Synergy with Mid-Infrared Surveys

Search for Reddened AGNs with AKARI and WISE

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Contents

- MIR search for AGNs
- Search for reddened AGNs using AKARI MIR survey
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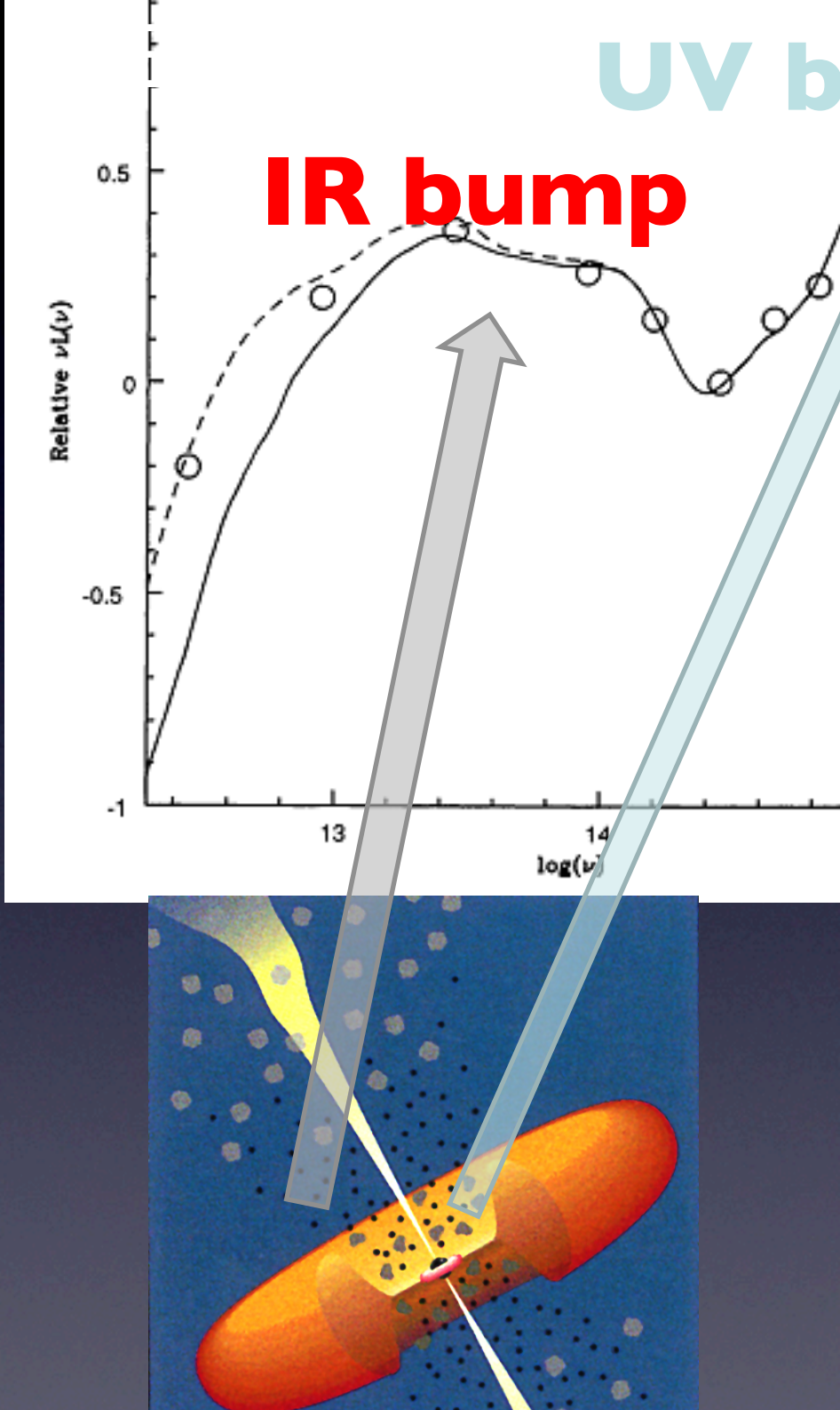
reddened AGNs

- Optical survey missed several AGNs.
  - How many are they?
- low-z reddened quasars in major mergers.
  - They may be transforming objects (Starburst→type 1AGN).
- high fraction of FeLoBALs in reddened quasars (30% in F2MS vs. 0.3% in SDSS quasars).
- Maybe dominant in the most luminous

Using MIR bands, we can detect
hermal emission from dusty torus
f AGNs and discriminate them
rom stars.

MIR is robust against extinction.→
xpect to discover reddened
uasar missed by optical survey.



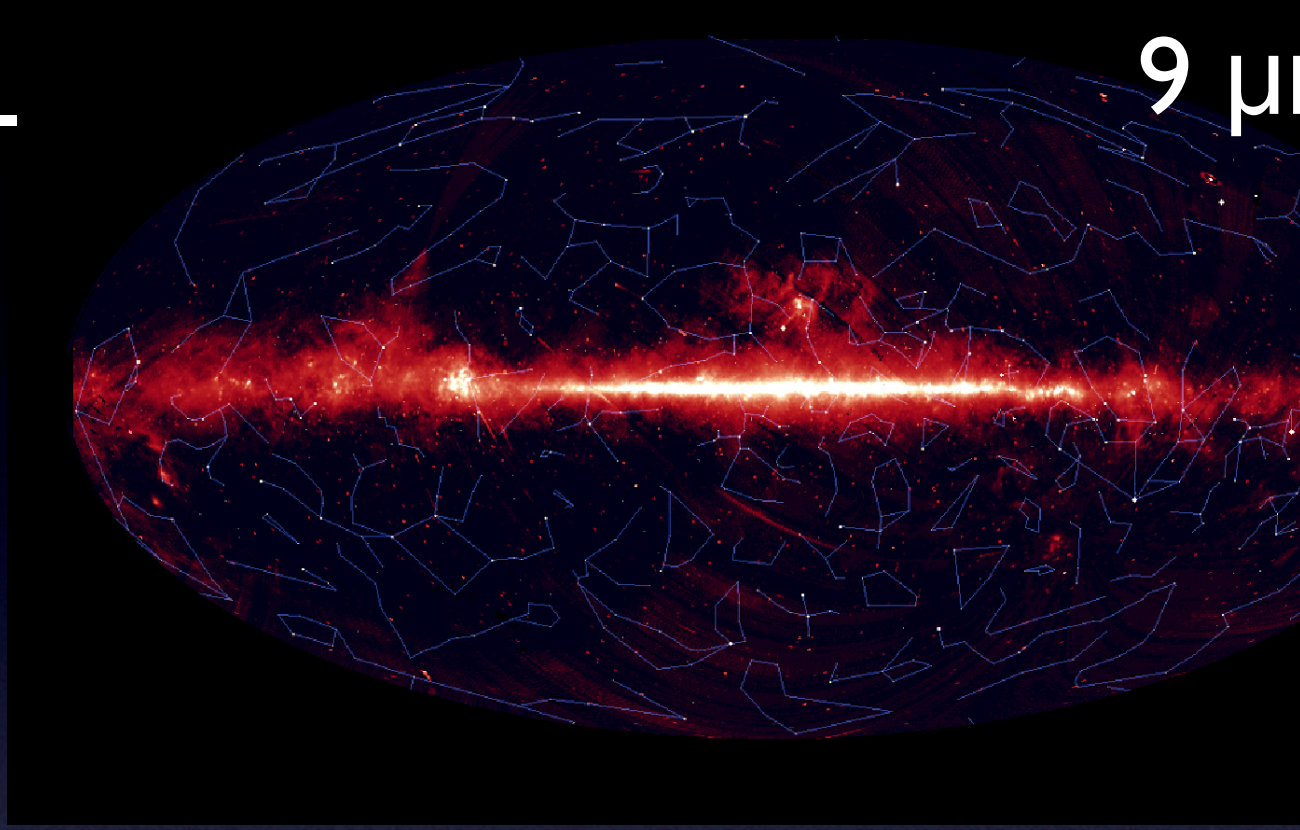
EARCH FOR REDDENED AG
USING AKARI MIR SURVEY

KARI mid-infrared all-
ky survey catalog

9 & 18 μm

|b|<30, LMC, and SMC regions are excluded.

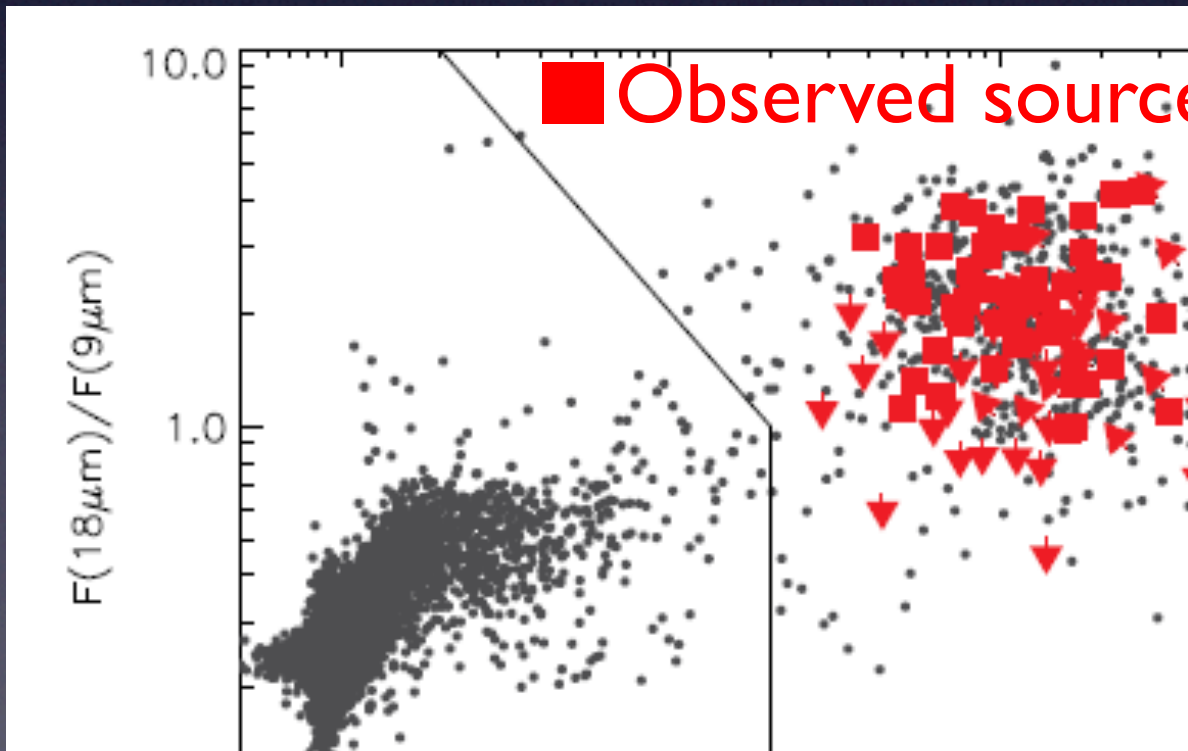
Identified with 2MASS



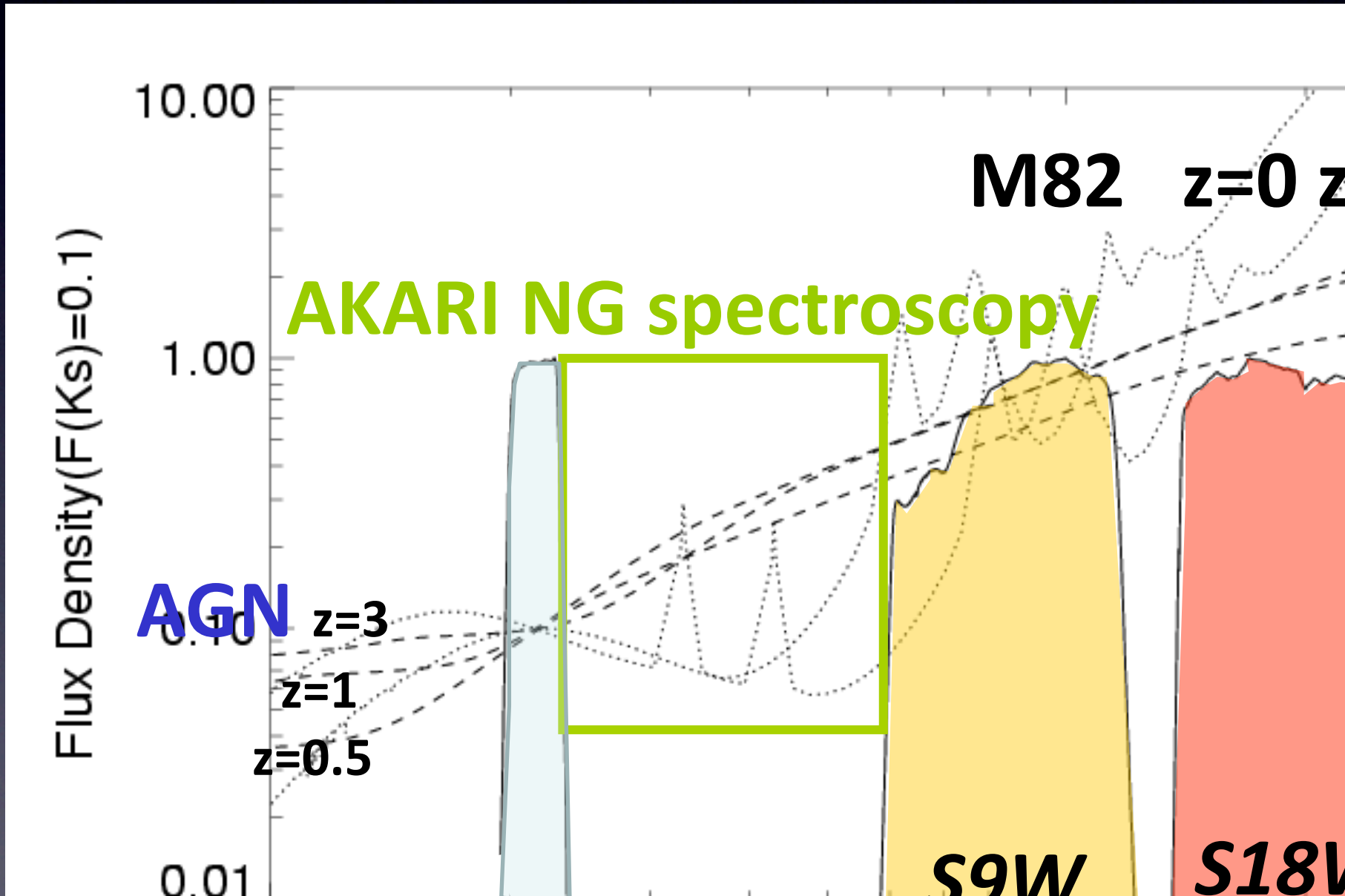
Criteria of MIR excess

$$\frac{F(9\mu\mathrm{m\ or\ }18\mu\mathrm{m})}{F(Ks)} > 2$$

1500 candidates



- We suffer from the contamination of PAH strong galaxies like M82.



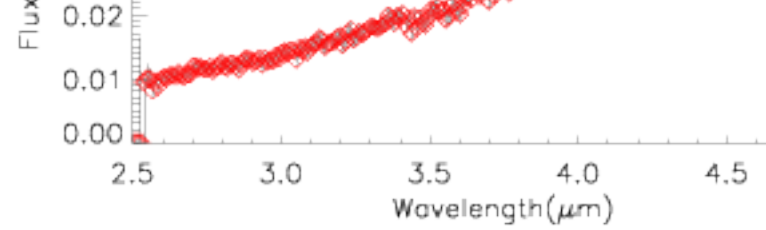
Results

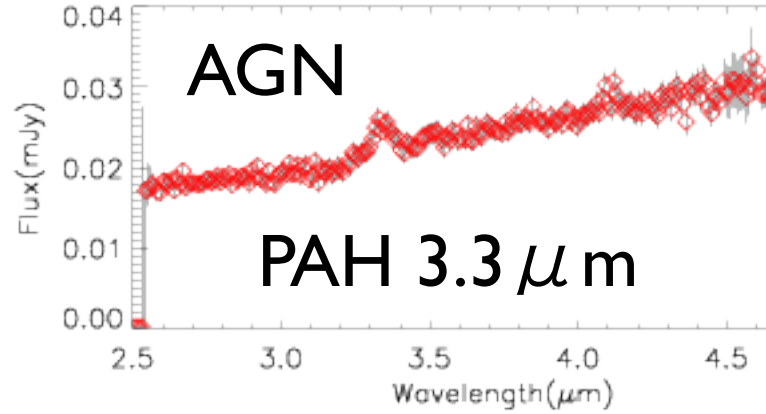
2 spectra are taken.

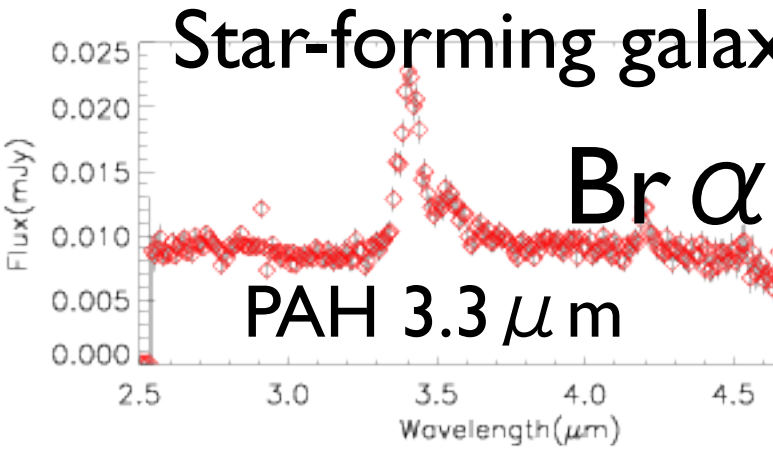
- 46 AGNs (15 AGNs have a PAH emission in 3.3 μm)
- 33 star-forming galaxy
- 13 red stars

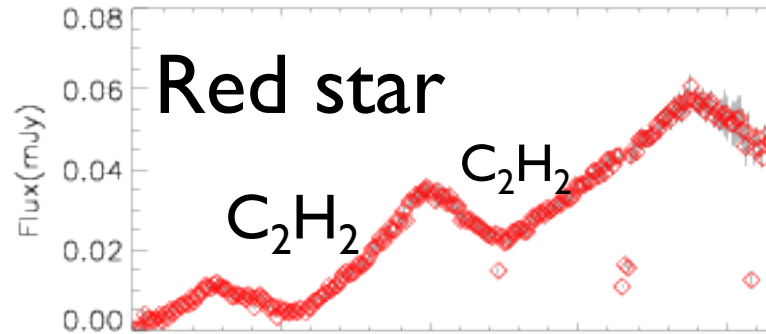
Ve also performed optical
pectroscopy from the ground.

- Lick 3m, KPNO 2m, SAAO 2m



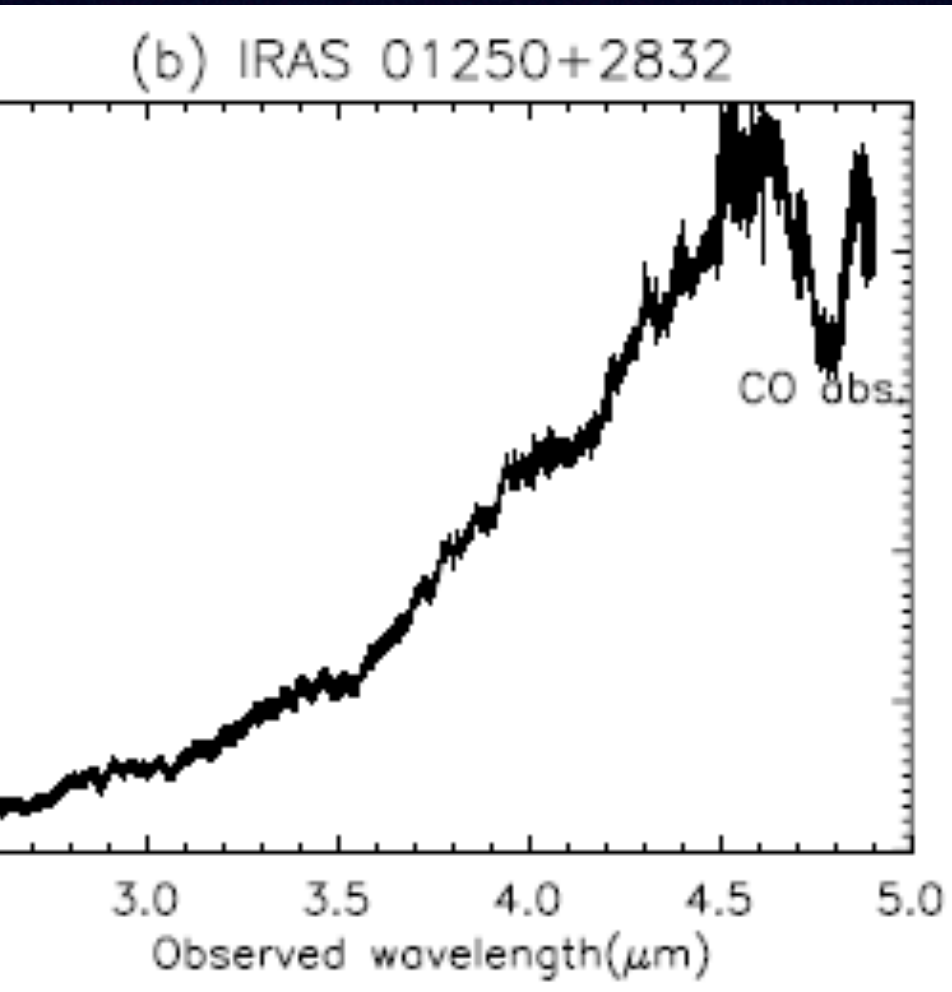


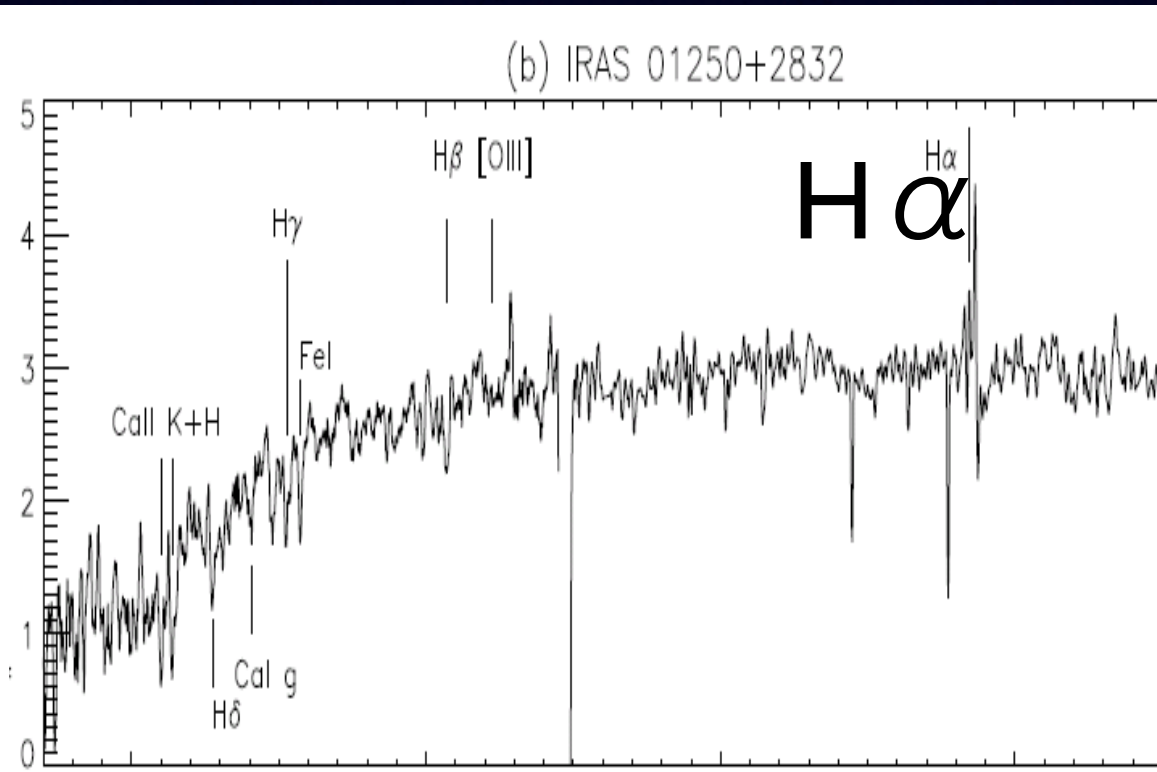




Redden AGN example

RAS 01250+2832 at z=0.04

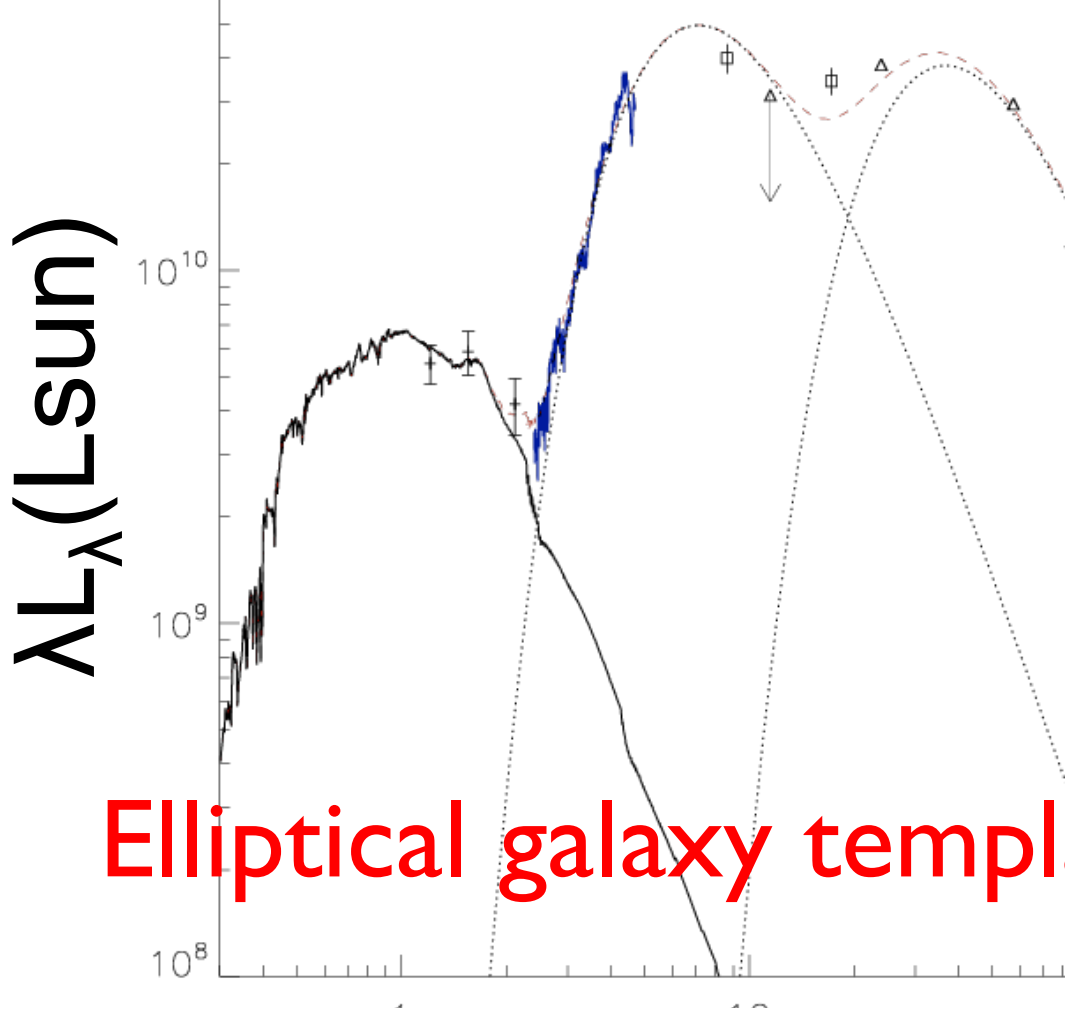




4000 6000

SED of IRAS 01250+2832

or this galaxy, 500K black body is
necessary.



Subaru IRCS/AO188 images

DA 84274

- Dn(4000)=1.1
- Galaxy mass: 6x10^9 M_sun

AS 01250+2832

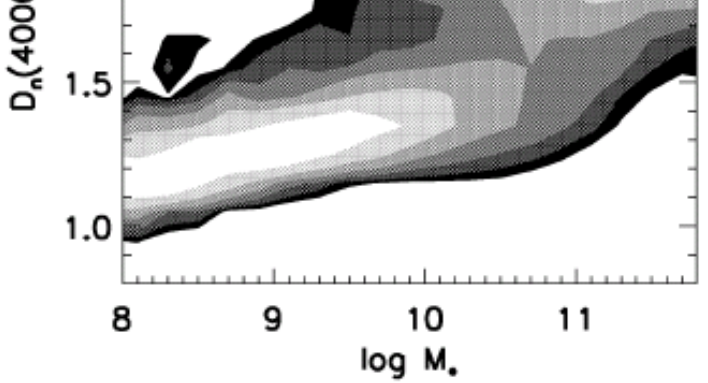
- Dn(4000)=1.6
- Gala

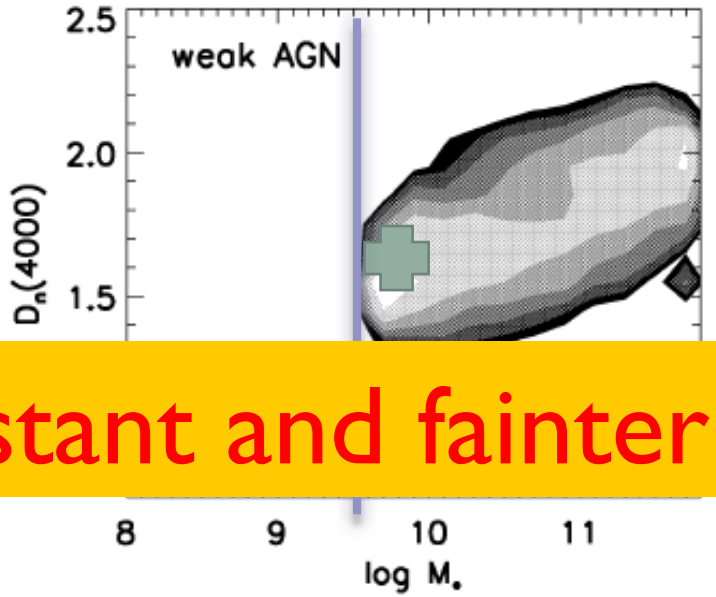
AGN 1920074

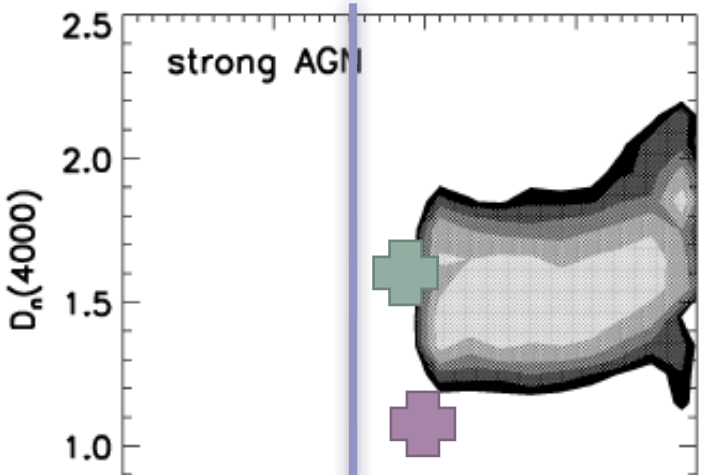
Galaxy mass: 3x10^9 M_sun

Next targets are more distant and fainter

ney harbor in less massive

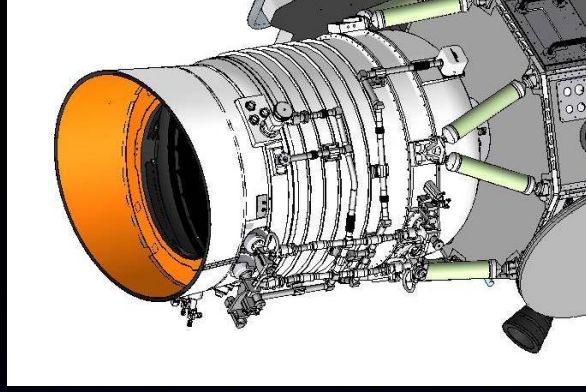






SUBARU FOLLOW-UP OBSERVATIONS OF WISE SOURCES

WISE



40cm telescope

All sky survey at 3.4, 4.6, 12, and 22 μm

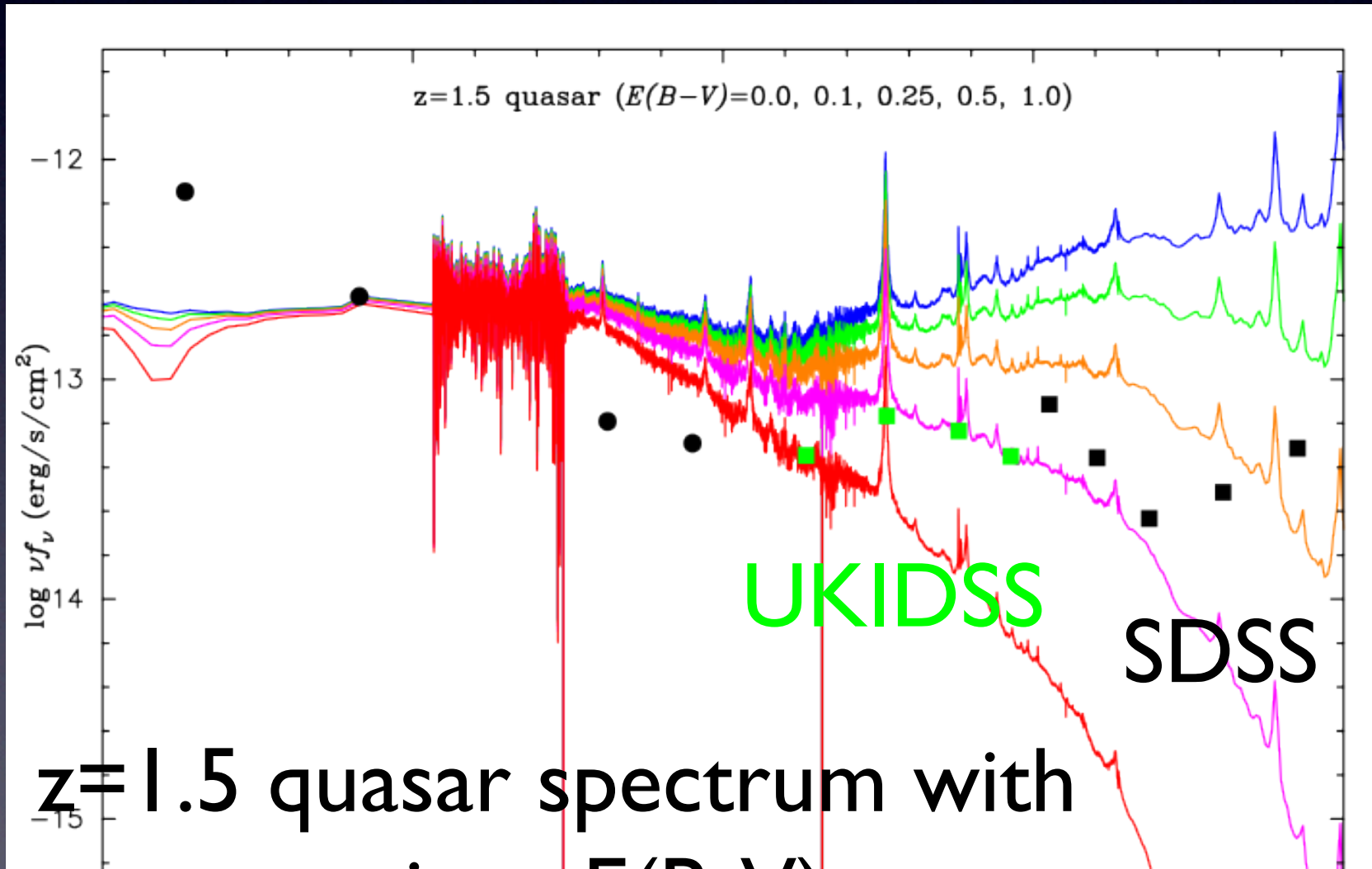
Detection limits are 0.08, 0.11, 1, and 6 mJy at 3.4, 4.6, 12, and 22 μm, respectively.

- For AKARI, 50 mJy at 9 μm

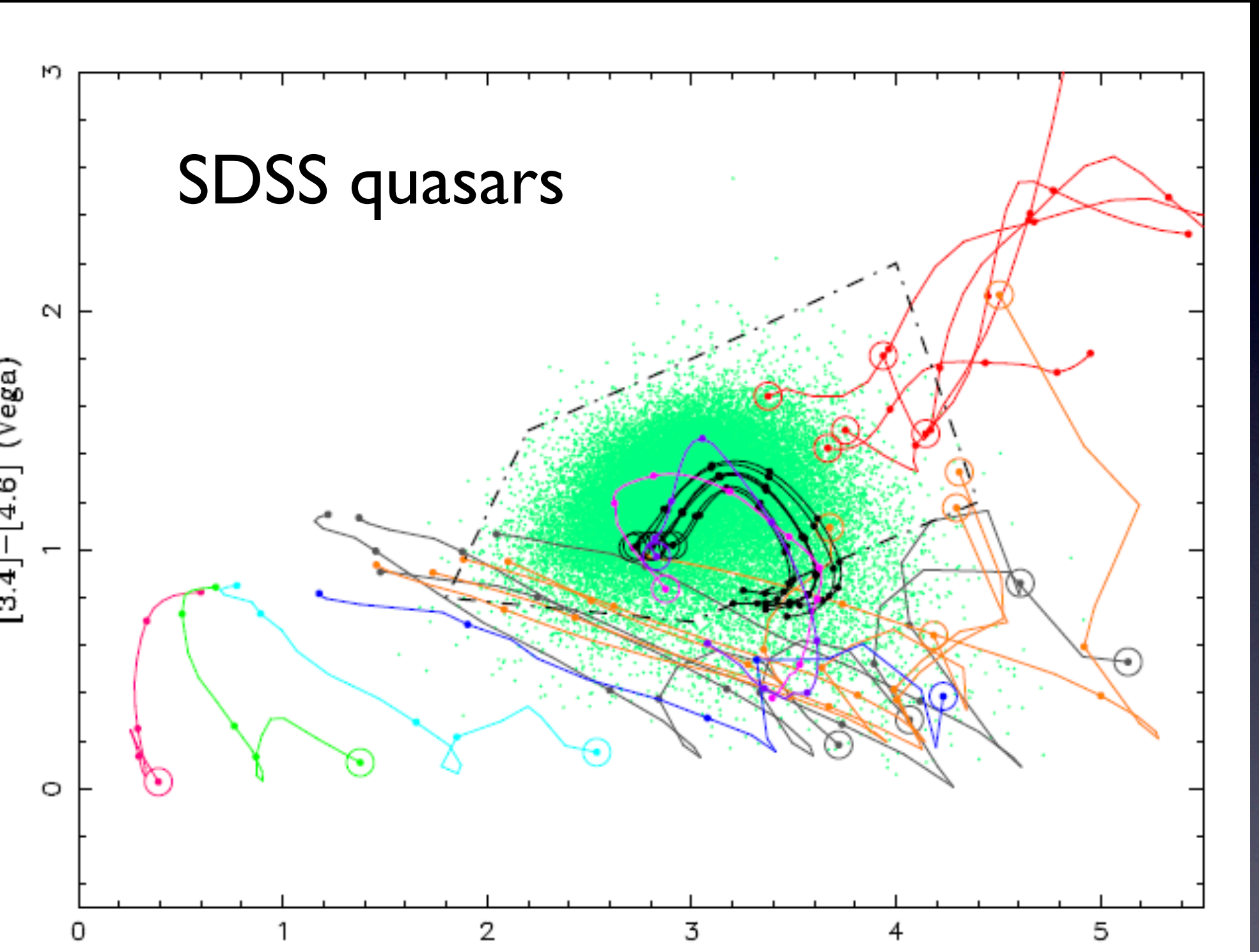
World of WISE data

- large area (whole sky).
- deep as large surveys in other wavelengths.

$L_{3000Å}$=45.2

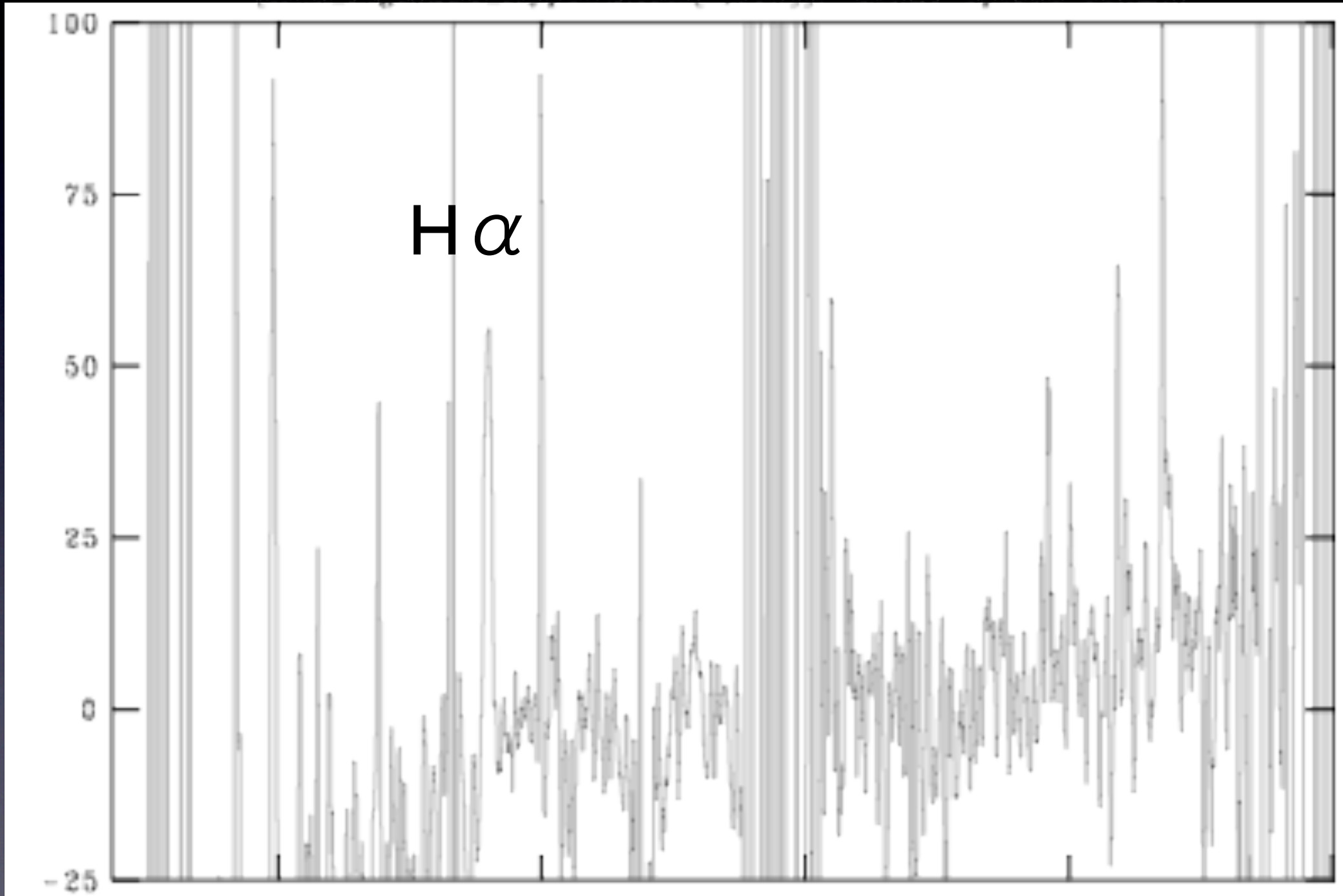


z=1.5 quasar spectrum with


SDSS quasars
[3.4]−[4.6] (Vega)
0
1
2
3
4
5

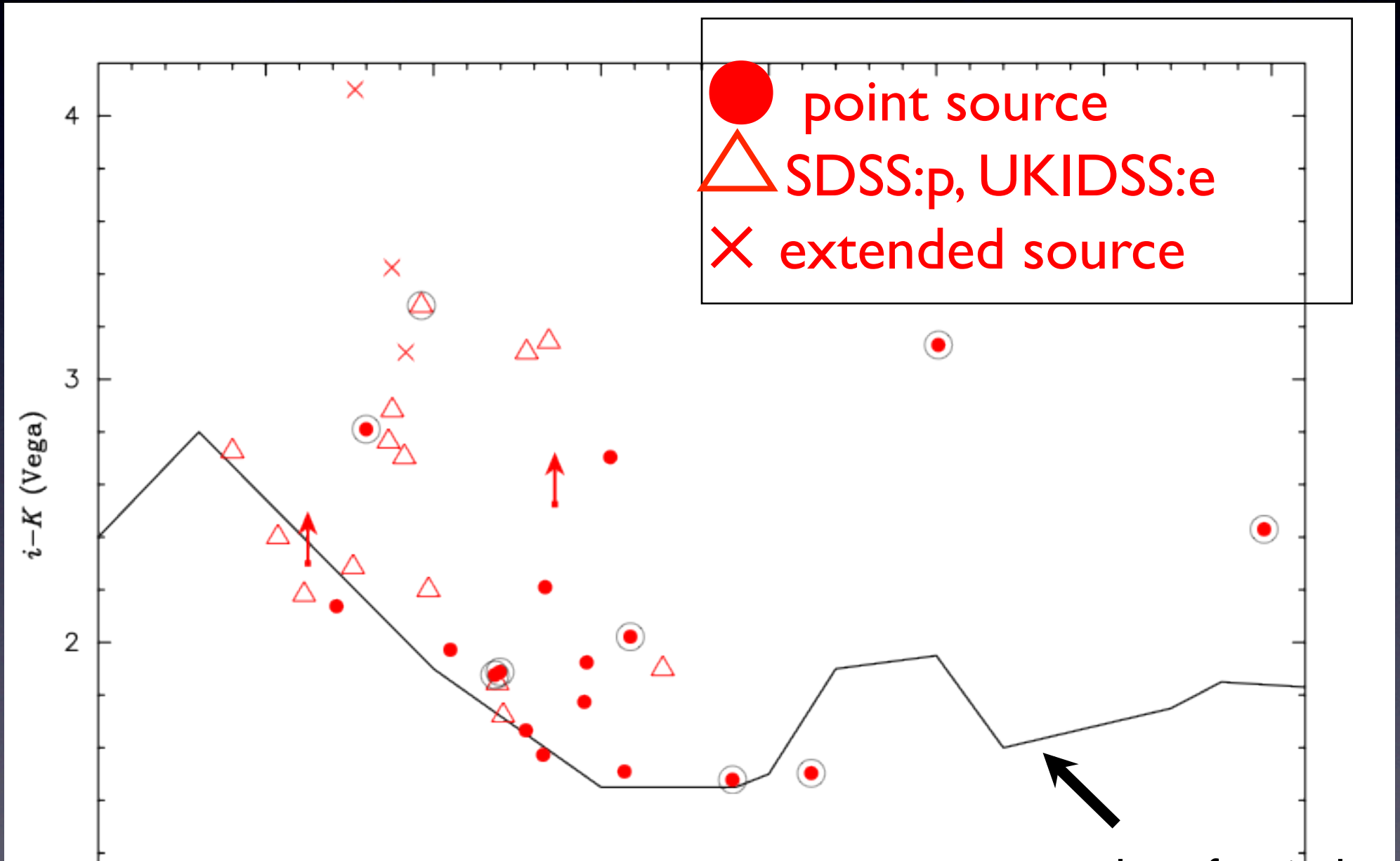
$(i\text{-}K)_{Vega}=4.1$

$z=0.766$

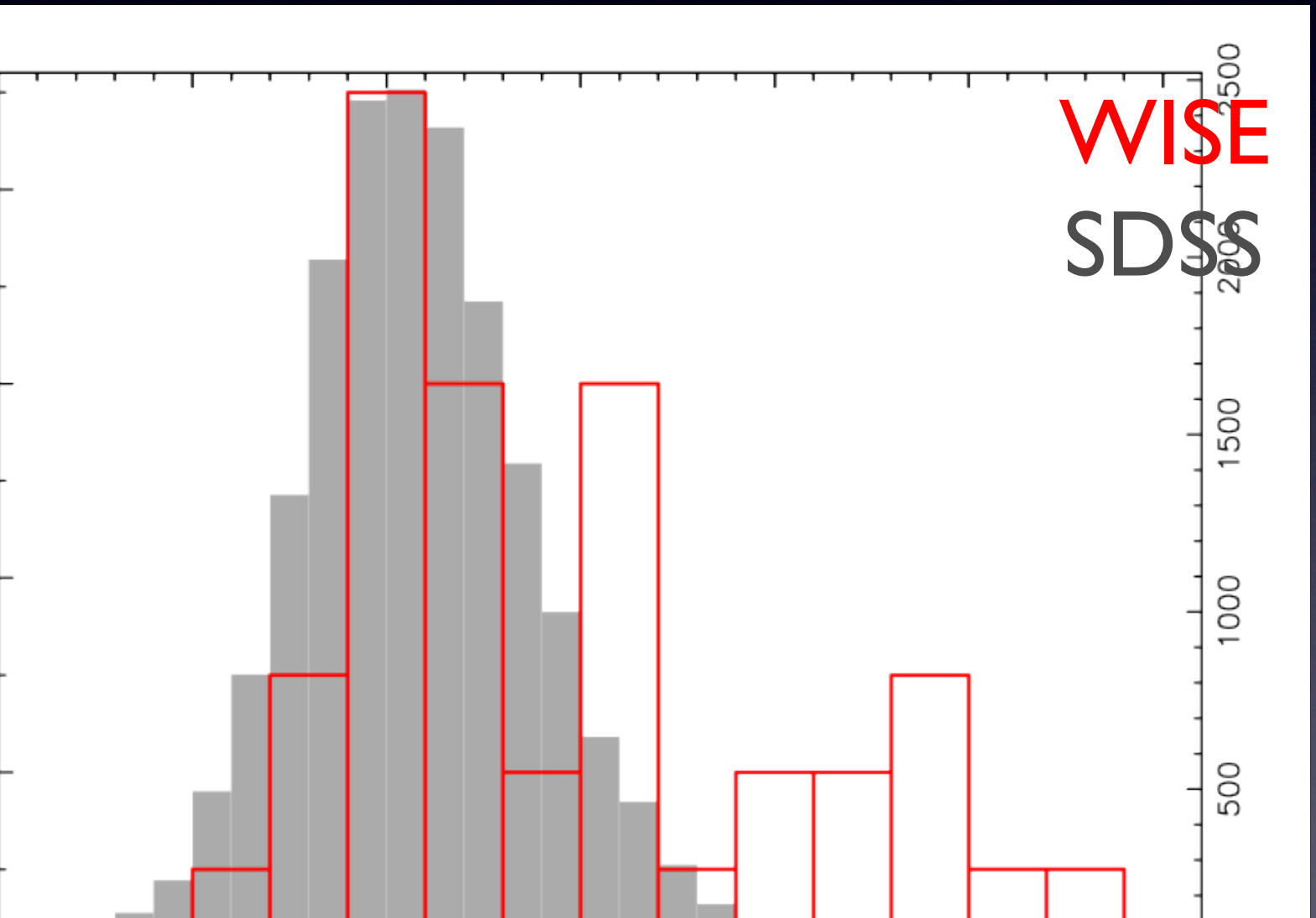


f_ν

- Point sources tend to be higher redshift.
- Extended sources are z < 1.
- Significant number of UKIDSS extended sources.

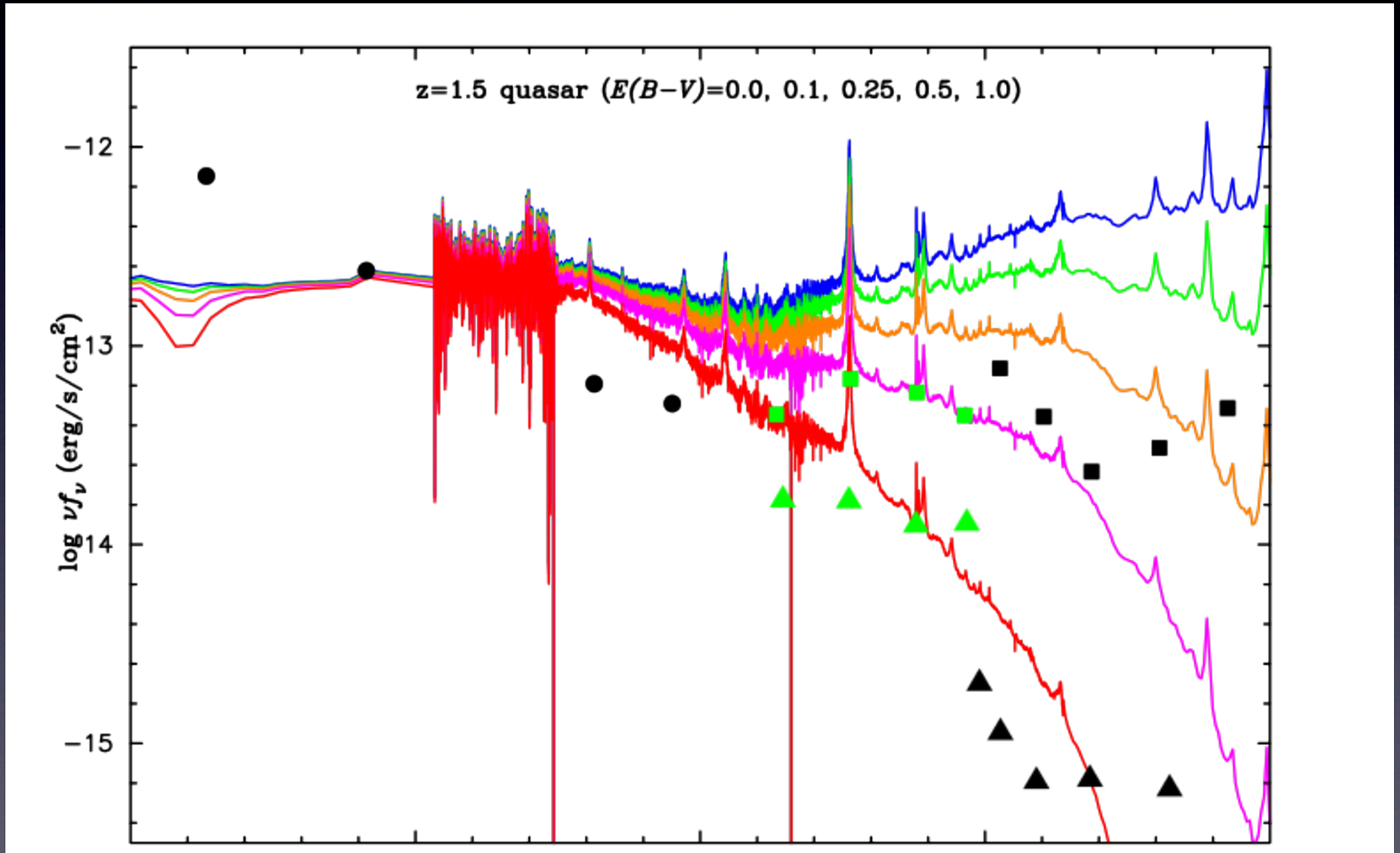


- Δ i-K = (i-K) - $(i\text{-}K)_{\text{typical quasar}}$ @same redshift
- different from SDSS quasars.
  - reason is host contribution or dust-reddened nucl



HSC SYNERGY

HSC improvement



A/Is

- We have to think about the method to confirm AGNs.
- We have to understand the success rate ~30% of FMOS follow-up observations in order to know the completeness issue.

……..

Plan

- I have to find Dr. Aoki and ask him what his plan is.

Summary

- Mid-infrared surveys are powerful tool of searching for redden AGNs.
  - AKARI MIR all-sky survey found very redden AGNs.
  - WISE capability extends more distant AGNs.
  - HSC-WIDE survey will be useful.

synergy w/HSC-WIDE

- FMOS spectroscopy.
- 4 regions in HSC-WIDE area (UKIDSS/LAS).
- 2 nights allocated in next May.