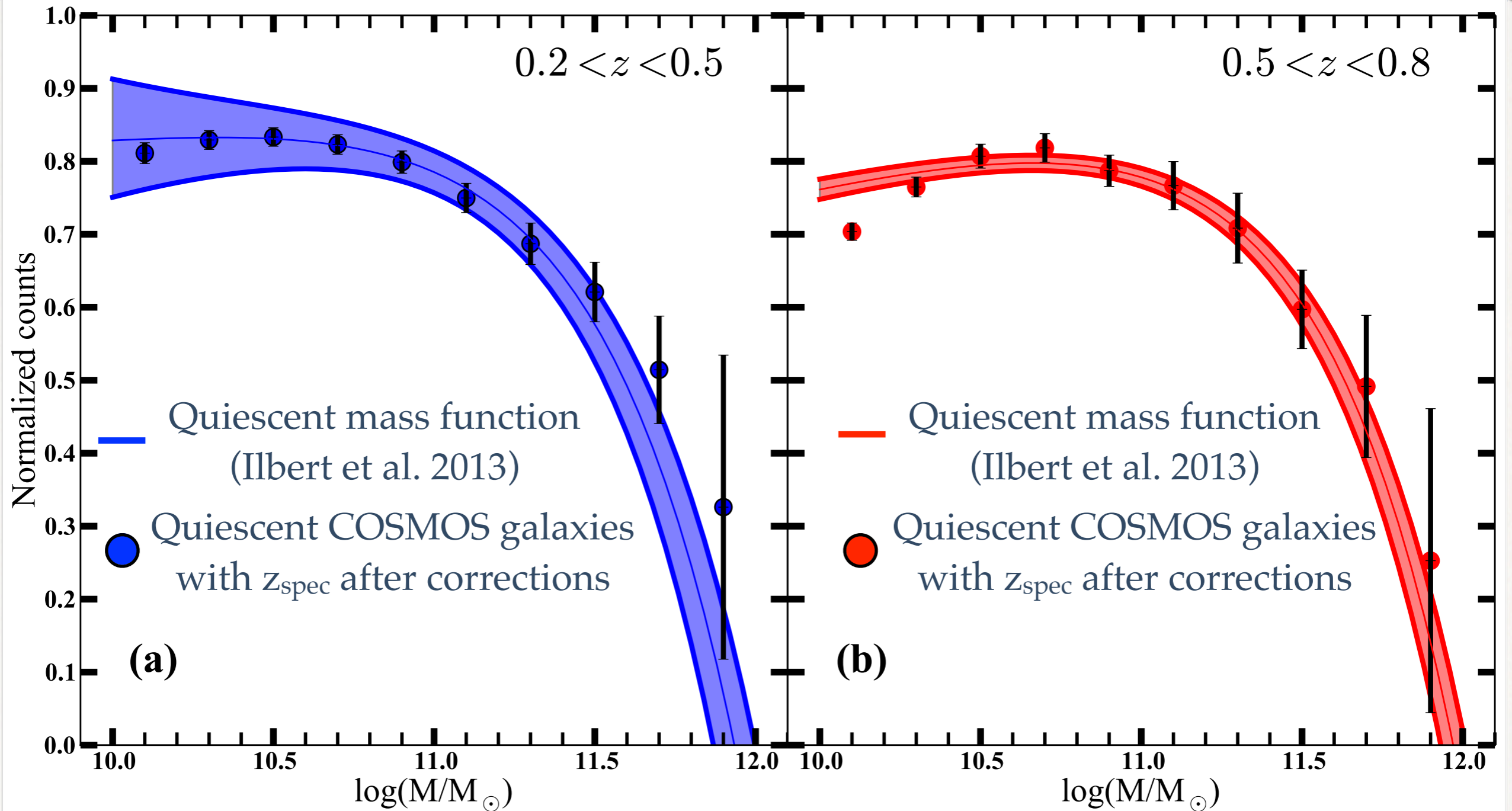
1. spectroscopic incompleteness
2. magnitude limit of redshift surveys and reliable size measurements

### Test:

reconstruction of the observed mass function  
with corrected parent sample

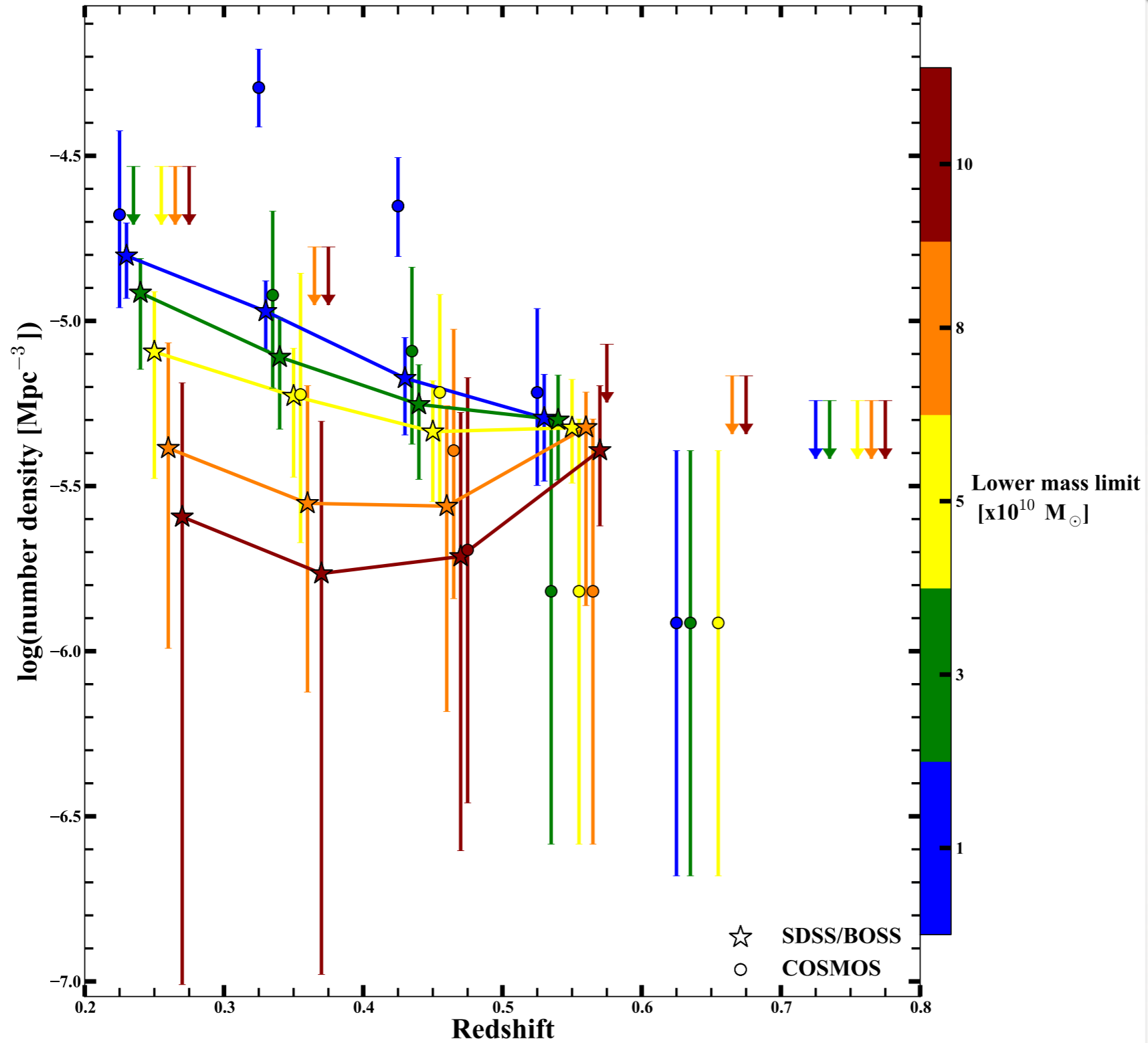
# Number density

## Observational effects

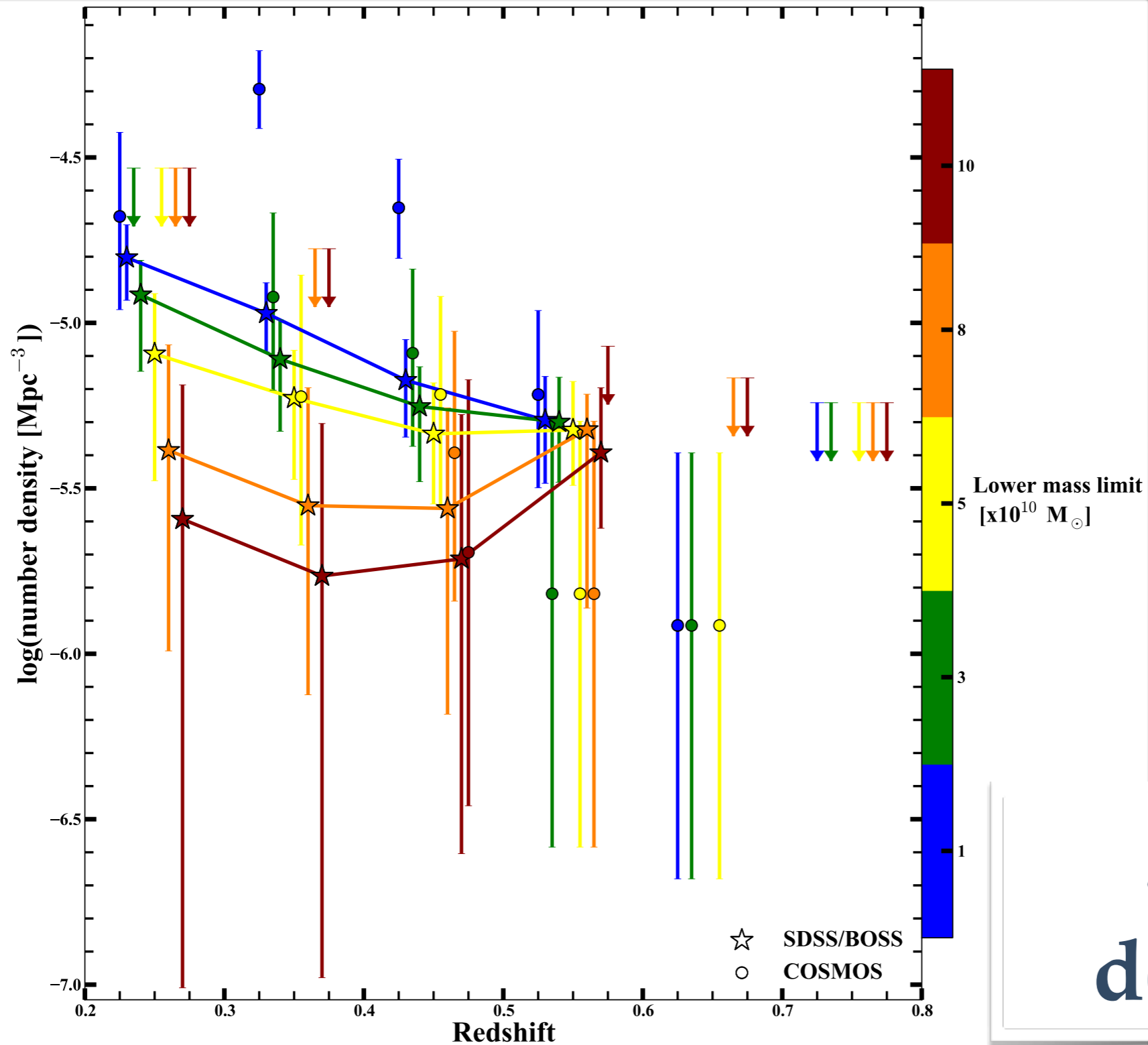




# Cosmic variance...



# Cosmic variance...



**...is not  
dominant**

