

Environments of AGNs at intermediate redshifts

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AGNs vs Environments (Scattered Pictures)

*AGN activity vs local density

*AGN host galaxies

.Mid-IR AGNs reside in blue clouds?

.X-ray AGNs reside in green galaxies ?

.radio-loud AGNs reside in BCGs or red sequence

.low power radio-loud AGNs reside in clusters

.high power radio-loud AGNs reside in the field or small group

.at $z=0.5$ high power radio-loud AGNs reside in clusters ?

.at $z=1.5$ radio-loud AGNs reside in green galaxies ?

.at $z=1.5$ X-ray AGNs reside in all galaxies ?

AGNs vs Environments (Scattered Pictures)

*Type I AGN clustering more than Type II ?

*at $z > 0.5$ Type I AGN clustering = Type II ?

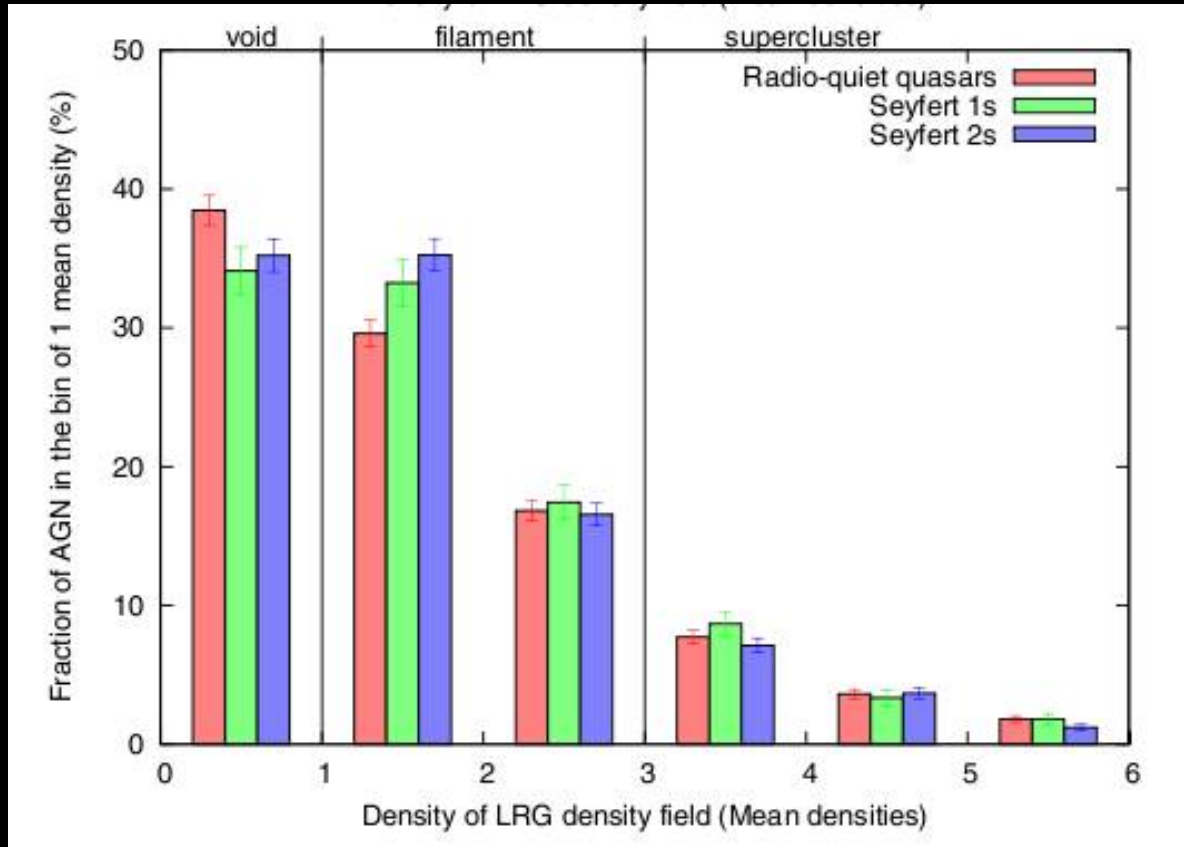
*at $z = 0$, X-AGNs reside in the field, group, .

*at $z = 0.6 - 1.4$, X-AGNs resides avoids field ?

*AGN Feedback to terminate star formation in host galaxy

*Galaxy evolution via AGN phase ?

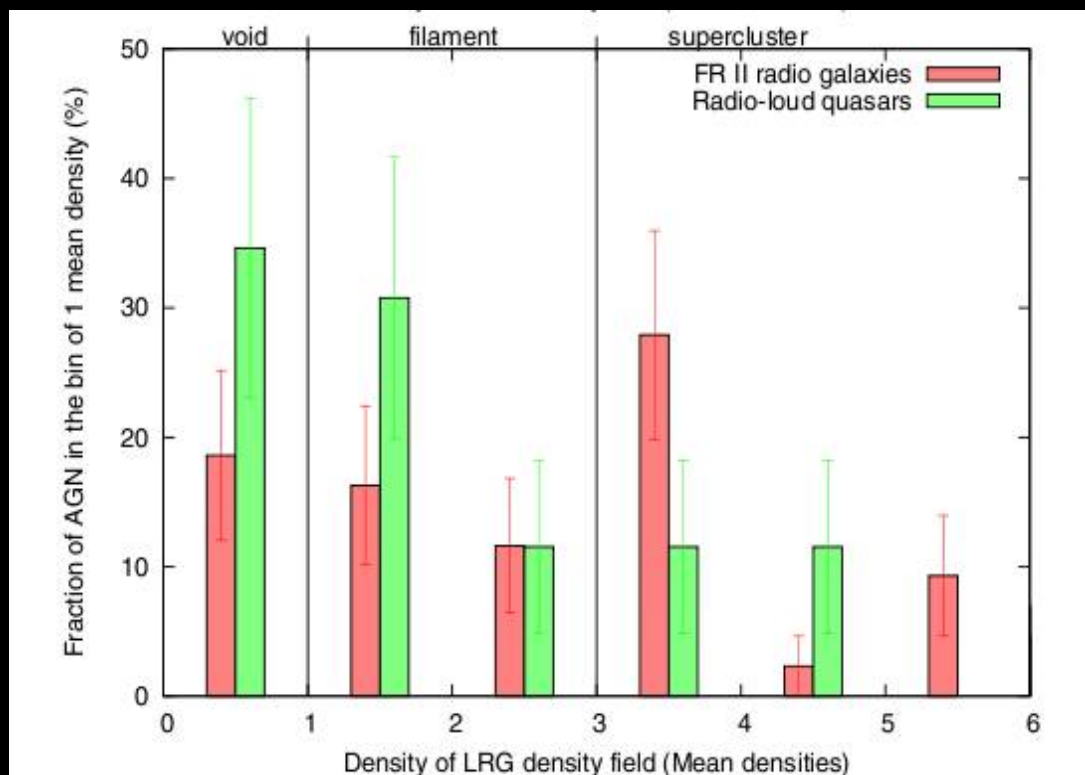
non-radio AGNs vs Environments



Lietzen et al. 2011

SDSS DR7 AGN vs LSS $z=0.02-0.4$ $r=3\text{Mpc}$ large scale density of LRGs

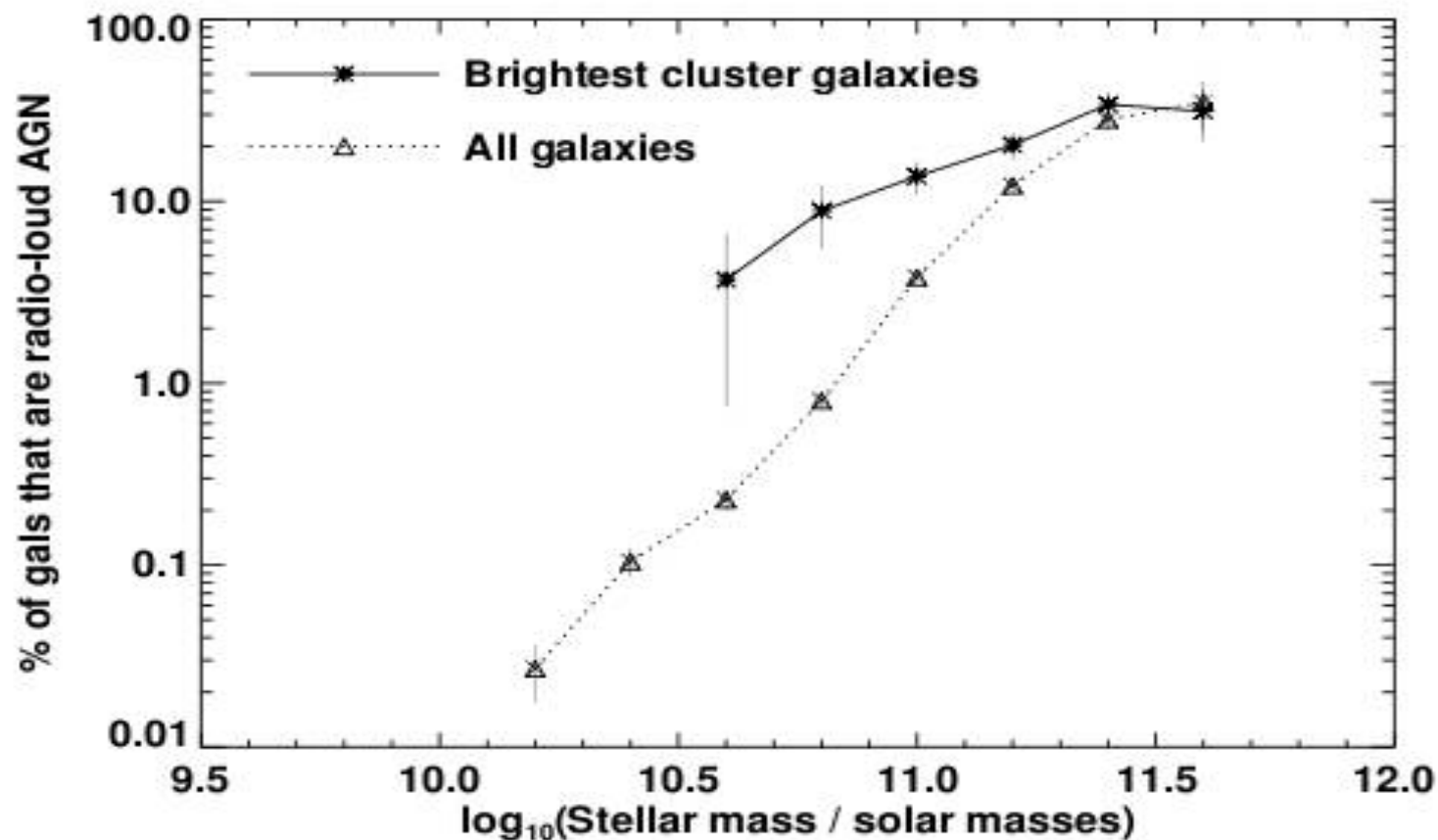
Radio-loud AGNs vs Environments



Lietzen et al. 2011

SDSS DR7 AGN vs LSS $z=0.02-0.4$ $r=3\text{Mpc}$ large scale density of LRGs

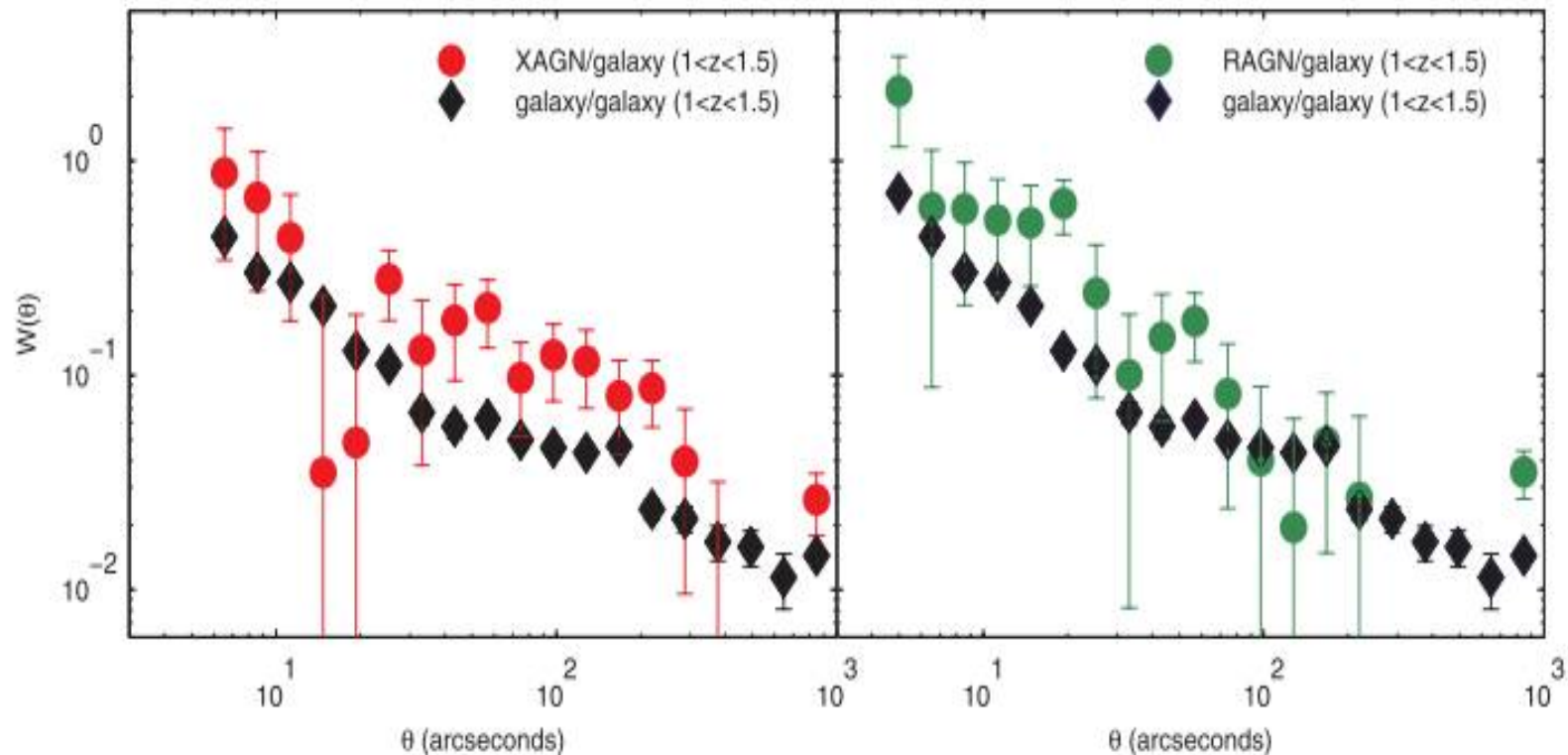
AGNs vs Environments



Best et al. 2007

SDSS DR4 484 clusters $z=0.02-0.1$

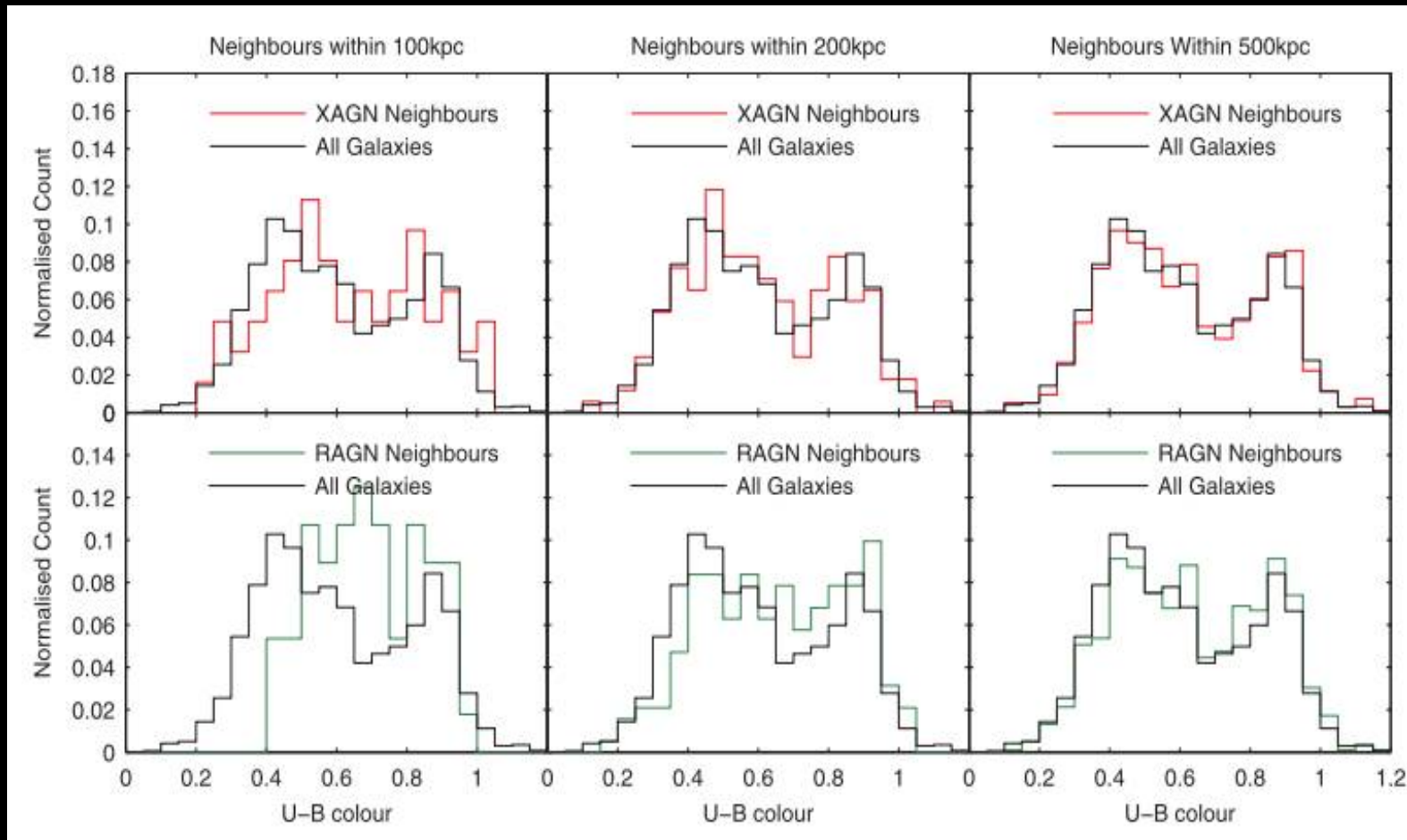
AGNs vs Environments at intermediate z



Bradshaw et al. 2011

Cross correlation between UKIDSS
UDS and X-ray or radio loud AGNs
at $z=1-1.5$

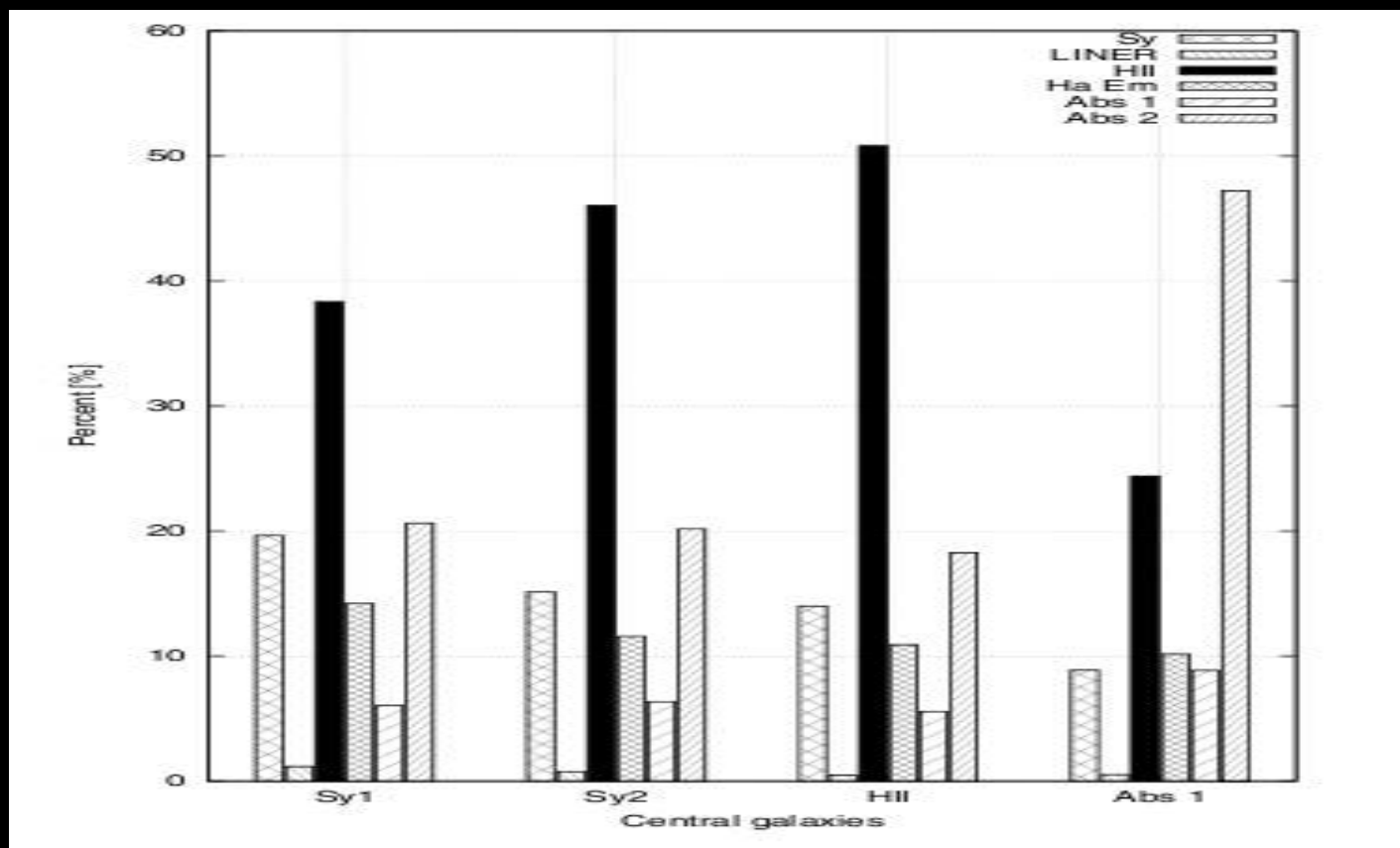
AGNs vs Host Galaxies at Intermediate z



Bradshaw et al. 2011

UKIDSS UDS neighbor galaxies around
X-ray or radio loud AGNs at $z=1-1.5$

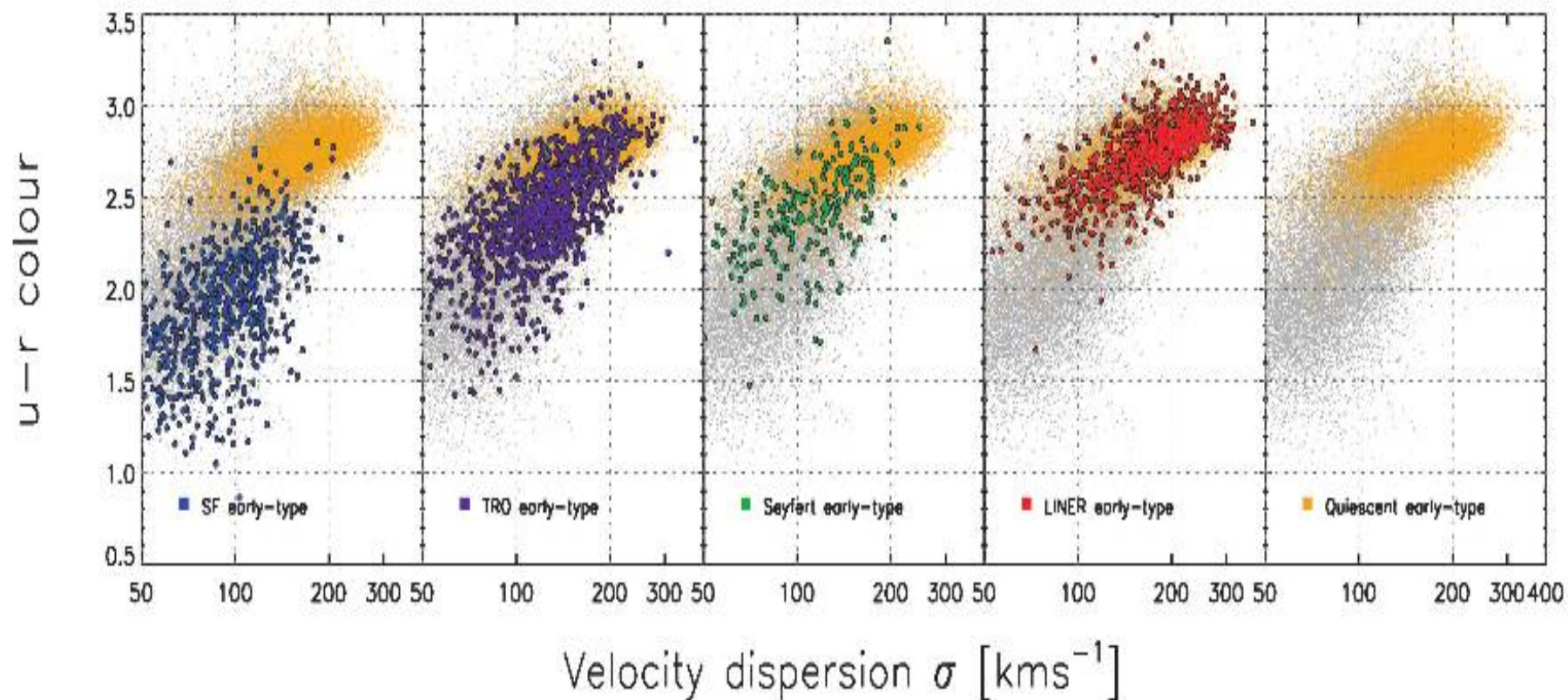
AGNs vs Neighbors Activity



Kollatschny et al. 2012

SDSS DR7 neighbor galaxies around ($r < 1\text{Mpc}$) AGNs at $z < 0.08$

AGNs vs Environments



Schawinski et al. 2009

AGNs vs Environments

- *Various environmental scales vs AGNs
- *AGNs and environments co-evolves
- *AGN types/properties vs environments
- *Evolutionary effect .. but only some spotted studies
- *Systemic studies only $z < 0.2$
- *Need a systematic and homogenous study to cover a wide variety of galaxy properties, redshifts, and AGNs properties

Basic Strategy

Data:

- *AGNs: Existing AGNs Catalog

- *Galaxies: HSC Wide

Methods:

- *Auto/Cross correlation

- *AGN properties vs Galaxy Properties

- *Photo-z (grizy)

- * $z = 1 - 1.5$

Numbers

*SDSS QSO catalog

~100k QSO (~Type I)

~25k QSO $z=1-1.5$

*Galaxies: HSC wide

I ~ 26

y ~ 24.4

~ 200k galaxies / deg²

~ 200M (1000 deg²)

~ 2M (at $z=1-1.5$)

~ 10k (inside $r=1$ Mpc at $z=1-1.5$)

Science Cases

- *AGNs properties vs local density, clusters, LSS
- *AGNs properties vs galaxy properties
- * $z=1-1.5$, epoch where red sequence formed and cosmic star formation drops
 - *Evolutions from $z=0$ to 1.5, or more
 - *Systematic and homogenous study
- *AGNs feedback on the host galaxy
- *AGNs influence on the nearby faint population

Extended Strategy

*AGNs: Subsets---

time variability AGN

X-ray, Radio, Mid-IR

Type I, II, low luminosity AGN

*NIR data

VIKING

UKIDSS LAS

* $z = 1.5 \sim 4-5$

*Follow up spectroscopy for
interesting cases

*and more....