Galaxies in groups with different state of relaxedness

Mojtaba Raouf

Collaborators:

Rory Smith (KASI), H. Khosroshahi (IPM), A. Dariush (IoA), S. Driver (ICRAR), Jongwan Ko (KASI), Ho Seong Hwang (KASI), Luca Cortese(ICRAR), Jesse Van de Sande, Scott Croom.

GAMA & SAMI Team

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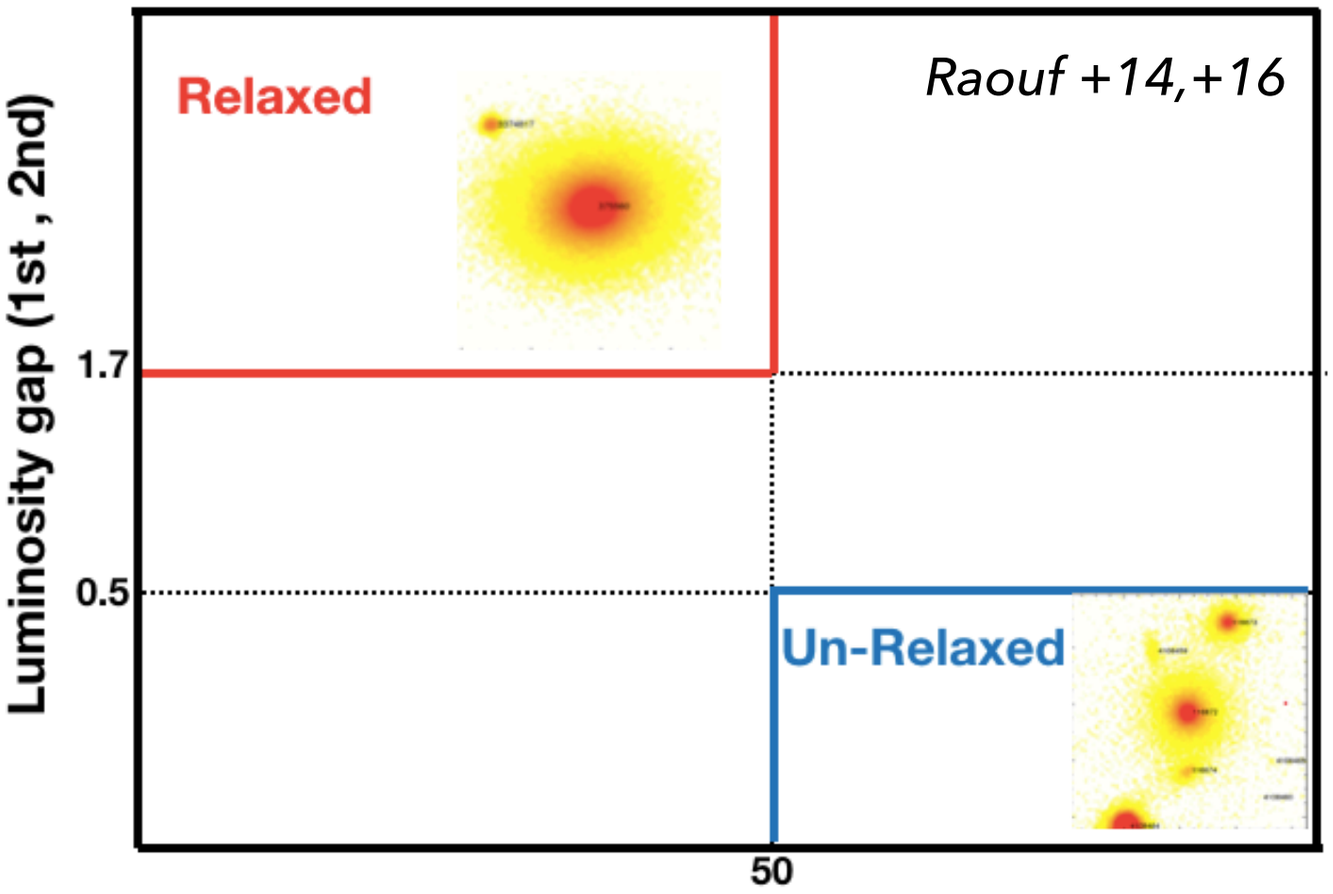
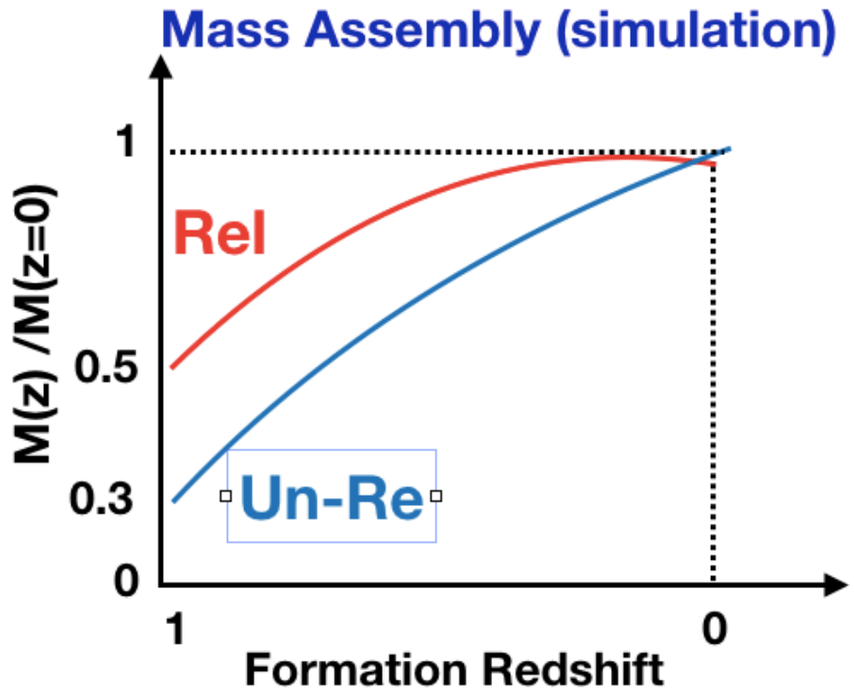
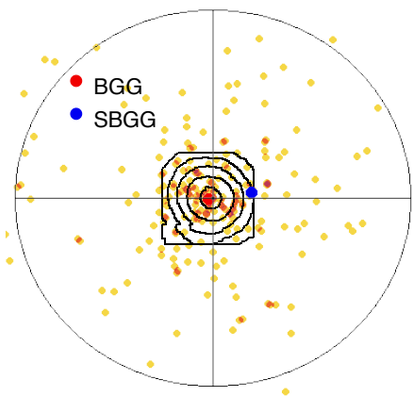
Method to Measuring Group relaxedness state
With the same range of halo mass

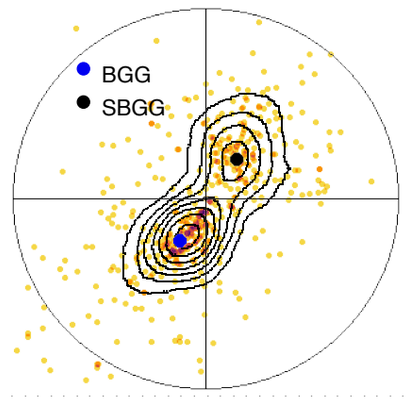
A very simple identification of Relaxed and Un-Relaxed galaxy groups using optically measurable parameter to understanding the evolution of central galaxies





Relaxed : Early formed **Un-Relaxed: Late formed**

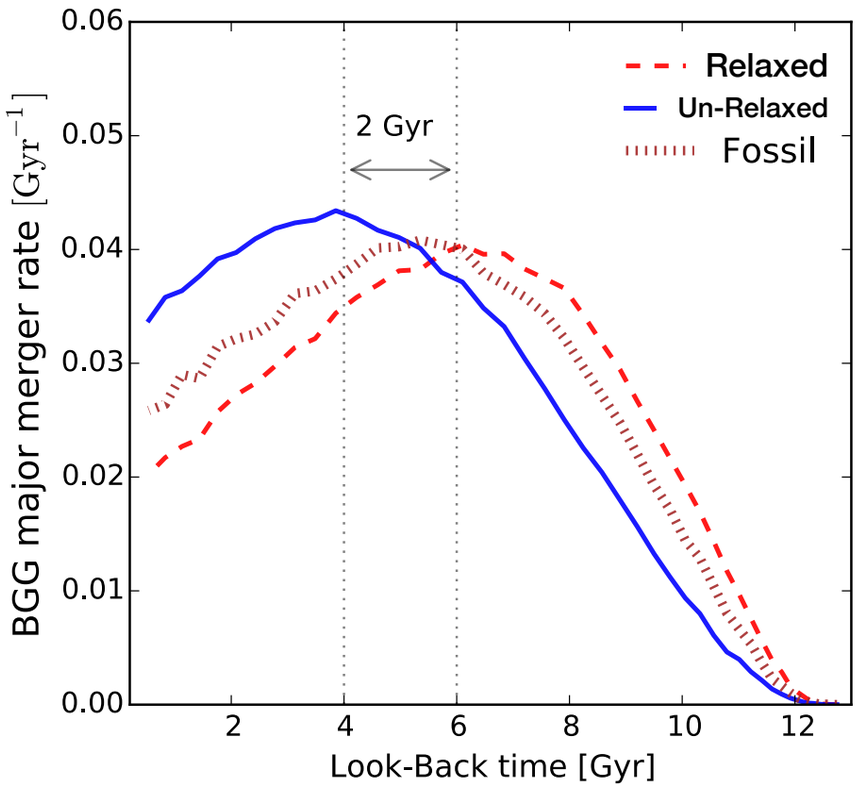


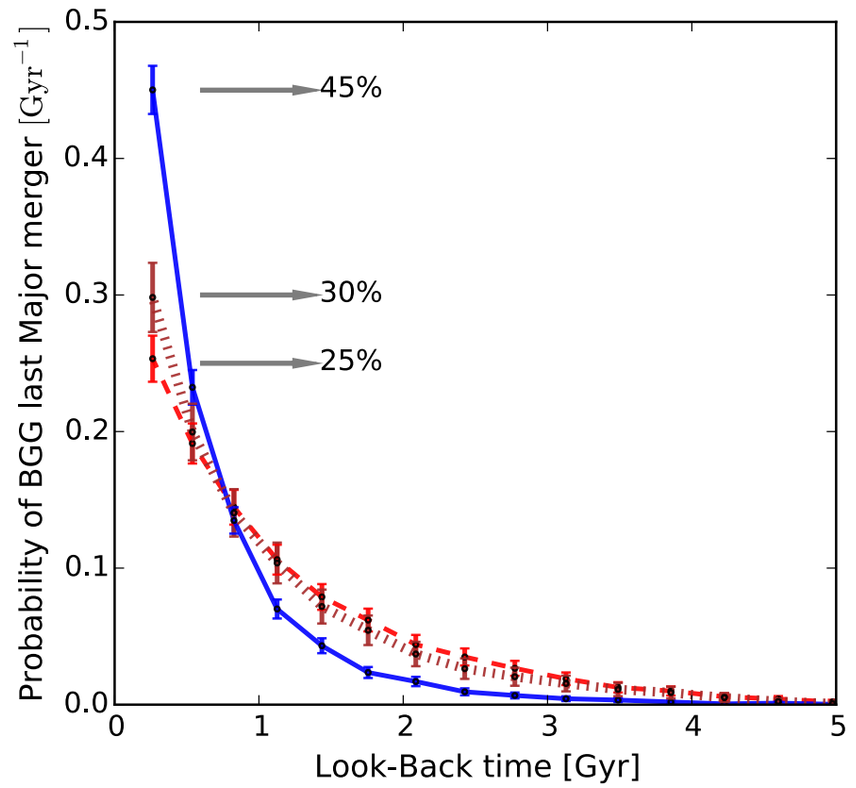


Merger History

Raouf +18

We find that the BGG major merger phenomenon is an earlier event in Relaxed groups than in Un-Relaxed groups.





	Relaxed	Un-Relaxed
BGG peak Merger rate	Earlier	Later
BGG Last Major Merger	Less recent	More recent

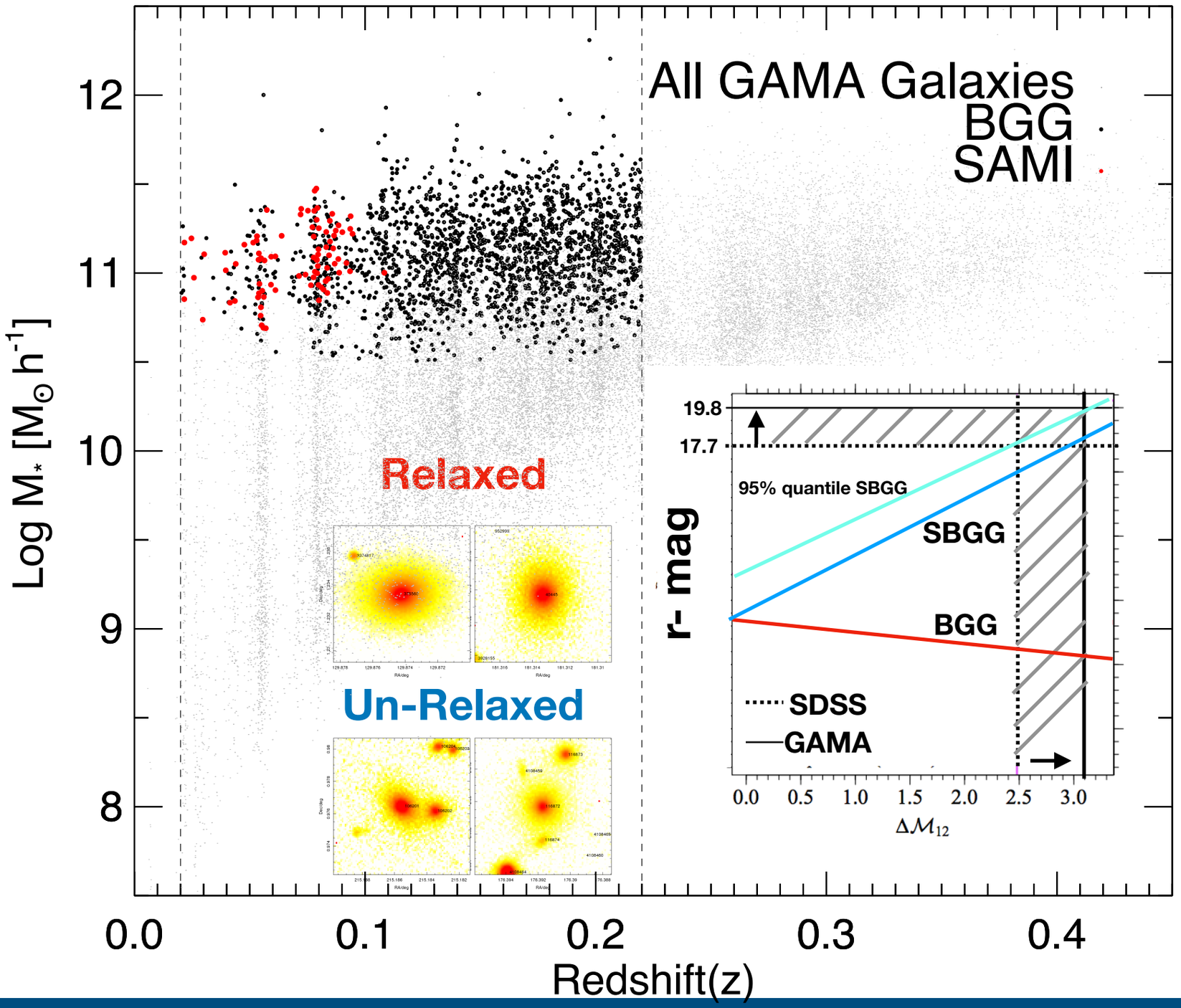
GAMA & SAMI: Observational Identification

GAMA

sami galaxy survey

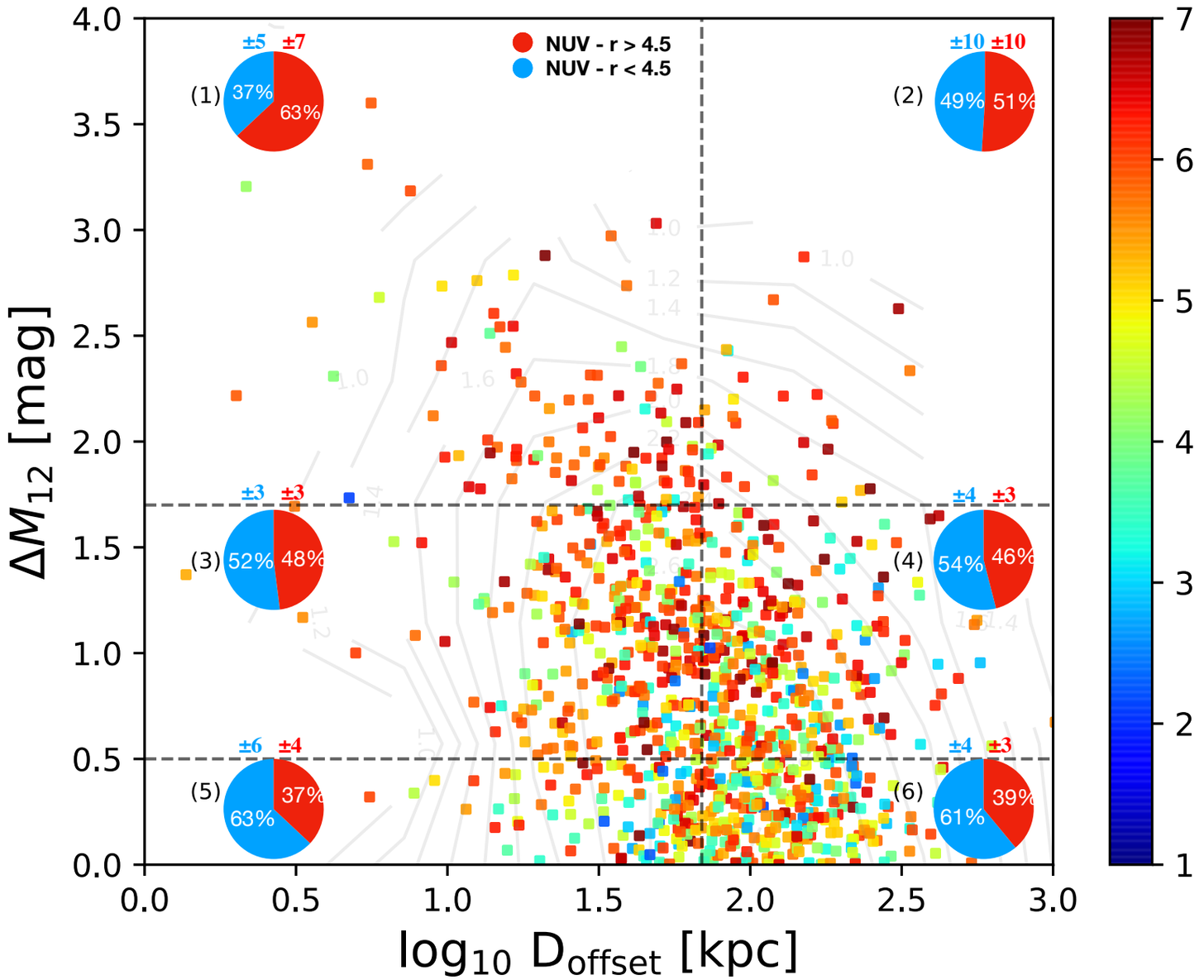
In order to understanding:

AGN activity
Stellar population properties
Kinematics of Galaxies



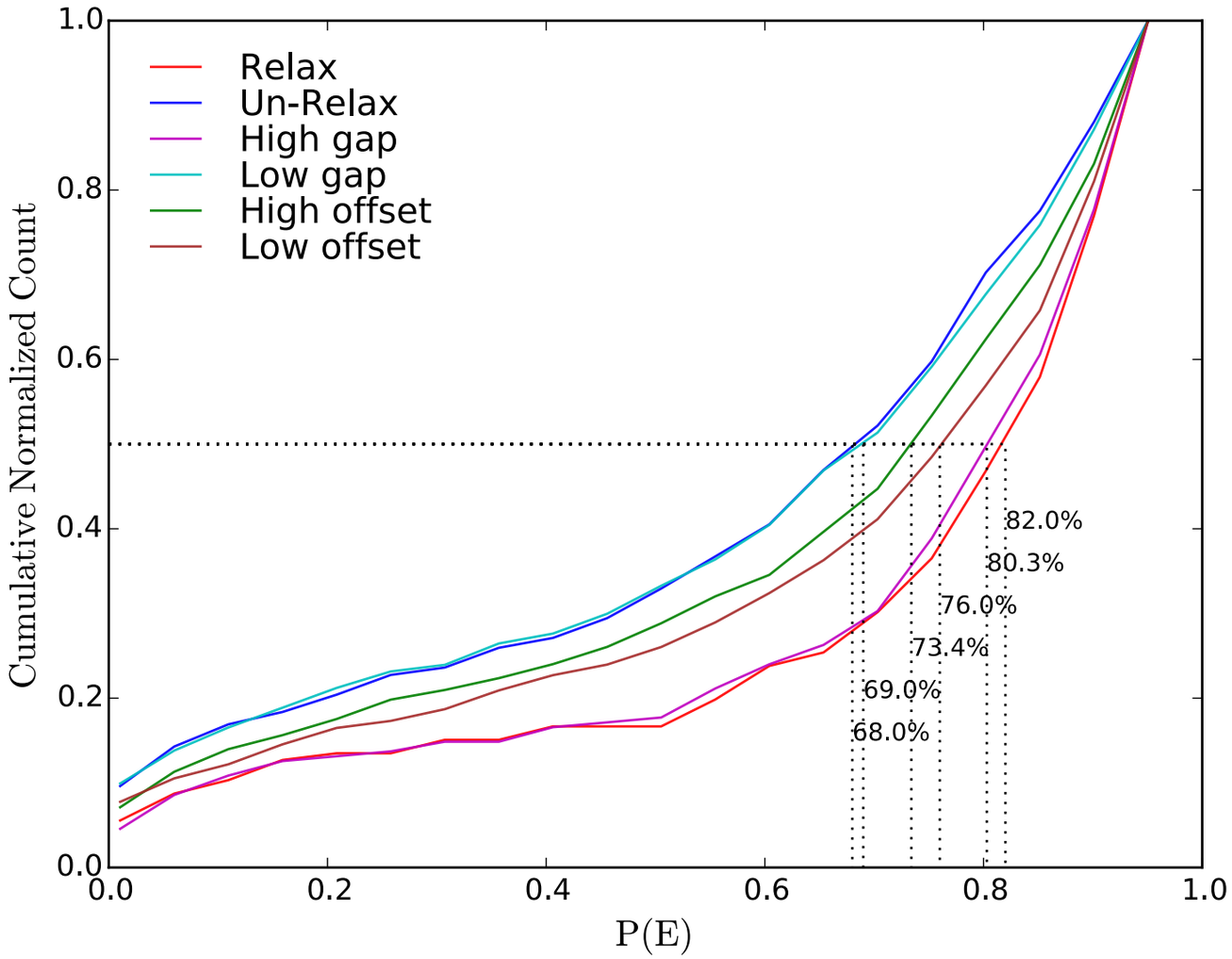
GAMA
Stellar population :
Active and Passive galaxies in different state of relatedness of groups

BGG hosted by Un-Relaxed groups are bluer in NUV-r color compare to the BGG in Relaxed groups.

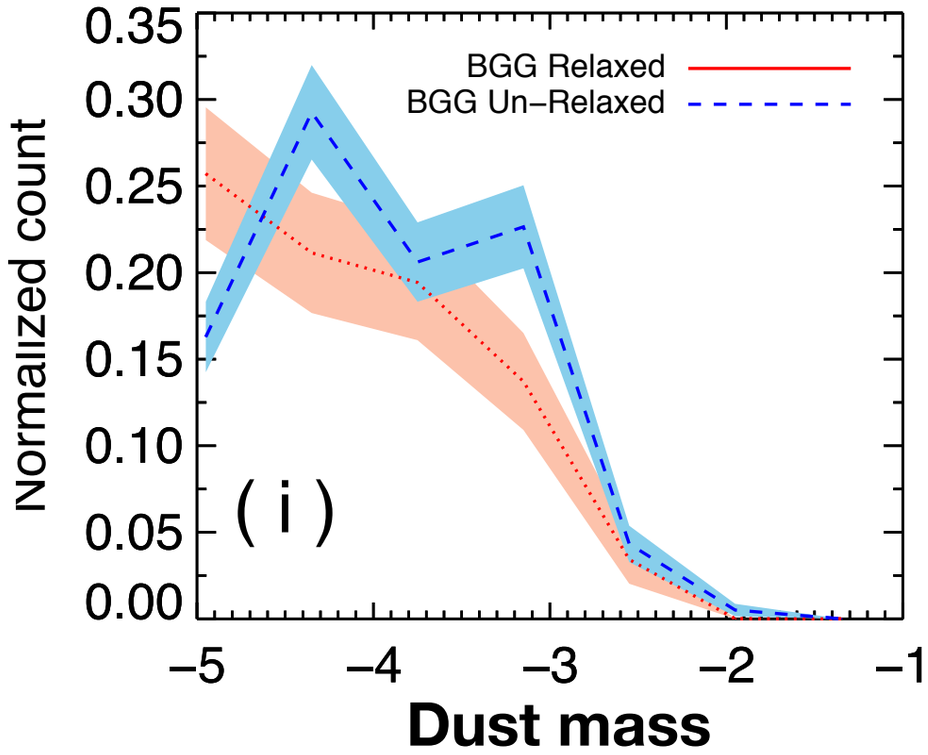


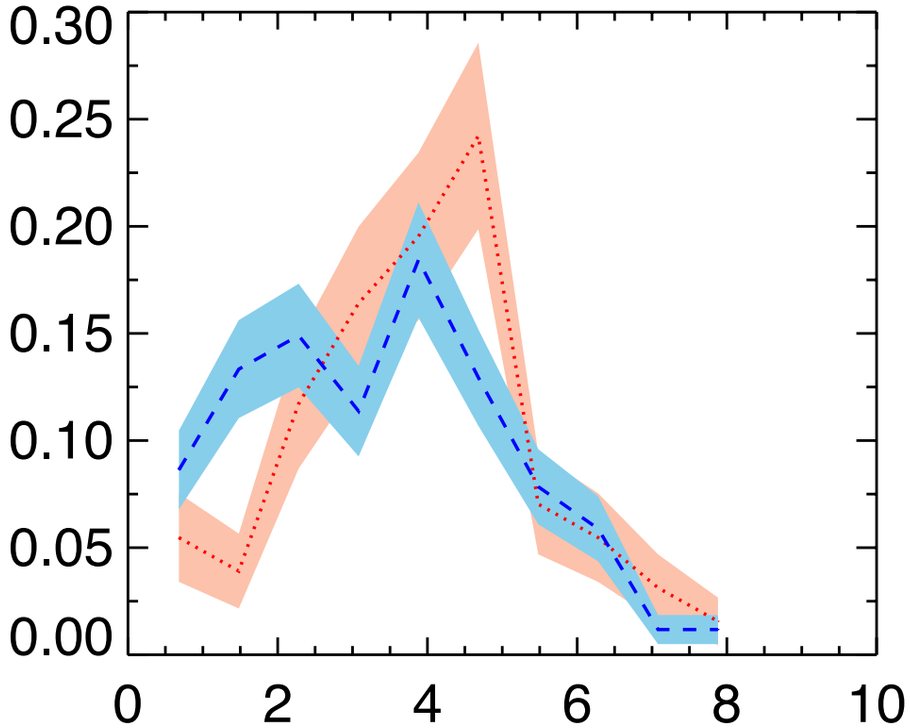
The luminosity gap is driving parameter

Distribution of dust and service index

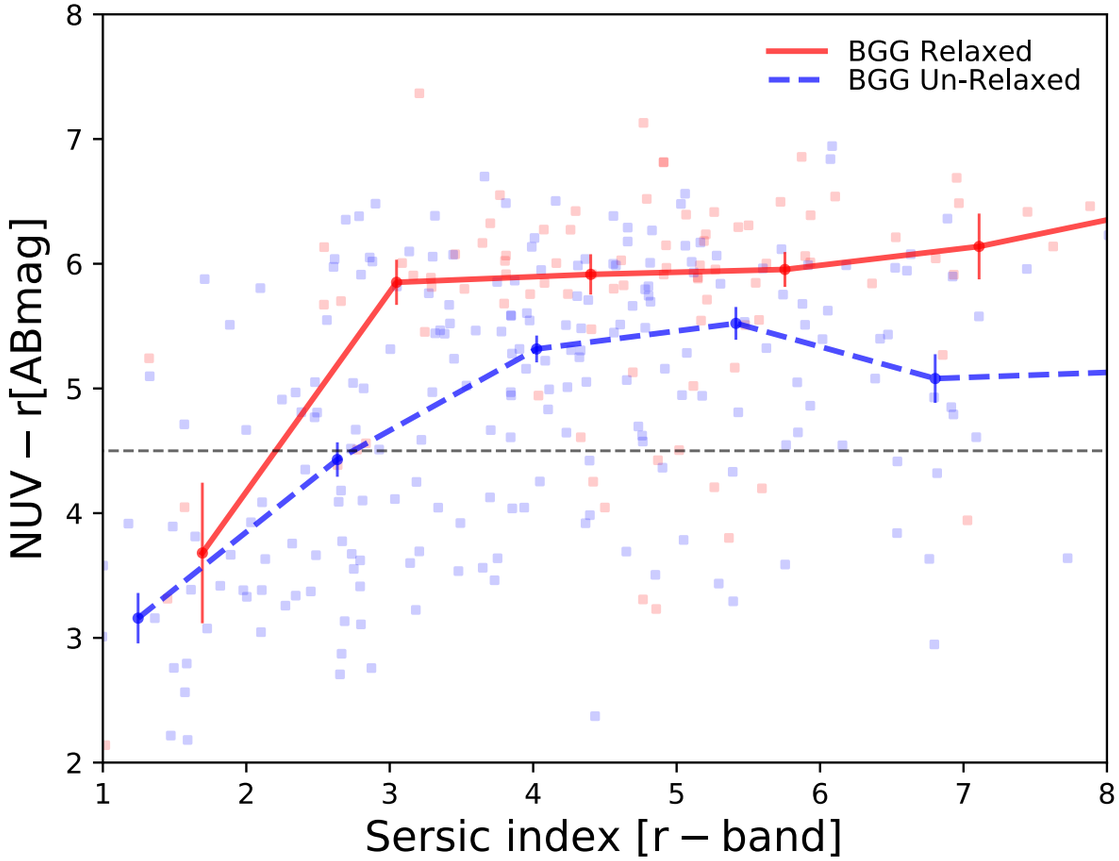


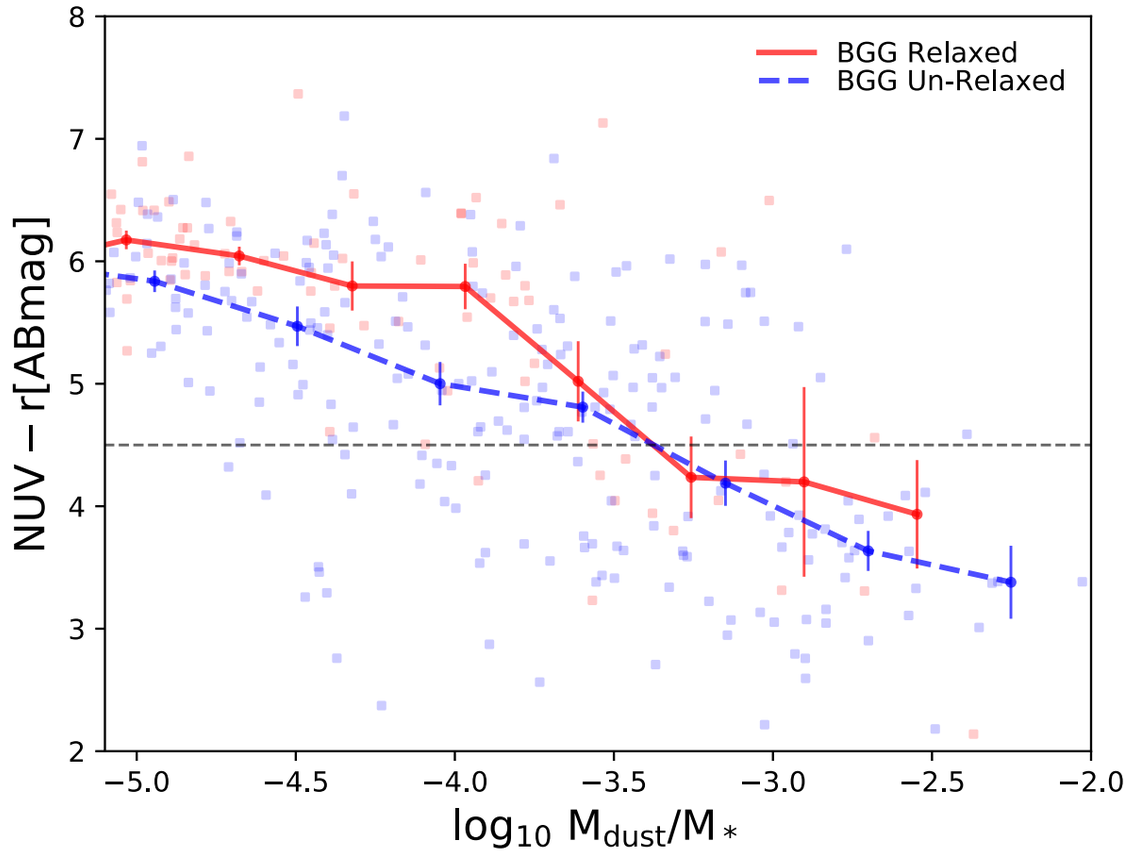
Elliptical probability



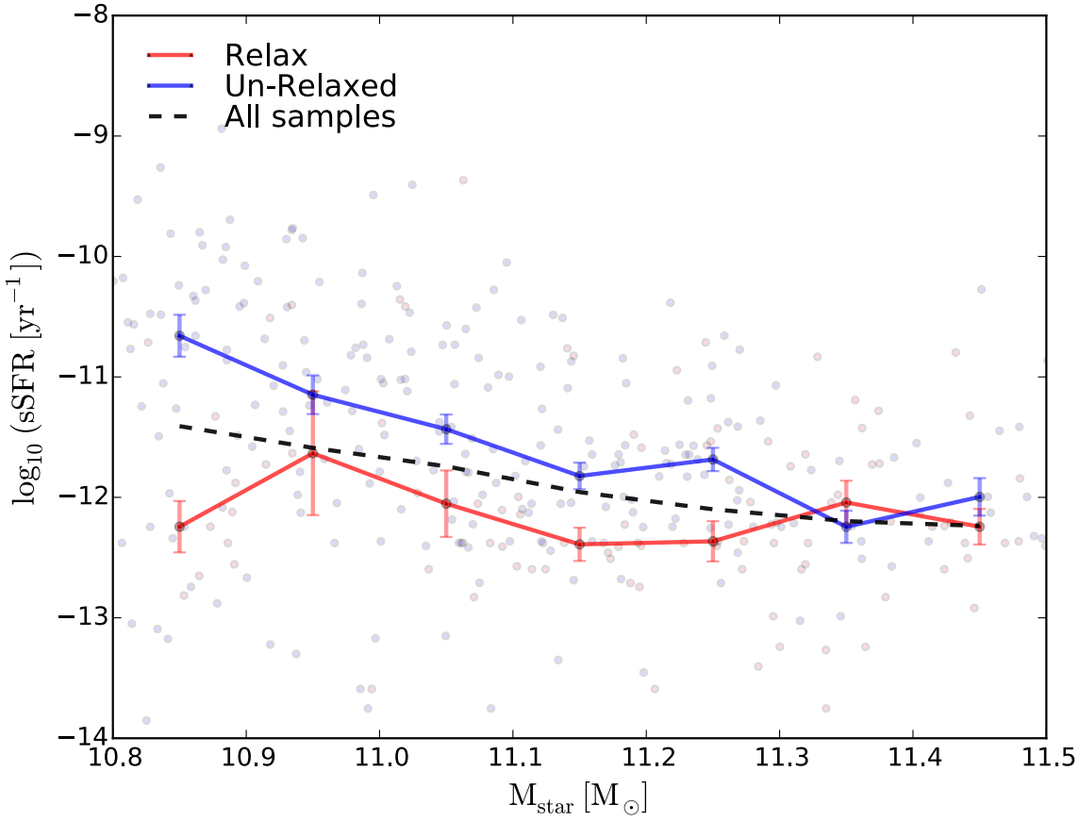


Independency to the dust and morphology



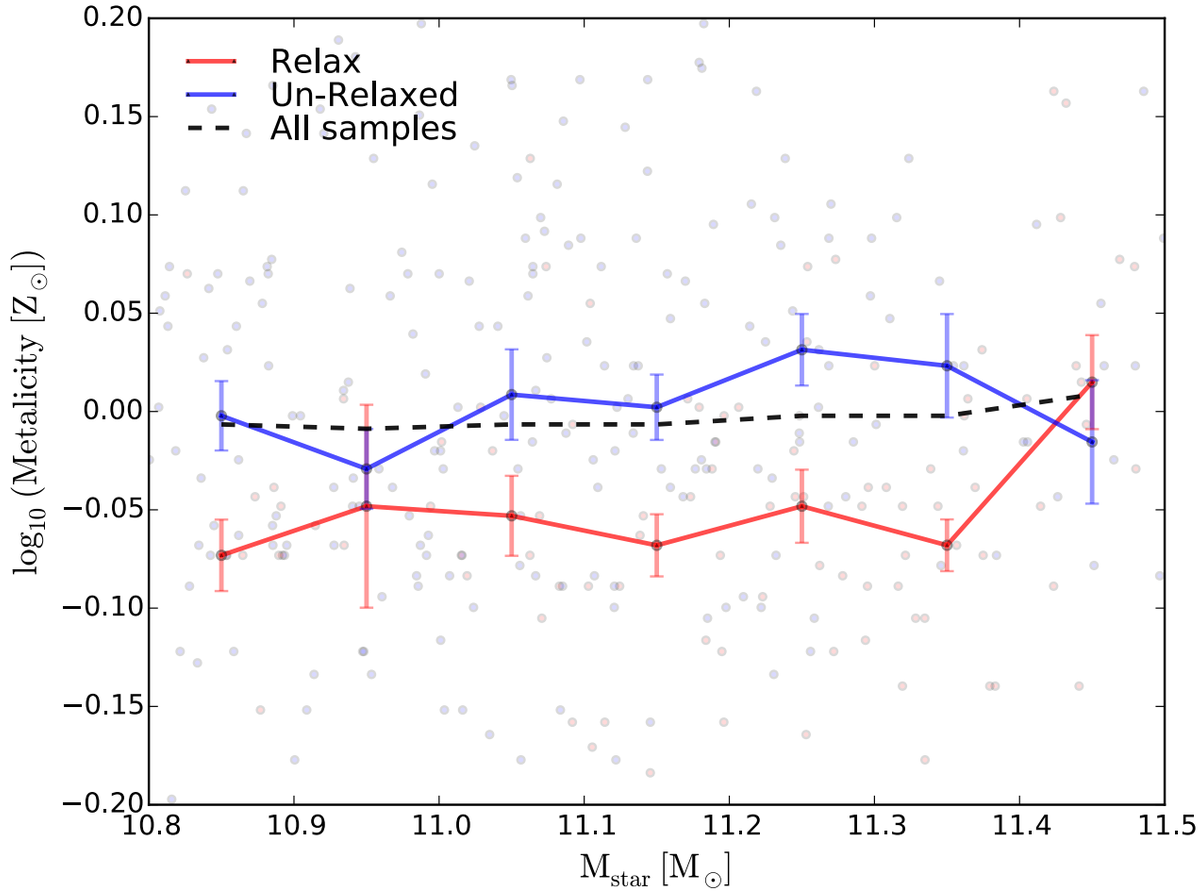


sSFR vs. Stellar mass



UnRelaxed: BGGs with non-elliptical morphology, have larger numbers of mergers, some of which may bring fuel for star formation.

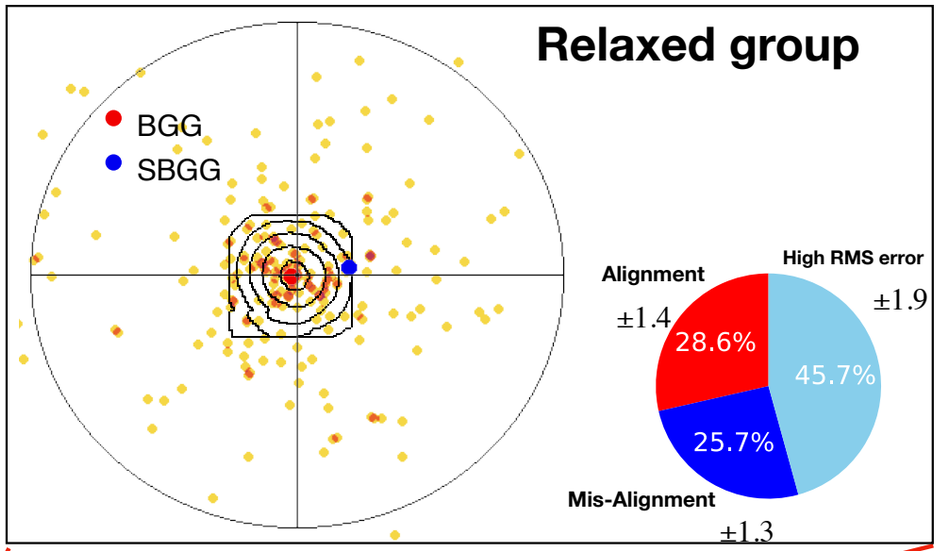
Metallicity vs. Stellar mass

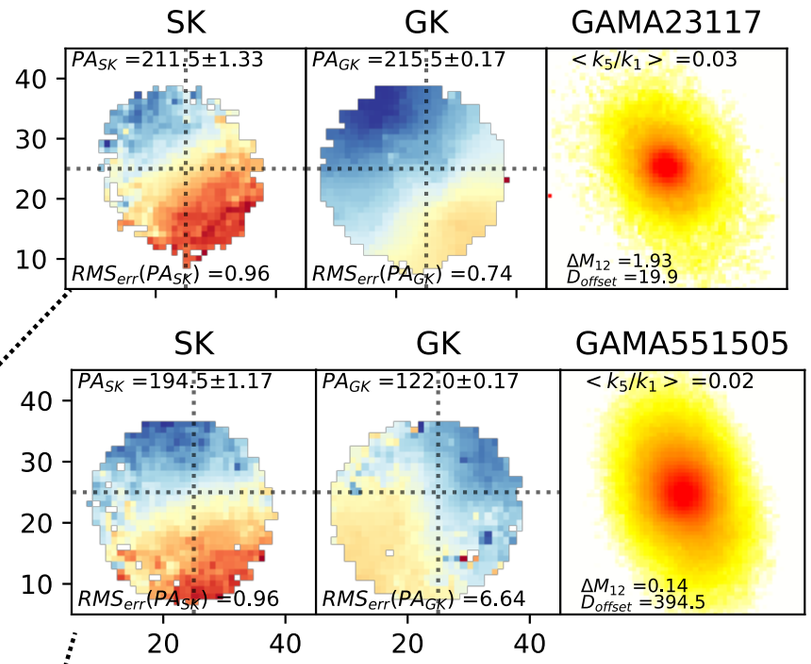


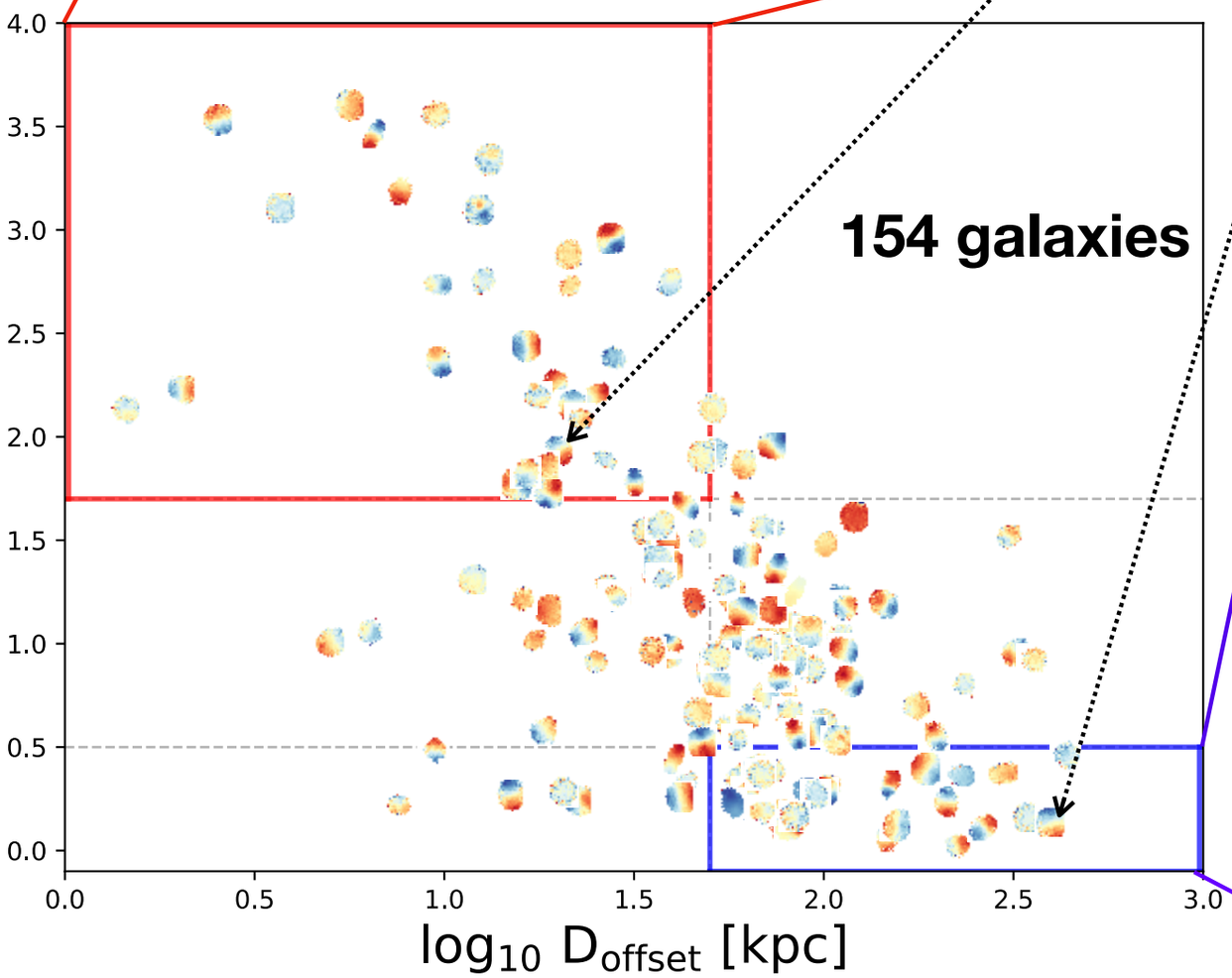
Unrelaxed : Their building blocks were more massive.

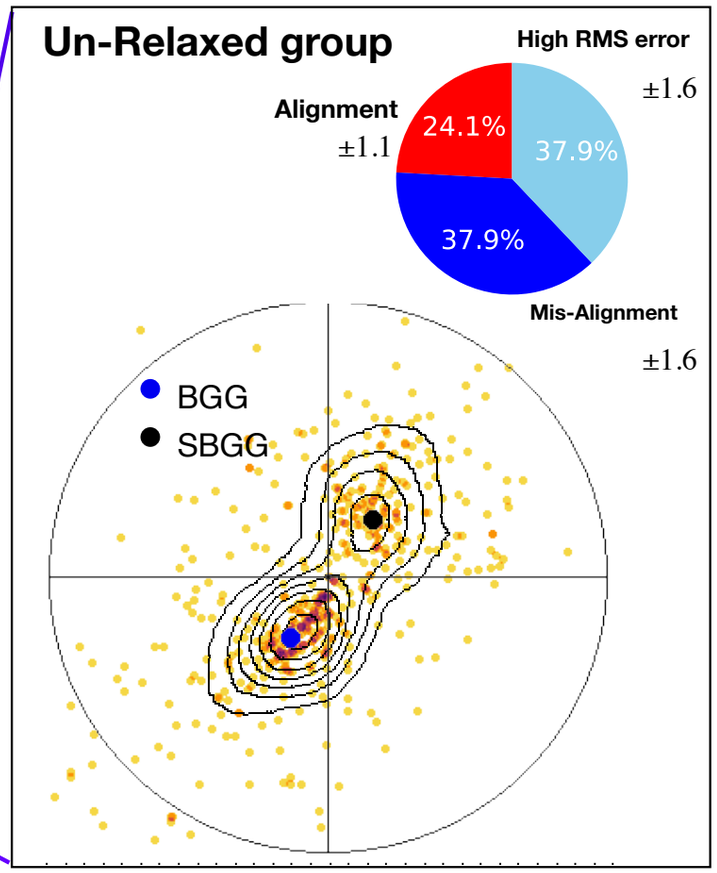
Raouf +19

Galaxy kinematic





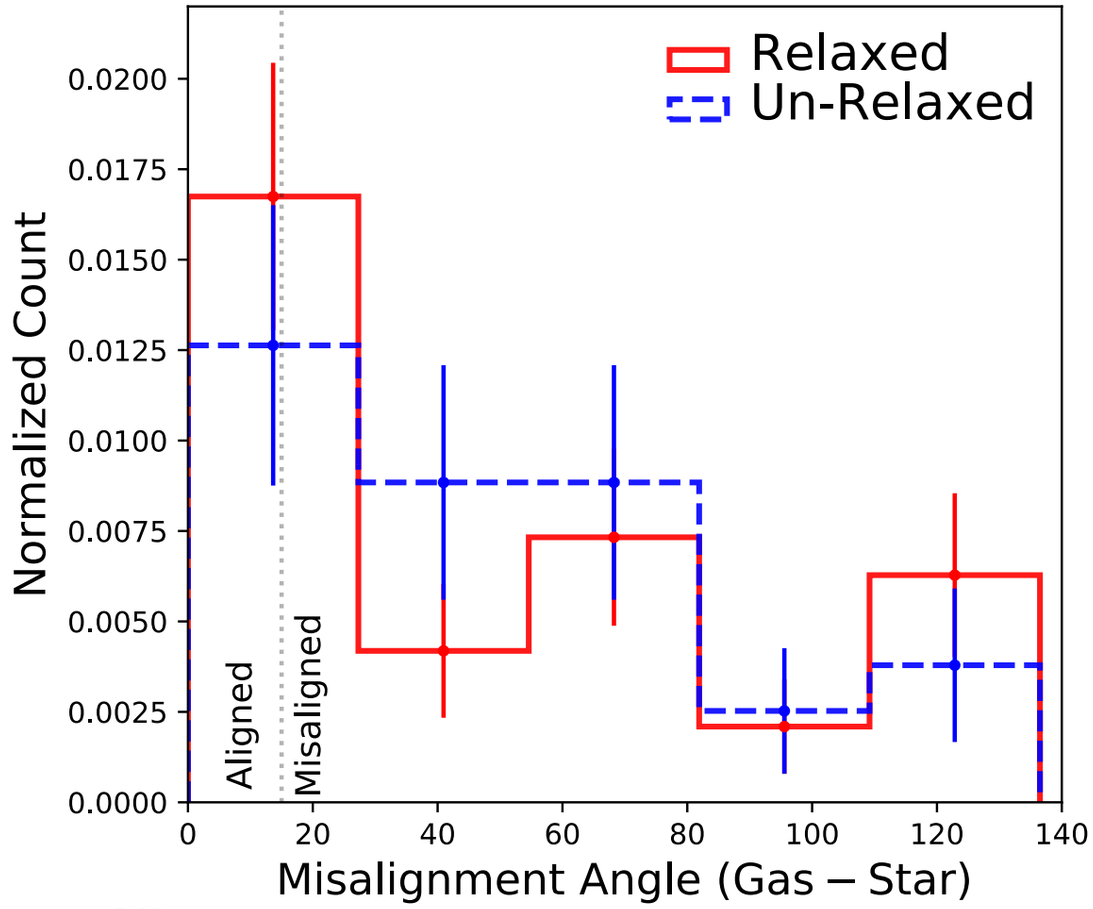


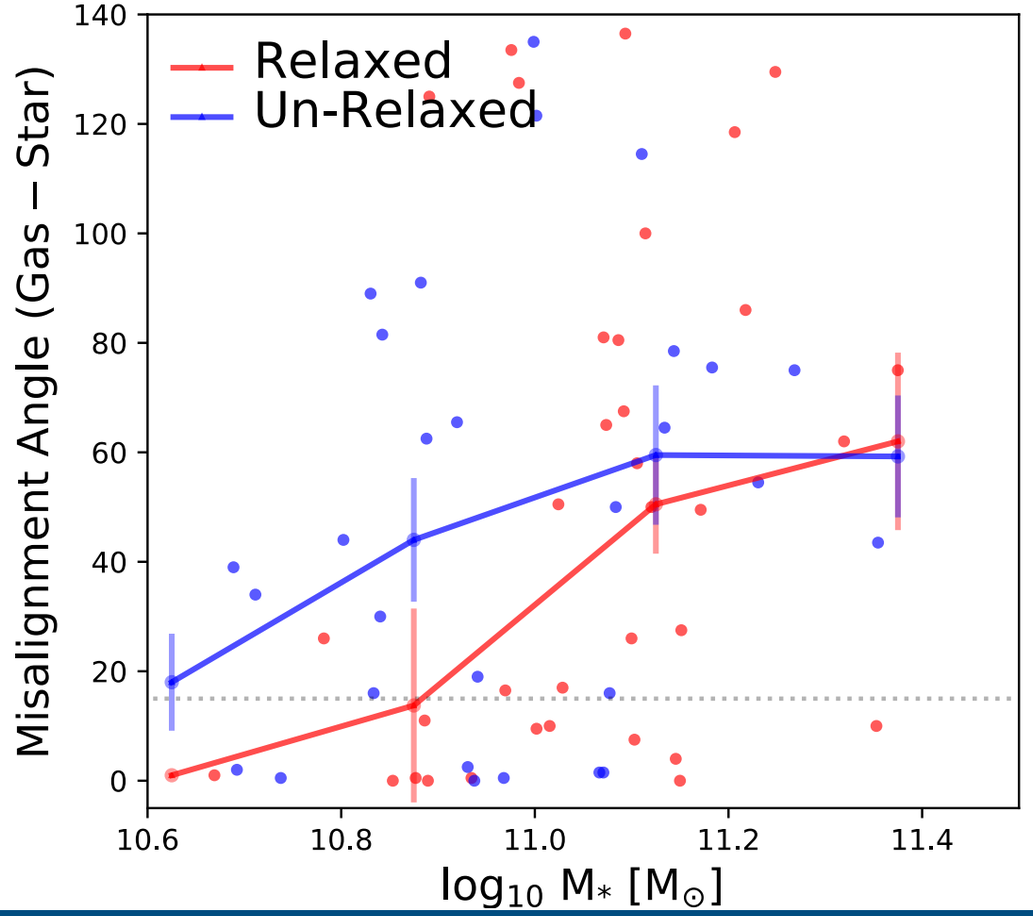


Misalignment angels between gas and Stellar velocity map

Most fraction of BGG in Relaxed group tend be aligned the velocity map of stellar and g dynamics

Originates from their differing internal group process and the BGG accretion history.





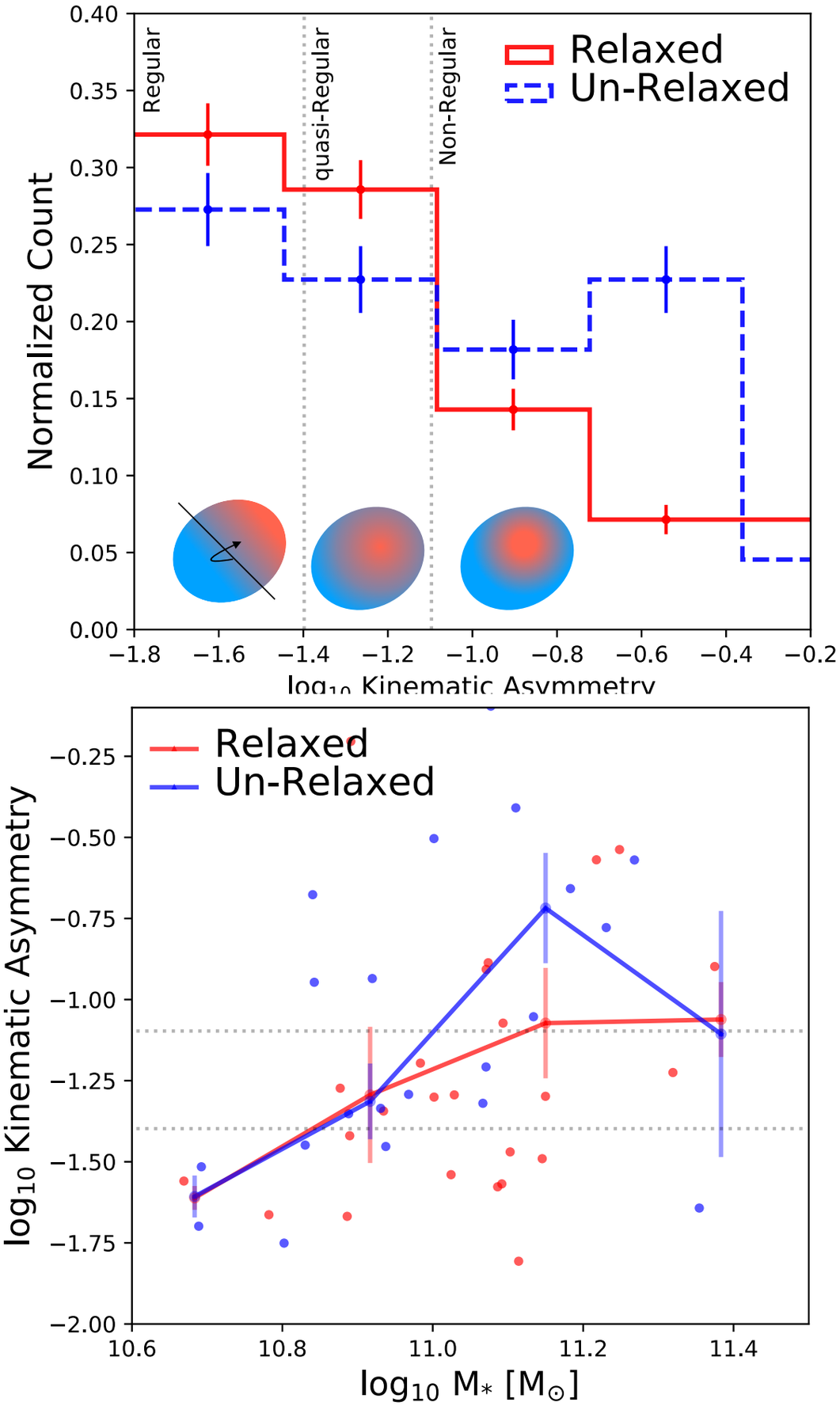
Rotational classification of BGG

Fraction of regular rotator BGG in relaxed group are higher

The 1st and 5th order amplitude of the Fourier harmonics on all velocity data

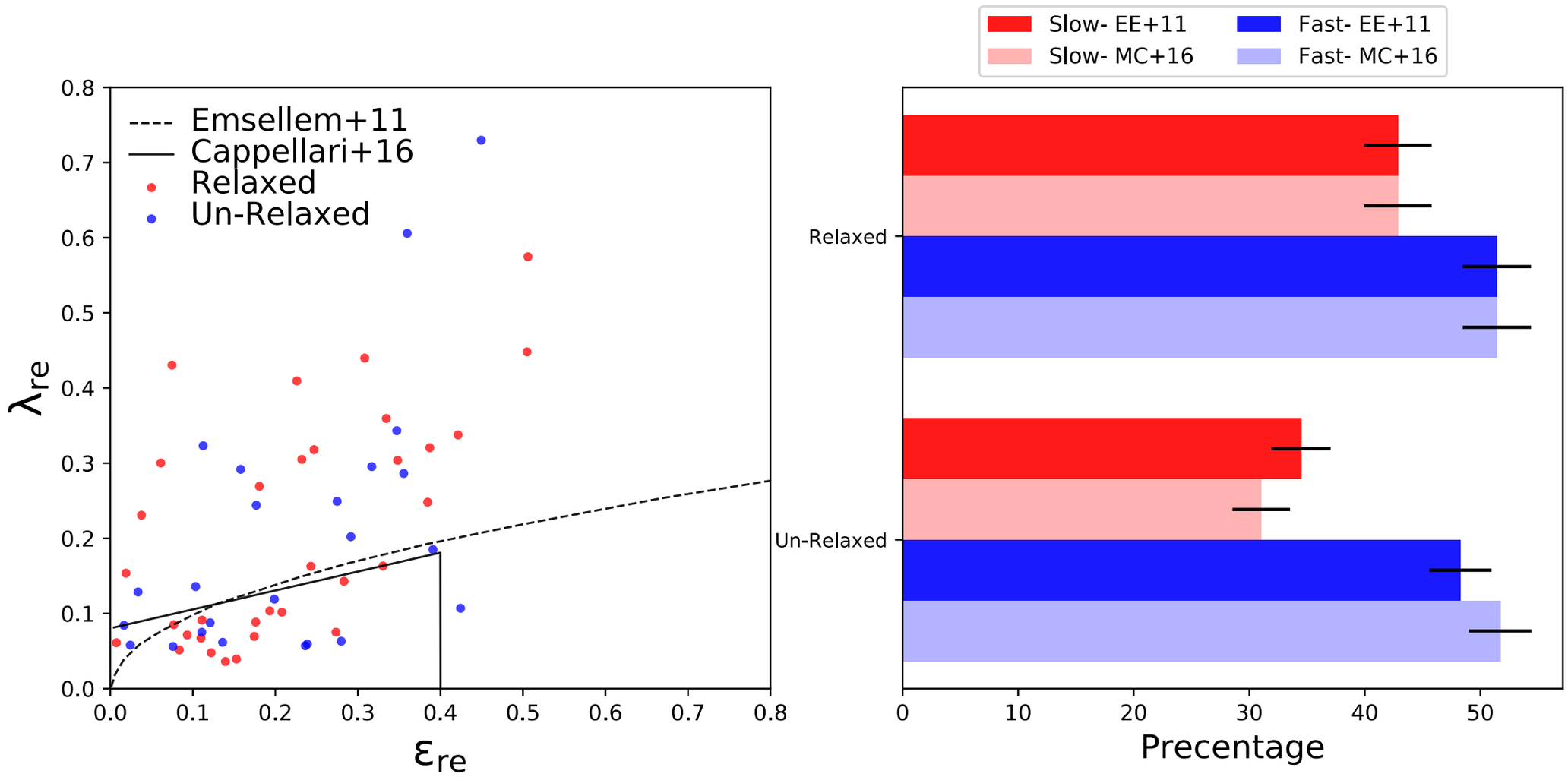
K1 : Equivalent to the rotational velocity

K5 : Describe the kinematic anomalies

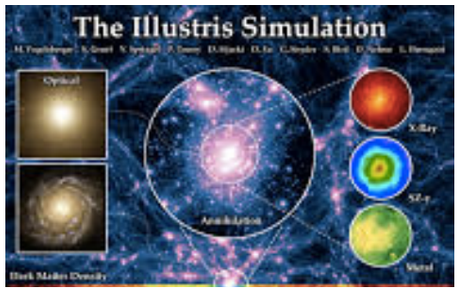


Rotational classification of BGG

Fraction of slow rotator BGG in relaxed group are higher



Summary

Relaxed	Halo	Un-Relaxed	
High luminosity gap		Low luminosity gap	Published 2014
Low BGG offset		High BGG offset	
High halo temperature		Low halo temperature	Published 2016
	Data sets		
High BH mass		Low BH mass	
Low BH accretion		High BH accretion	
Low L (1.4 GHz, 325 MHz)		High L (1.4 GHz, 325 MHz)	Published 2017
Earlier merger event		Later merger event	Published 2018
More passive	Radio-SAGE	More active	
More elliptical		More Disk shape	
Less sSFR, Metallicity	GAMA	More sSFR, Metallicity	
Less Dust		More Dust	
Low Velocity gap		High Velocity gap	Published 2019
Low PA offset gas-star	sami galaxy survey	High PA offset gas-star	
Regular rotator		non-regular rotator	In progress
Counter rotating ?	ALMA muse	Counter rotating ?	Future
2020 Dust continuum ?		Dust continuum ?	

Thanks for your attention

SAMI: BGG Stellar mass (top) and group Halo mass (bottom) distributions