

MIR selected quasars from WISE PDR

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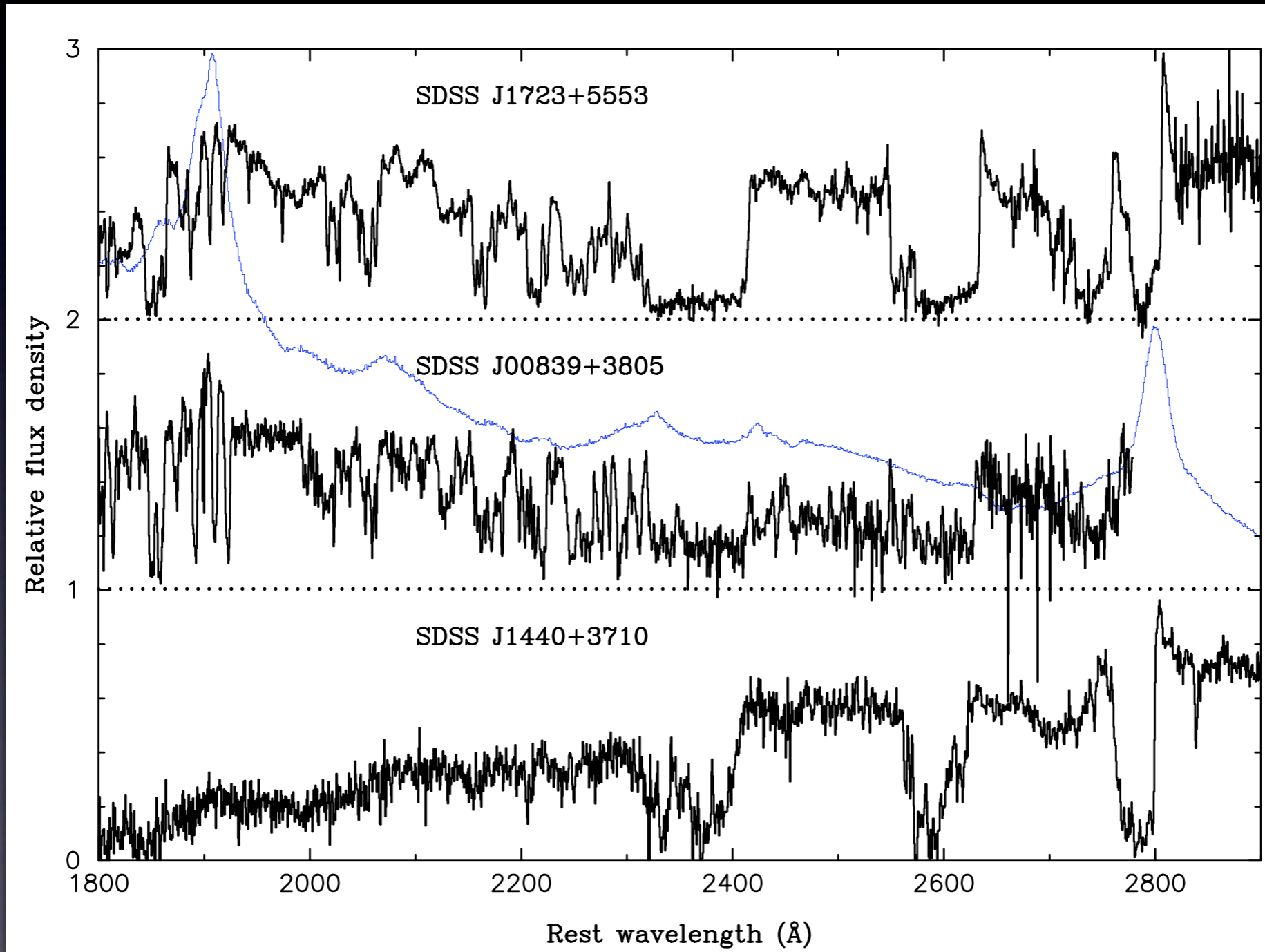
MIR selection of quasars

- 'quasar' = type 1 luminous AGN, not type 2
- easy to discriminate from stars.
- MIR is robust against extinction. → expect to discover reddened quasar missed by optical survey.

reddened quasar

- Glikman's talk on Monday.
- LoBAL, FeLoBAL are reddened.
- low- z reddened quasars in major mergers.
- high fraction of FeLoBALs in reddened quasars.
- They may be transforming objects (SB \rightarrow type I AGN) (see Lazaro's poster).

FeLoBALs are redder than non-BAL quasars.

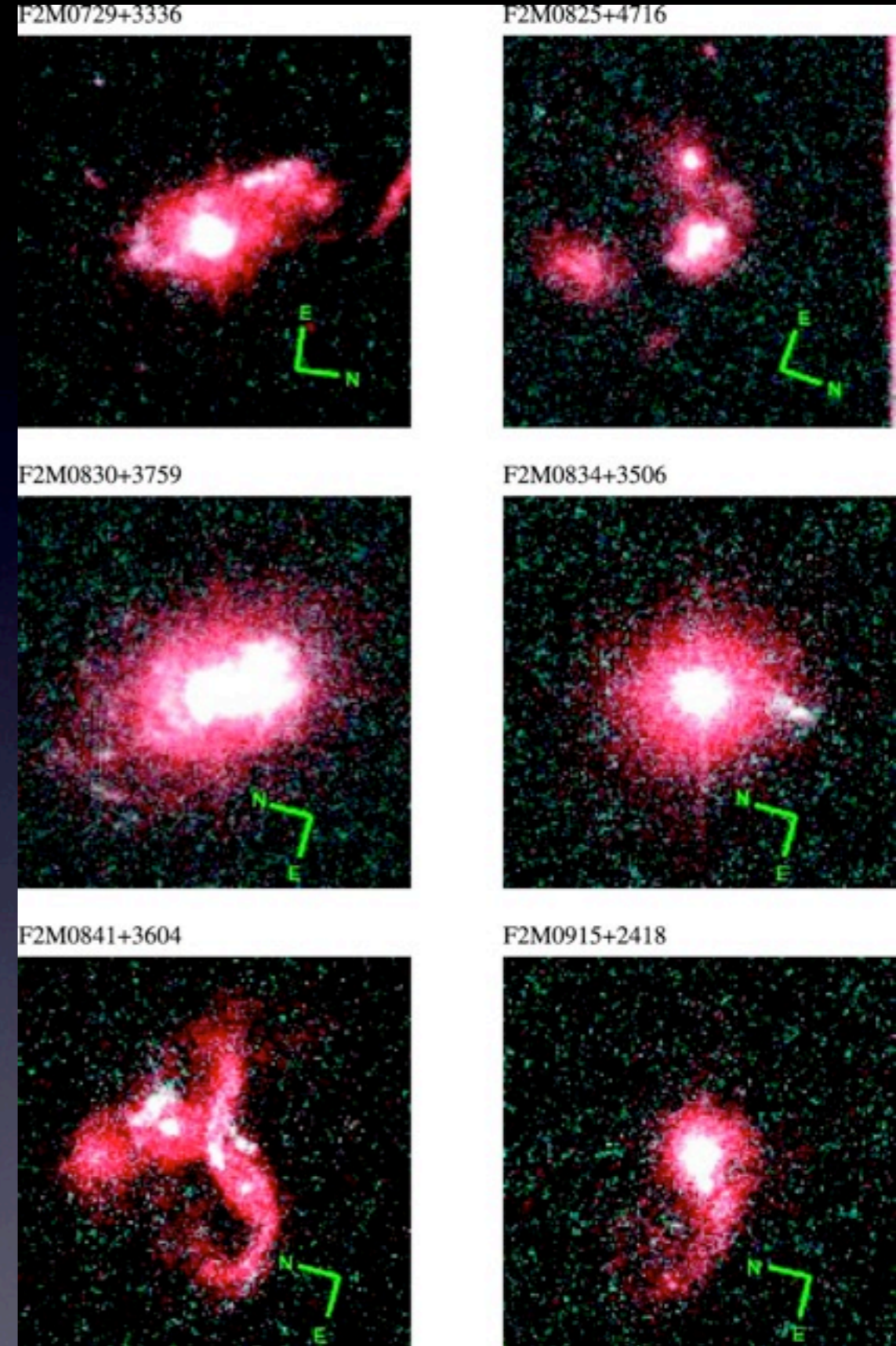


reddened quasar

- Glikman's talk on Monday.
- LoBAL, FeLoBAL are reddened.
- low- z reddened quasars in major mergers.
- high fraction of FeLoBALs in red F2MS quasar (Uruttia+06).
- They may be transforming objects (SB \rightarrow type I AGN) (see 's poster).

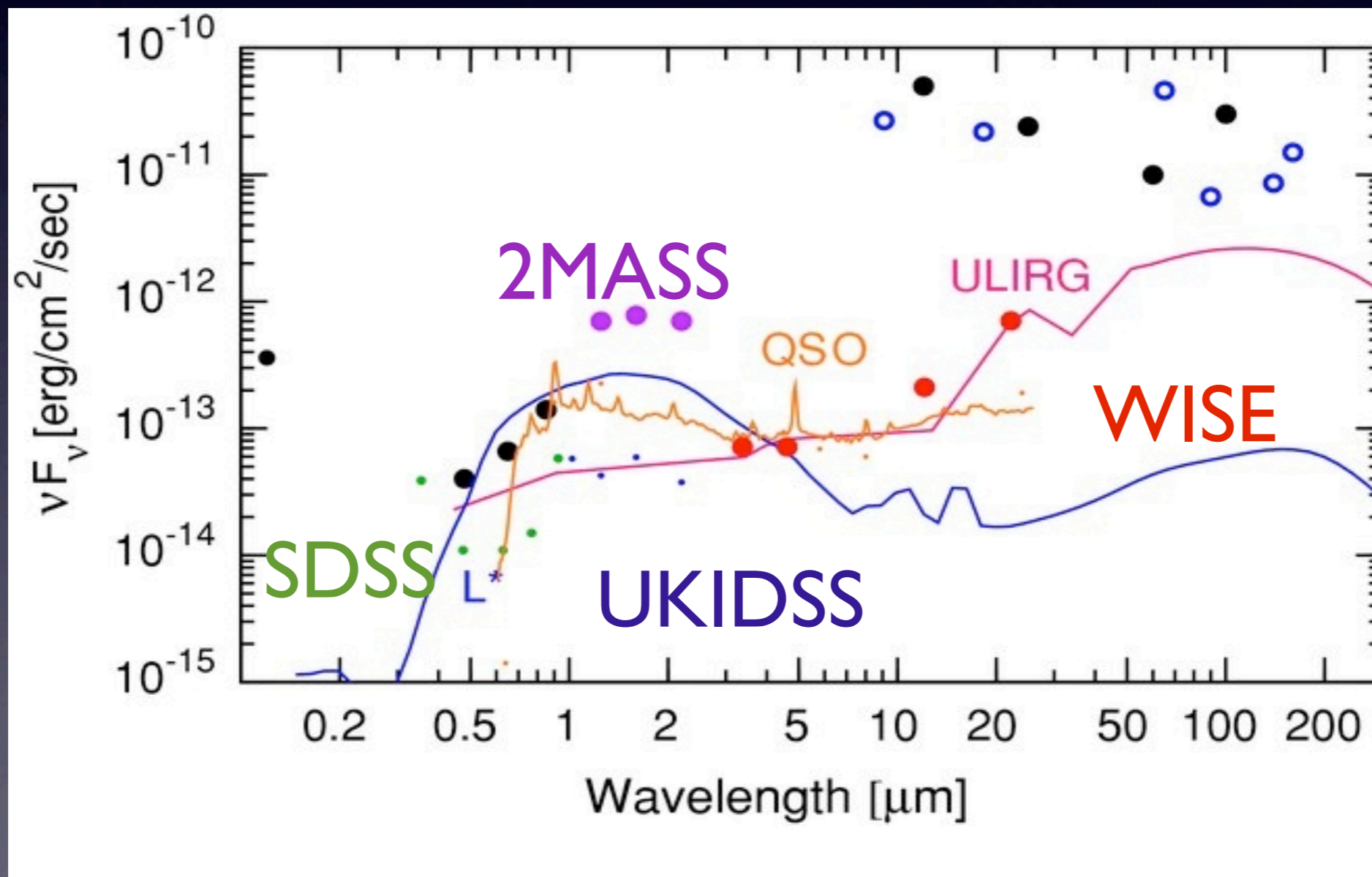
- red F2MS quasars by Urrutia+08

- FIRST & 2MASS crossmatch
- $J-K > 1.7$ && $R-K > 4$ or $R-K > 5$
- HST/F814W imaging ($0.4 < z < 1.0$)
- 11/13 strong interaction



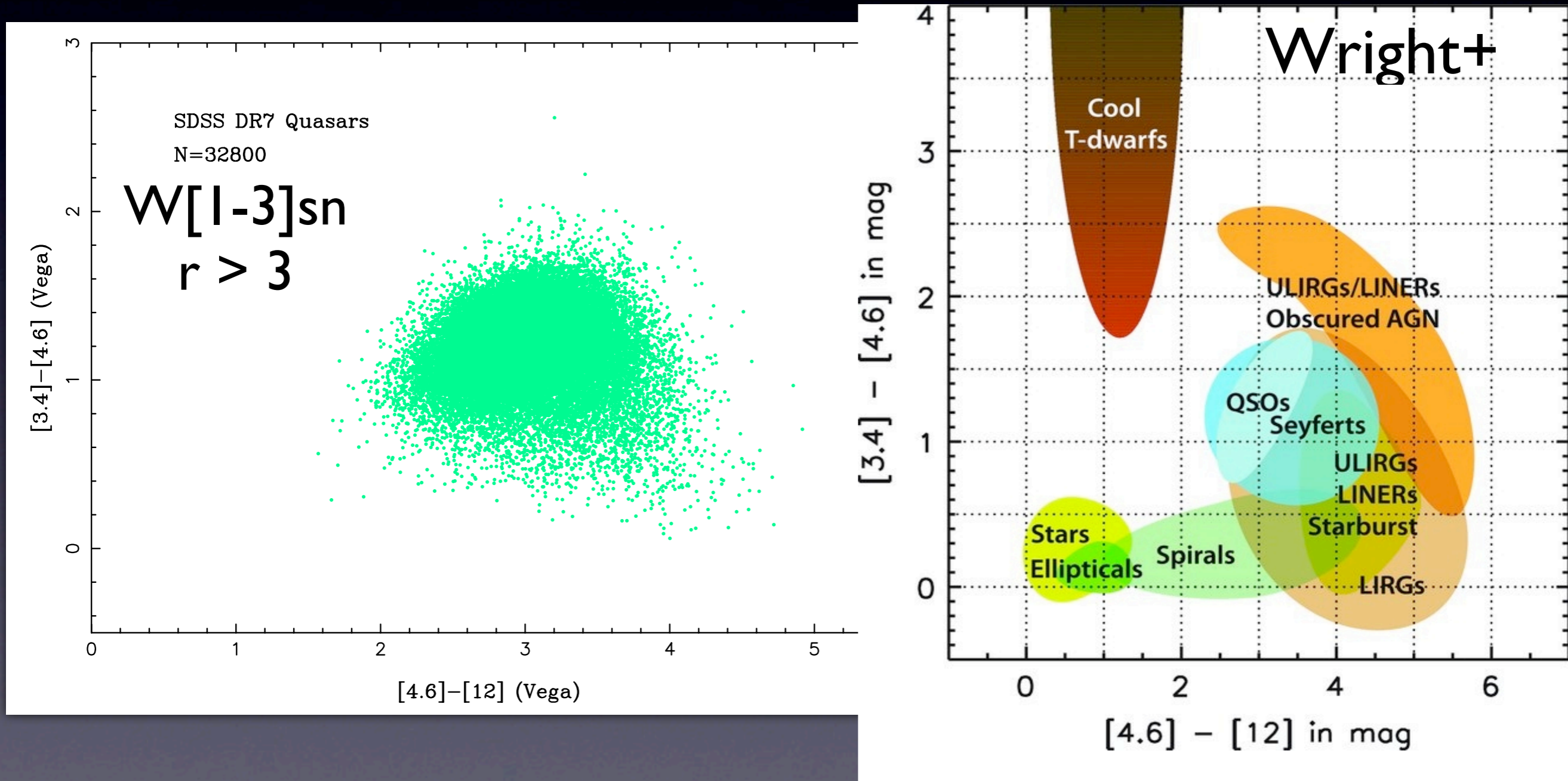
Merits of WISE data

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

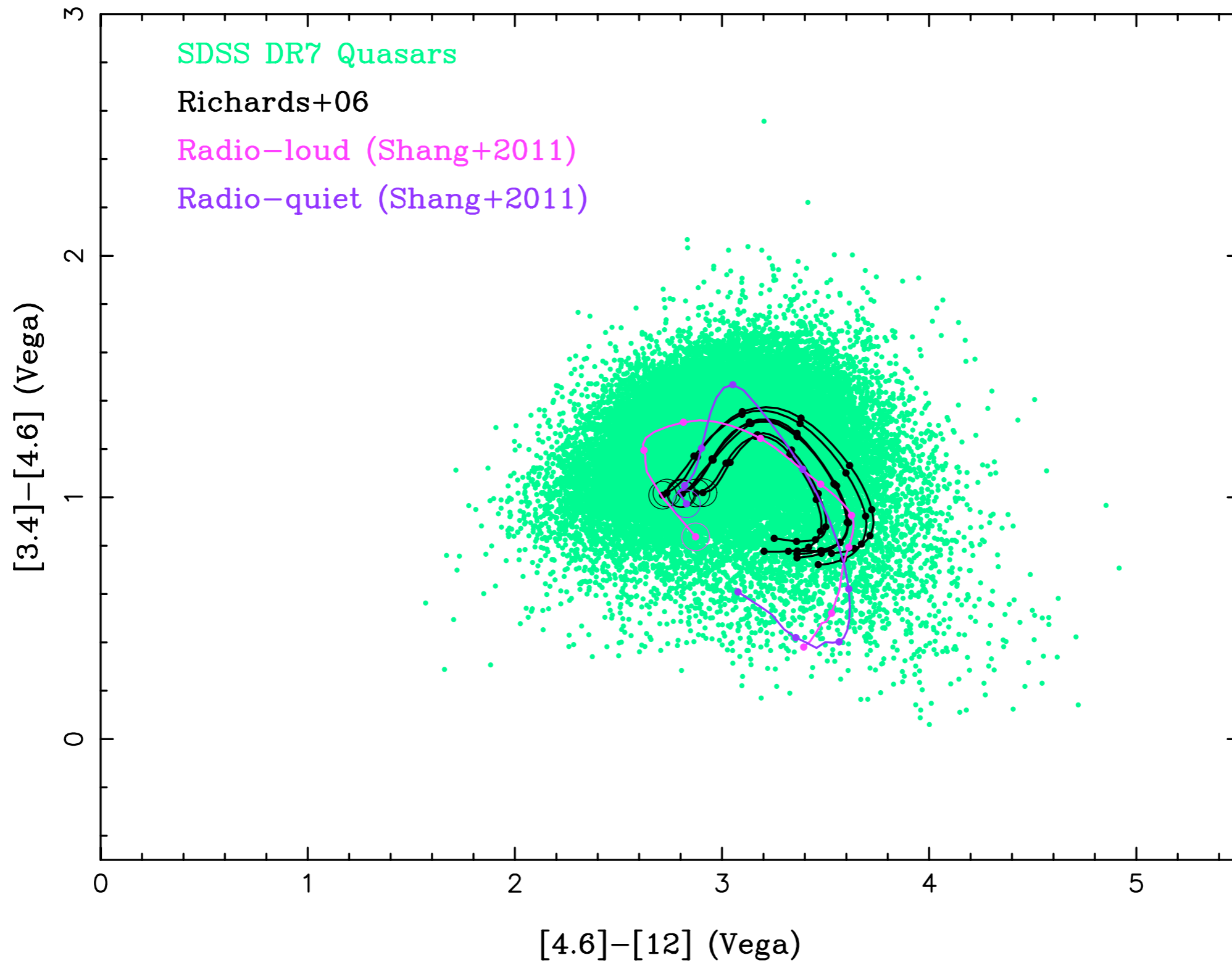


Wright+ 2010

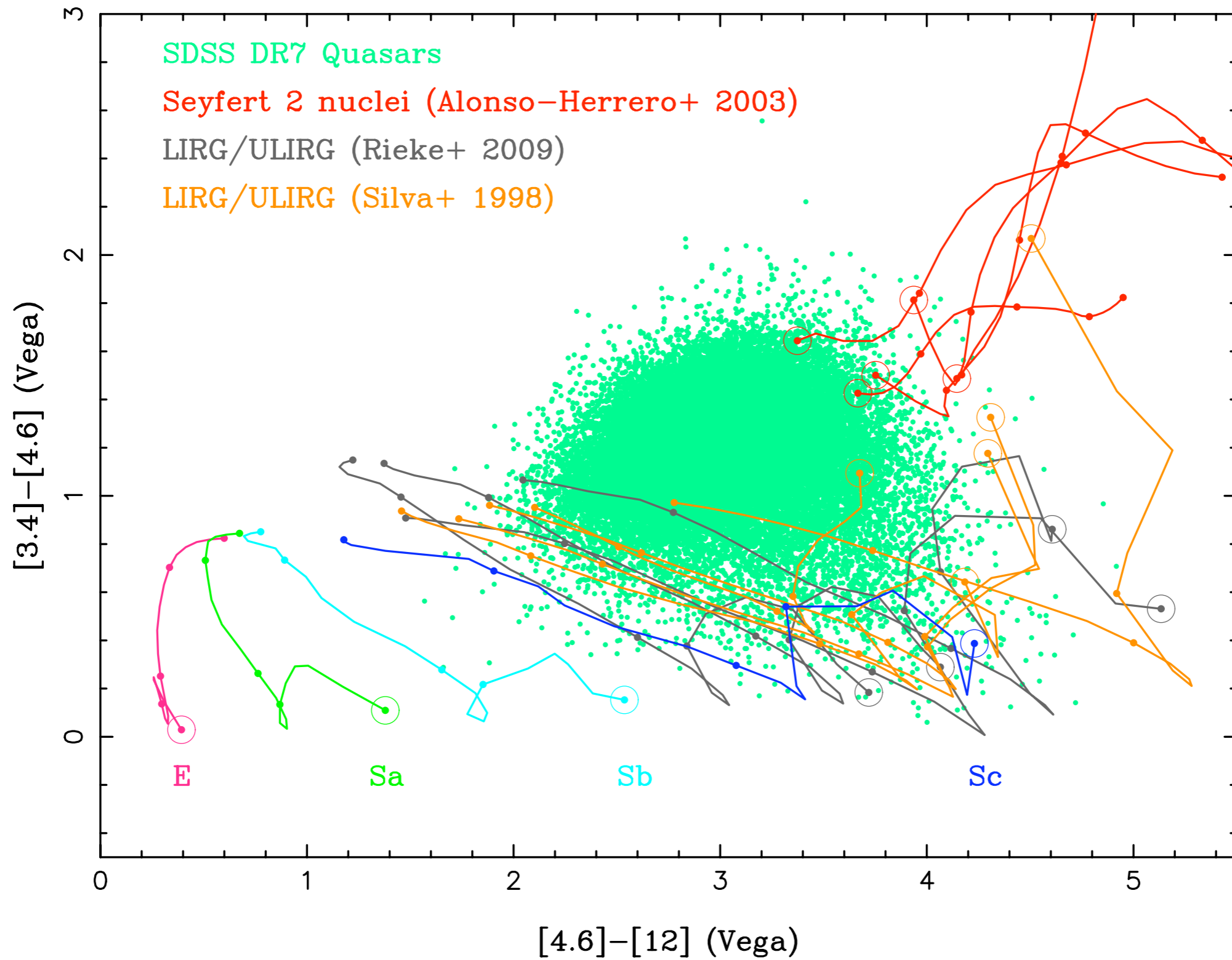
Color selection of quasars using WISE bands

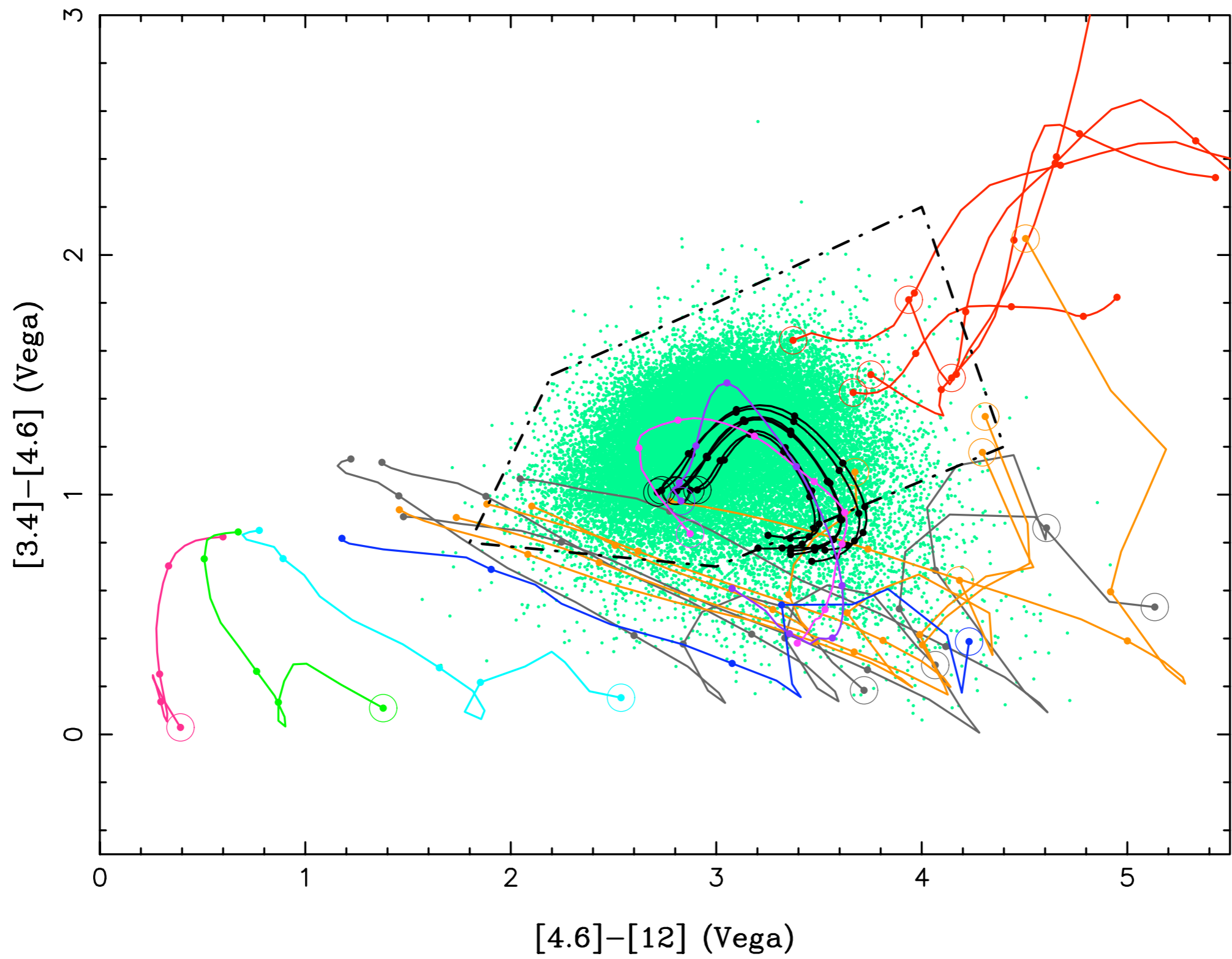


Quasar color ($0 < z < 4$) from SED



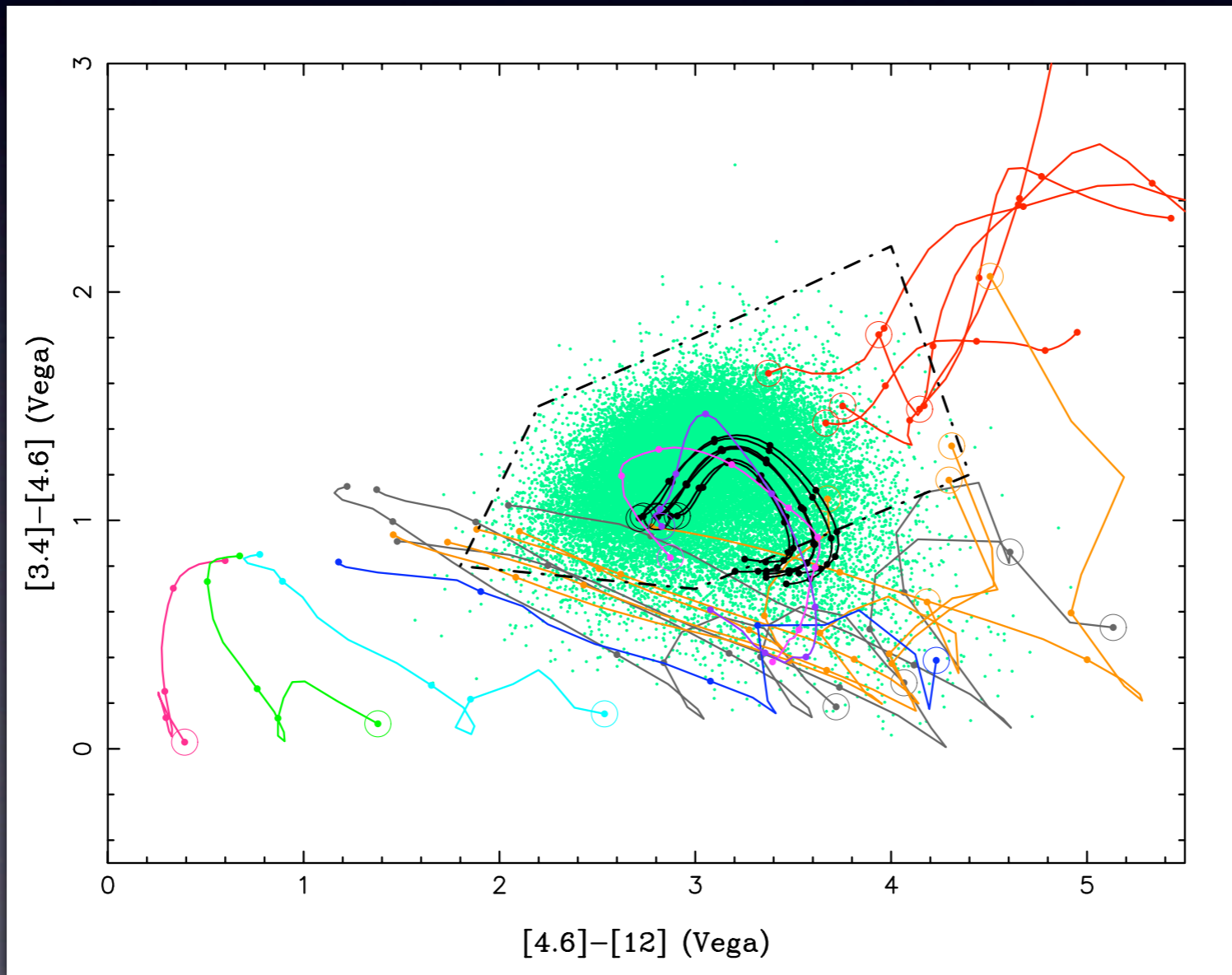
Galaxies color ($0 < z < 2$) from SED



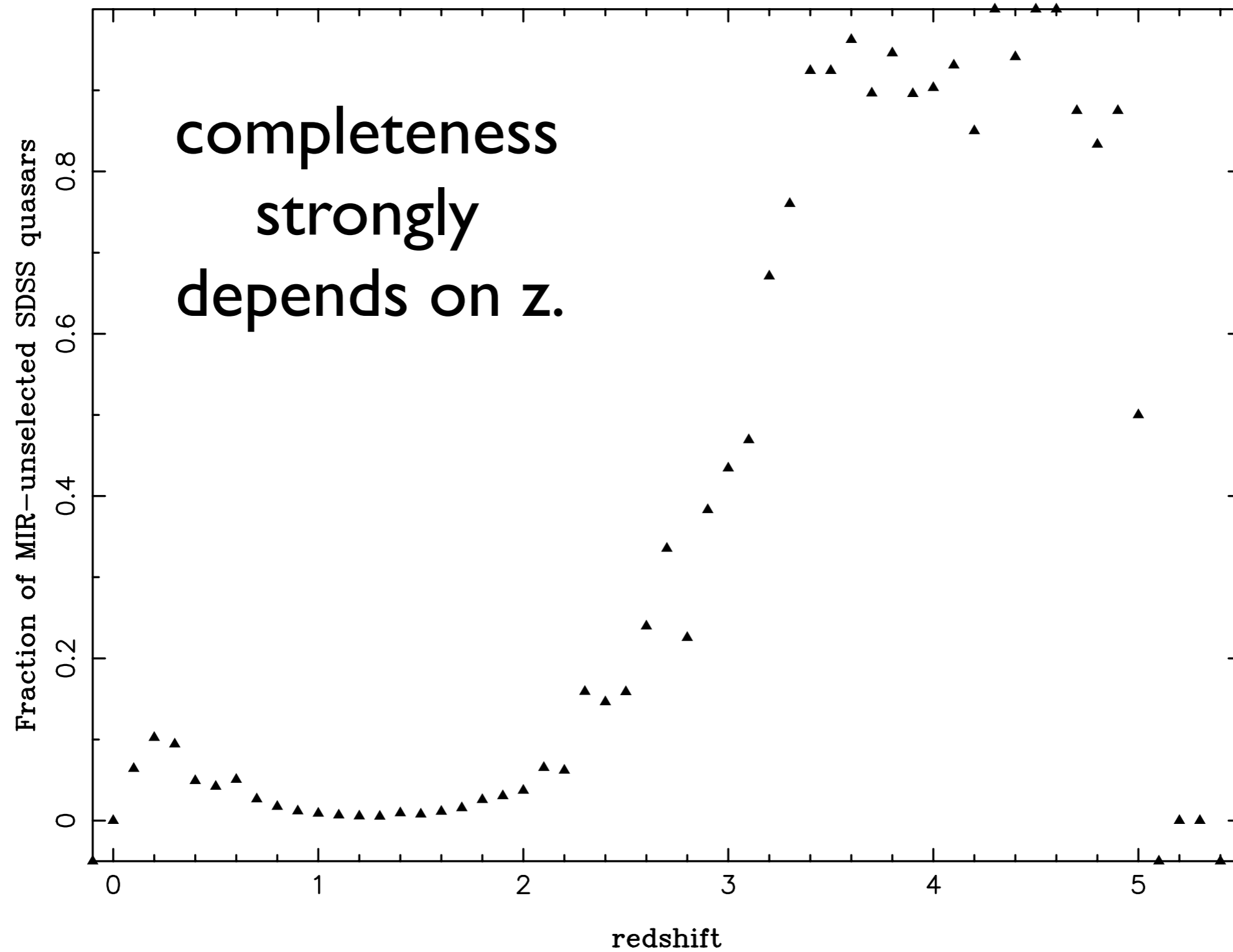


Completeness

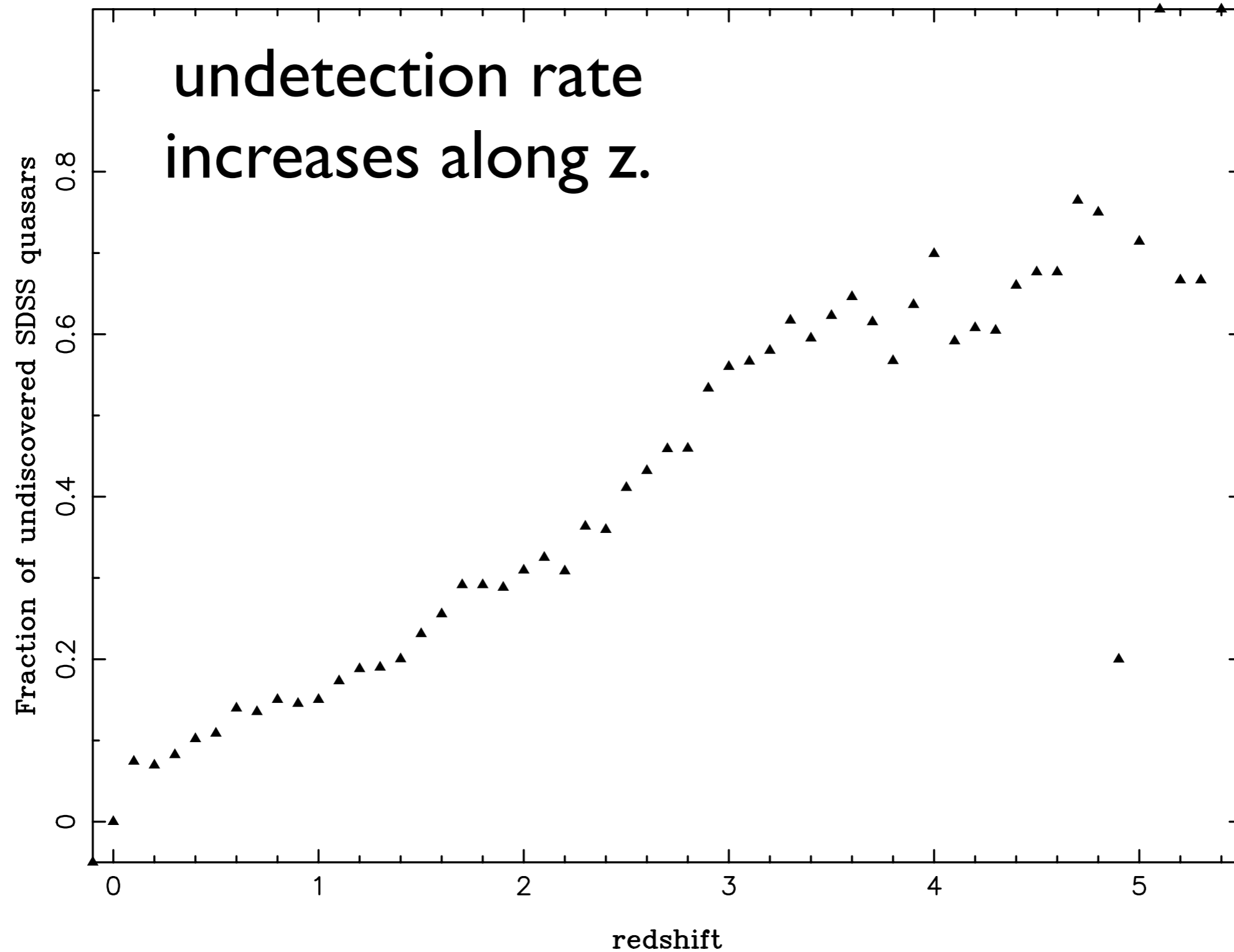
- checked by SDSS (i.e., optically selected) quasars.
- completeness vs. efficiency.



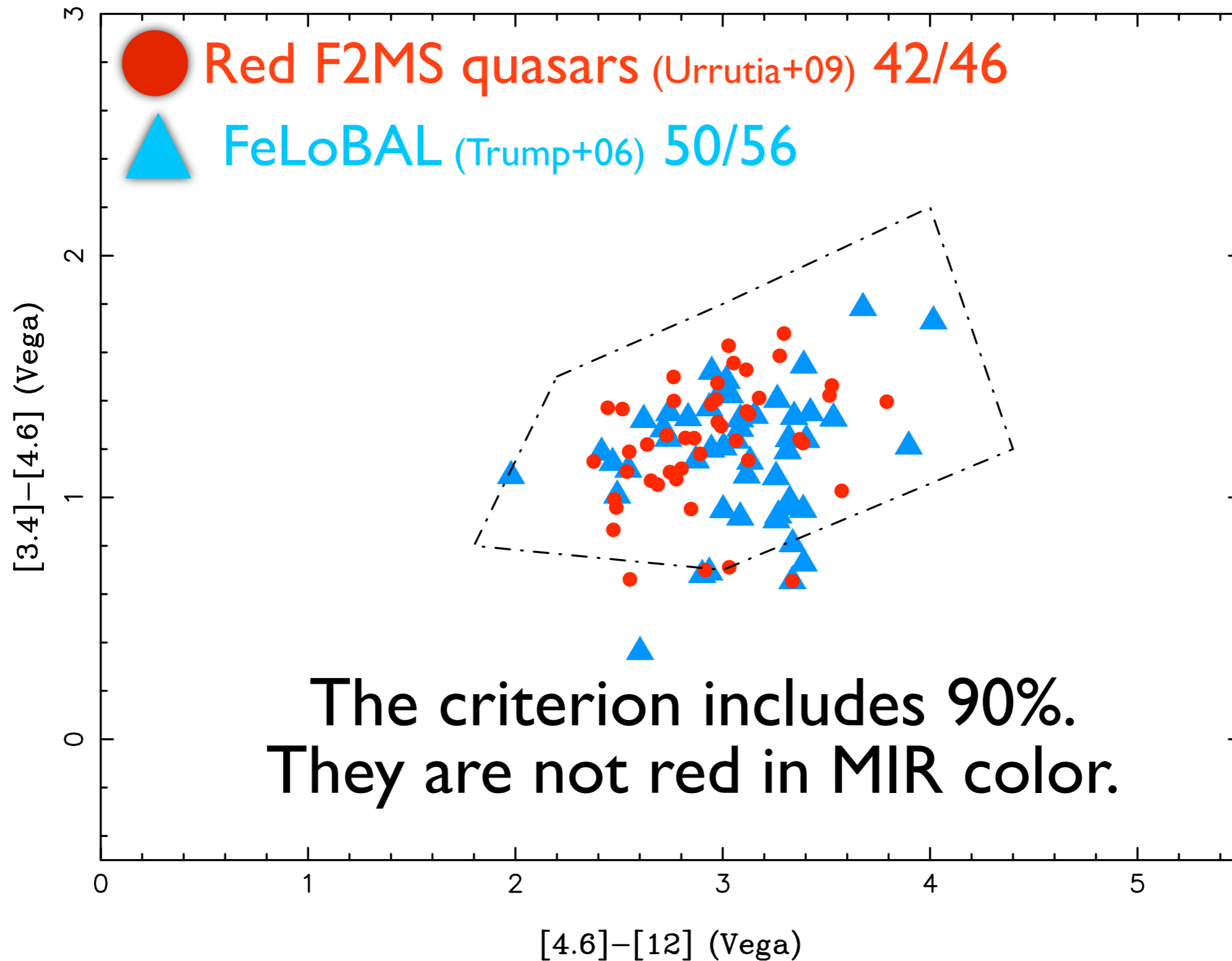
redshift dependence of MIR-unselected SDSS quasars



redshift dependence of undiscovered SDSS quasars by WISE



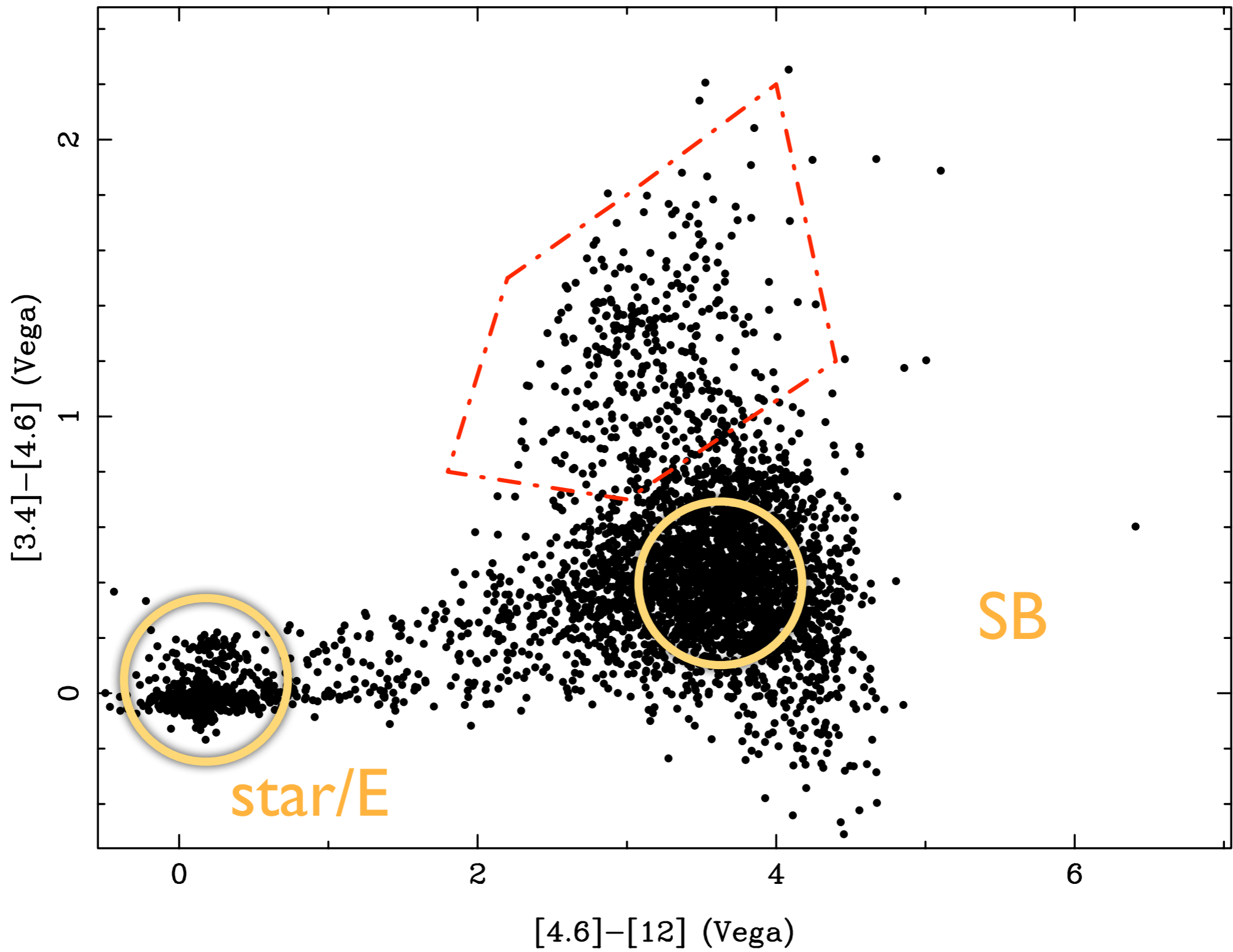
Red quasars & FeLoBALs



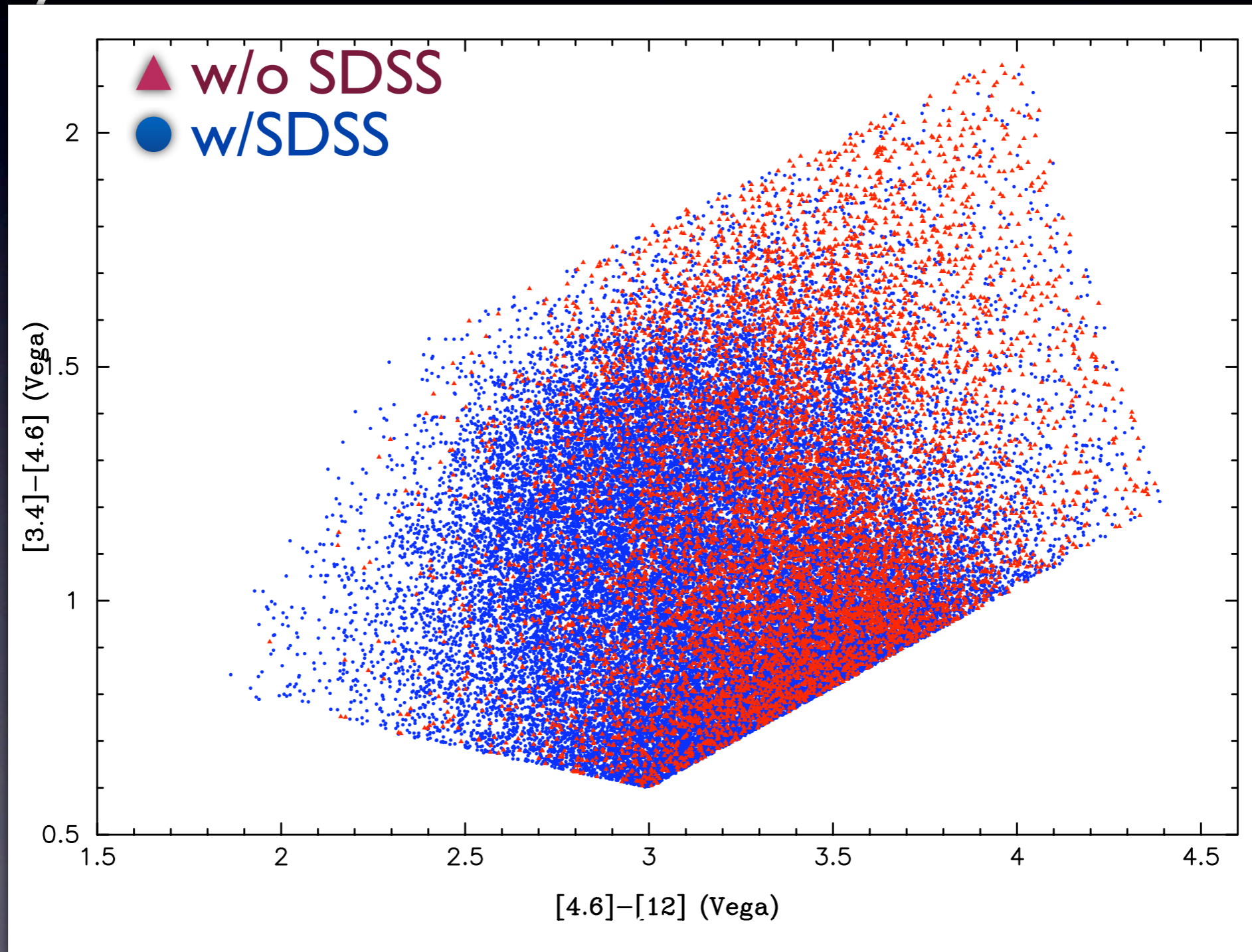
Application to a real sky

- Select a high galactic latitude region both SDSS and WISE PDR covered.
- RA: 220° - 240° , Dec: 10° - 30°
- ~400,000 WISE sources
- 35,000 WISE selected quasar candidates
- 90 candidates / deg^2

wise_prelim_reg_VI_2_prune.dat



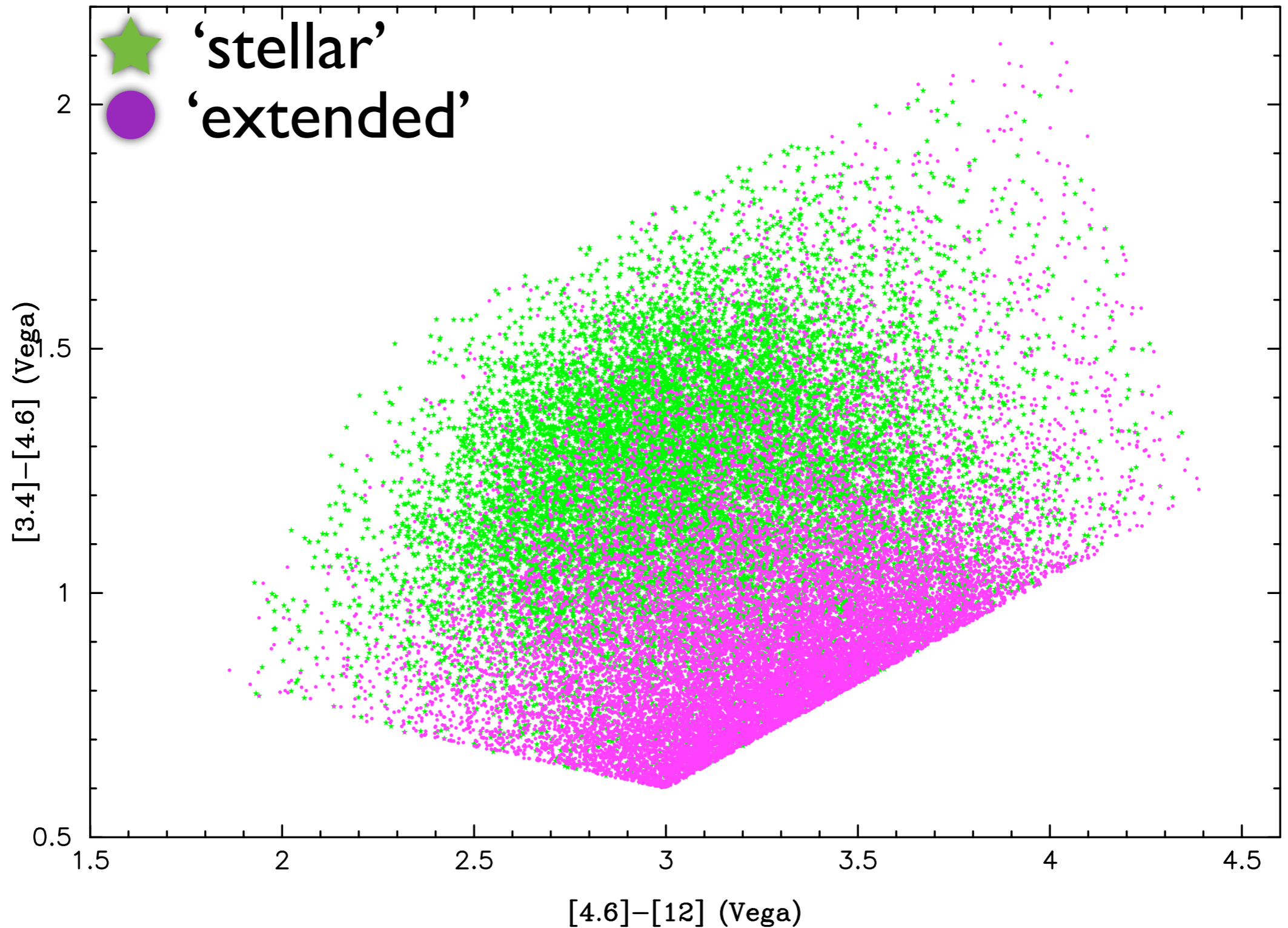
- 20%(=7159/35143) candidates are not associated with SDSS sources.
- They are redder than SDSS-associated candidates.



Efficiency (contamination)

- Check the optical morphology of 28,000 SDSS-associated candidates.
- 53% are 'stellar' vs. 47% are 'extended'.
- 41% of low- z ($z < 0.5$) quasars in SDSS DR7 quasar catalog are 'extended' sources.
- The efficiency is expected to be $\geq 50\%$

- 53% are 'stellar' vs. 47% are 'extended'.



Future work

- Spectroscopic ID.
 - we are proposing 3.6 deg² NIR spectroscopic survey
 - ~200 quasars & ~160 new expected.

Summary

- Our WISE color criterion makes
 - 90 candidates / deg².
 - 90% completeness at $z < 2$.
 - efficiency is 50%.
 - robust to (known) reddened quasars.