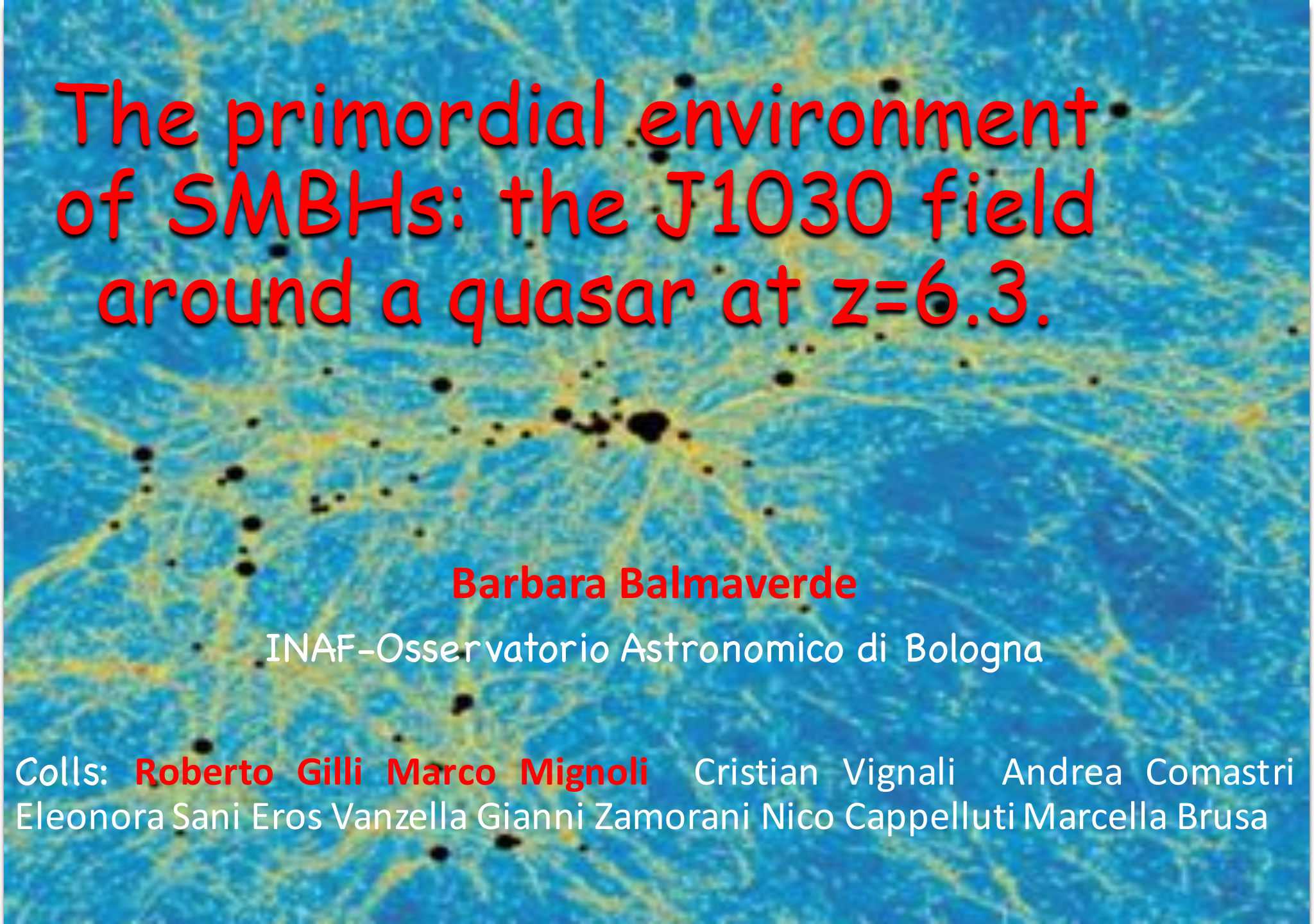


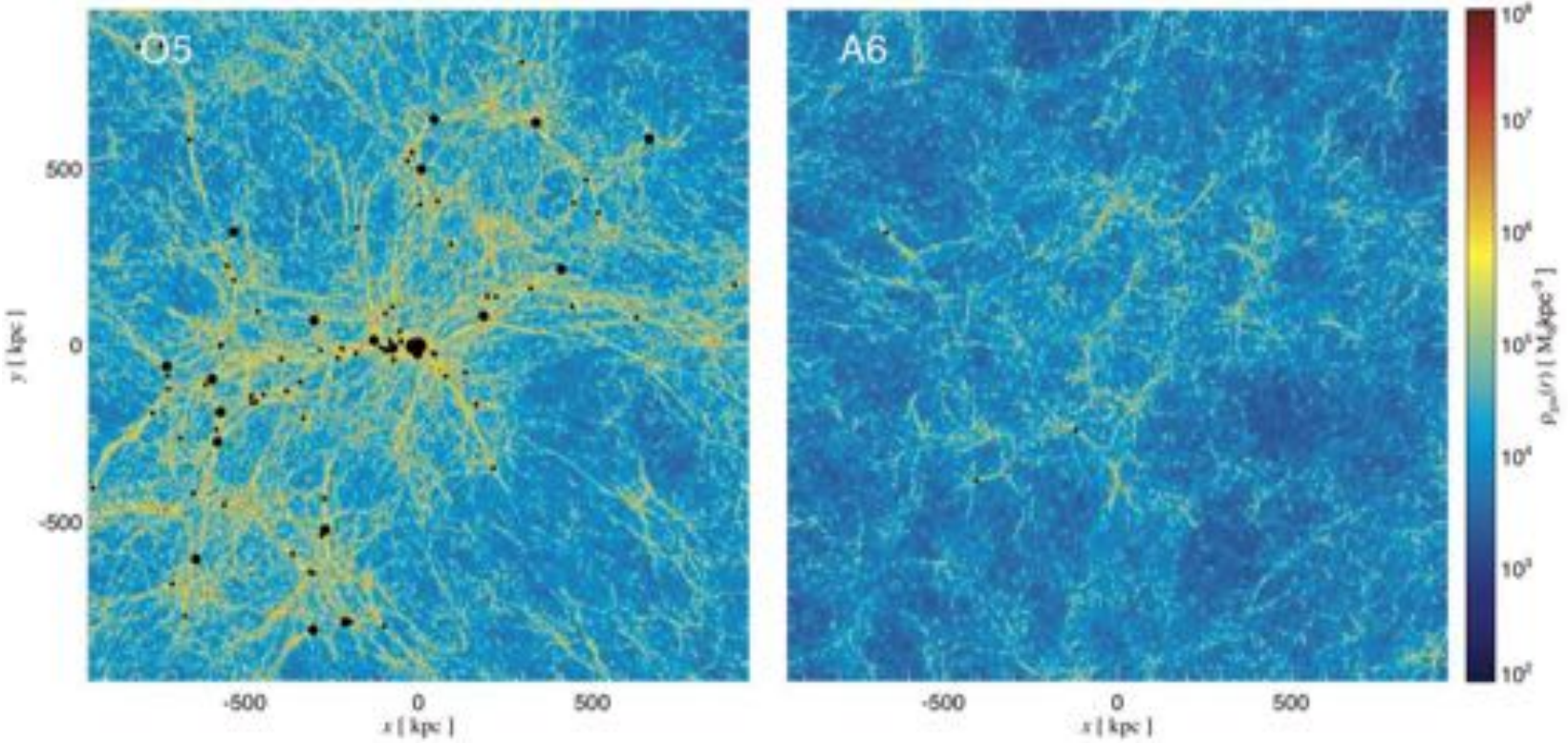
The primordial environment of SMBHs: the J1030 field around a quasar at z=6.3.

Barbara Balmaverde

INAF-Osservatorio Astronomico di Bologna

Colls: **Roberto Gilli Marco Mignoli** Cristian Vignali Andrea Comastri Eleonora Sani Eros Vanzella Gianni Zamorani Nico Cappelluti Marcella Brusa

High-z SMBHs formation and environment



Costa et al. 2014

The BH masses measured for the SDSS bright quasars at z~6 are of the order of 10^9 $M_\odot$ grown in less than 1 Gyr.

From theory:

Early SMBHs should only form in the most massive dark matter halos (Overzier09, Di Matteo 12, Angulo13) and should be part of large galaxy over-densities that may extend up to 10 physical Mpc (pMpc).

These regions should be populated by galaxies that are more massive, dusty, and star-forming (~SFR 700 $M_\odot yr^{-1}$) than those in average-density fields (Yajima et al. 2015).

How is the environment around high-z QSO?

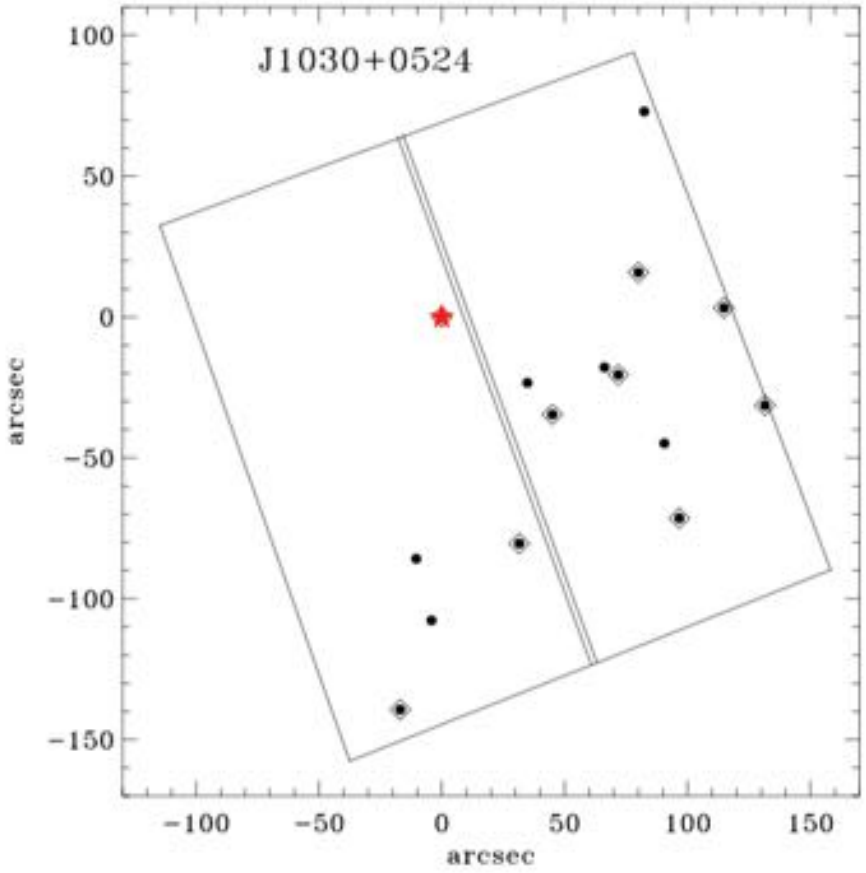
Currently we lack clear observations of the environment in which high redshift QSOs reside….

Observations of galaxies candidates around z ~ 6 QSOs seems to show no evidence of pronounced overdensities ir small ACS/HST field ~200X200 arcesc

(Stiavelli+05, Kim+09, Husband+13, Banados+13, Simpson+14)

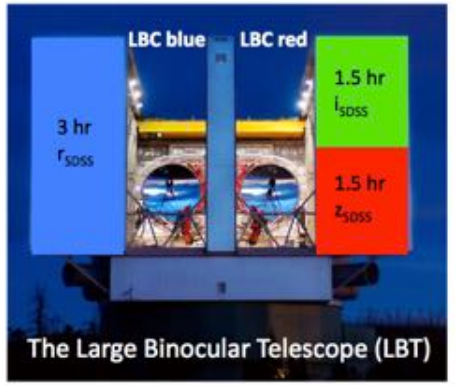
HOWEVER

the HII regions generated by luminous quasars can affect the formation and clustering of galaxies.



Kim et al. 2009.
Field around QSO J1030 at z=6.3

The project: investigate the environment in which high redshift QSOs reside at very large scales (~25'X25').
The tecnique:



LBT = 2 x 8.4m telescopes – Mt. Graham (AZ)

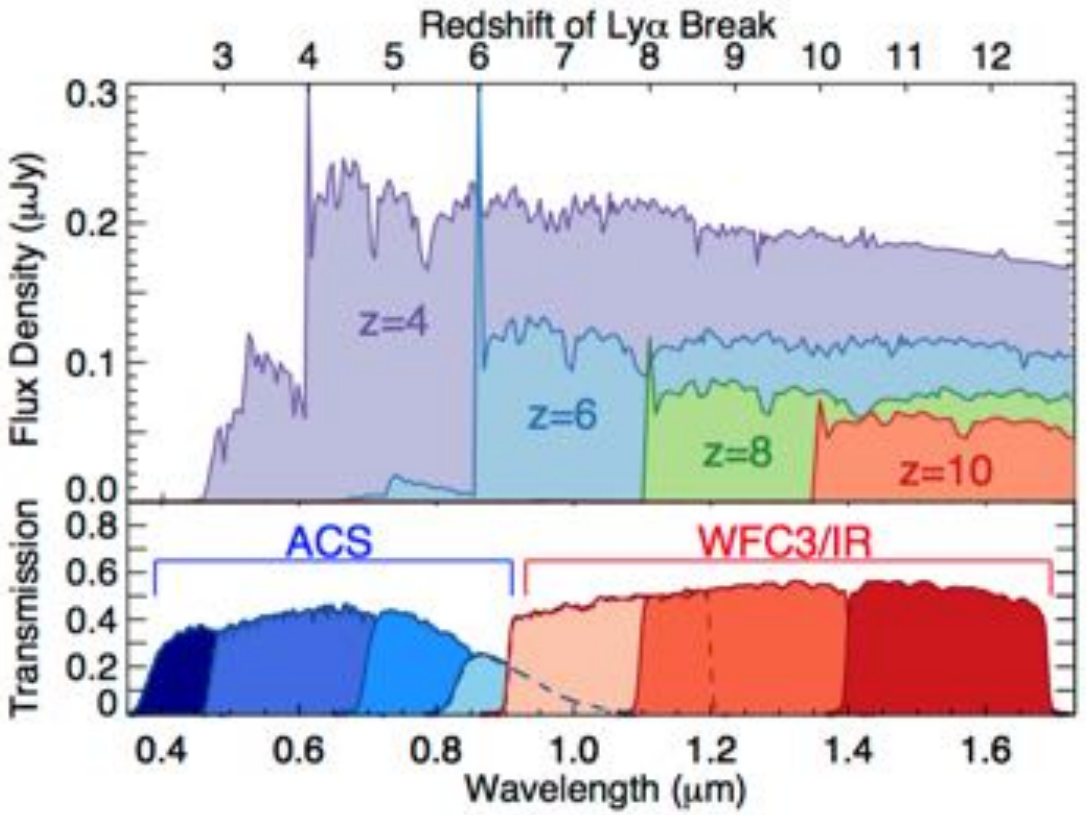
COLOR SELECTION

in Morselli14 we select LBGs candidates with color criteria in the fields around four z~6 QSOs in the SDSS: i-dropout in LBT images z, i,r.

CRITERIUM:

PRIMARY: (i-z)>1.3 & undetected in r

SECONDARY: 1.1<(i-z)<1.3

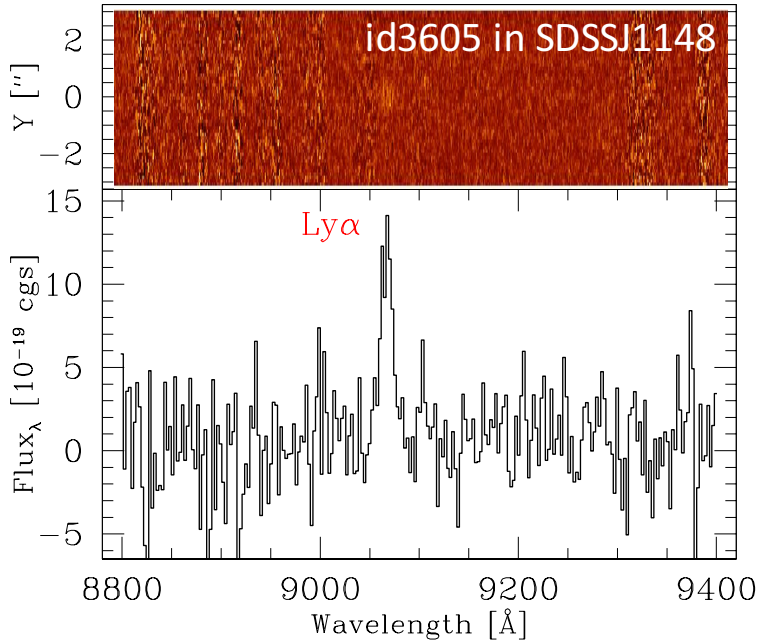


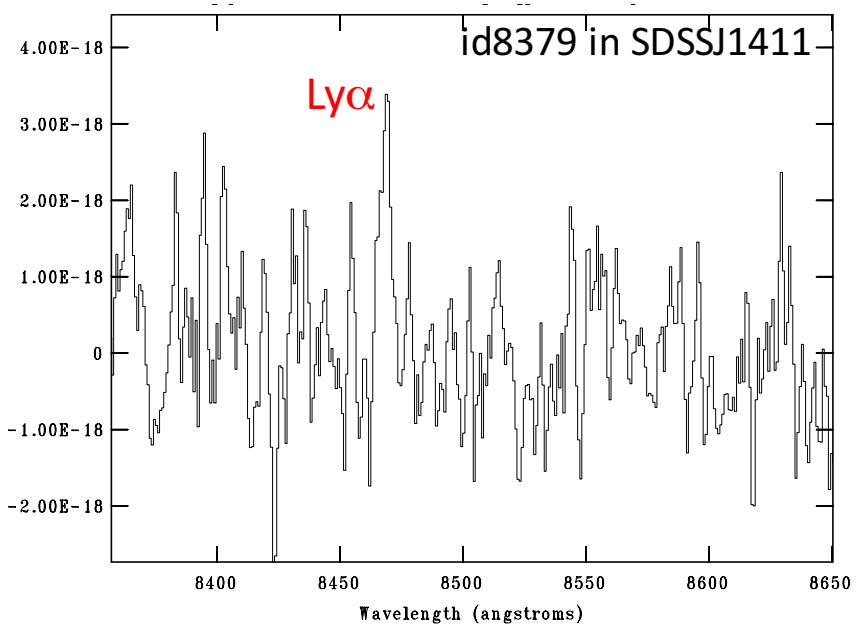
Finkelstein15 courtesy

Spectroscopic follow-up with MODS@LBT

16 i-drop observed in 5 masks in the 3 northern fields (SDSS J1048, J1411, J1148), 6hr per mask:

Only 2 LBGs likely within QSO halo





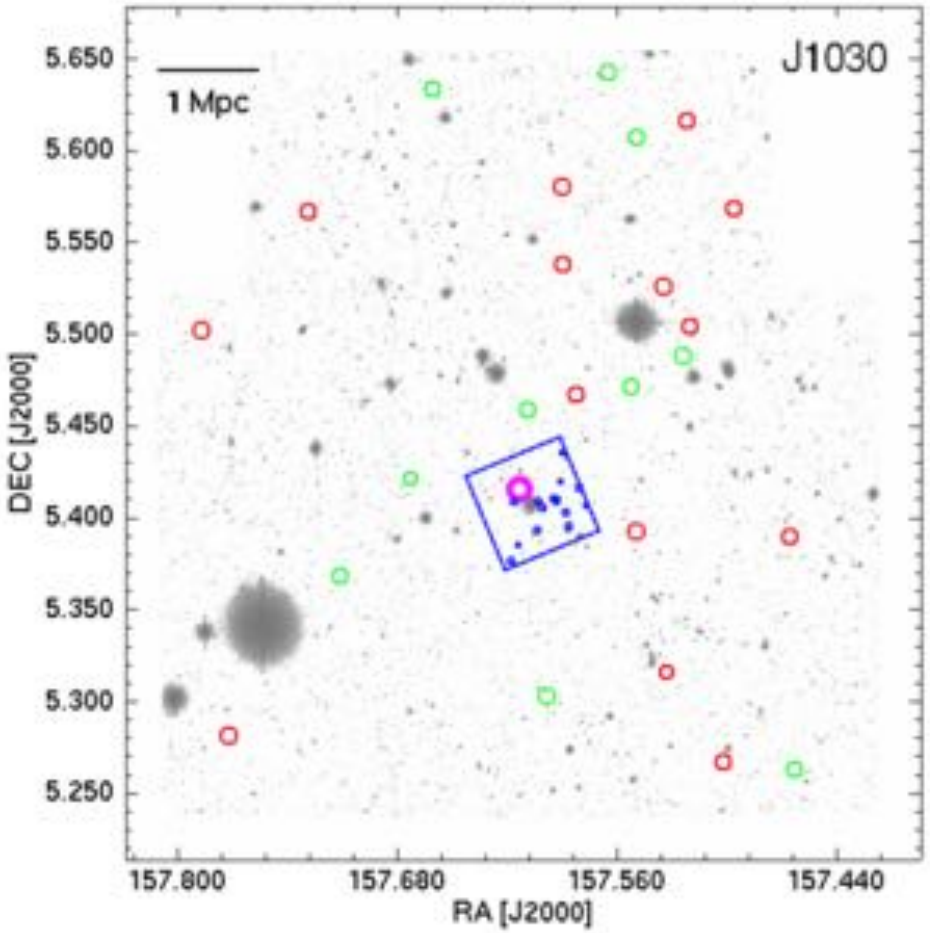
z_{LBG}=6.456, z_{QSO}= 6.42 → d~ 4 pMpc

z_{LBG}=5.964, z_{QSO}= 5.903 → d~ 5 pMpc

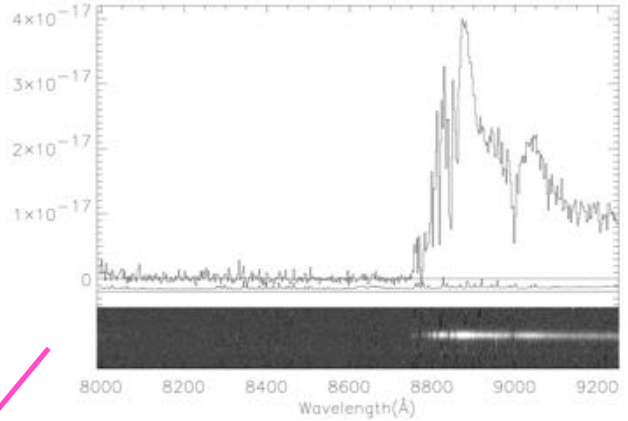
Towards an accurate selection of LBGs candidates…

In this talk, I focus on the region around the z = 6.28 QSO SDSS J1030+0524 (hereafter the J1030 field), the most overdense one.

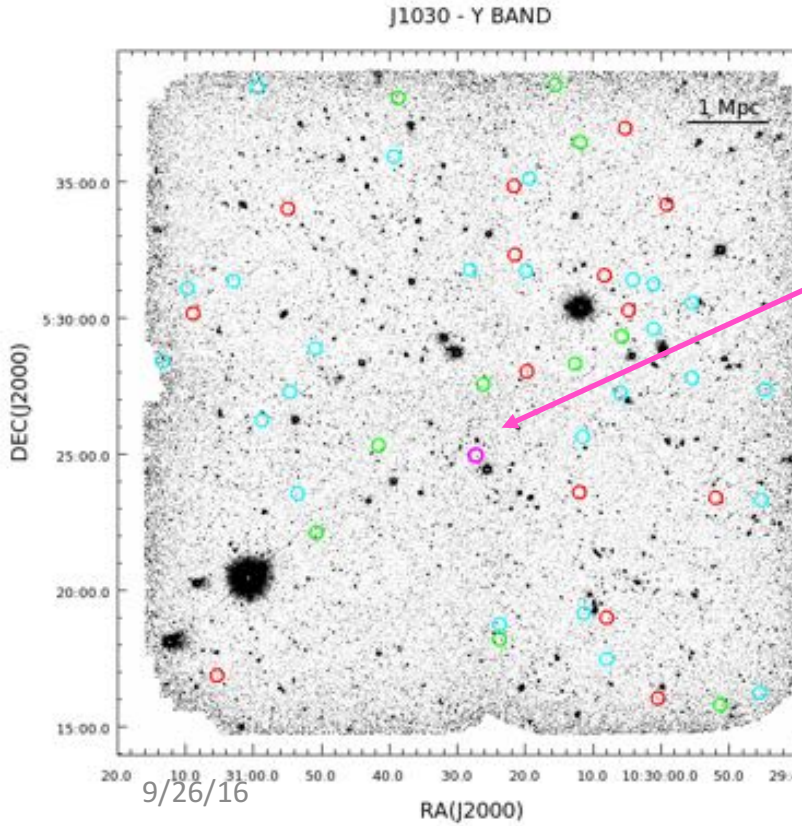
Because spectroscopic observations are very time expensive we need to select carefully our candidates.

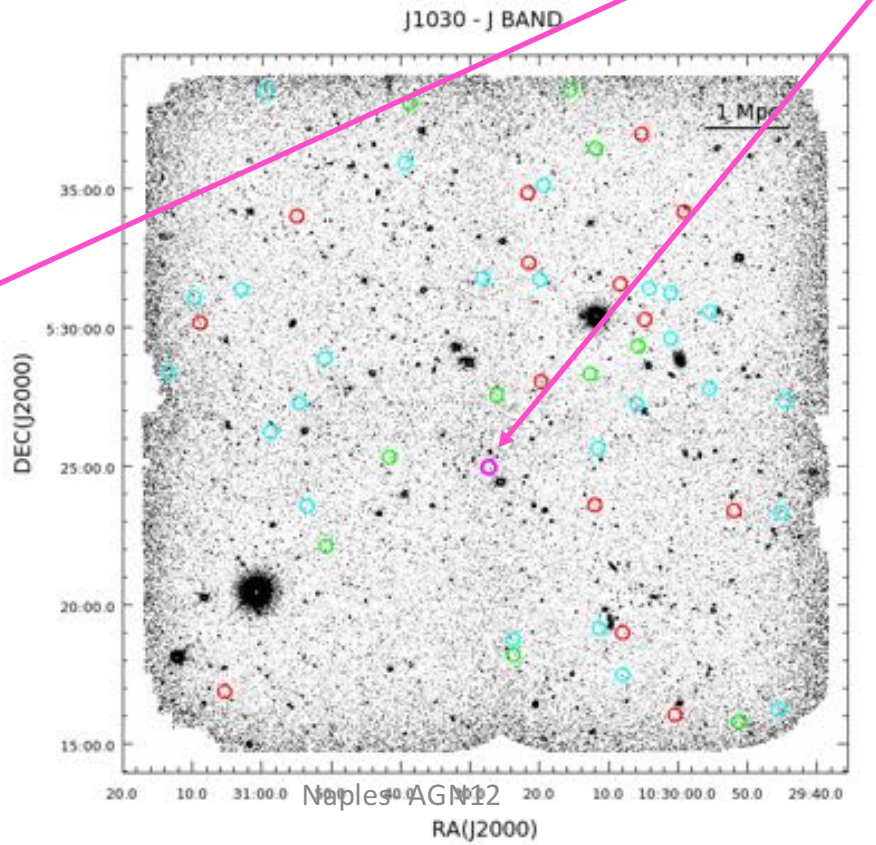


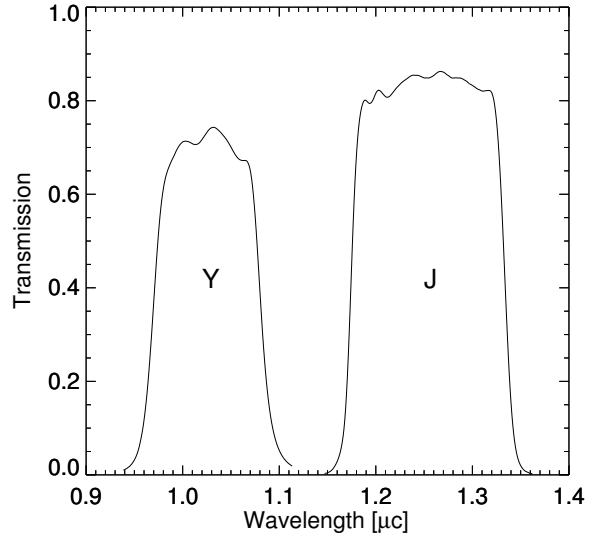
Deep near IR Y and J images around J1030



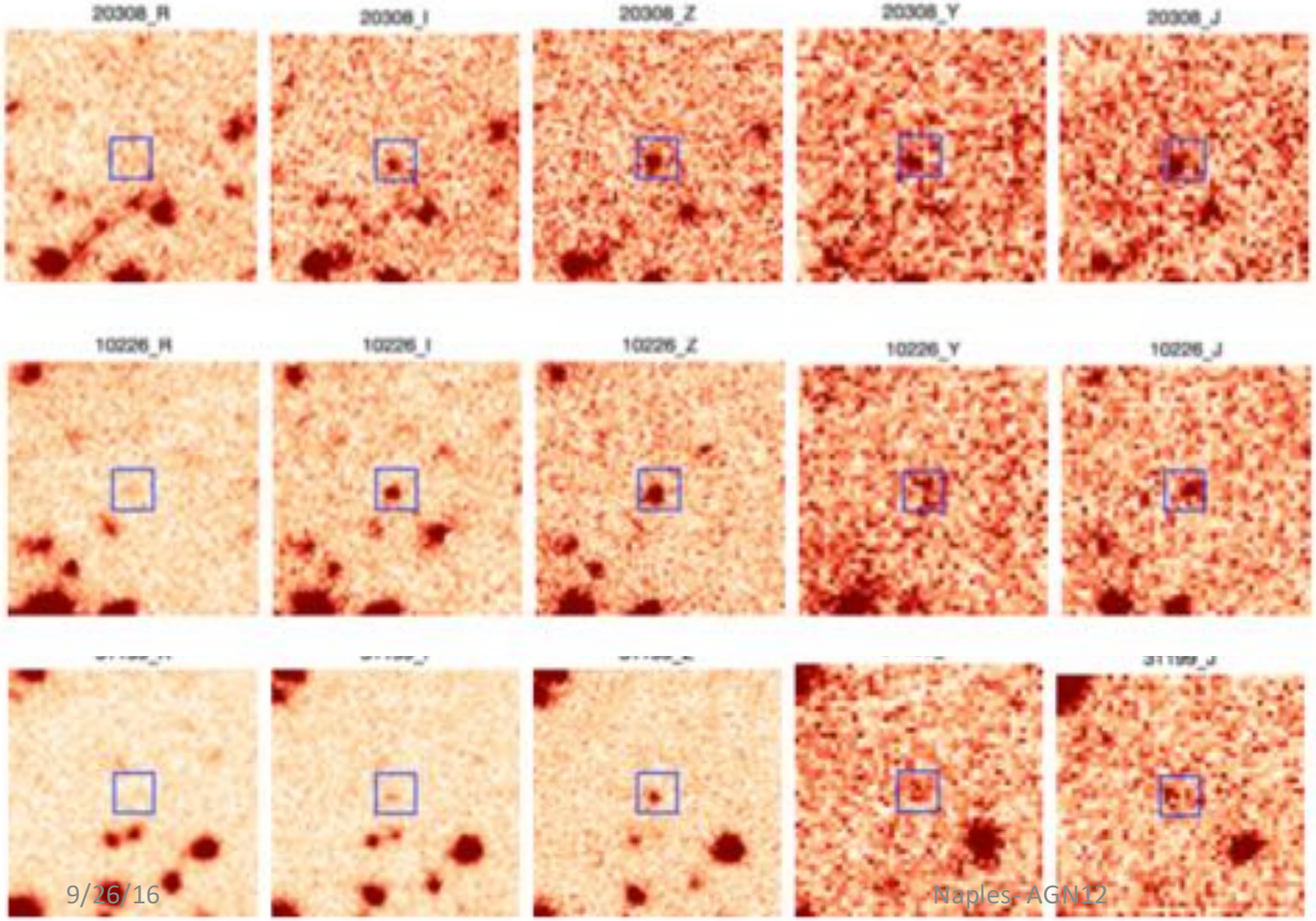
Pentericci02 - VLT/Fors2 spectrum

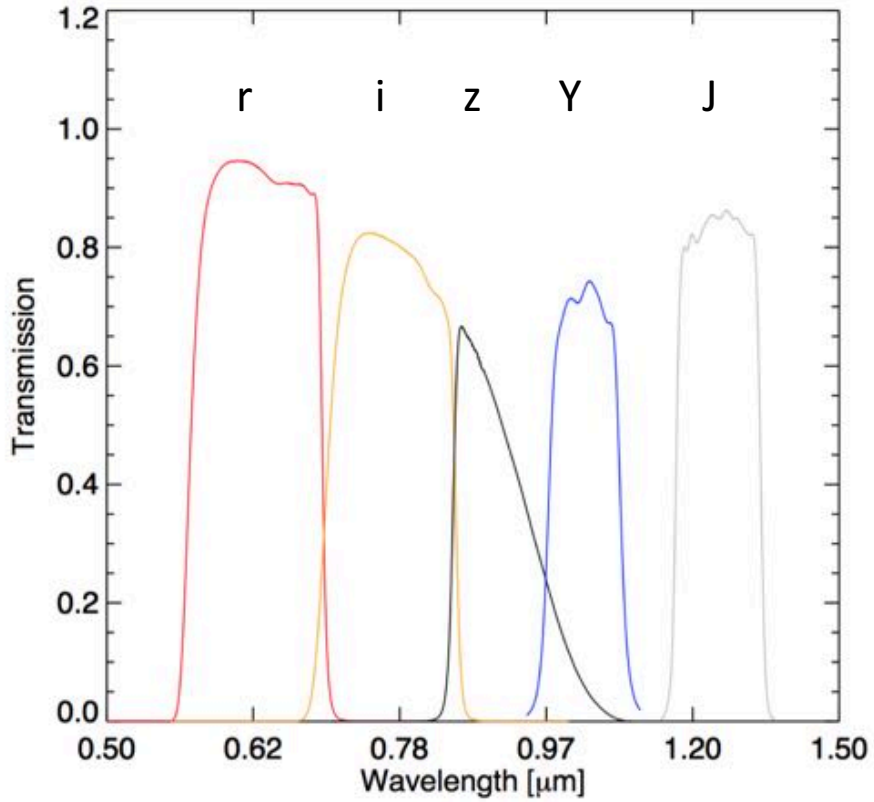






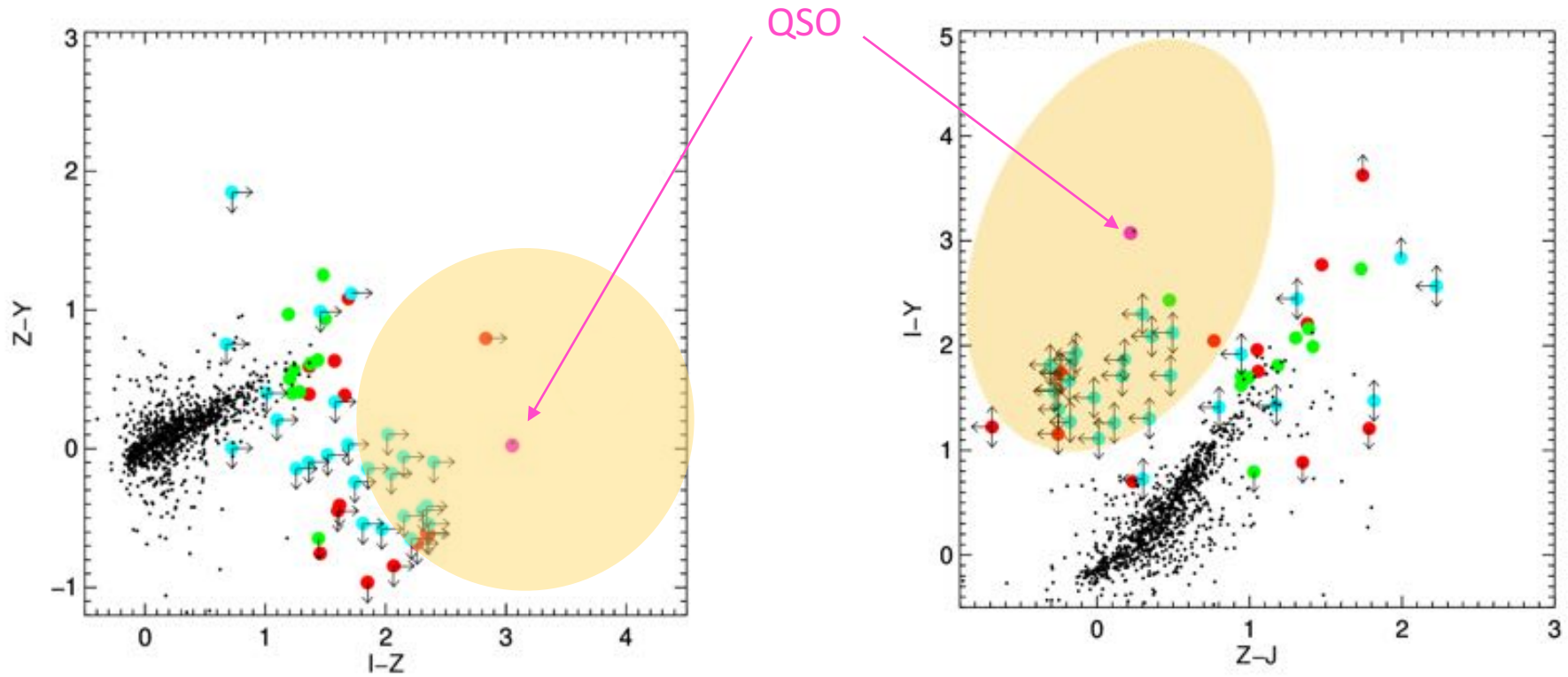
Toward a better LBGs candidates selection: Color plots & photometric redshift



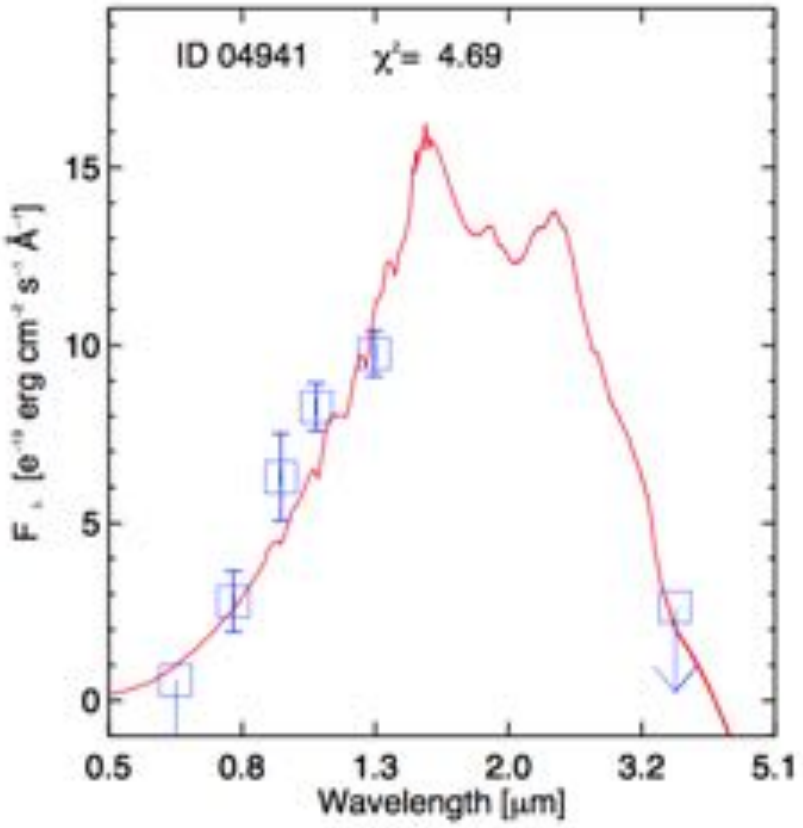


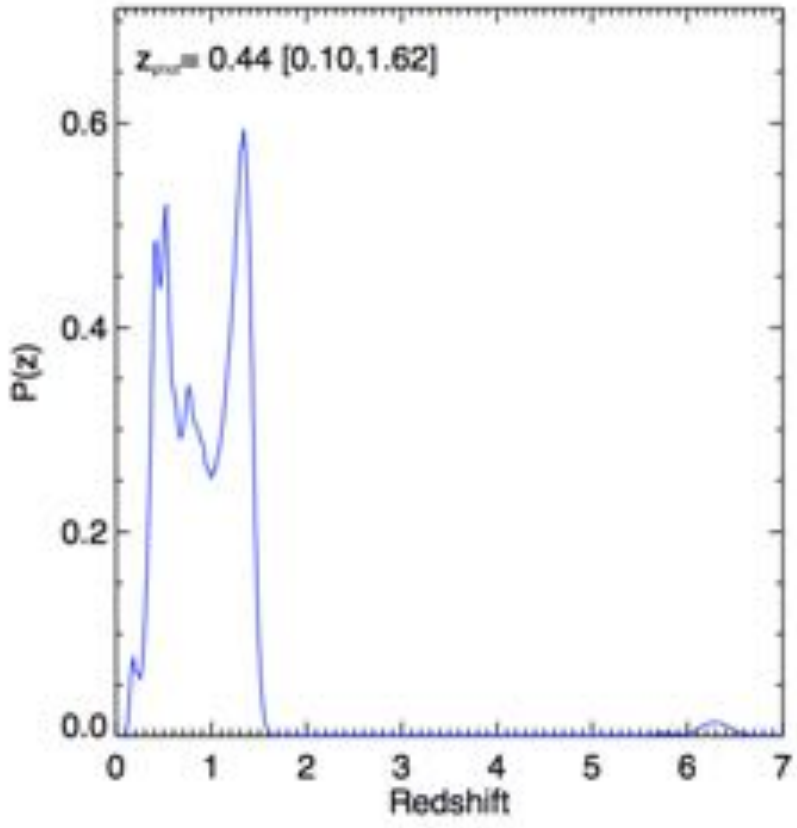
Toward a better LBGs candidates selection: Color plots & photometric redshift

We select even more FAINT candidates: (i-z)>1.3 & undetected in r & z>25.2

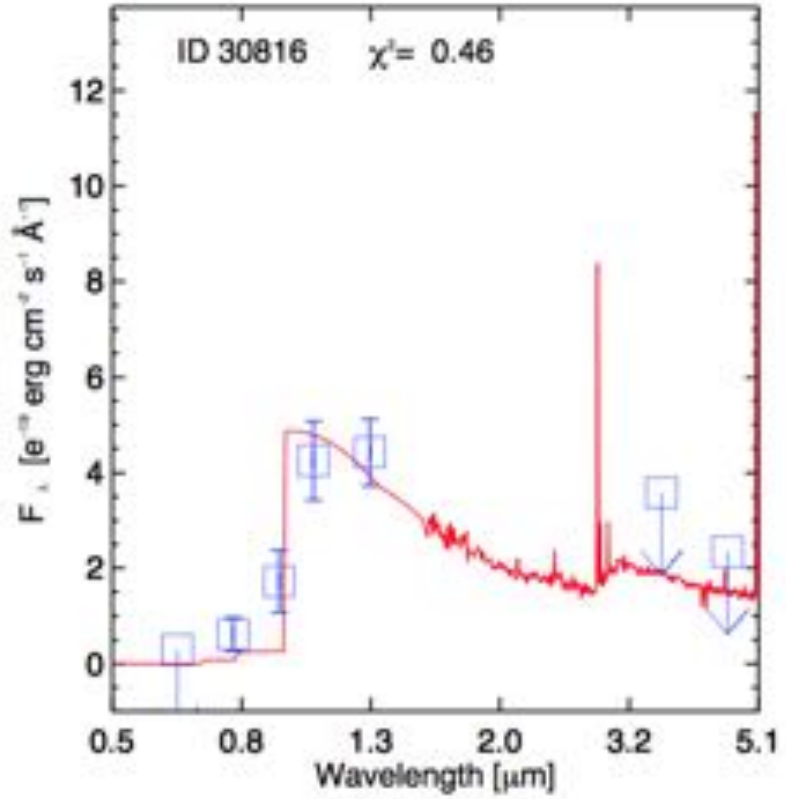


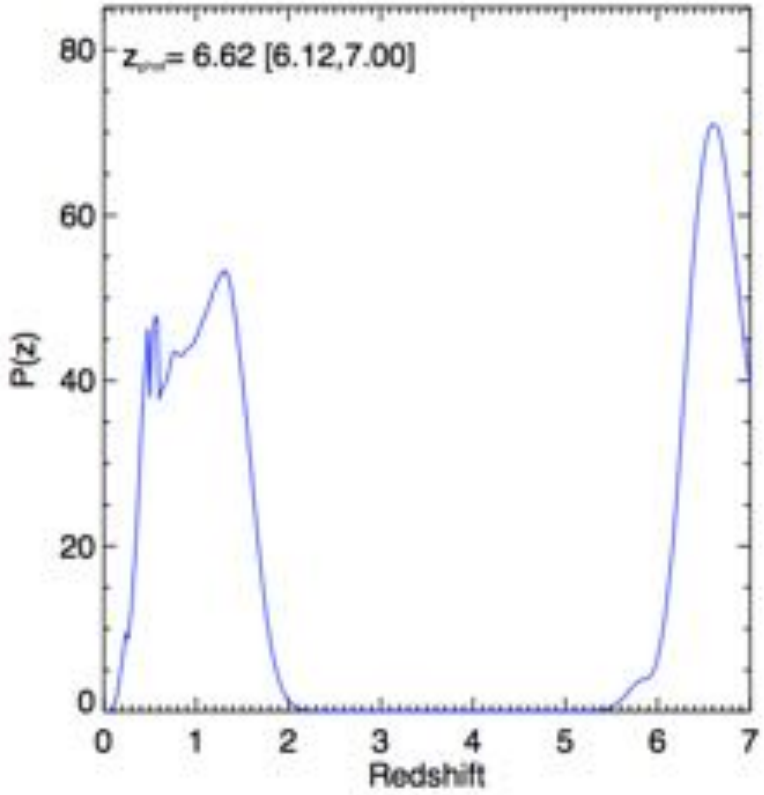
Toward a better LBGs candidates selection: Color plots & photometric redshift with Hyper



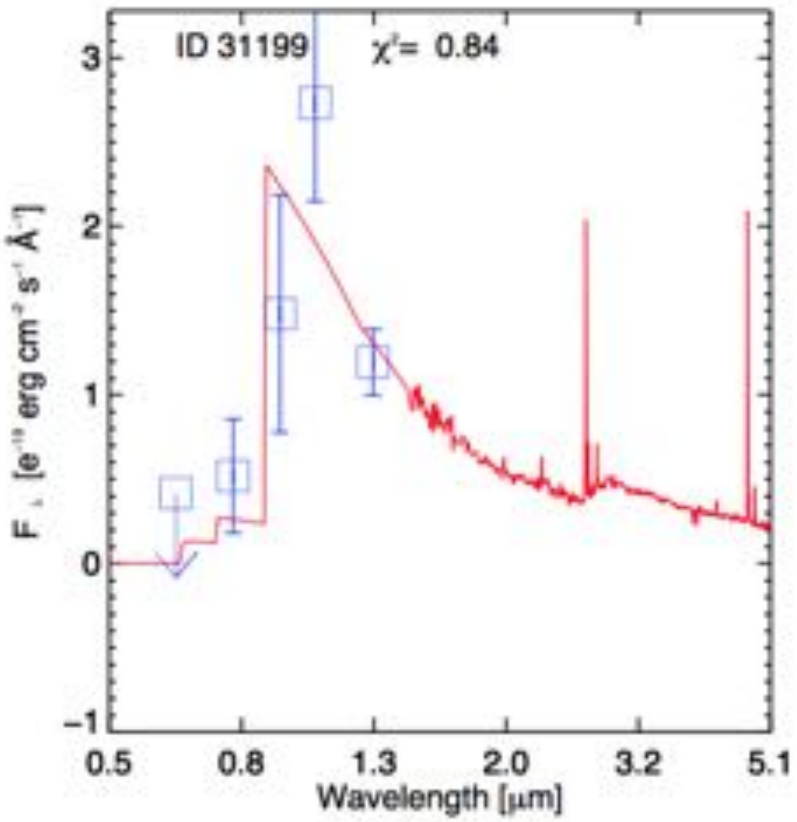


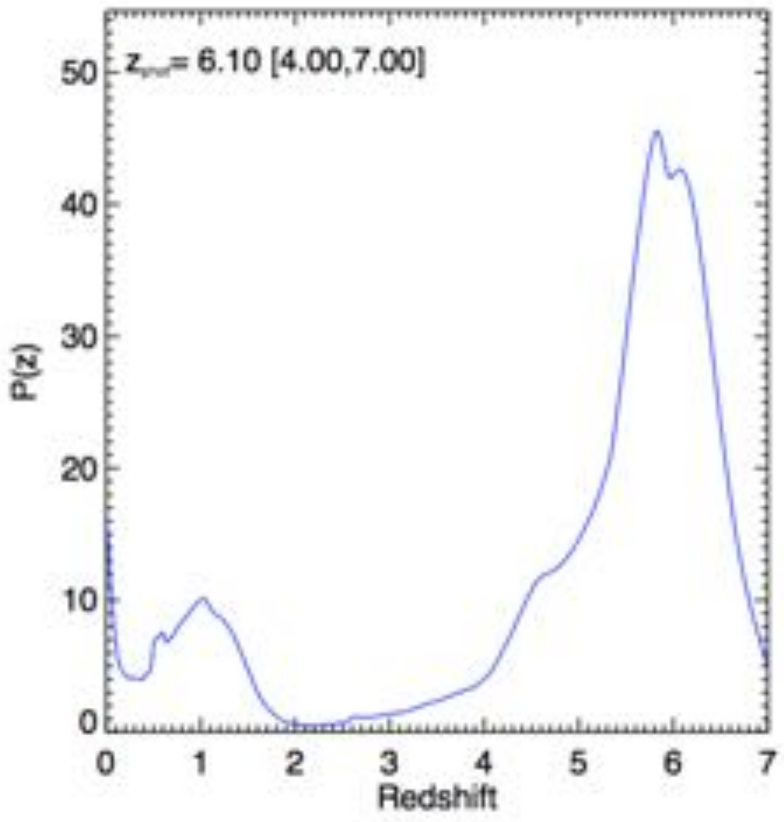
Toward a better LBGs candidates selection: Color plots & photometric redshift with Hyperz





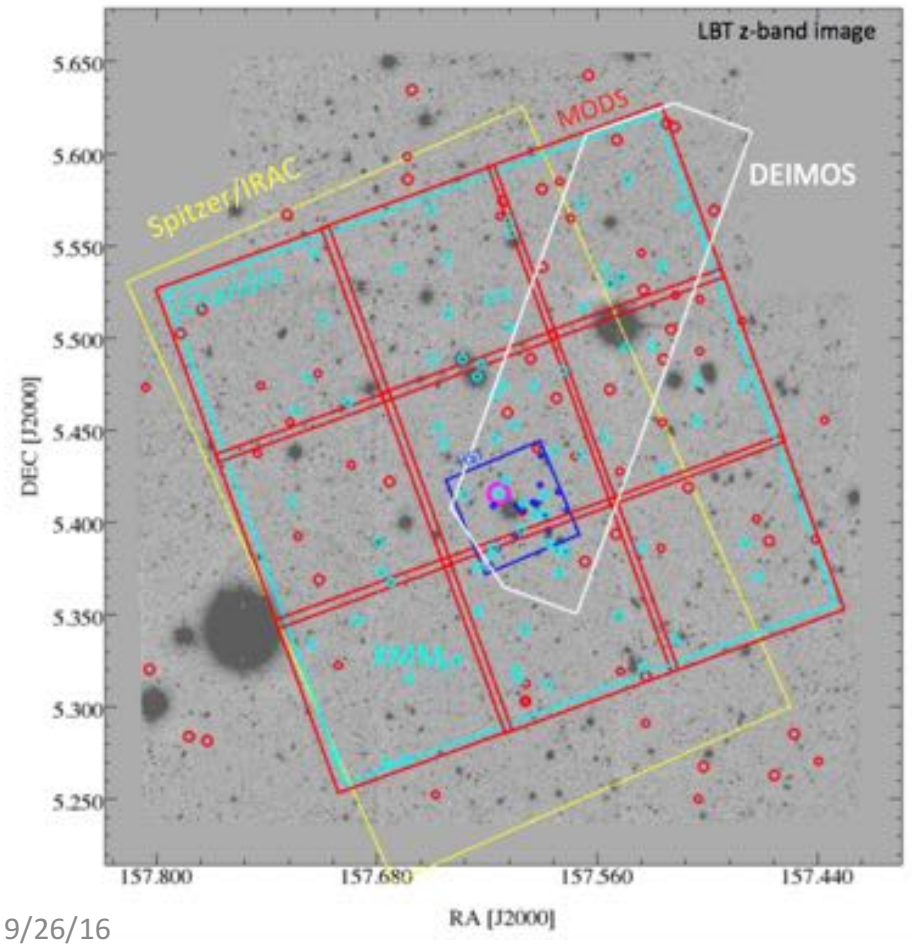
Toward a better LBGs candidates selection: Color plots & photometric redshift with Hyperz



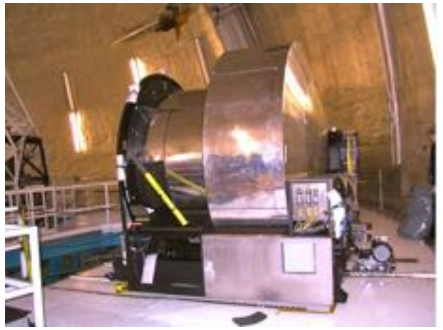


FUTURE prospect:

Keck observations of most of the LBGs candidates in early Dec. with



DEIMOS (DEep Imaging Multi-Object Spectrograph)
to find the FIRST spectroscopically confirmed galaxies in the J1030 QSO halo.



Stay tuned for new results in the next few months....

Thank you!