

Compact Groups of galaxies in SDSS DR7 + LAMOST DR4

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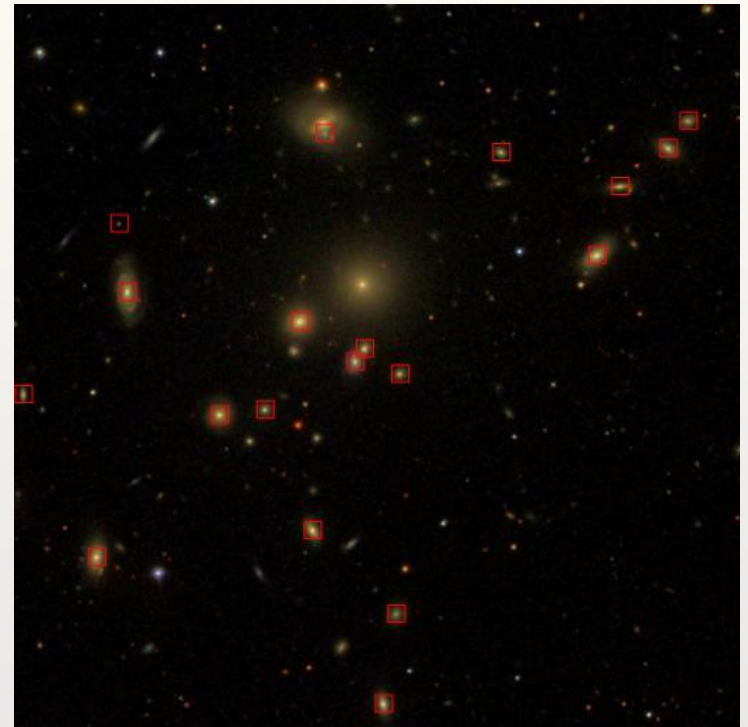
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Shanghai Astronomical Observatory

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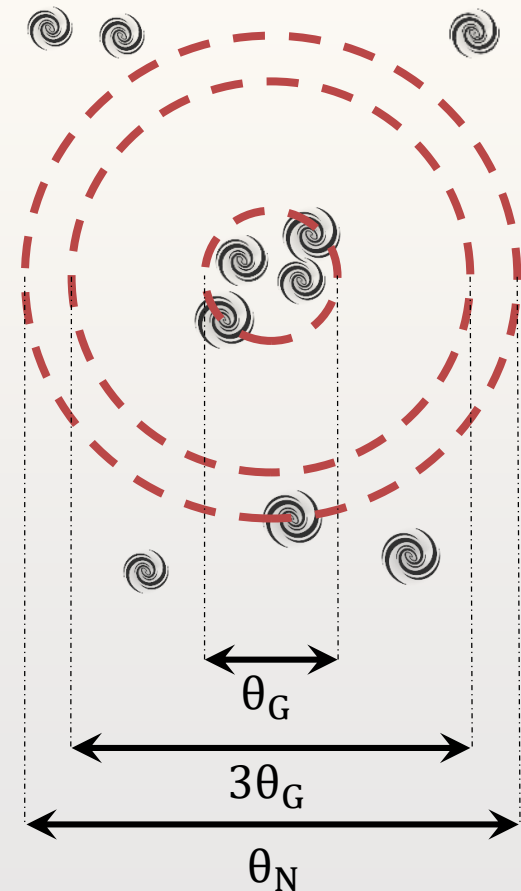
Introduction

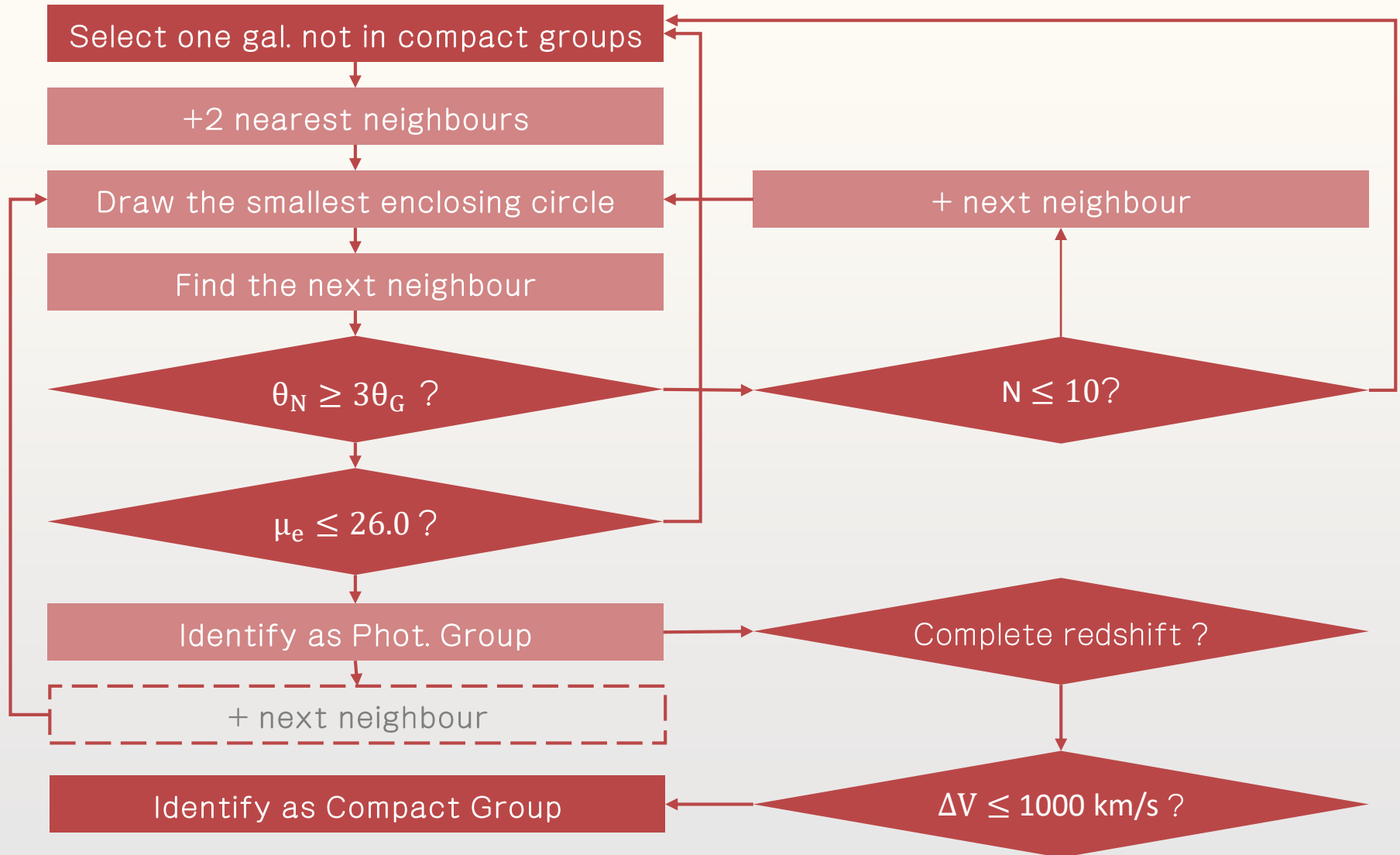
- Several member galaxies
- High number density
- Densest System
- Unstable
- Short time scales due to merging (?)
- Similar environment to the early universe



How to select

- Step1: Photometric
Hickson Criteria (Modified)
 - Population : $3 \leq N \leq 10$
 - Compactness : $\mu_e \leq 26.0 \text{ mag asec}^{-2}$
 - Isolation : $\theta_N \geq 3\theta_G$
 - Fiber Collisionness
 - Only Photometric data
- Step 2: Spectro
FoF Criteria (Modified)
 - Linking Velocity $\leq 1000 \text{ km/s}$
 - If redshift data completeness





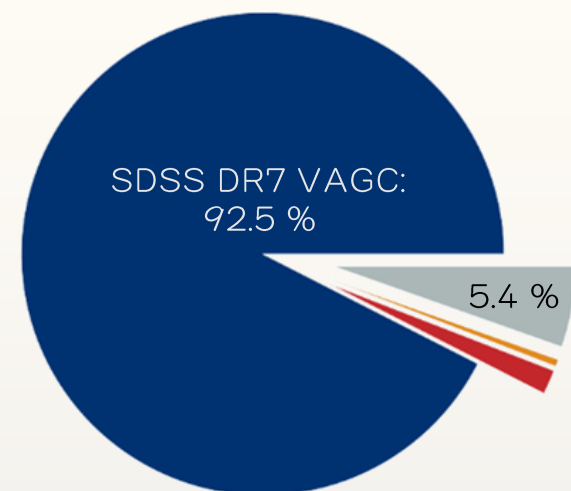
Galaxy Catalogue

Origin data

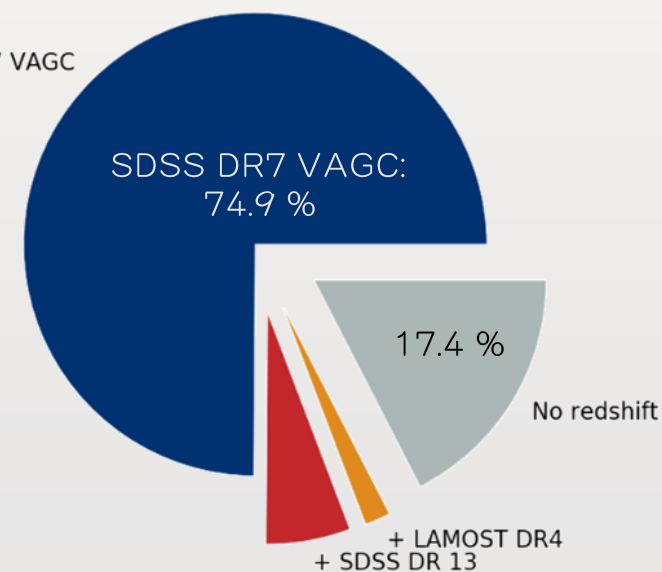
SDSS DR7 VAGC	total galaxies	748,731
($14.5 \leq r \leq 17.77$)	no spec. data	56,174
SDSS DR13	supplement spec.	12,189
LAMOST DR4	supplement spec.	3,499
	Still no redshift	40,486

Photometric Groups

SDSS DR7 VAGC	Total groups	20,804
	total galaxies	67,032
($14.5 \leq r \leq 17.77$)	no spec. data	16,821
SDSS DR13	supplement spec.	3,941
LAMOST DR4	supplement spec.	1,189
	Still no redshift	11,691



SDSS DR7 VAGC



Compact Group Catalogue

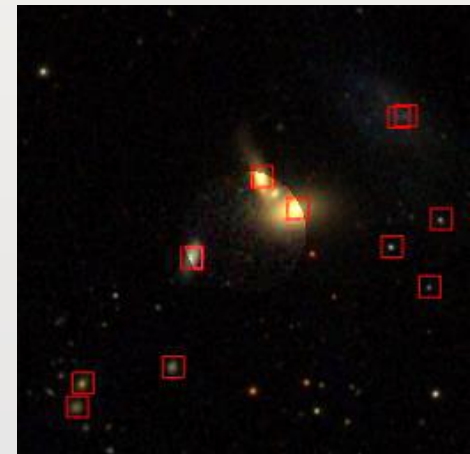
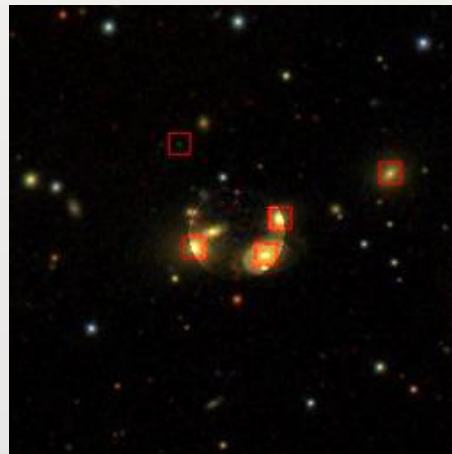
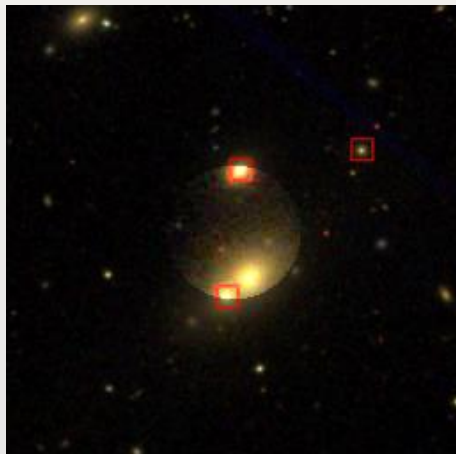
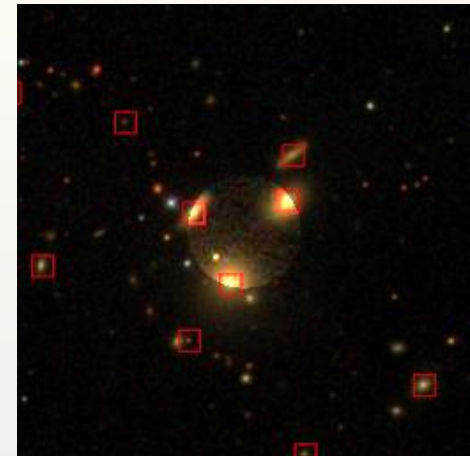
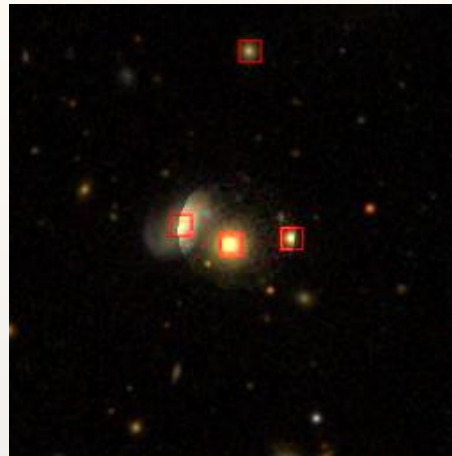
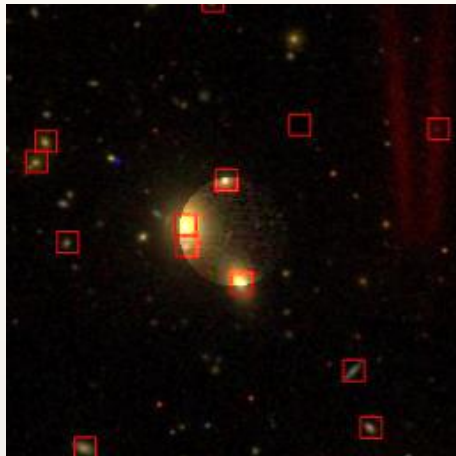
Photometric :

Catalog		Criteria	Group	Data Source	Maglimit
Rose	1977	density enhance ($N \geq 3$)	205	POSS	$G \leq 17.5$ mag
Hickson(HCG)	1982	Hickson ($N \geq 4$)	100	POSS	$G \leq 17.5$ mag
Lee	2004	Hickson (Modified, $N \geq 4$)	175+2	SDSS EDR	$14 \leq r \leq 21$
McConnachie A	2009	Hickson ($N \geq 4$)	2297	SDSS DR6	$14.5 \leq r \leq 18$
McConnachie B	2009	Hickson ($N \geq 4$)	74791	SDSS DR6	$14.5 \leq r \leq 21$
Phot Groups	-	FoF+Hickson ($N \geq 3$)	20804	SDSS DR7 + LDR 4	$14.5 \leq r \leq 17.77$
		FoF+Hickson ($N \geq 4$)	~3500	SDSS DR7 + LDR 4	$14.5 \leq r \leq 17.77$

Spectro :

Catalog		Criteria	Group	Data Source	Maglimit
Barton(RCGS)	1996	FoF ($N \geq 3$)	89	CfA2+SSRS2	$B_0 \leq 15.5$
Sohn	2016	FoF+Hickson ($N \geq 3$)	1588	SDSS DR12 + FAST	$14.5 \leq r \leq 17.77$
Final Groups	-	FoF+Hickson ($N \geq 3$)	4351	SDSS DR7 + LDR 4	$14.5 \leq r \leq 17.77$

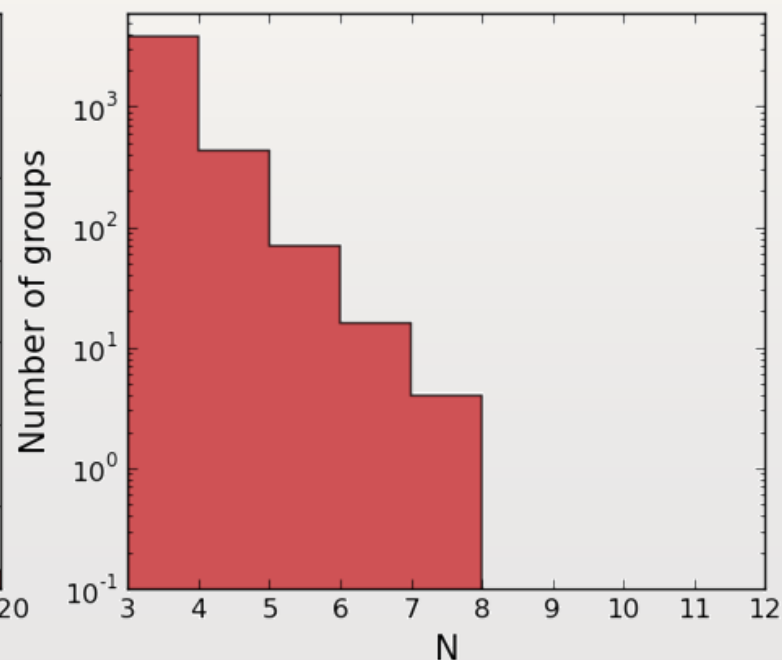
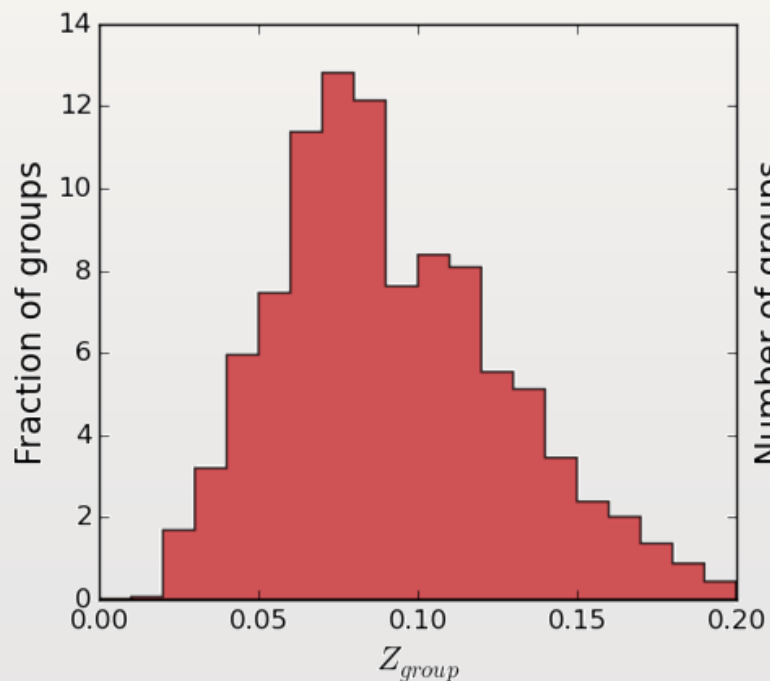
Sample Picture



Compact Groups Catalogue

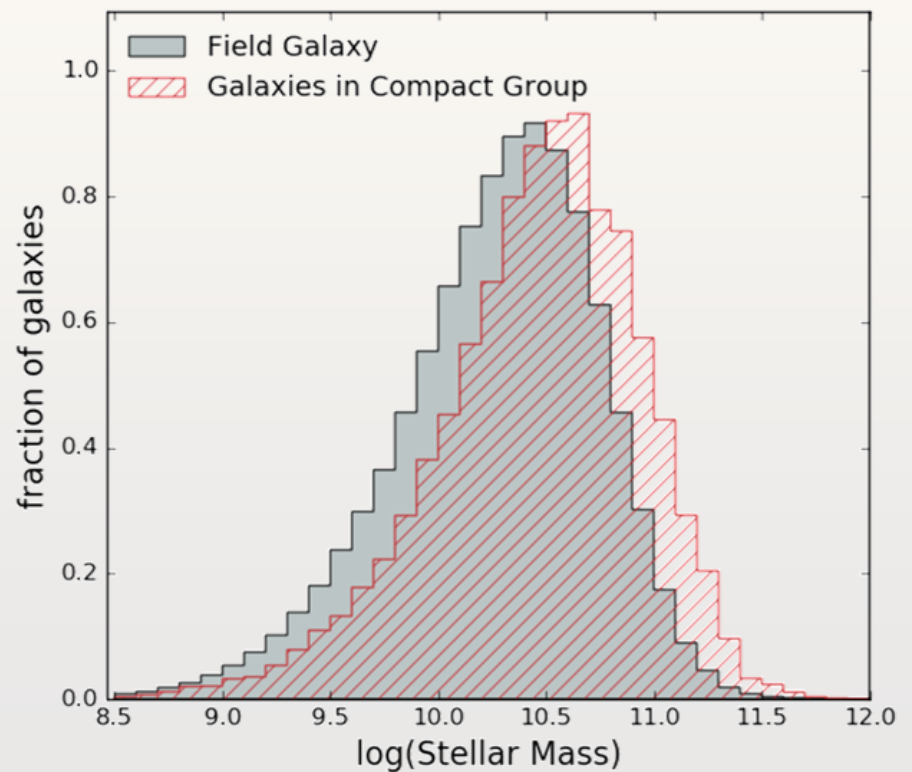
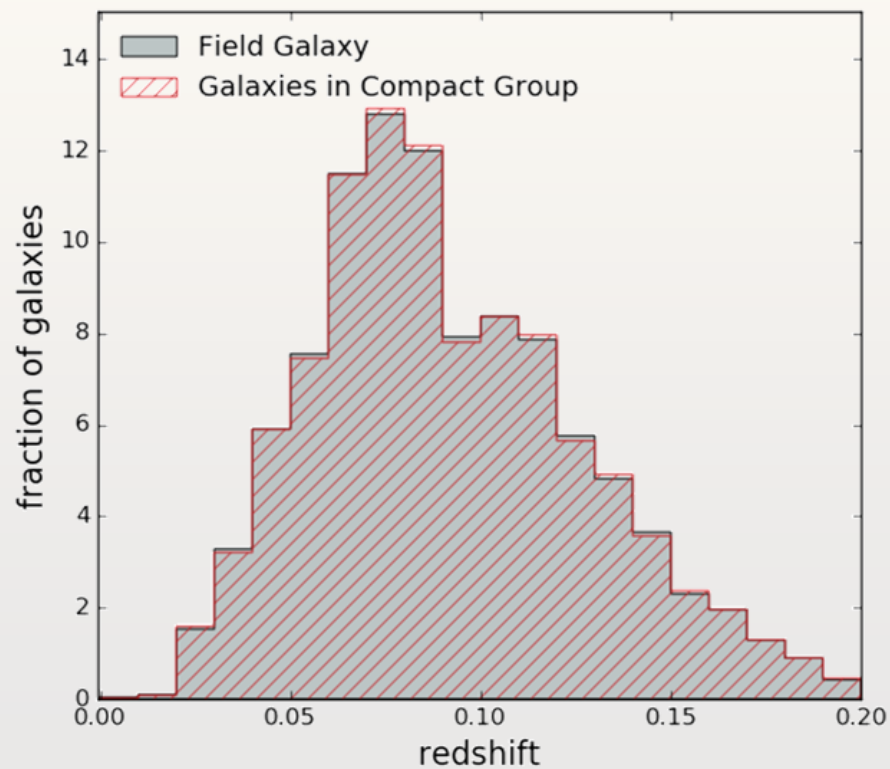
Photometric Groups

Incomplete redshift	44%
Complete redshift	56%
No physical Association	59%
Normal Group ($N \geq 3$) + Interloper	5%
True Group + Interloper	
True Group	36%



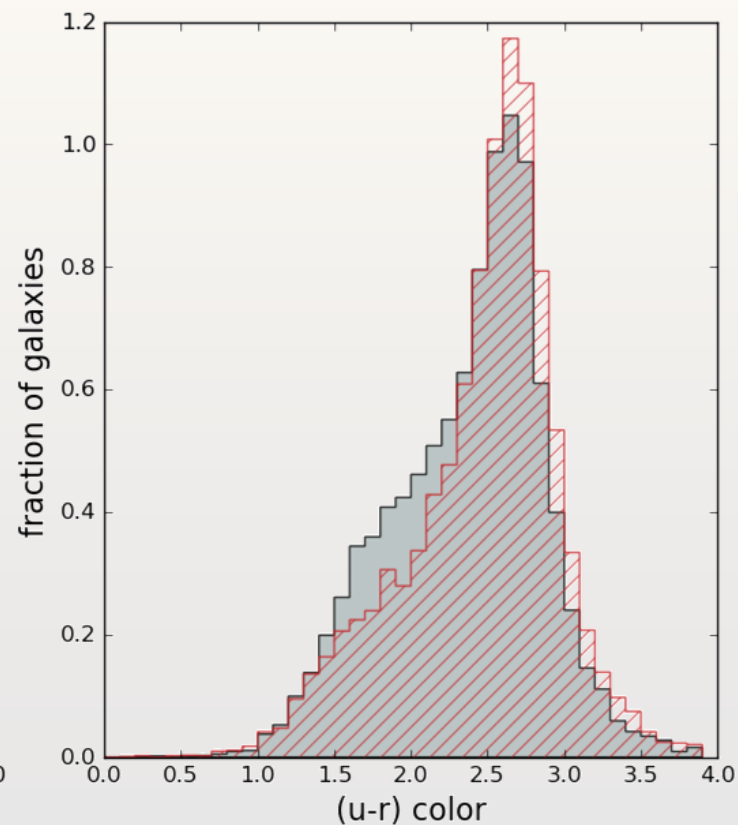
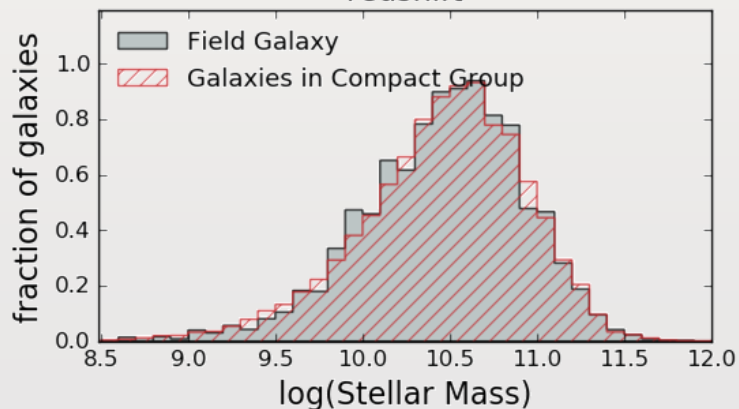
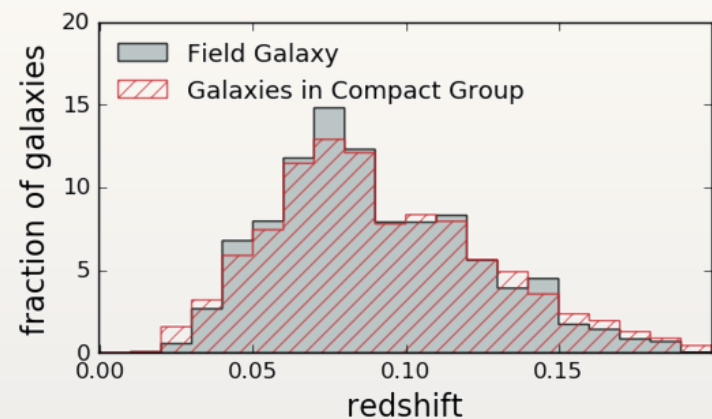
Galaxies in CG vs. Field Galaxies

Same Z distribution



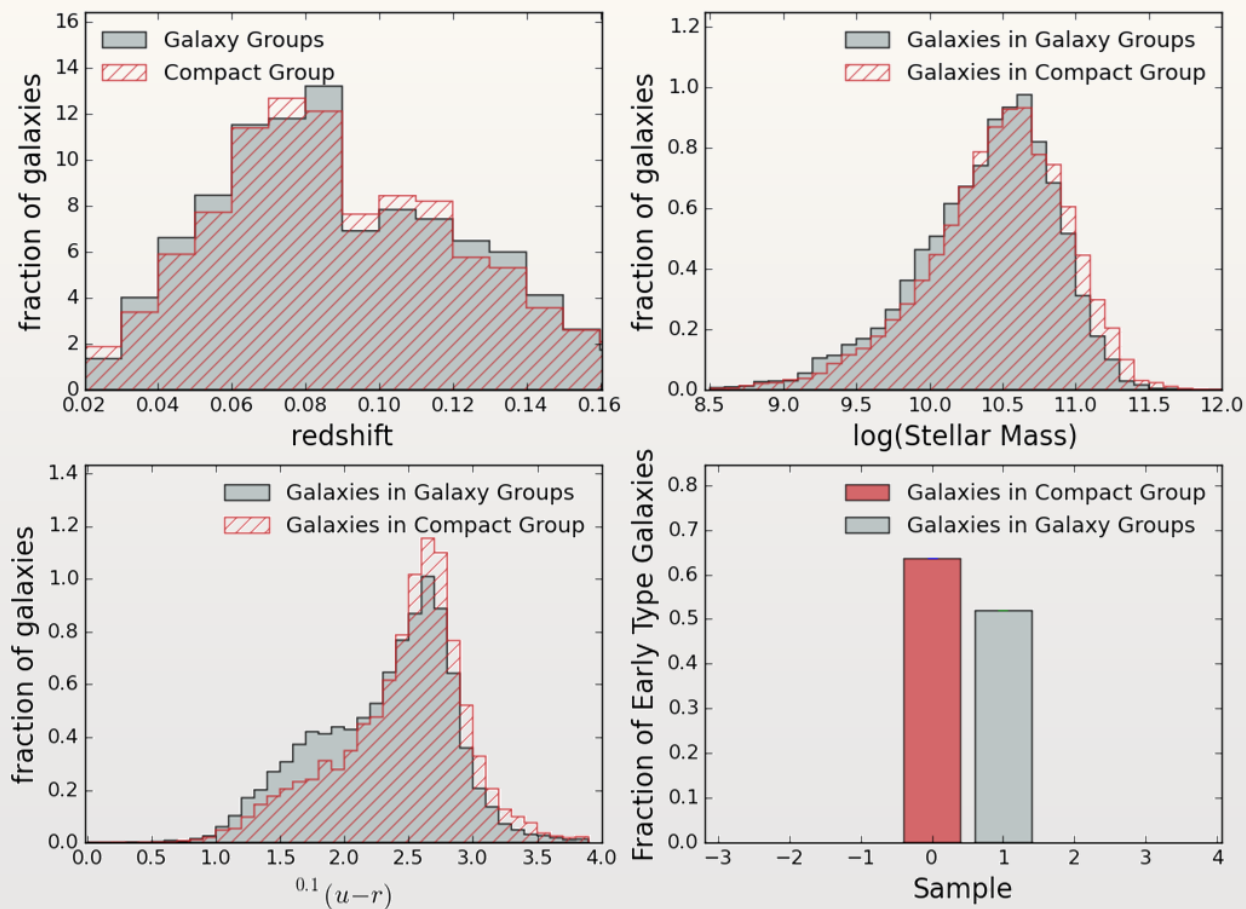
Galaxies in CG vs. Field Galaxies

Same Z and M_* distribution



Compact Group vs. Normal Galaxy Group

Same member(N=3), same Z distribution



Future Work

- Properties of CG
 - Evolution of abundance of CG
 - X-ray property
 - S-Z effect
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- Properties of member galaxies
 - LF
 - Star formation
 - Nuclear Activity
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