Probing high redshift galaxy clusters at 1.4<z<2 using radio galaxies

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Contents

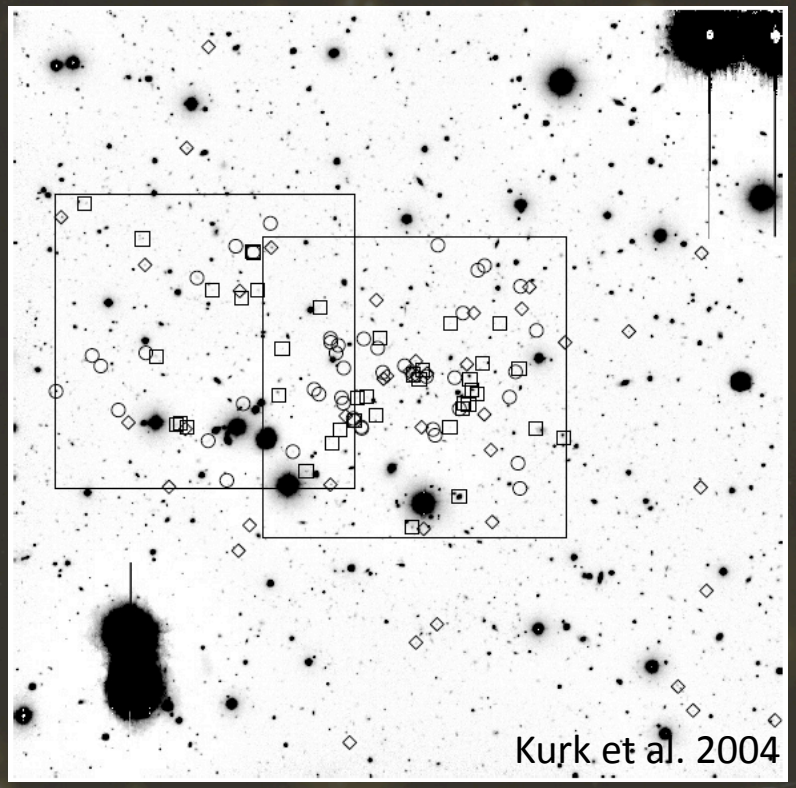
HzRGs as probe of galaxy clusters

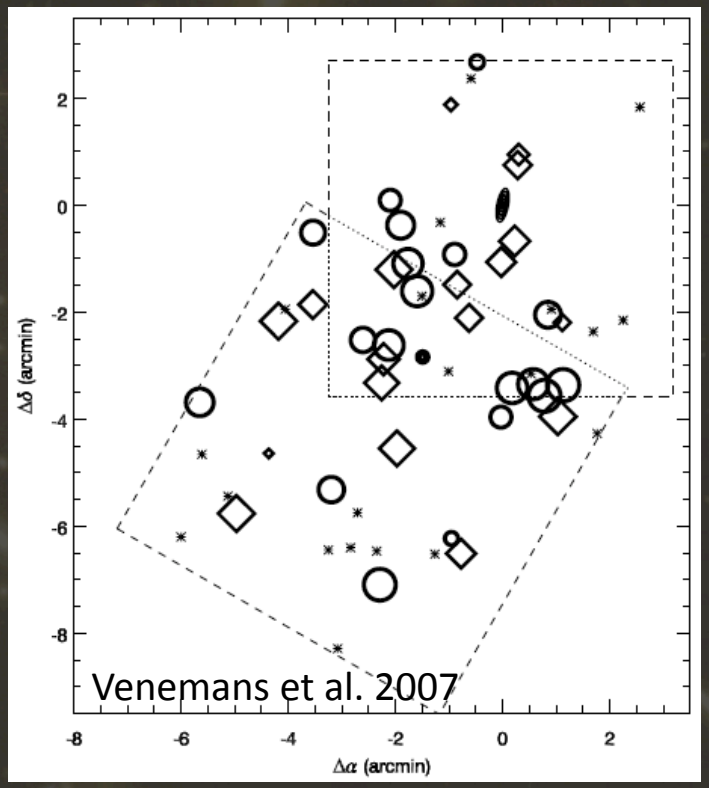
See George Miley's review.

Looking for narrow-lines emitters (Hα, Lyα):

- PKS 1138-262 (z=2.16)
- TN J1338-1942 (z=4.11)
- TN J0924-2201 (z=5.2) …

Venemans et al. 2002, 2004, 2005, 2007; Kurk et al. 2004; Overzier et al. 2006; Pentericci et al. 2000 etc…

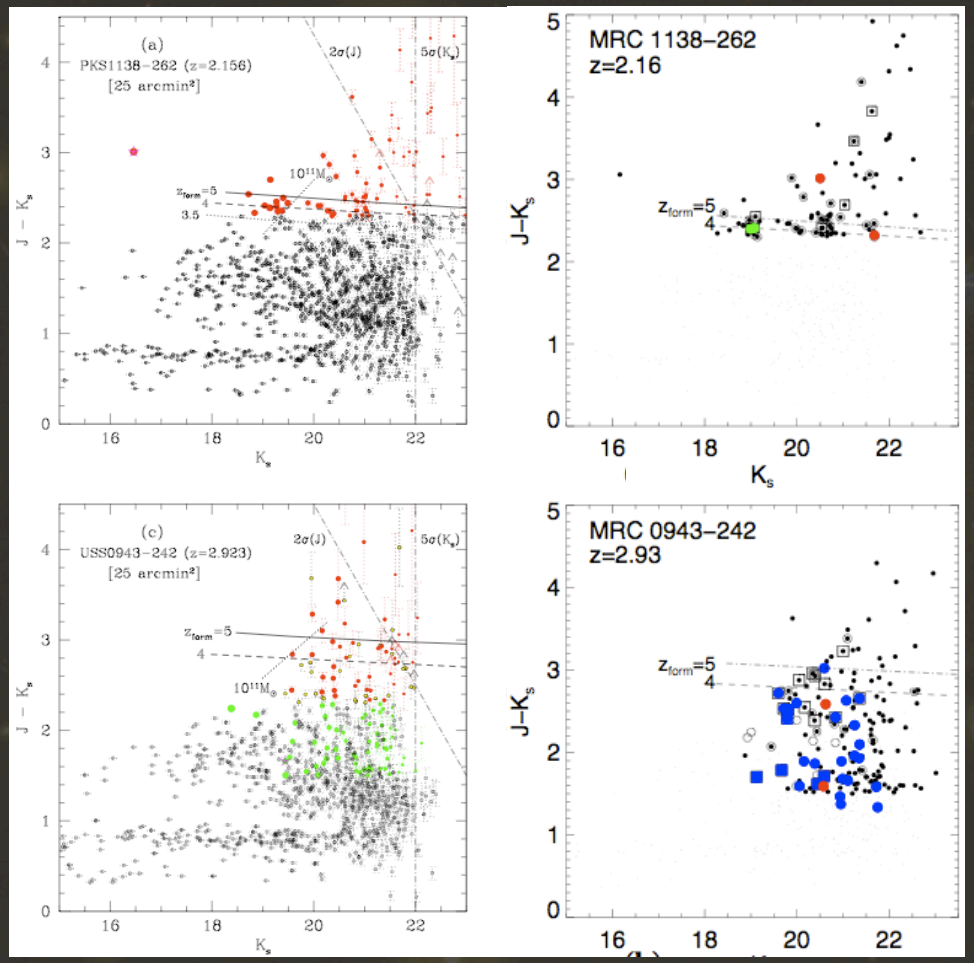




HzRGs as probe of galaxy clusters

Looking for the highest mass cluster members

- Exploring the evolved galaxy population
  - Studying the formation of the red sequence at high-z



30 DRGs targeted
⟶ 15 zspec
⟶ 2 at the redshift of PKS1138-262

Doherty et al. 2009, accepted in A&A on astro-ph, yesterday

38 targeted (23 rJHK, 15bJHK)
⟶ 18 zspec
⟶ 0 at the redshift of USS0943-242

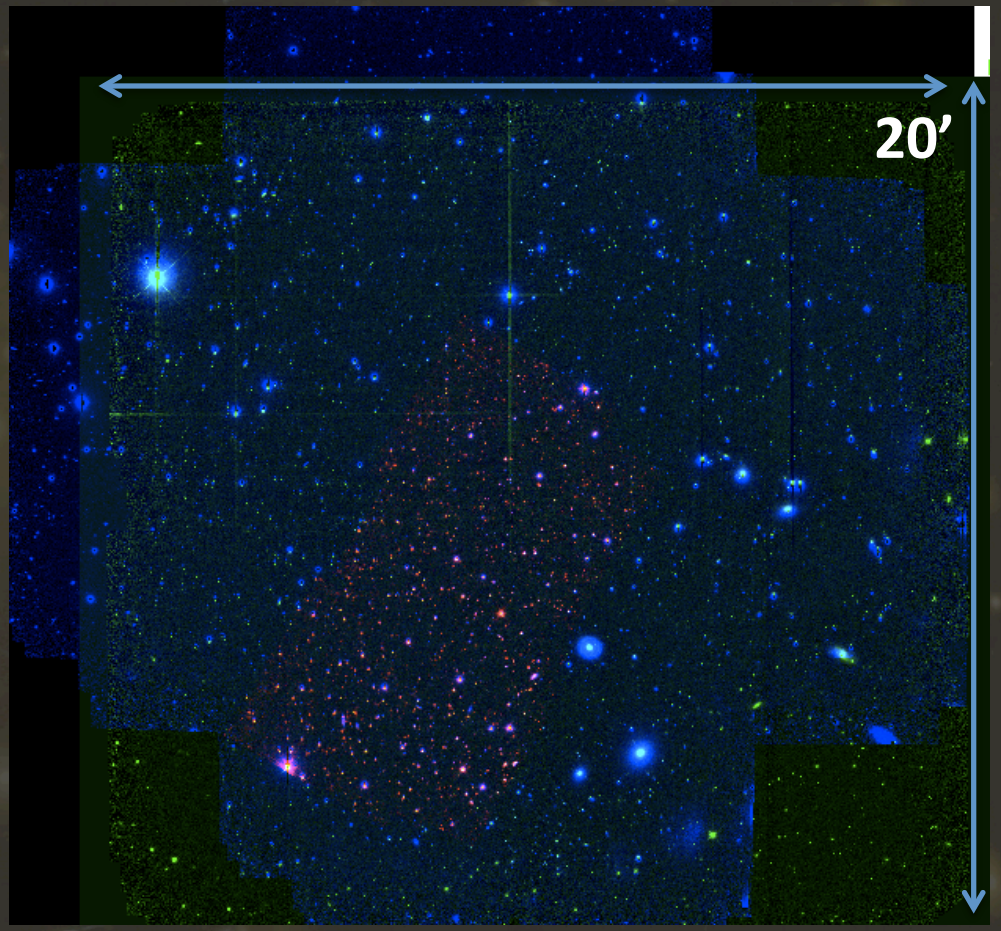
7C1756+6520 & 7C1751+6809

Targets:

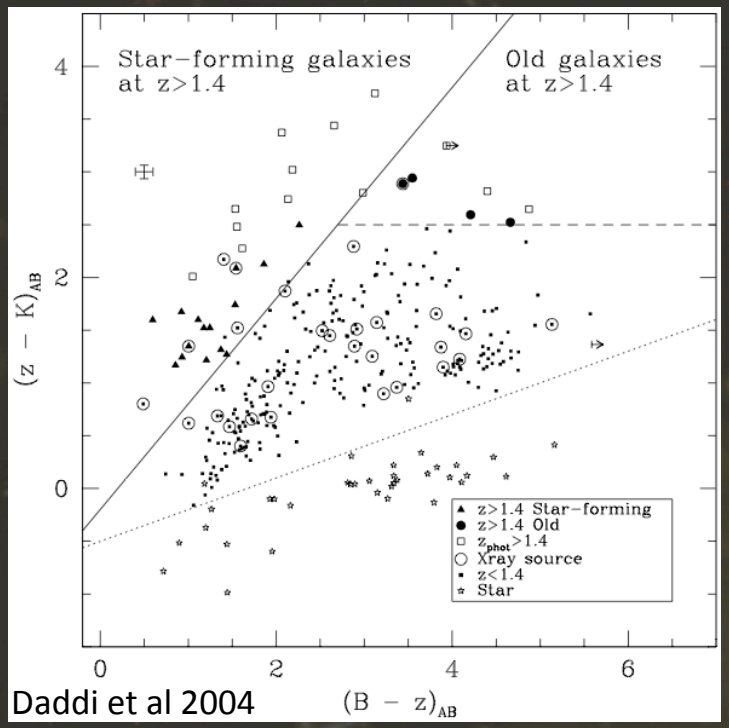
- 7C1756+6520 (z=1.416)
- 7C1751+6809 (z=1.54)

Data:

- B and z-band:
  Palomar 200 inch
- J and Ks-band:
  Wircam/CFHT
- Spitzer/IRAC + MIPS



Color-color selection at z>1.4: BzK criterion

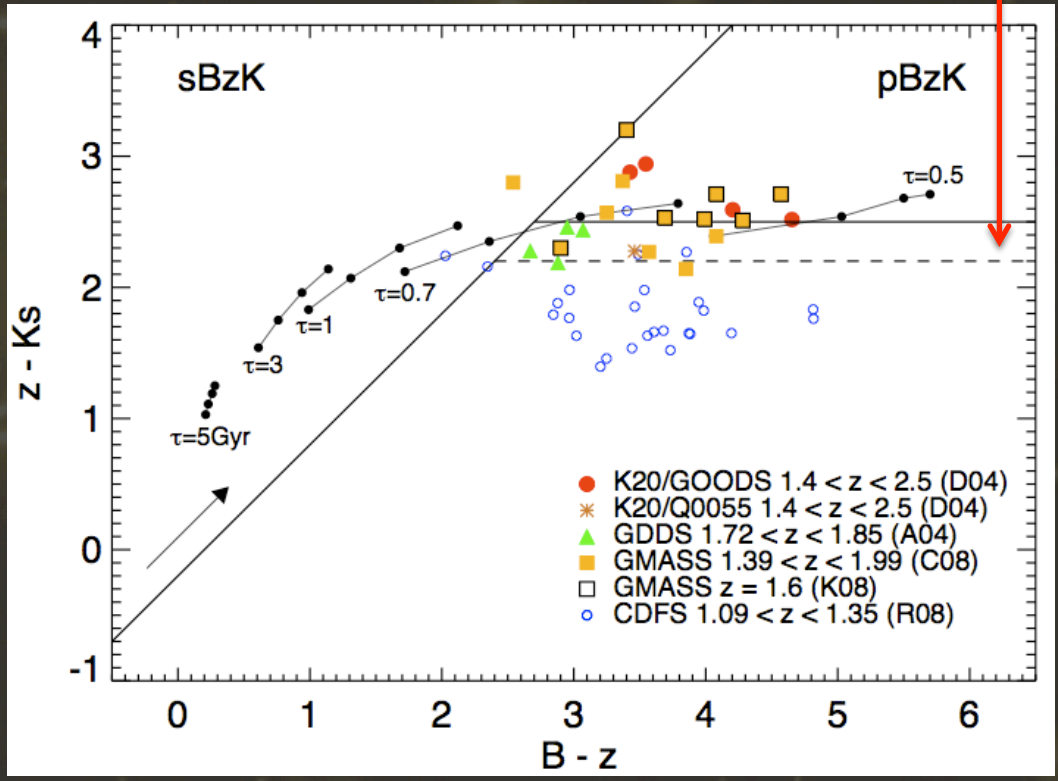


Daddi et al 2004

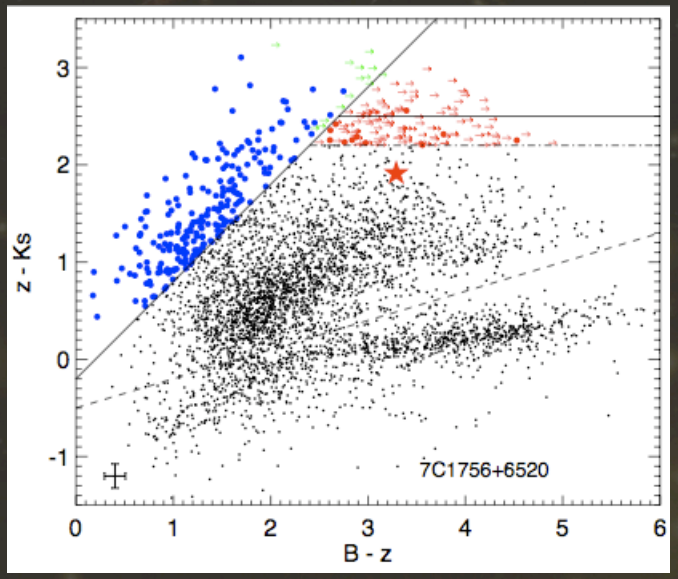
$$BzK \equiv (z-K)_{AB} - (B-z)_{AB}$$

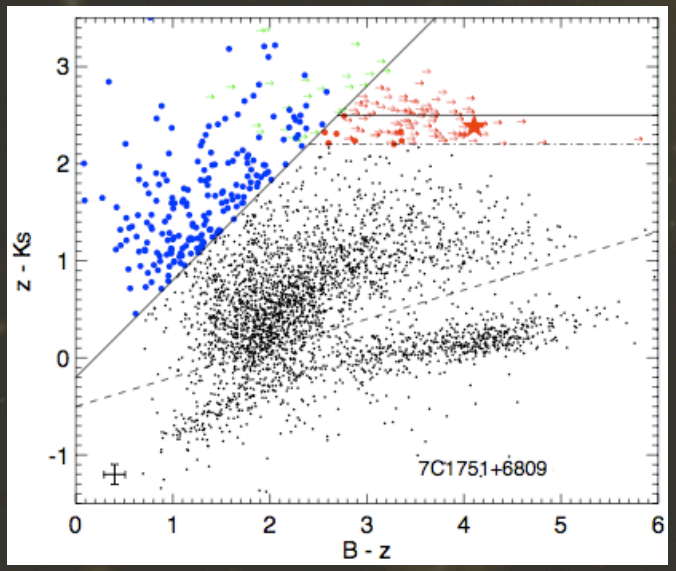
$$pBzK : BzK < -0.2 \cap (z-K)_{AB} > 2.5 \rightarrow 2.2$$

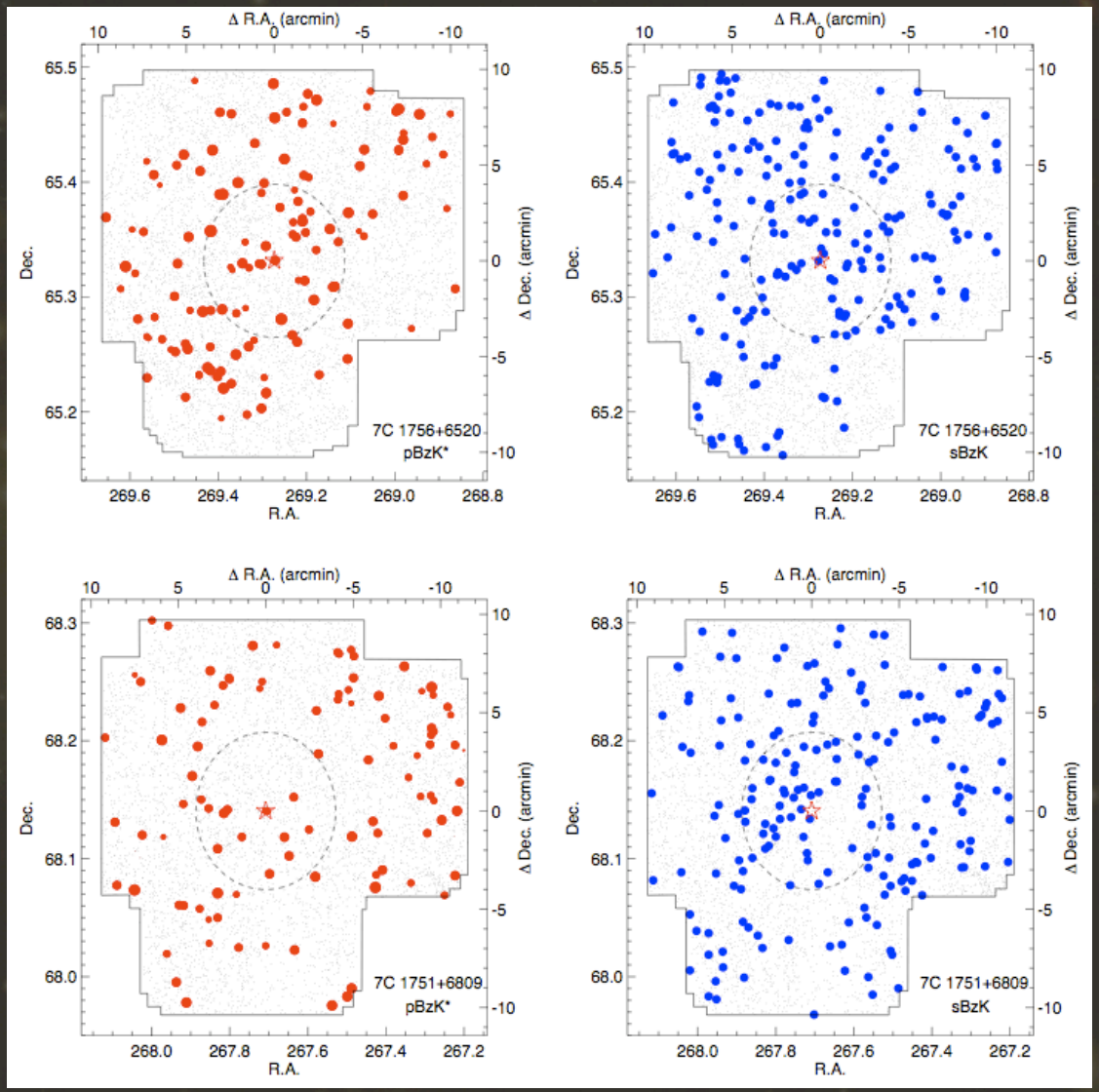
$$sBzK : BzK \geq -0.2$$



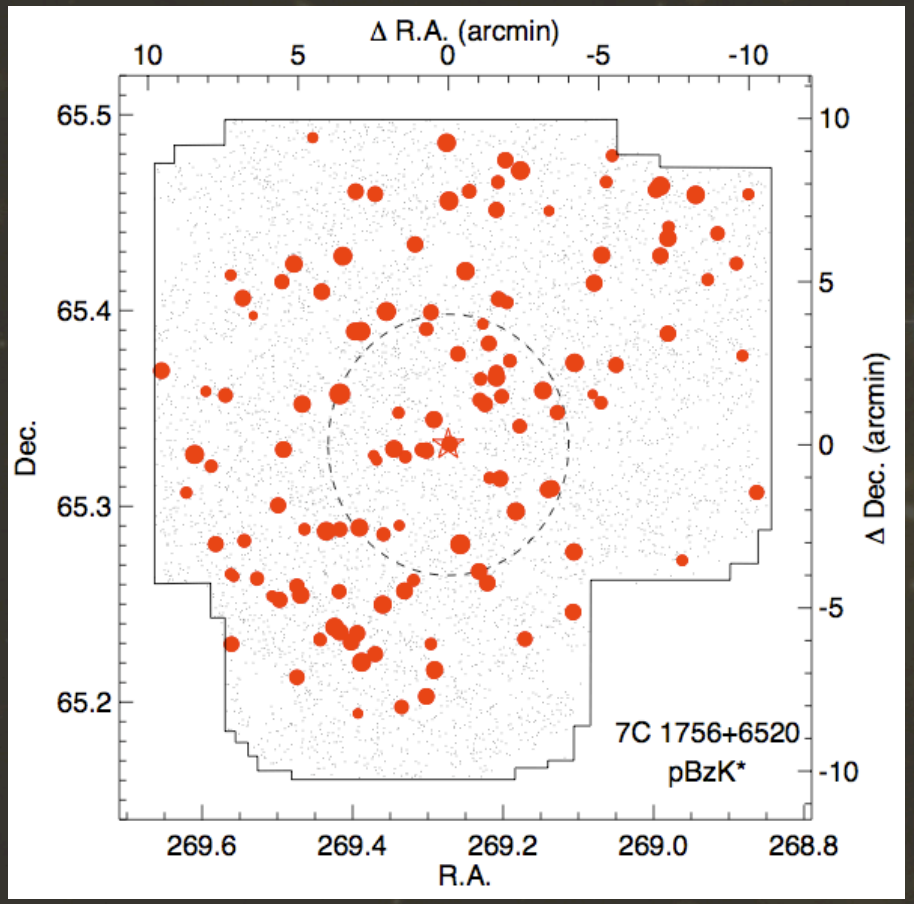
An overdensity around 7C1756+6520

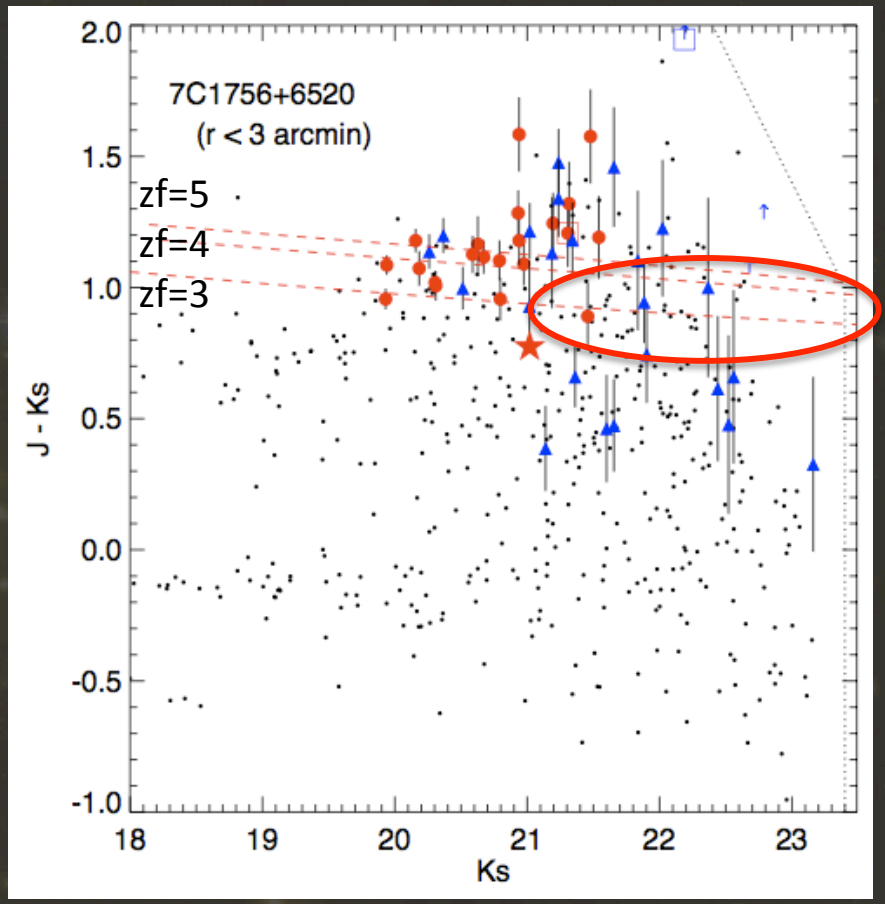




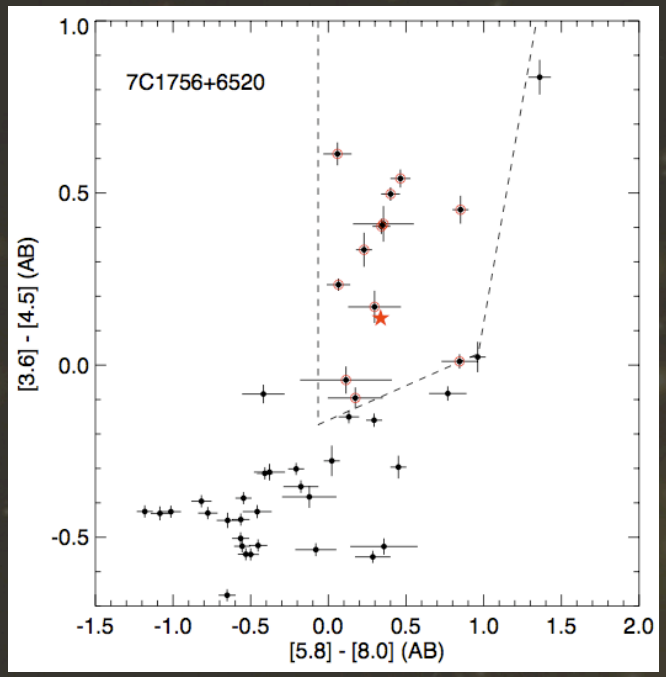


Properties


Δ R.A. (arcmin)
10
5
0
-5
-10
65.5
65.4
65.3
65.2
Dec.
10
5
0
-5
-10
Δ Dec. (arcmin)
269.6
269.4
269.2
269.0
268.8
R.A.
7C 1756+6520
pBzK*


7C1756+6520
(r < 3 arcmin)
zf=5
zf=4
zf=3
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
J - Ks
18
19
20
21
22
23
Ks

Properties

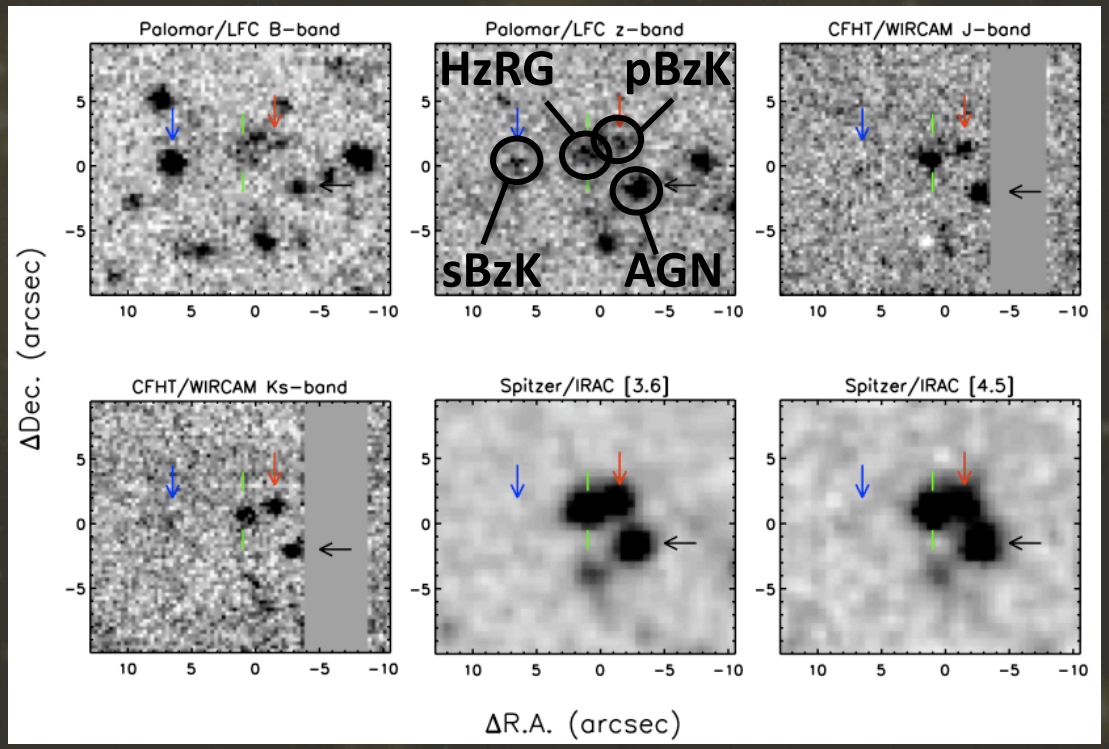


An overdensity of AGN candidates …

- Mid-Infrared selected AGN
  Stern et al. 2005 – Spitzer selection
- By a factor of 2 compared to the density of the IRAC Shallow Survey (Eisenhardt et al. 2004)

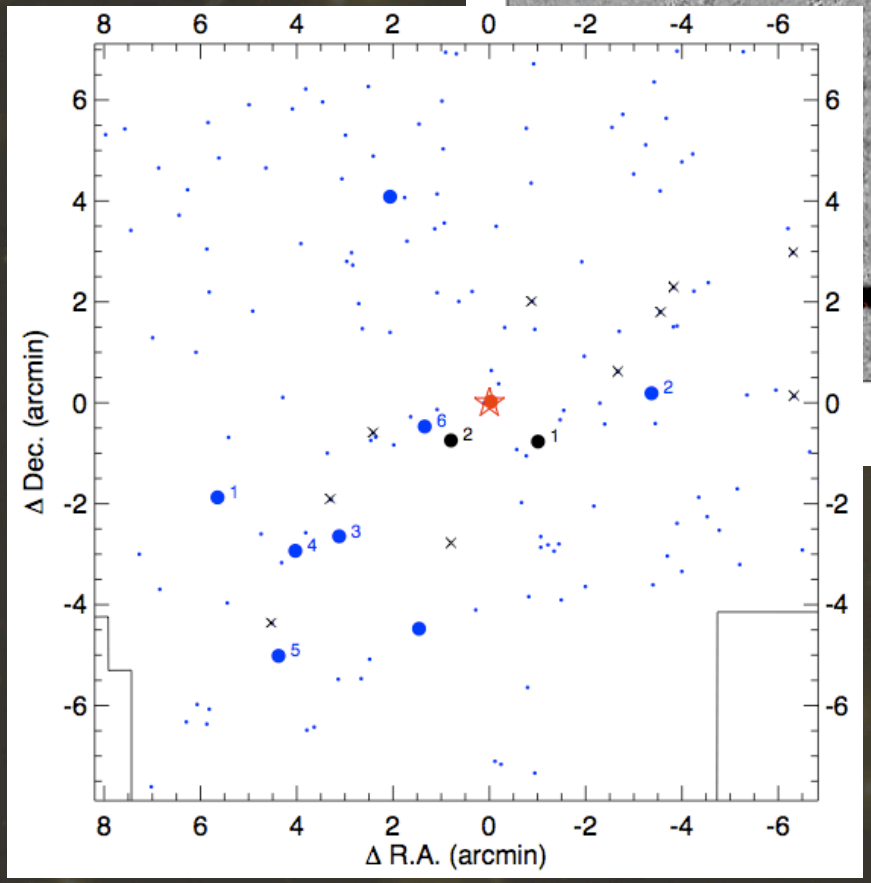
… and potential close-by companions (within 6’’):

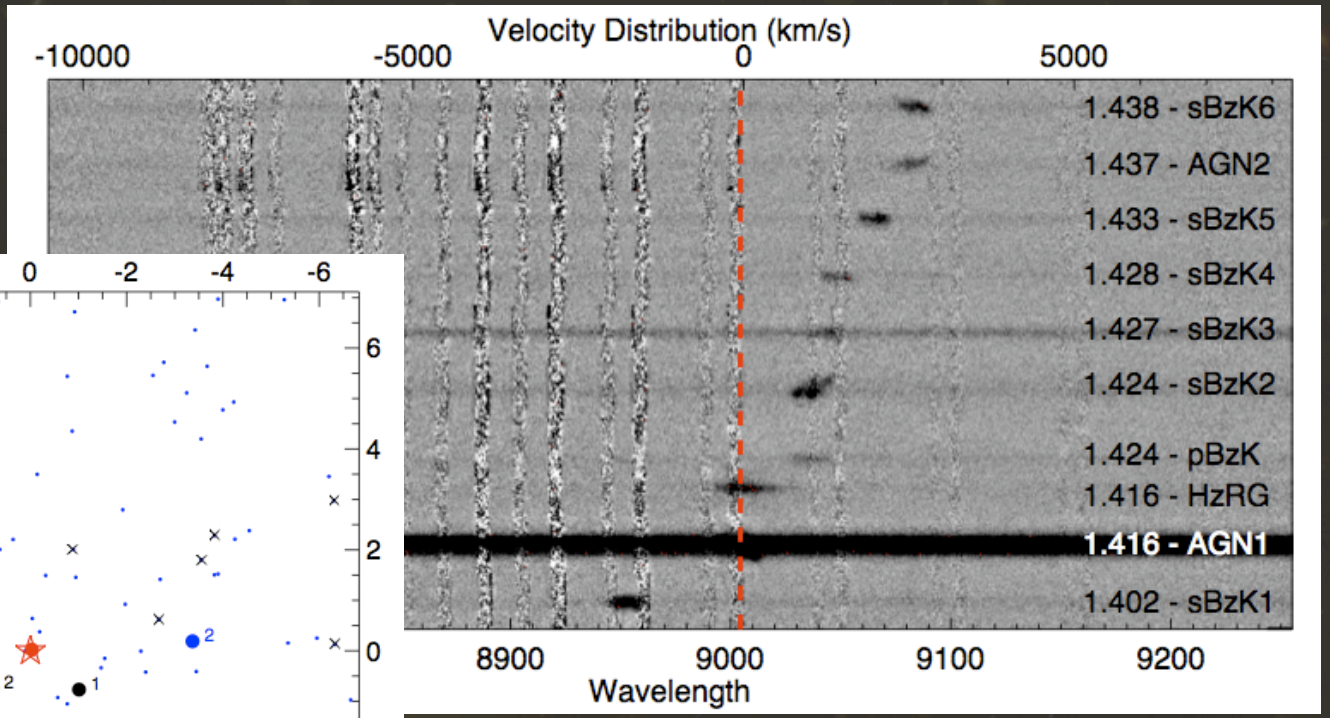
- 1 pBzK
- 1 sBzK
- 1 AGN



Spectroscopic confirmation

Galametz et al.
in preparation



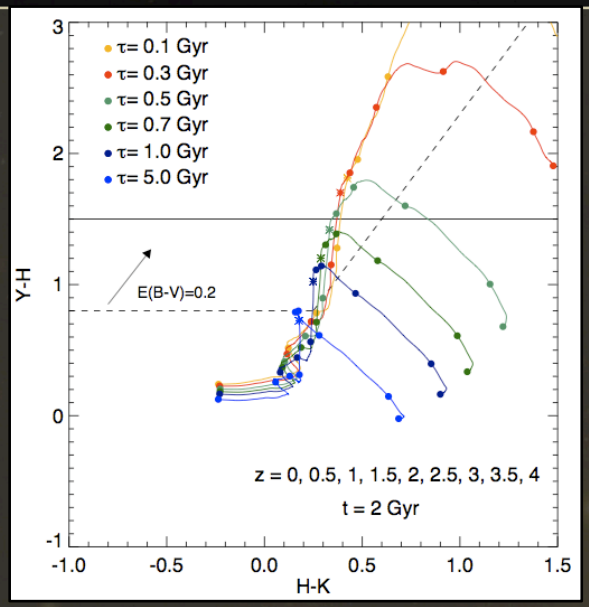


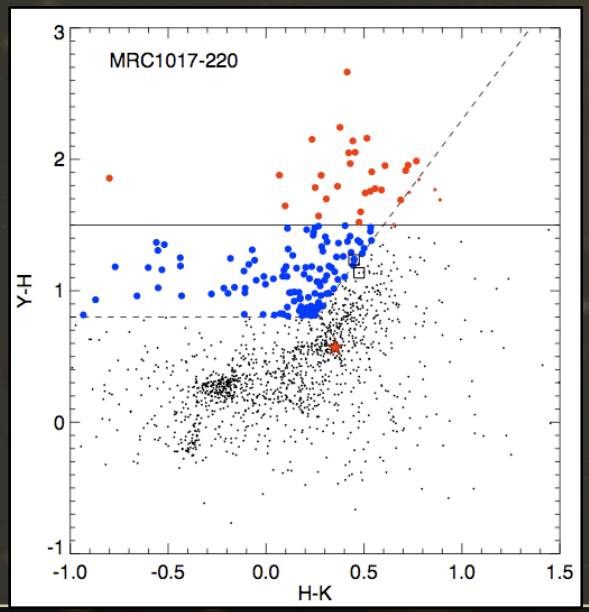
Spectroscopy with Keck/DEIMOS:

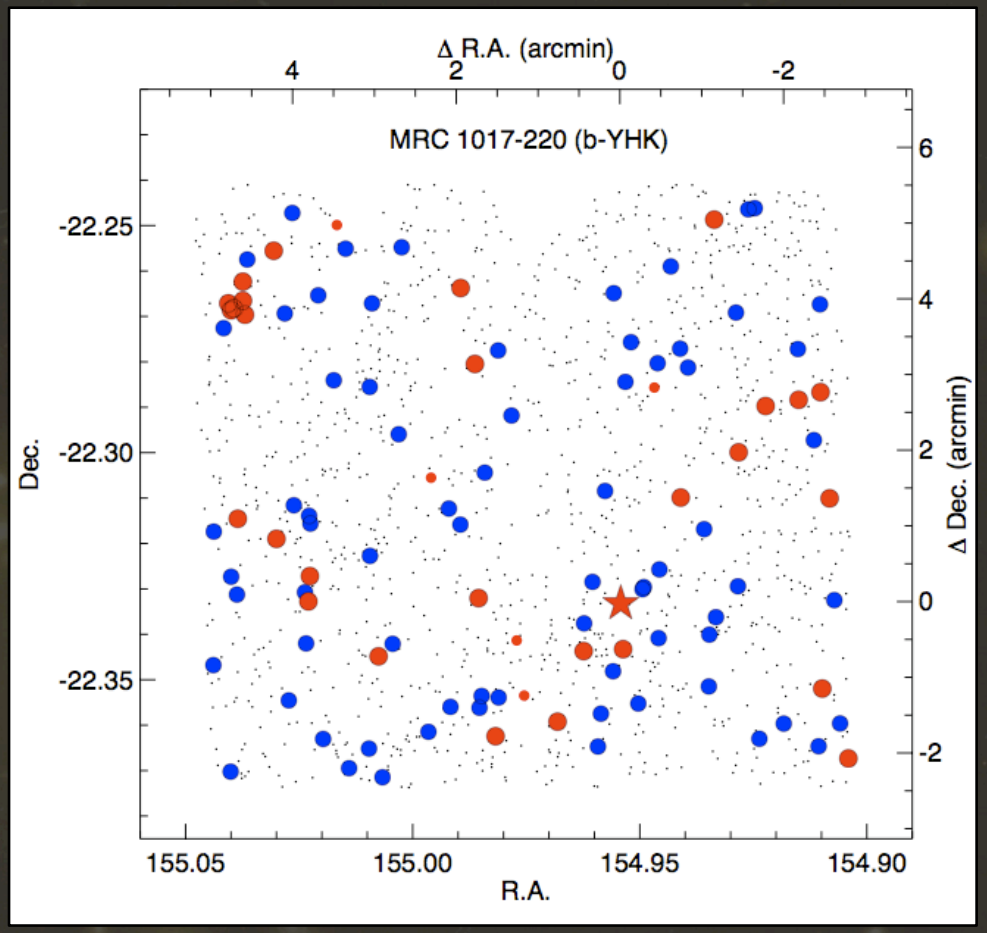
- 8 sBzKs
- 1 pBzK
- 2 AGNs

Confirming the red candidates?

Looking at higher redshifts: MRC1017-220 at z=1.77







On going work

See also N.Hatch talk

Concluding remarks

We studied the environment of 2 radio galaxies at z=1.4-1.5

- Not all the HzRGs reside in overdense regions.
- A source overdensity is found around 7C1756+6520.
- Several clumps of red objects are found in the field of 7C1756+6520 (distributed in the direction NW/SE) suggesting a large scale structure around the central clump.
- We have confirm 11 members so far with optical spectroscopy but near infrared spectroscopy will be necessary to confirm the red clumpy structure.

We pushed the study to higher redshift – HAWK-I project:

- We set a new near-infrared YHK criterion to select sources at z>1.6 and test our criterion.
- We isolate the candidate galaxy cluster members around MRC1017-220 – Next step will be to confirm their possible association with the HzRG.