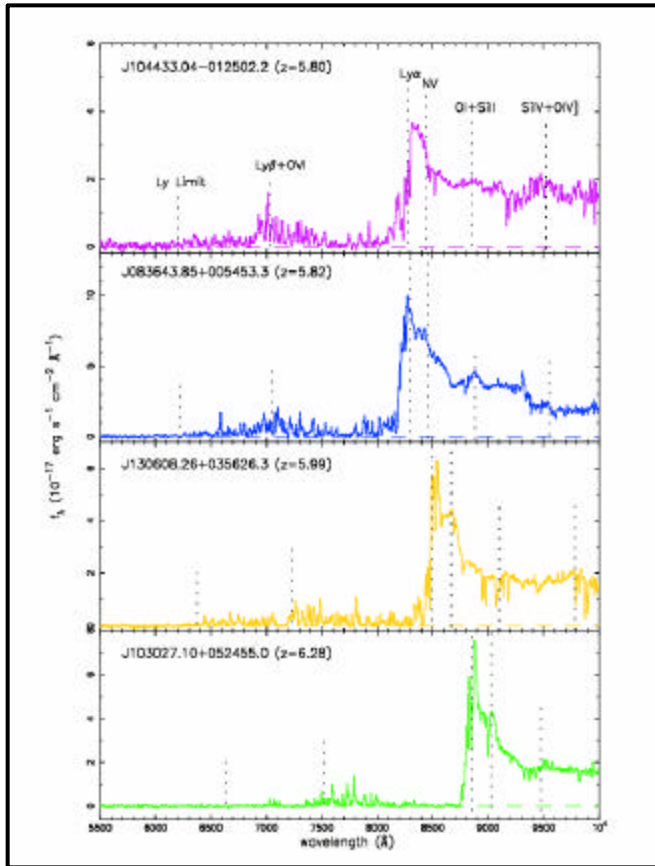
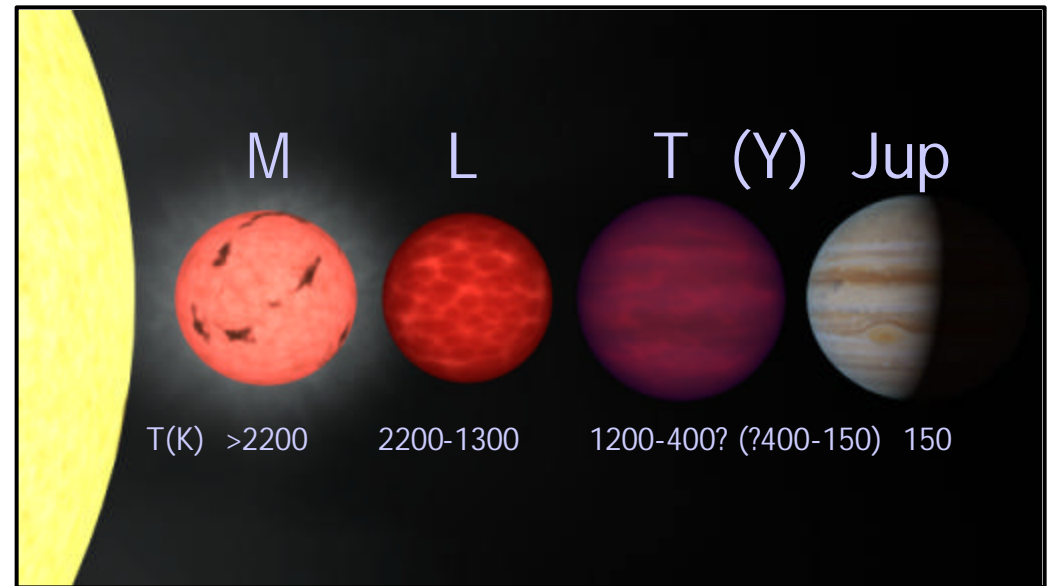


# $z > 7$ quasars, Y brown dwarfs, with UKIDSS/VISTA/LSST

Note: all mags are Vega, 5-sigma

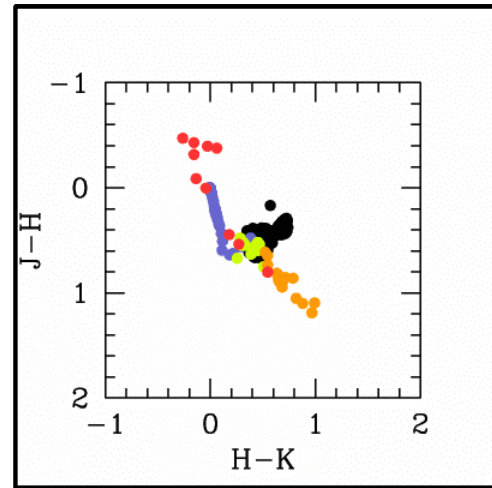


SDSS limit  $z=6.4$

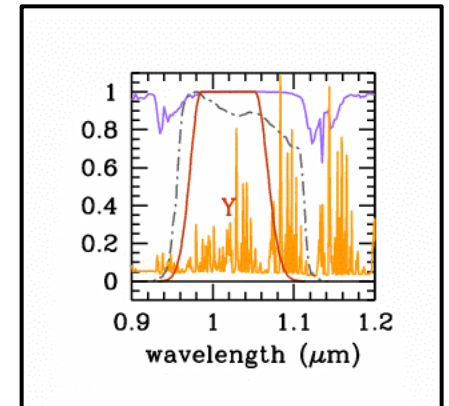
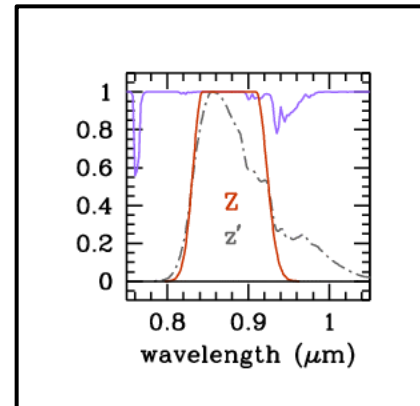
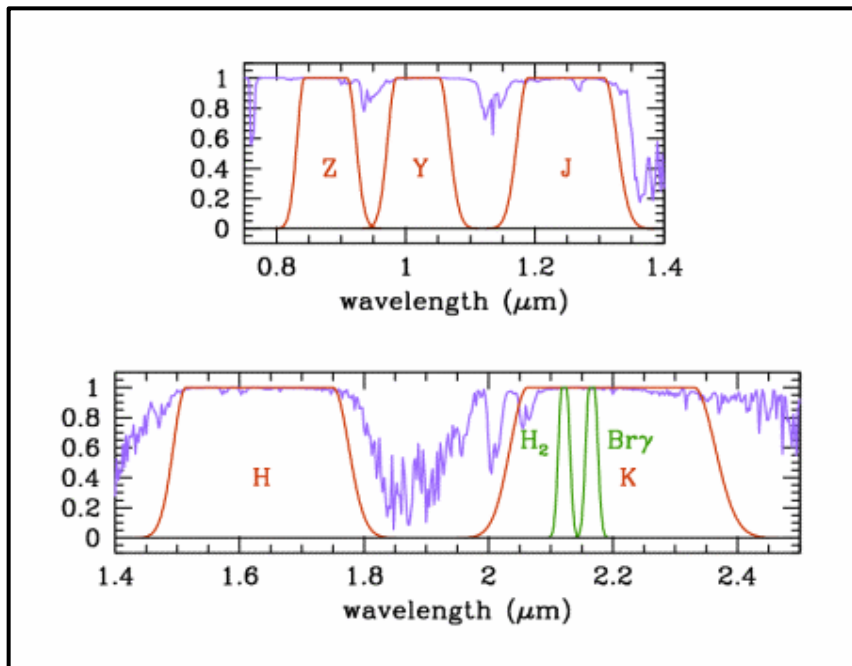


SDSS, 2MASS limit  $T=650K$

JHK colours are pretty boring

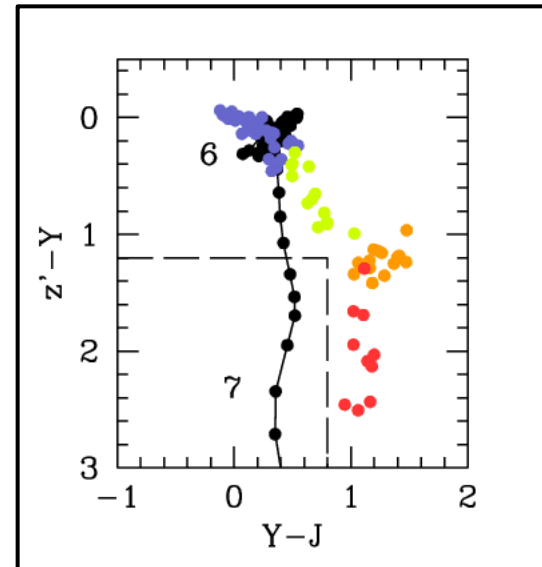
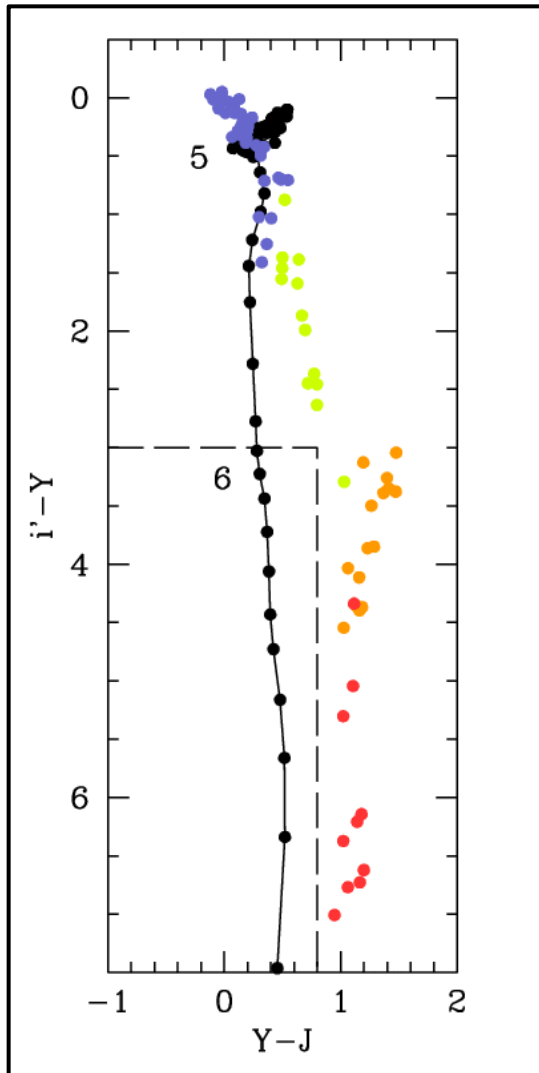


# UKIDSS $z > 6.4$ quasars



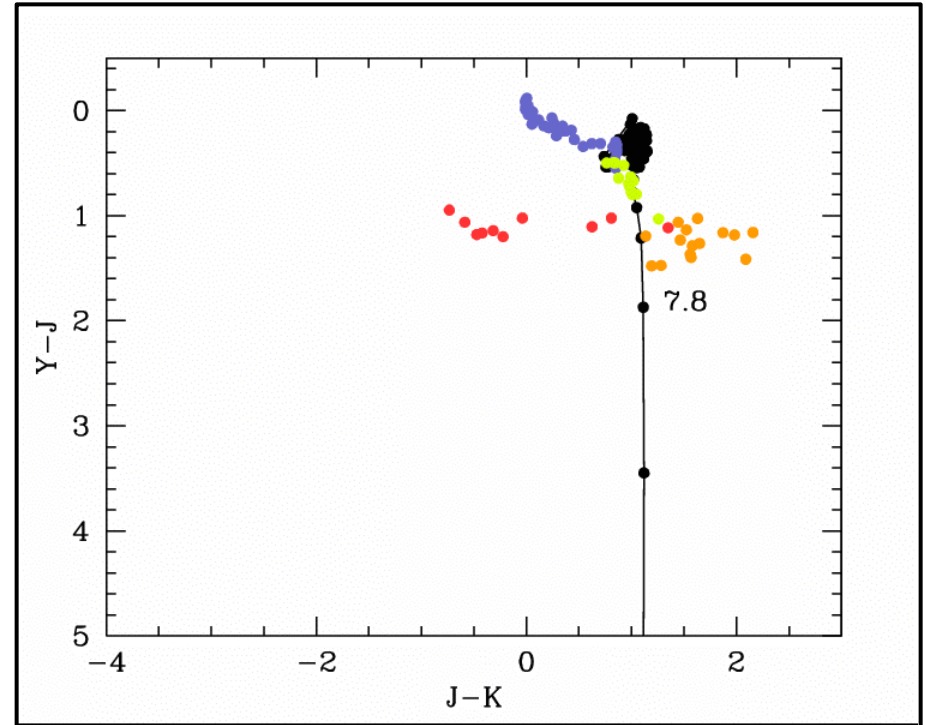
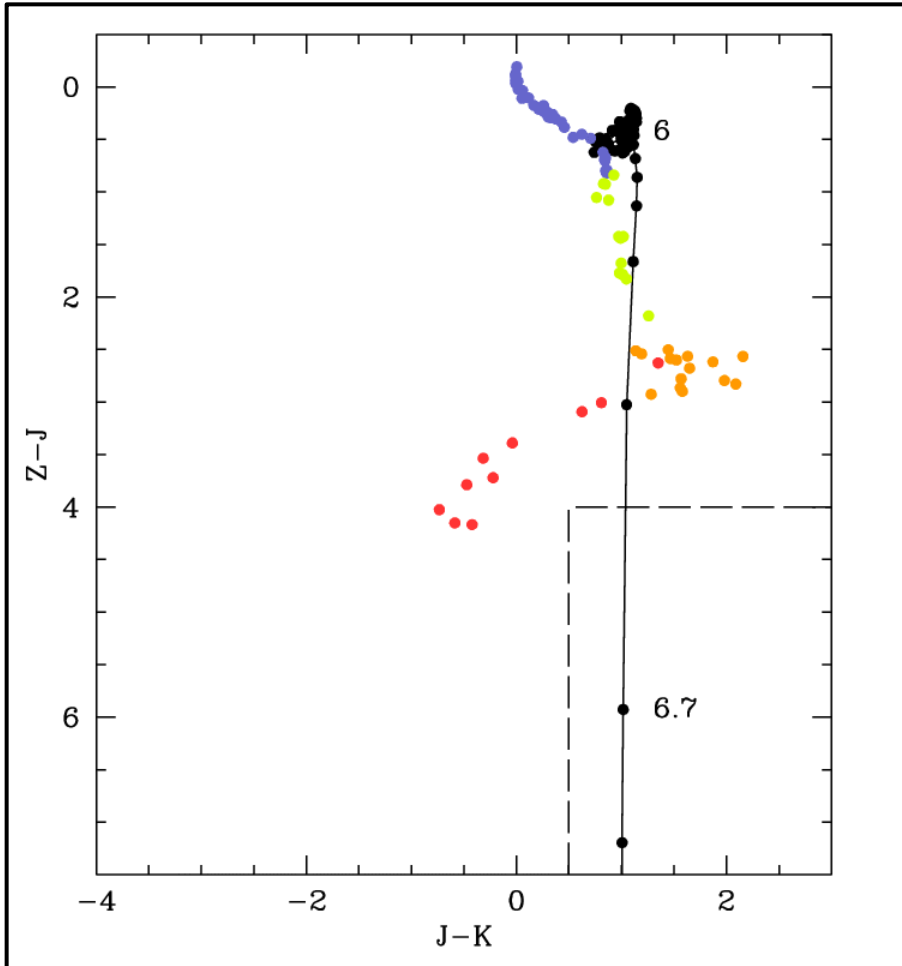
Y filter 0.97-1.07micron  
carefully designed for  
brown dwarf / quasar  
discrimination

# UKIDSS $z > 6.4$ quasars



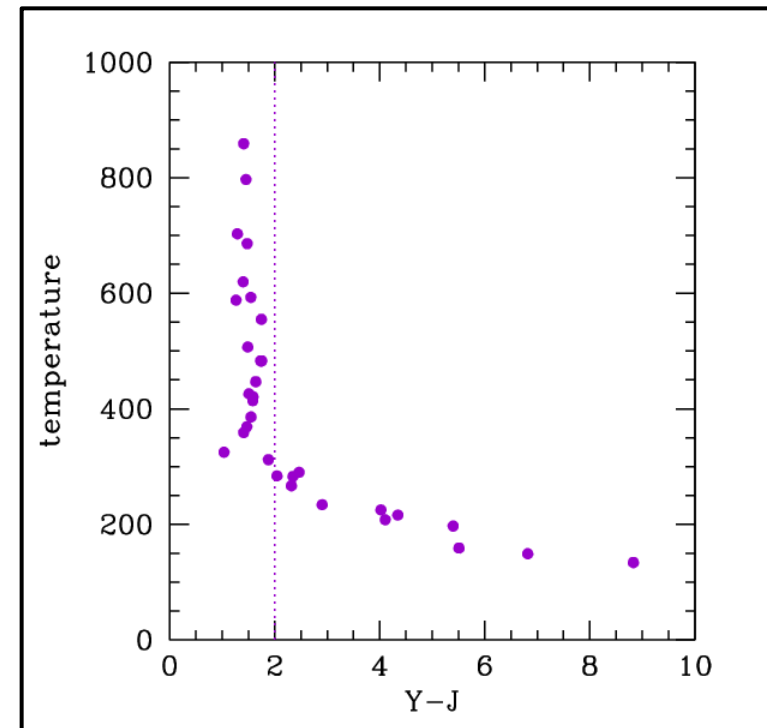
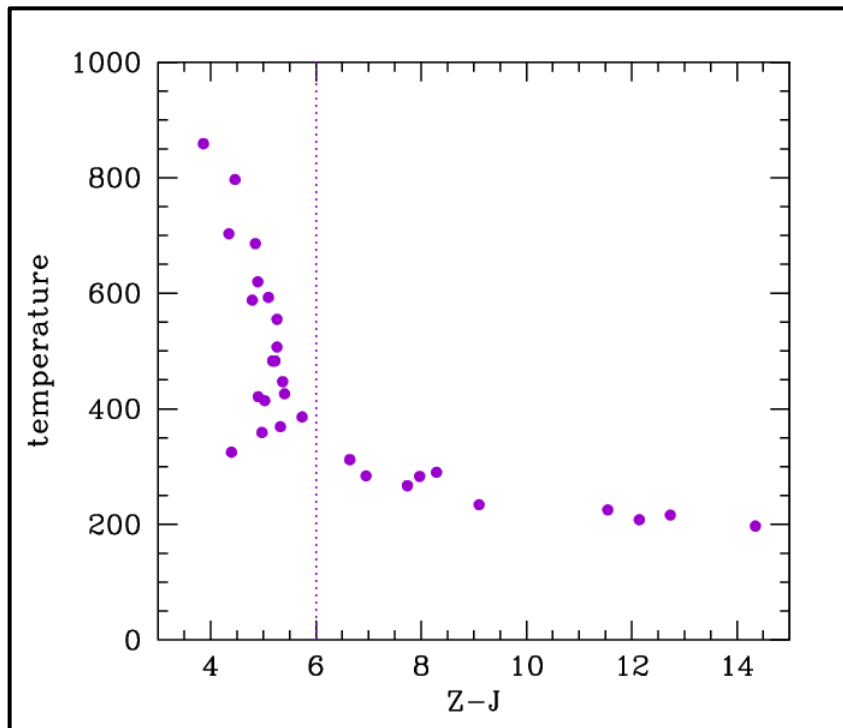
With SDSS  $i' = 22$ , UKIDSS  $Y = 19$ ,  
4000 sq degs, 3-4 quasars  $6.4 < z < 7.2$   
With VST  $i' = 23+$  UKIDSS  $Y = 20$ ,  
2000 sq degs, 7-9 quasars  $6.4 < z < 7.2$   
(SDSS  $z'$  not very useful)

# UKIDSS/VISTA/LSST $z > 7$ ?



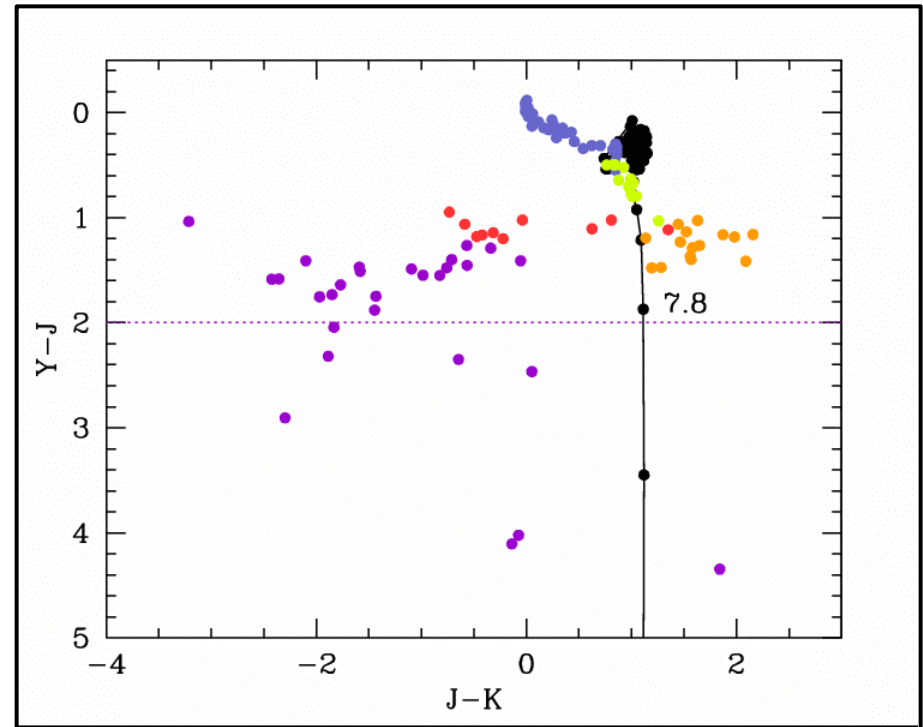
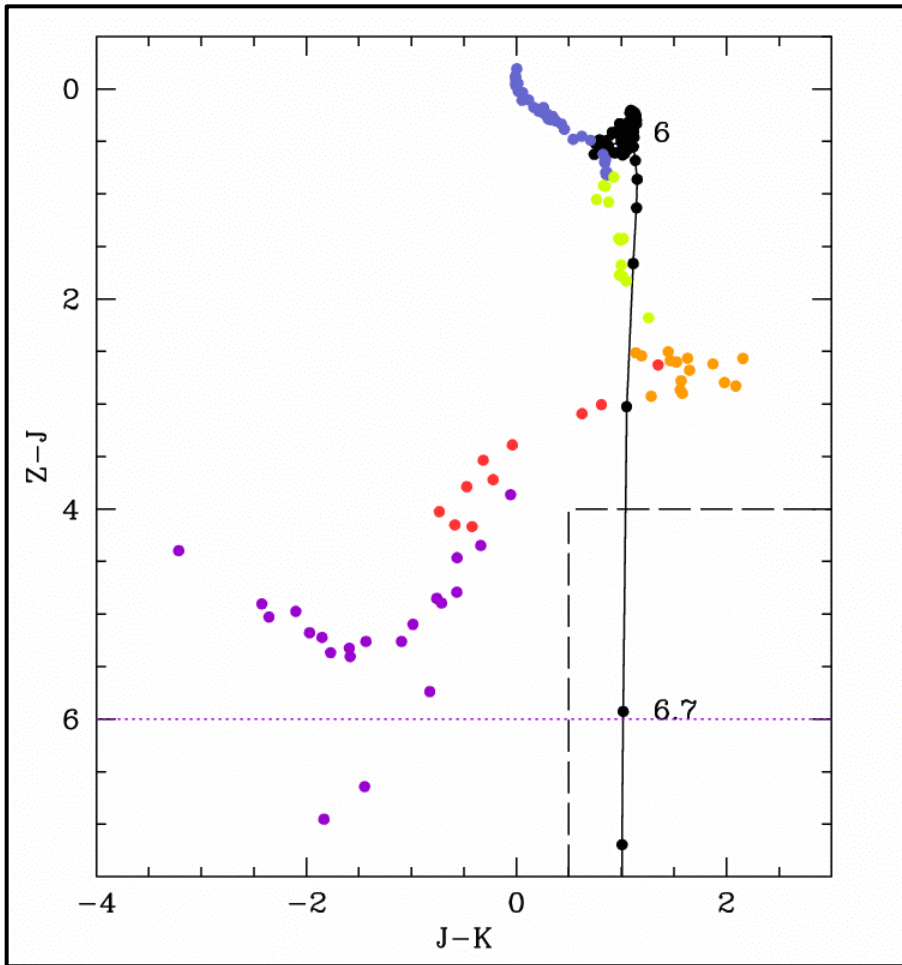
With LSST  $Z=23.5$ , UKIDSS  $J=19.5$ ,  
4000 sq. degs, 3-4 quasars  $7.2 < z < 8.0$   
With LSST  $Z=24.0$ , VISTA  $J=20.0$ ,  
4000 sq. degs, 6-10 quasars  $7.2 < z < 8.0$

# UKIDSS/VISTA/LSST Y dwarfs?



Burrowes et al., 2003, models (ApJ 596, 587)

# UKIDSS/VISTA/LSST Y dwarfs?



UKIDSS can search 4000 sq. degs  
 $J=18.5$   $Y=20.5$   $Y-J>2$   
VISTA can extend by  $\sim 0.5$  mag.  
LSST/VISTA  $J=20.5$   $Y=23$  would  
extend by further 1.5 mag.

# Summary

Preliminary calcs suggest that LSST stacked Z, Y depths would nicely match UKIDSS and VISTA high-z quasar and brown dwarf goals, and greatly extend those surveys.

## “Recommendations”

1. Separate square Z and Y filters.
2. Further study of possibilities for Z and Y science, complemented by near-ir photom.
3. Z is good, and Y is bad, for  $Z > 7$  quasars.  
Need  $\sim 4000$  sq. degs to  $Z > 24$ , to find  $\sim 10$ .
4. Y is good, and Z is bad, for Y dwarfs.  
Need  $\sim 4000$  sq. degs to  $Y > 22$ .