Obscured luminous z~2 quasars in the UKIDSS Large Area Survey

Bram Venemans (IoA, Cambridge)

Melanie Hawthorn, Richard McMahon (IoA)
P. Hirst, E. Gonzalez, A. Blain, M. Jarvis

Nature of Extremely Red Objects in UKIRT Infrared Deep Sky Survey (UKIDSS) Large Area Survey

UKIDSS Large Area Survey

	Filter	Area	t_{exp}	Mag limit 10σ,Vega
LAS	Y	~4000 deg^2	40	19.6
	J		2x40	18.9
	H		40	18.0
	K_s		40	17.4

survey overview, area, depth

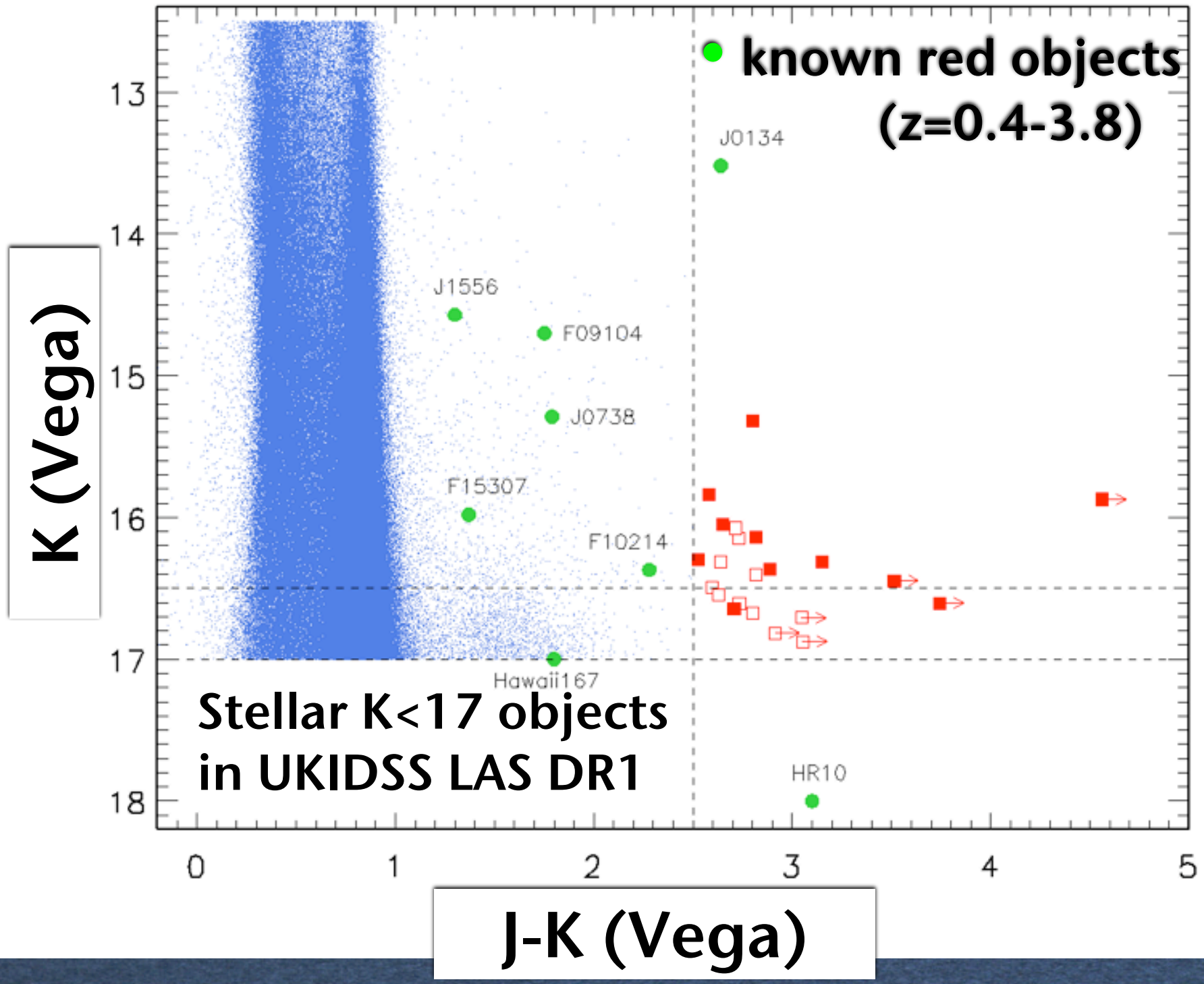
Extremely Red Objects in UKIDSS Large Area Survey

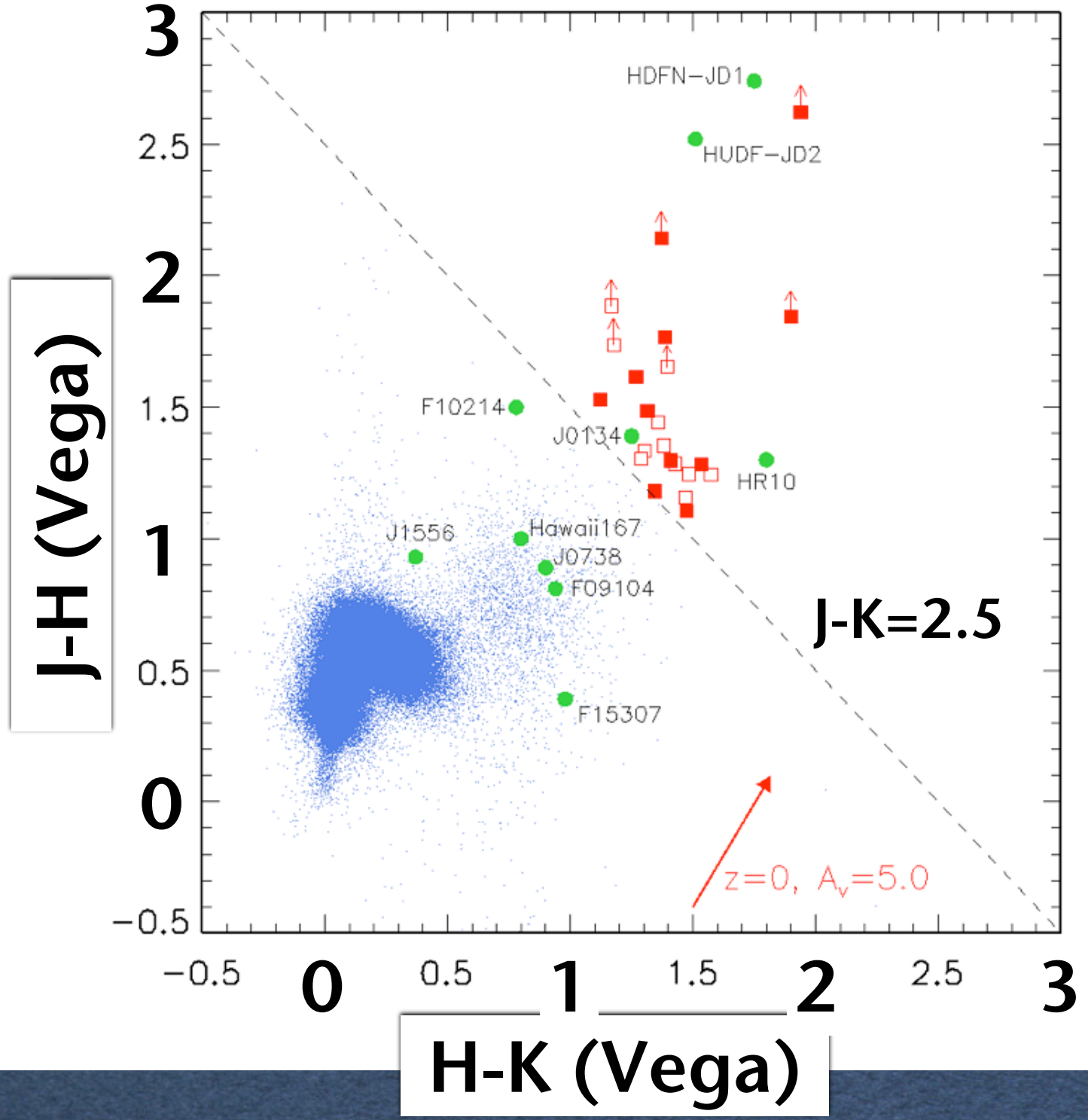
- EDR + Data Release 1 Stripe 82 (~100 square degrees)

  → K (Vega) < 17, J-K (Vega) > 2.5

  22 stellar EROs selected

- 50% undetected in SDSS (i.e. i>23 [AB])


known red objects
(z=0.4-3.8)
J0134
J1556
F09104
J0738
F15307
F10214
Hawaii167
HR10
Stellar K<17 objects
in UKIDSS LAS DR1
K (Vega)
J-K (Vega)
13
14
15
16
17
18
0
1
2
3
4
5


HDFN−JD1
HUDF−JD2
F10214
J0134
HR10
J1556
Hawaii167
J0738
F09104
F15307
J-K=2.5
z=0, A$_v$=5.0
J-H (Vega)
H-K (Vega)
3
2.5
2
1.5
1
0.5
0
−0.5
−0.5
0
0.5
1
1.5
2
2.5
3

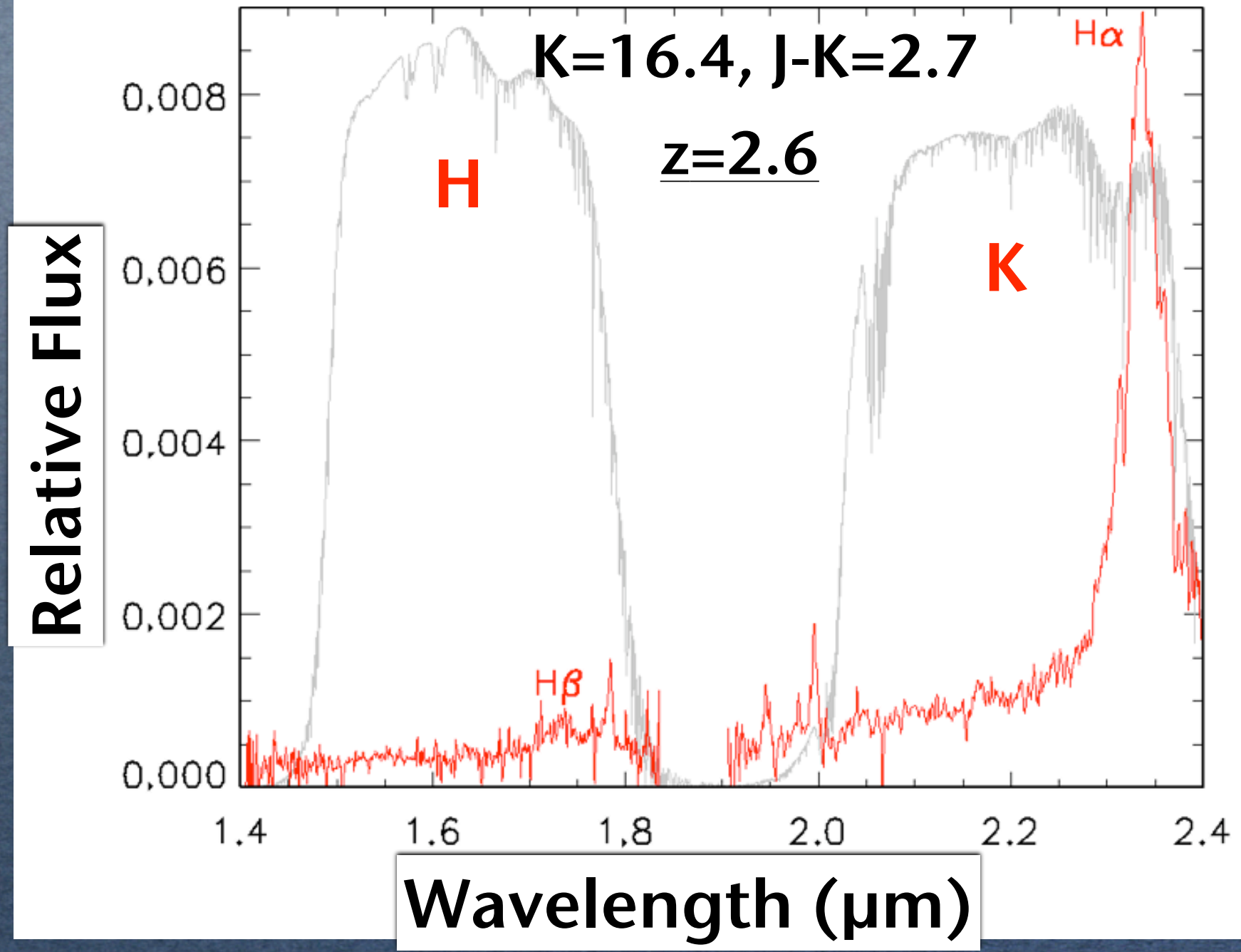
Extremely Red Objects in UKIRT Infrared Deep Sky Survey

What is the nature of these EROs?

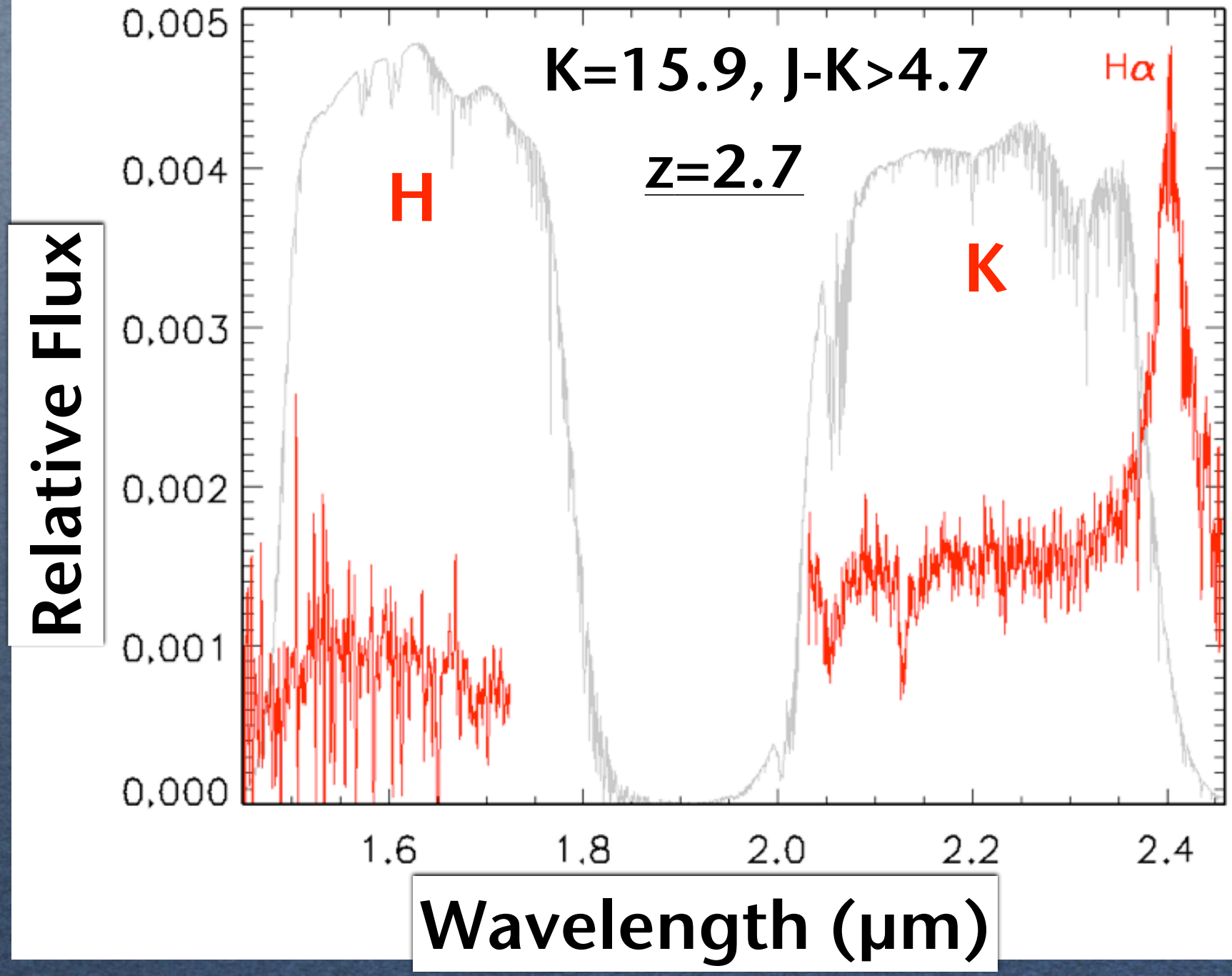
- Obscured AGN (if so, which redshift?)
- High redshift elliptical galaxies
- Carbon stars
- Gravitationally lensed objects

- Some as red as potential massive z~6 galaxy in Hubble UDF
- 4 detected in VLA FIRST → AGN?

ULAS J0141+0101(radio source)



ULAS J1539+0557



Obscured AGN at z~2-3

For 11/22 EROs have infrared spectra

- 7 show broad Hα emission at $2.2 < z < 2.7$

→ **highly obscured, dust-reddened AGN**

- Other 4 show no obvious emission lines

Another 9 EROs found in UKIDSS DR2

- 6 more spectra, still to be analyzed

Work in progress

- Optical imaging of EROs underway
  → SED fitting, luminosity, extinction
- Optical spectroscopy done on subset (to look for Lyα emission)
- Space densities, compare with optically selected type I AGN
- …