

The NEOWISE-Reactivation Proper Motion Survey: Methods and First Results

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Neowise-Reactivation

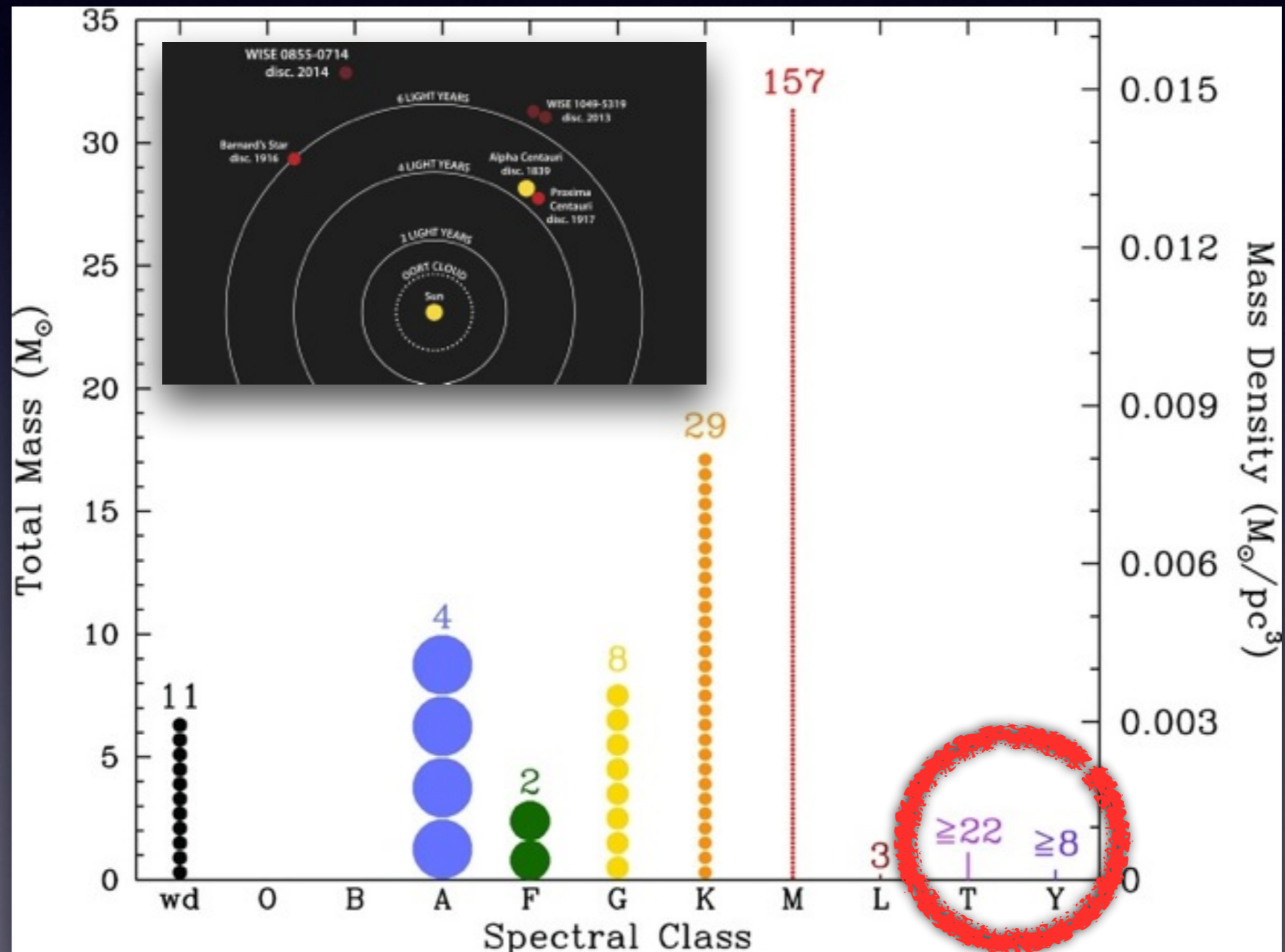
- WISE was reactivated in December of 2013 to search for potentially hazardous near-Earth objects (NEOWISE-R)
- W1 and W2 only
- Unlike previous WISE data, images are not coadded

Why a(nother) WISE motion survey?

- Motion surveys are color-independent
- Both previous WISE motion surveys (Luhman 2014, Kirkpatrick et al. 2014) missed objects found by the other
- ~8x longer time baseline than previous WISE motion surveys

Motivation

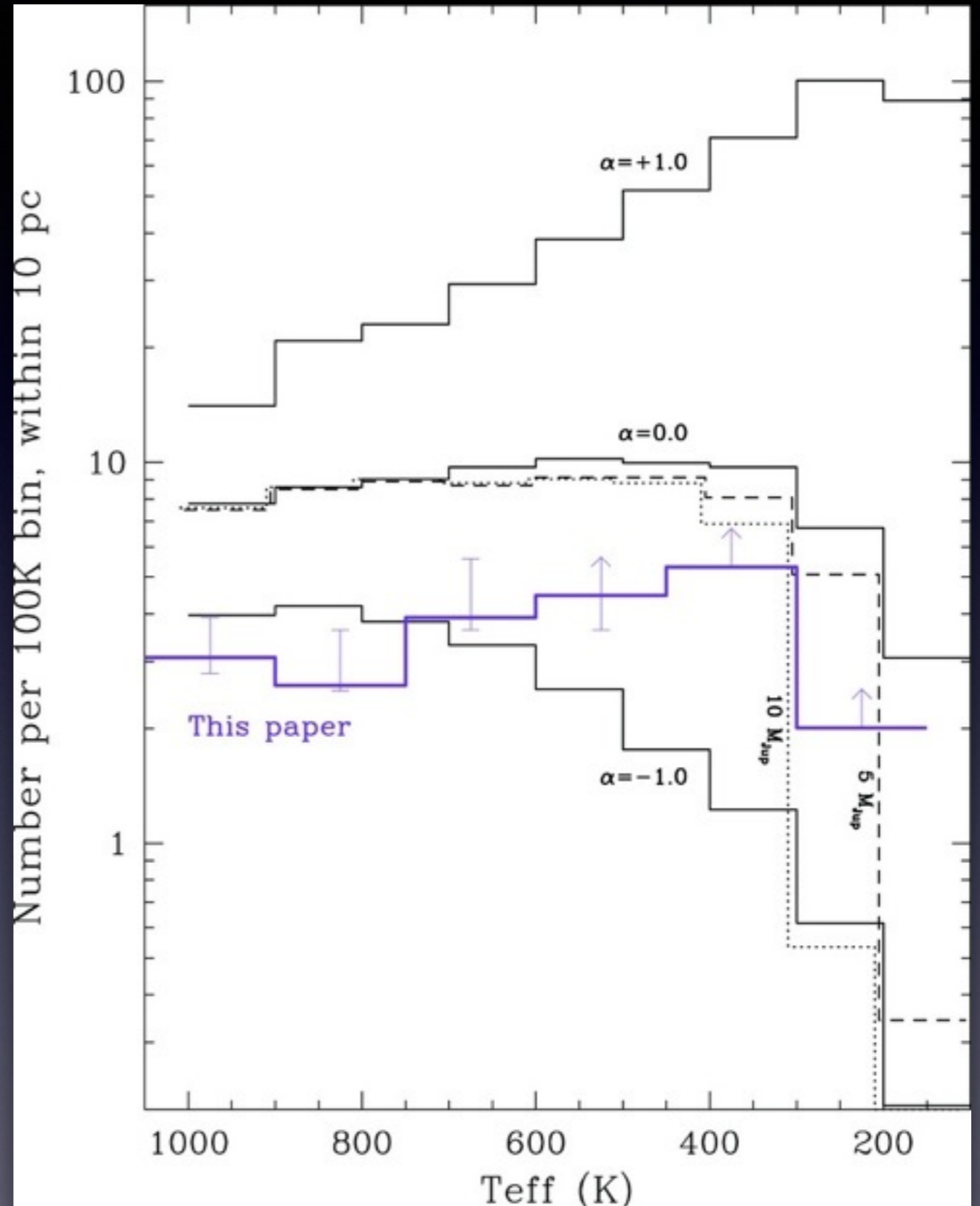
- Map the Solar Neighborhood



8 pc sample from Kirkpatrick et al. 2012

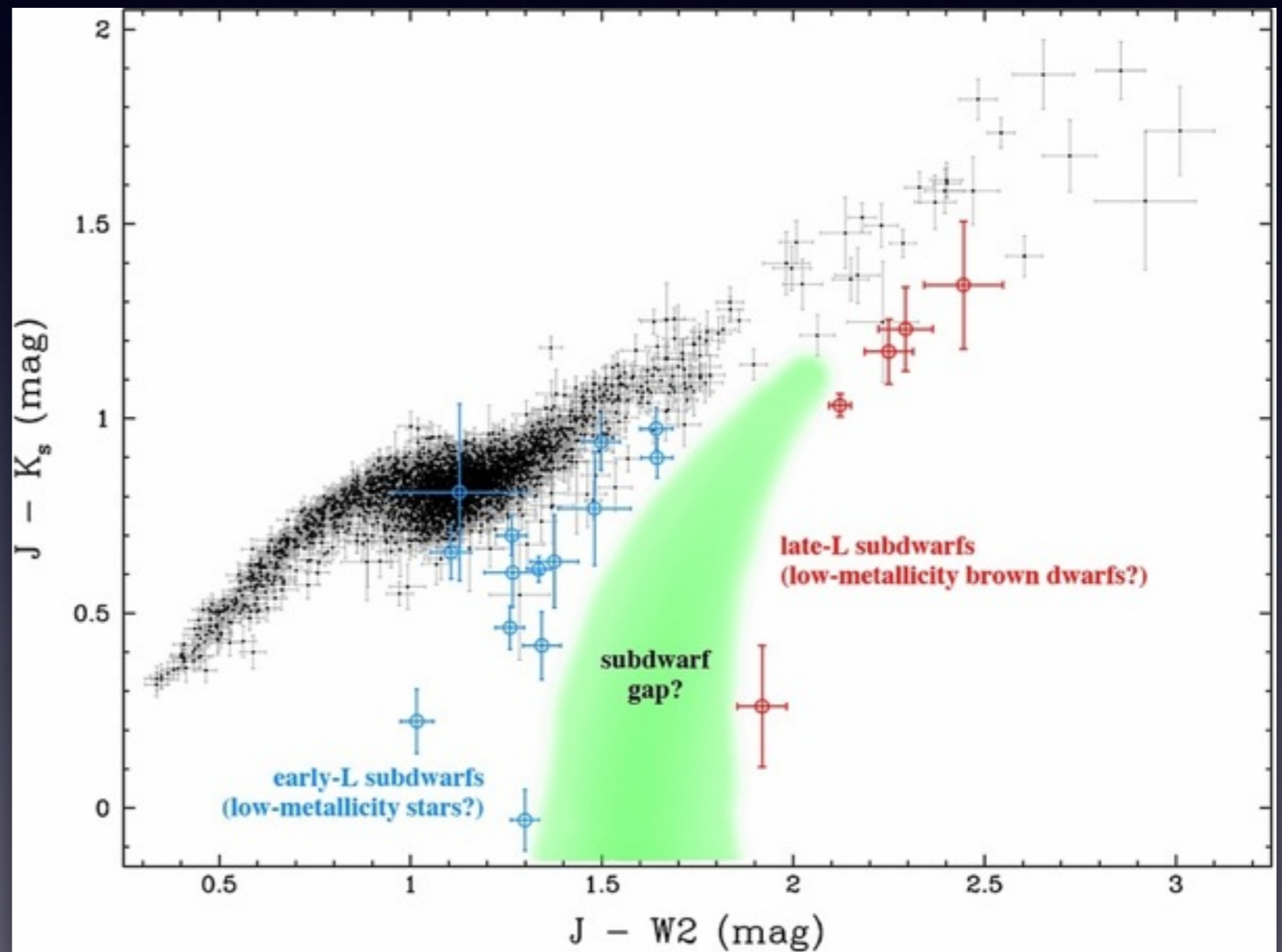
Motivation

- Map the Solar Neighborhood
- Brown dwarf mass function
- Simulations (Burgasser 2004, 2008 - black)
- Observations (Kirkpatrick et al. 2012 - purple)



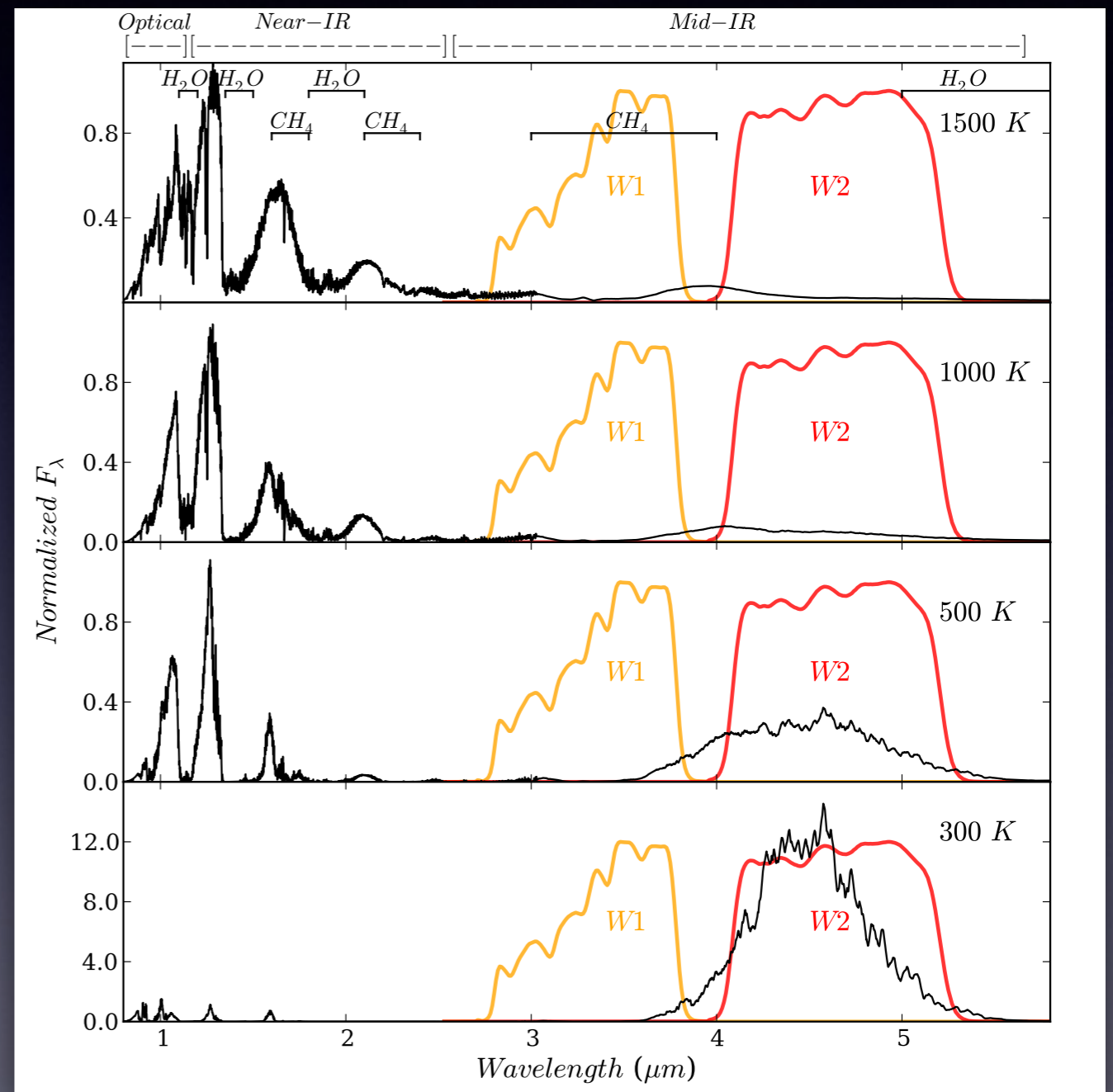
Motivation

- Map the Solar Neighborhood
- Brown dwarf mass function
- Low-metallicity subdwarfs



NEOWISE-R Proper Motion Survey

- WISE channel 2 (W2 - most sensitive to low-temperature brown dwarfs)
- Individual (L1b) detections used to produce source catalog

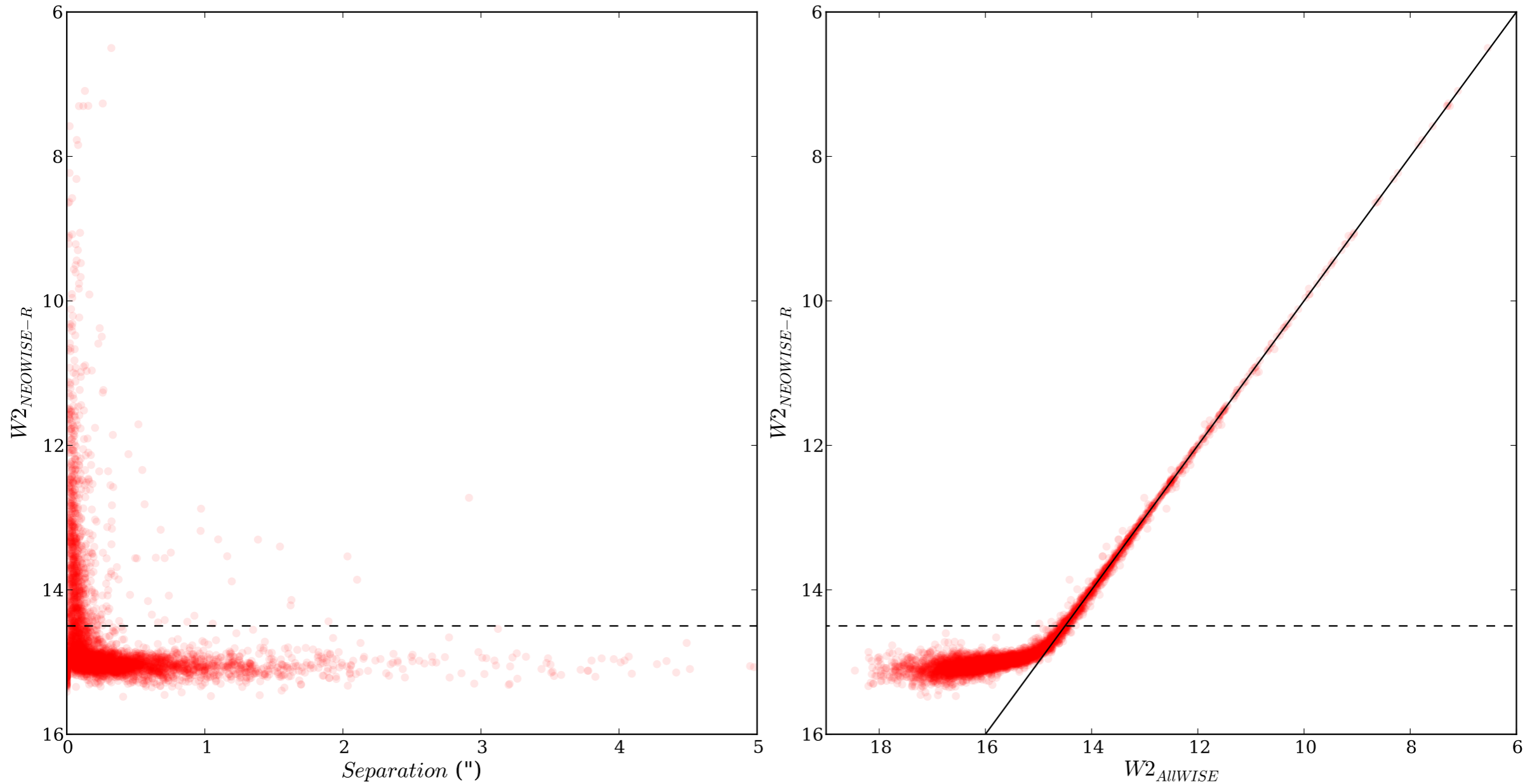


Models from Saumon et al. 2012

Candidate Selection

- $W2 \leq 14.5$





Candidate Selection



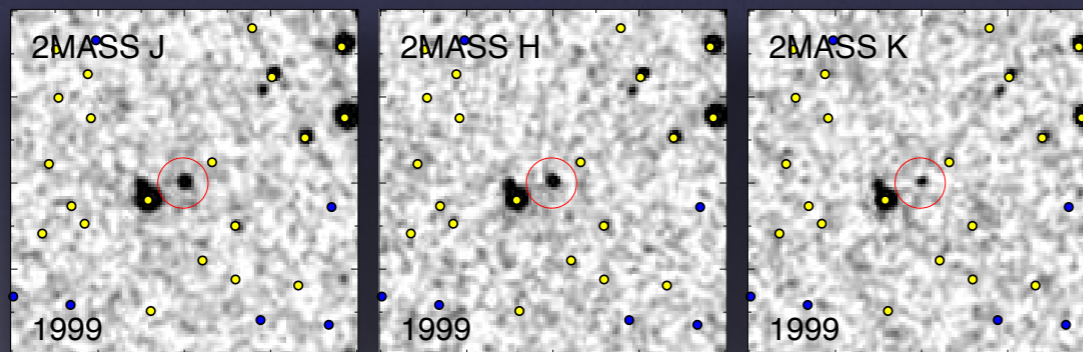
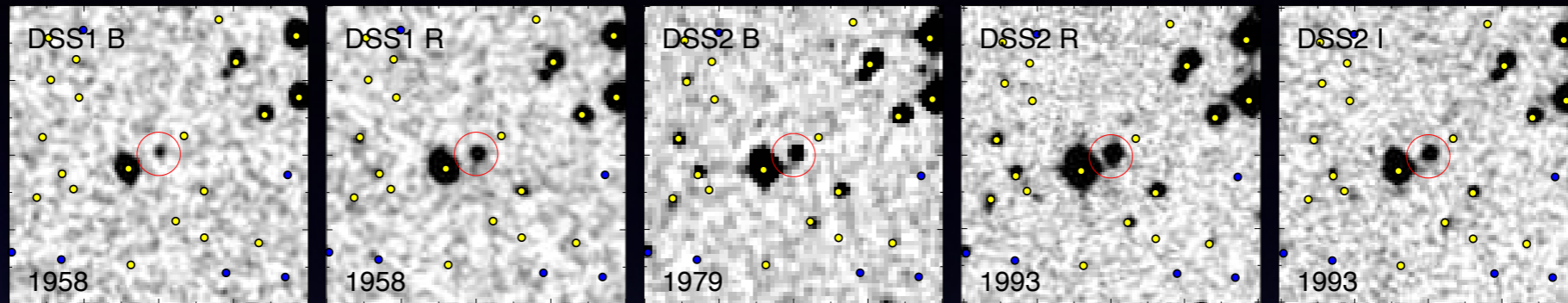
Candidate Selection

- $W2 \leq 14.5$ (using relations from Dupuy & Liu 2012)
 - L0  85 pc
 - T0  35 pc
 - Y0  12 pc
 - W0855-type  3 pc

Candidate Selection

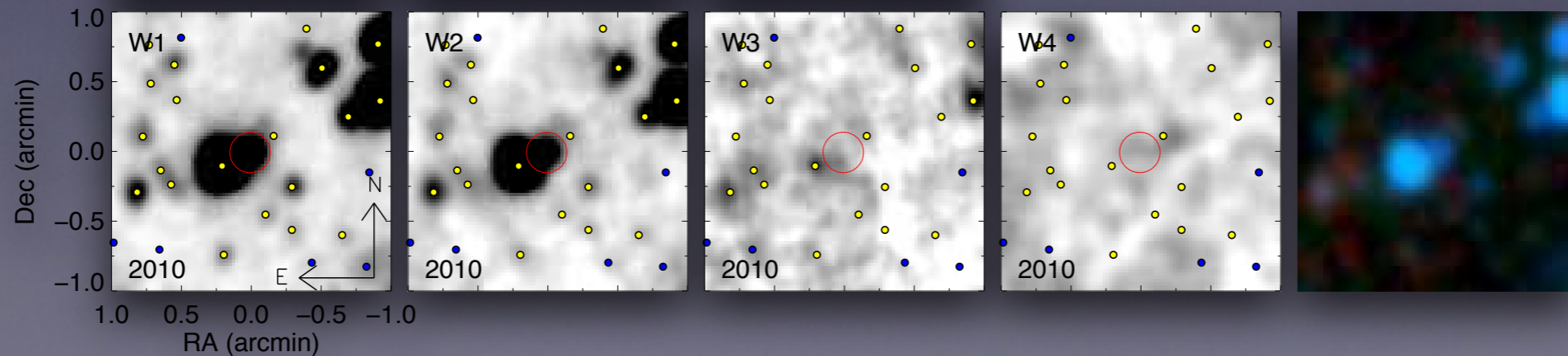
- $W2 \leq 14.5$ (using relations from Dupuy & Liu 2012)
 - L0  85 pc
 - T0  35 pc
 - Y0  12 pc
 - W0855-type  3 pc
- No AllWISE match within 1''

Candidate Selection







$\alpha = 10:47:06.991$ (161.77913)
 $\delta = -31:52:04.30$ (-31.86786)
 $l = 274.25$
 $b = +23.99$

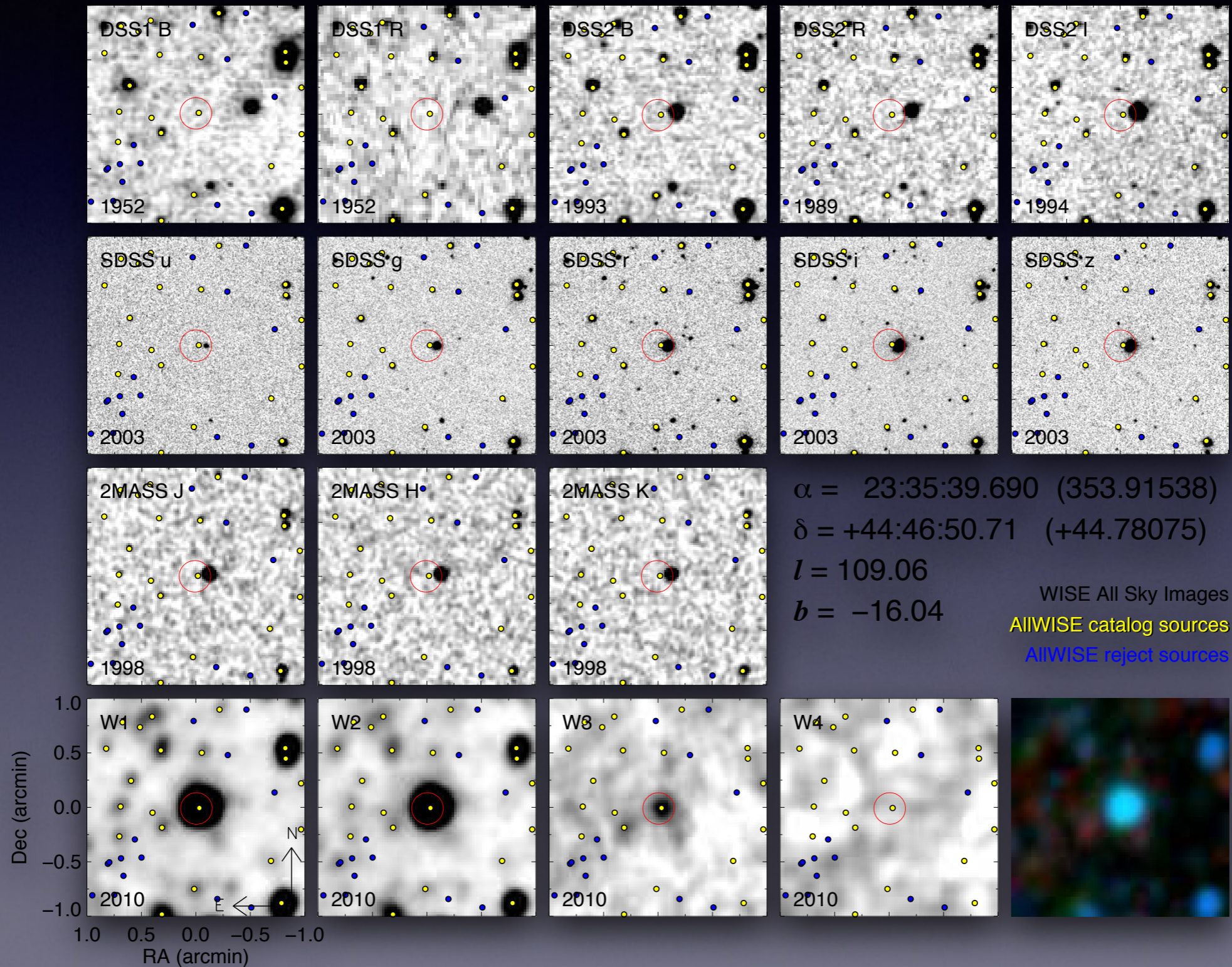
WISE All Sky Images
AllWISE catalog sources
AllWISE reject sources



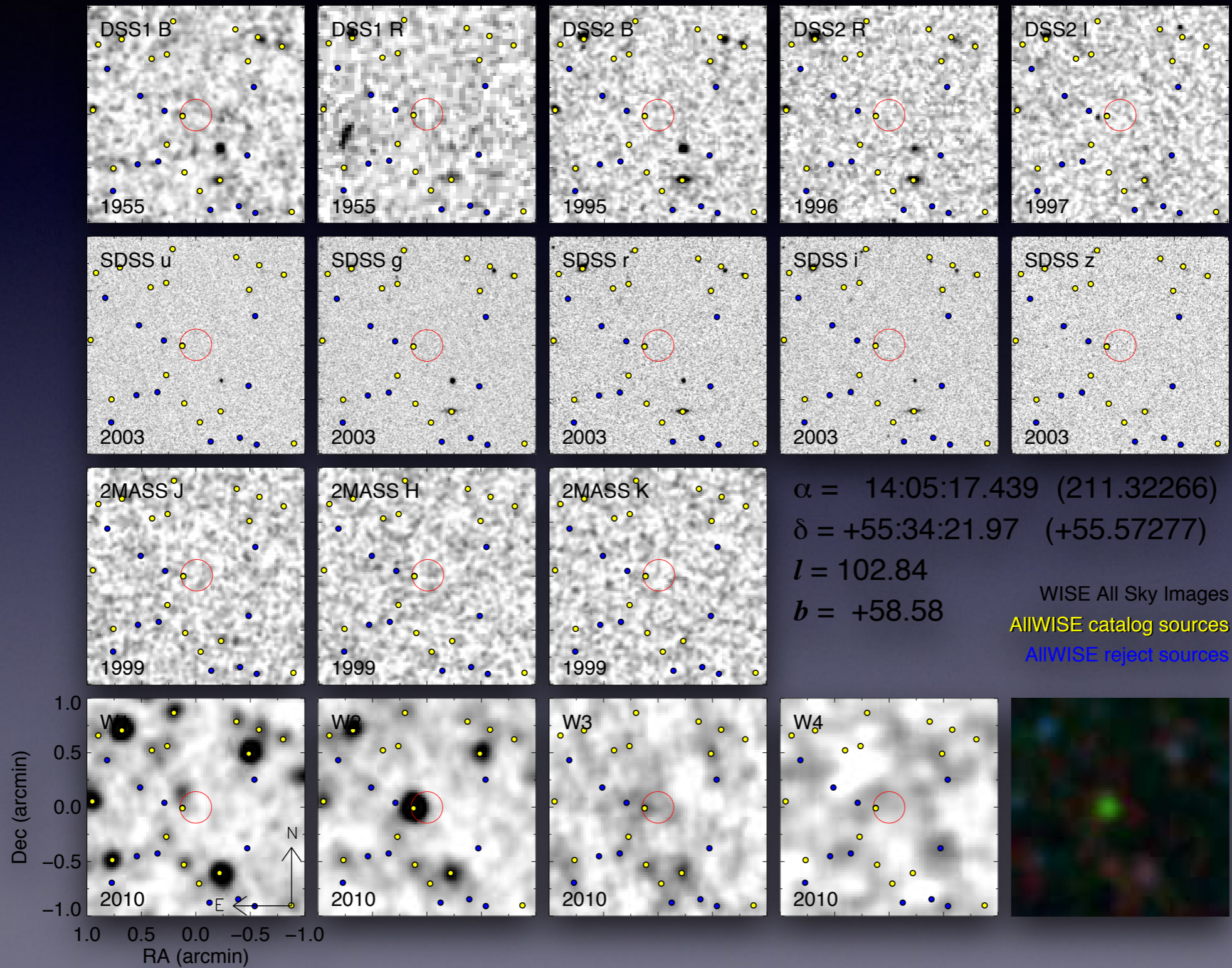
Candidate Selection

- $W2 \leq 14.5$ (using relations from Dupuy & Liu 2012)
 - L0  85 pc
 - T0  35 pc
 - Y0  12 pc
 - W0855-type  3 pc
- No AllWISE match within 1''
- No 2MASS match within 1''

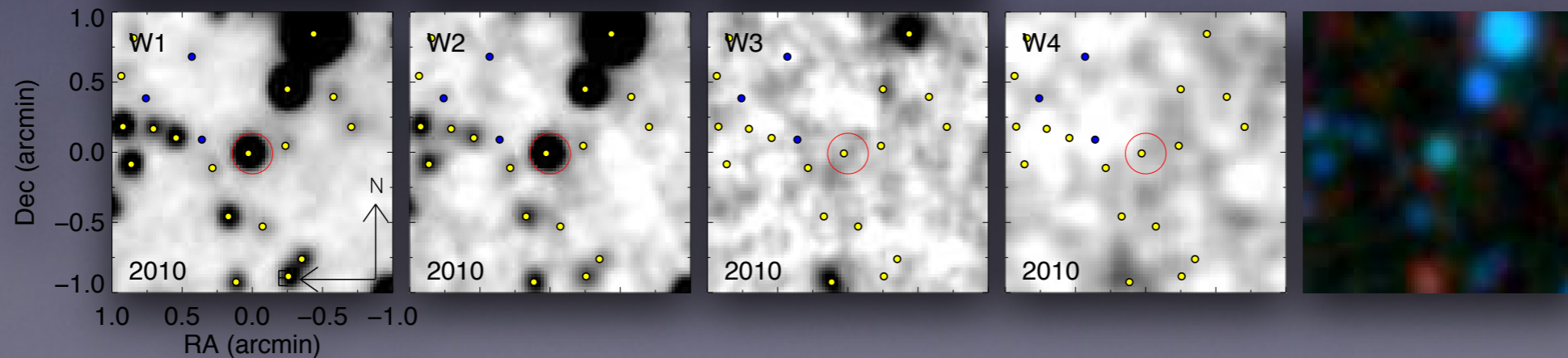
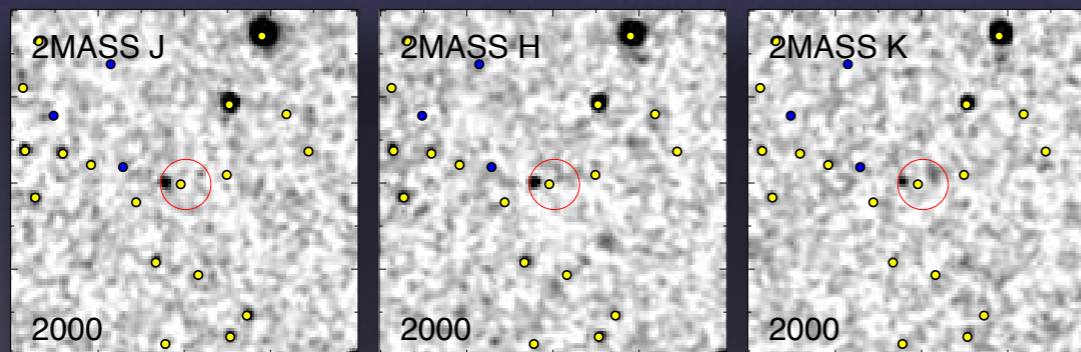
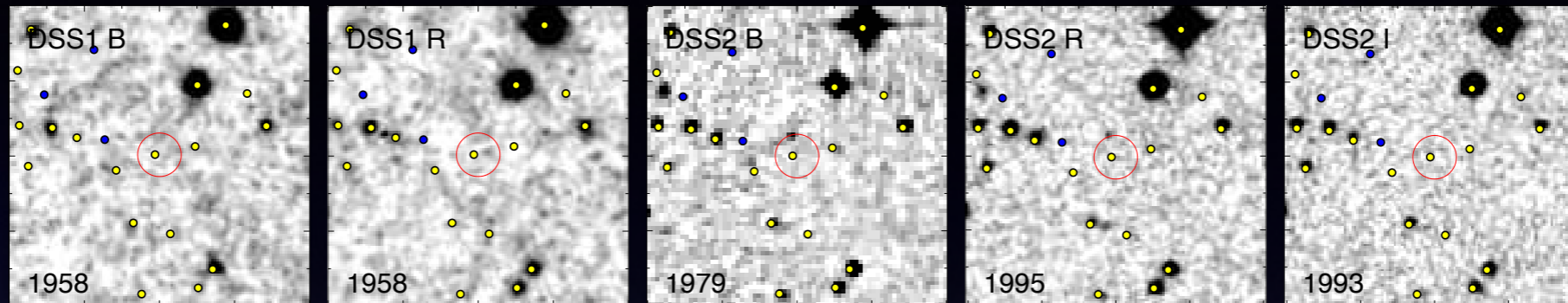
Typical Finder Chart



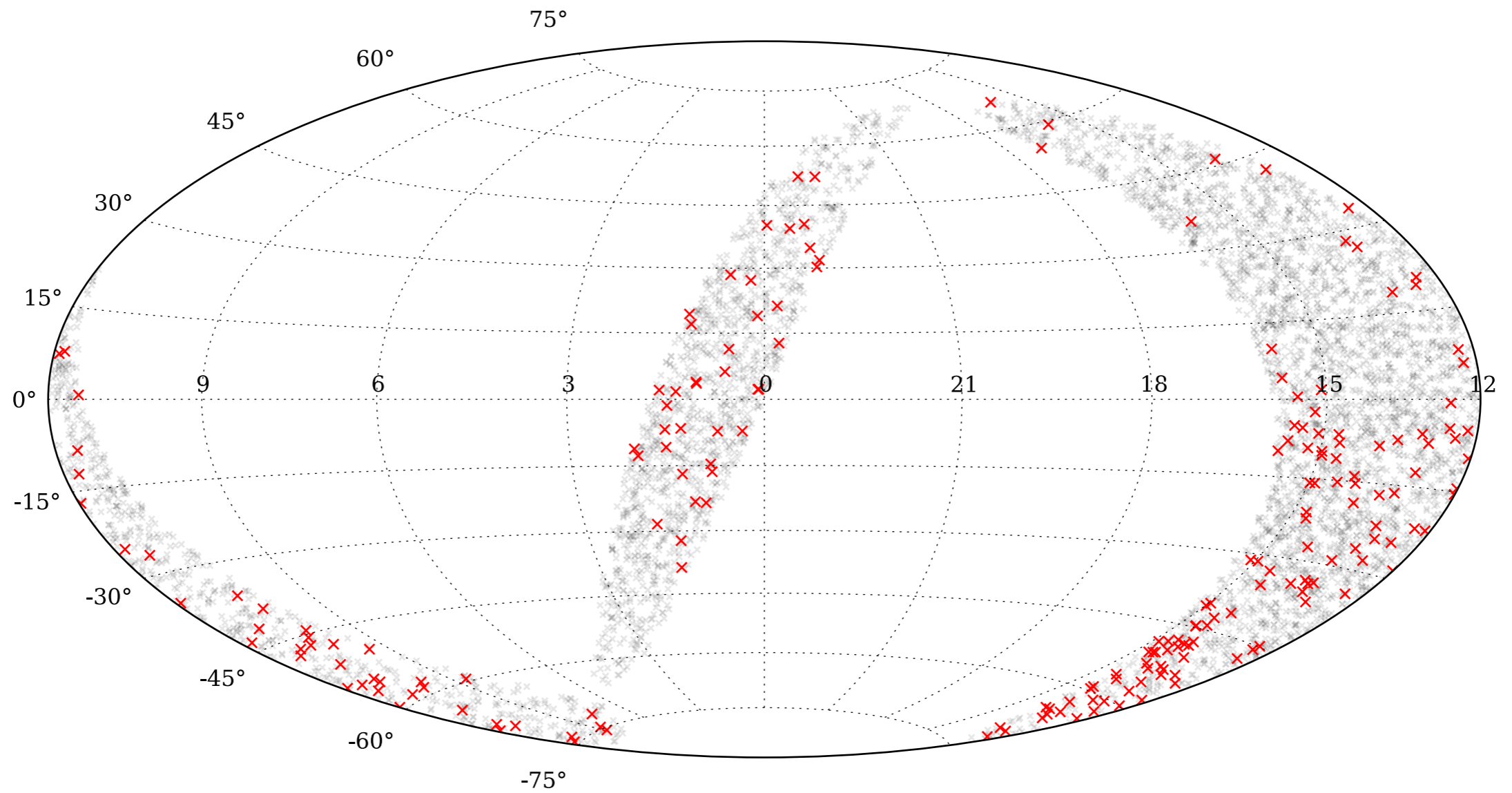
Known Y Dwarf



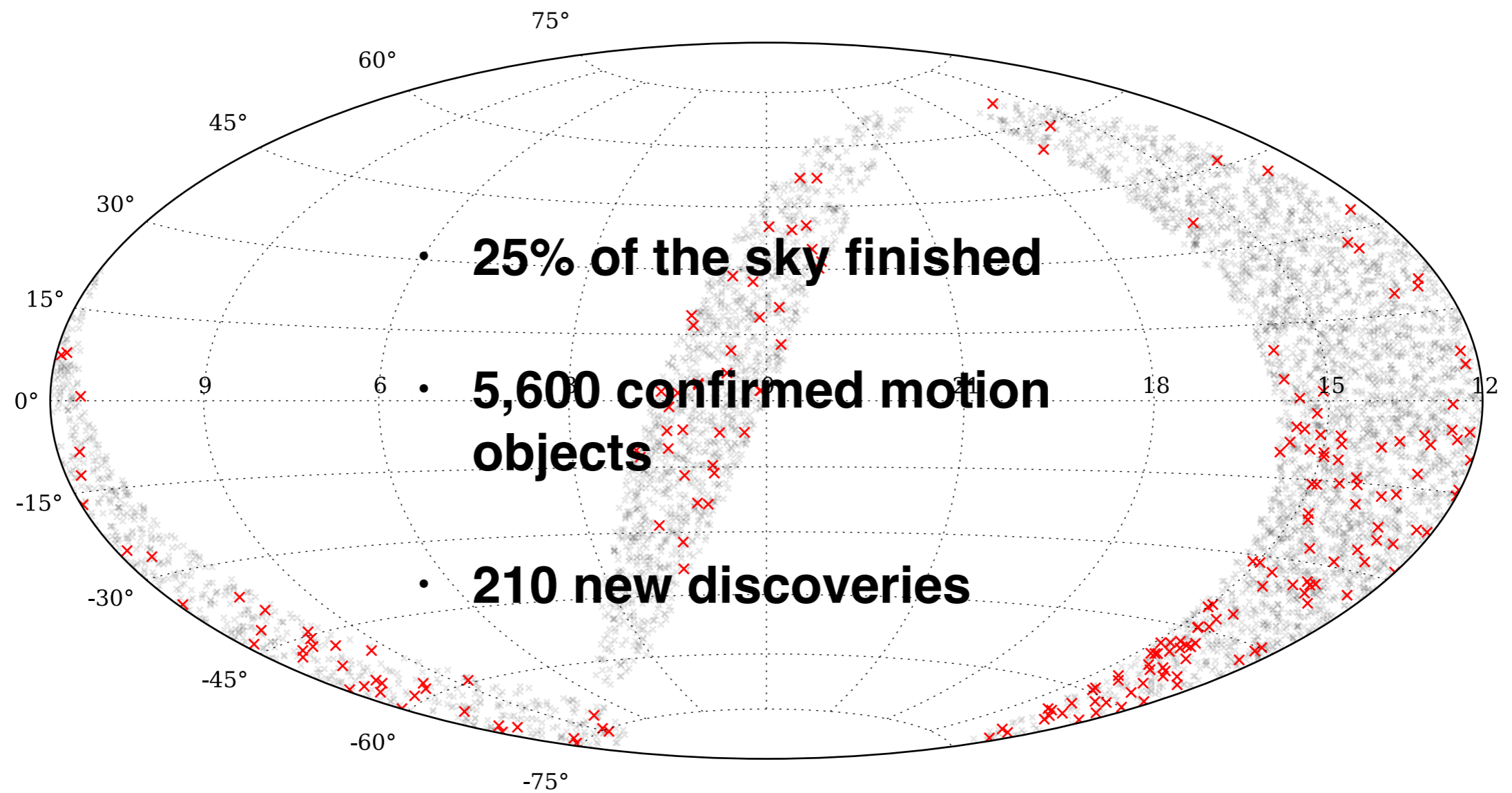
A Discovery



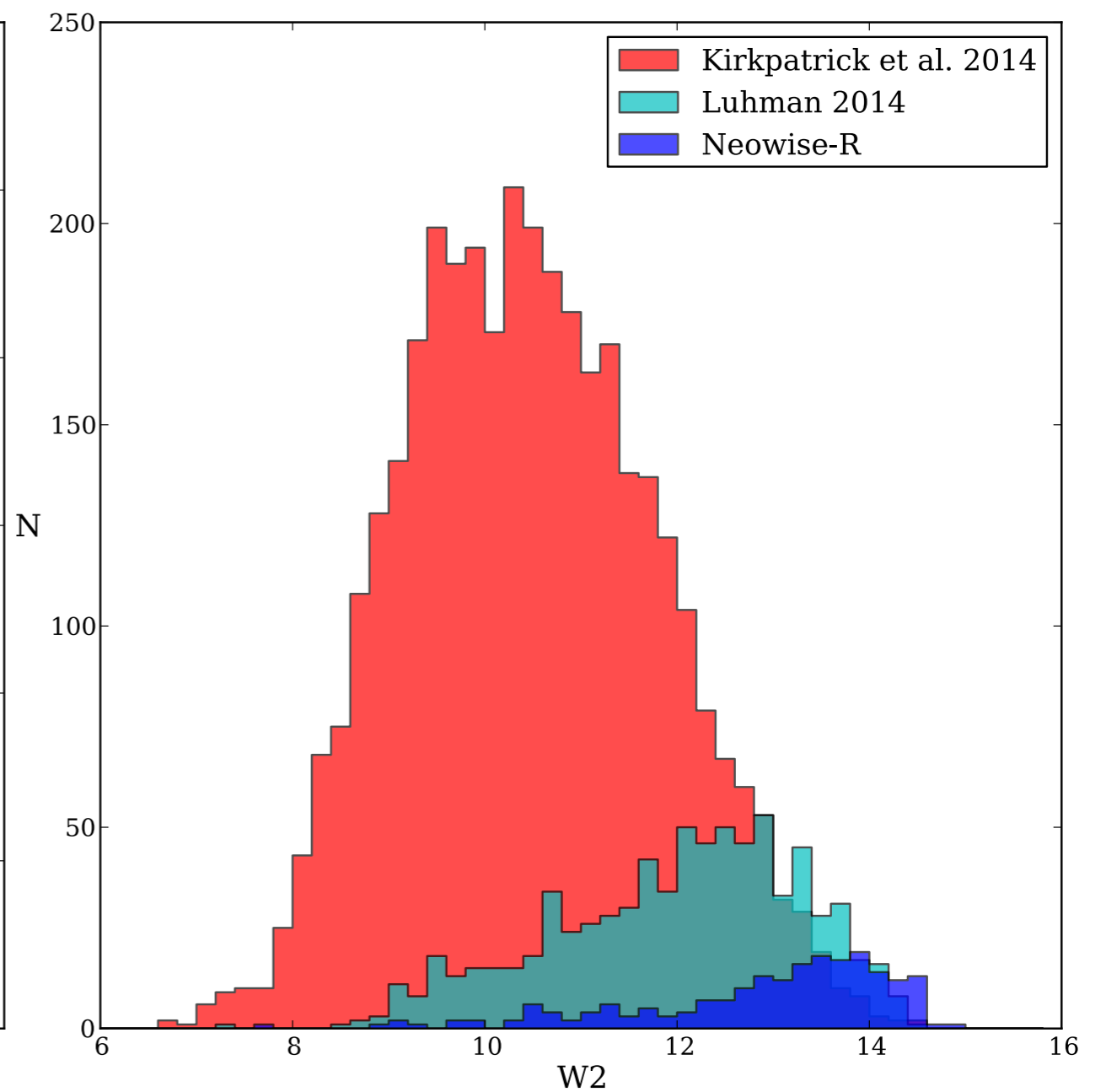
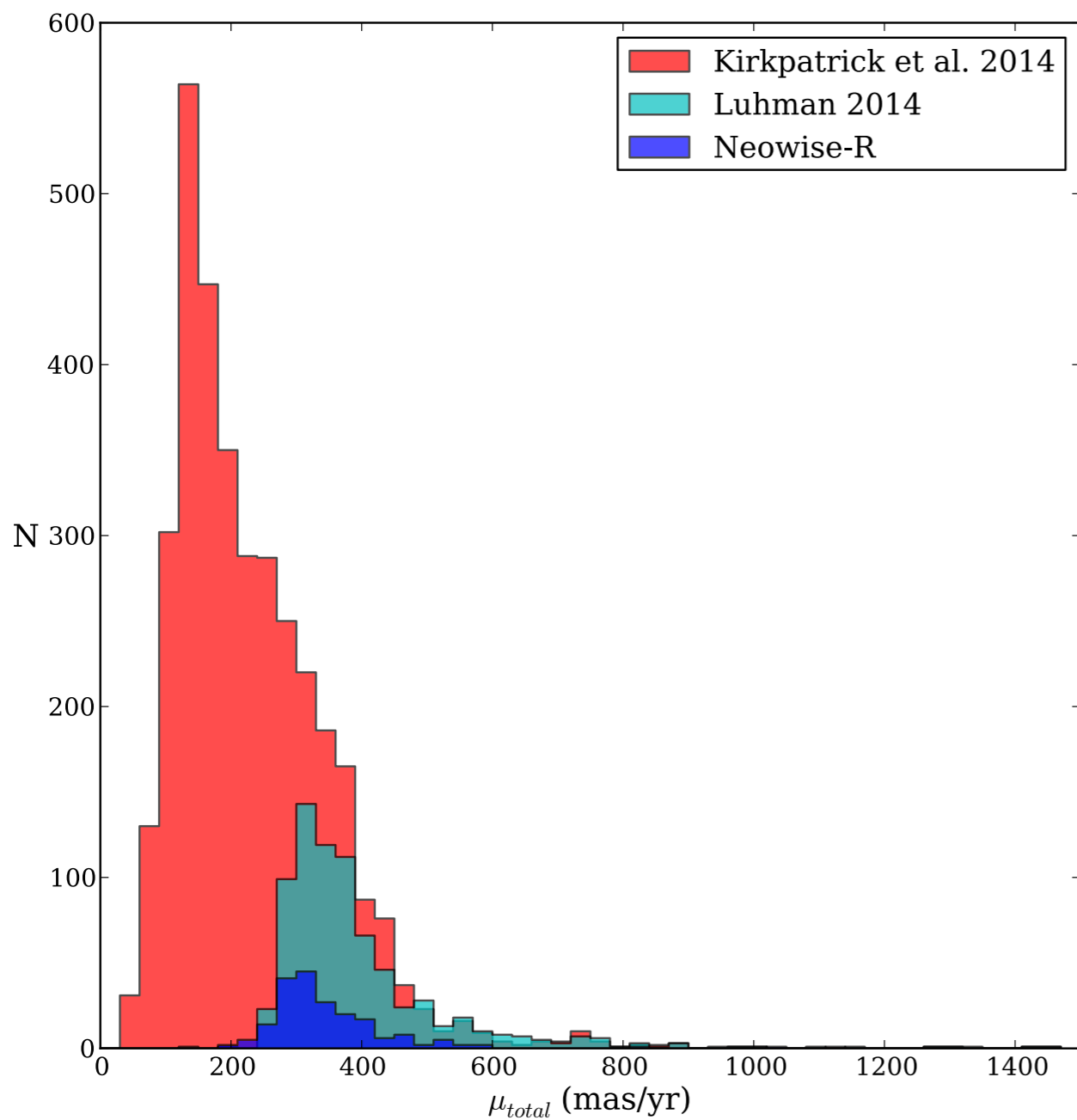
Progress...



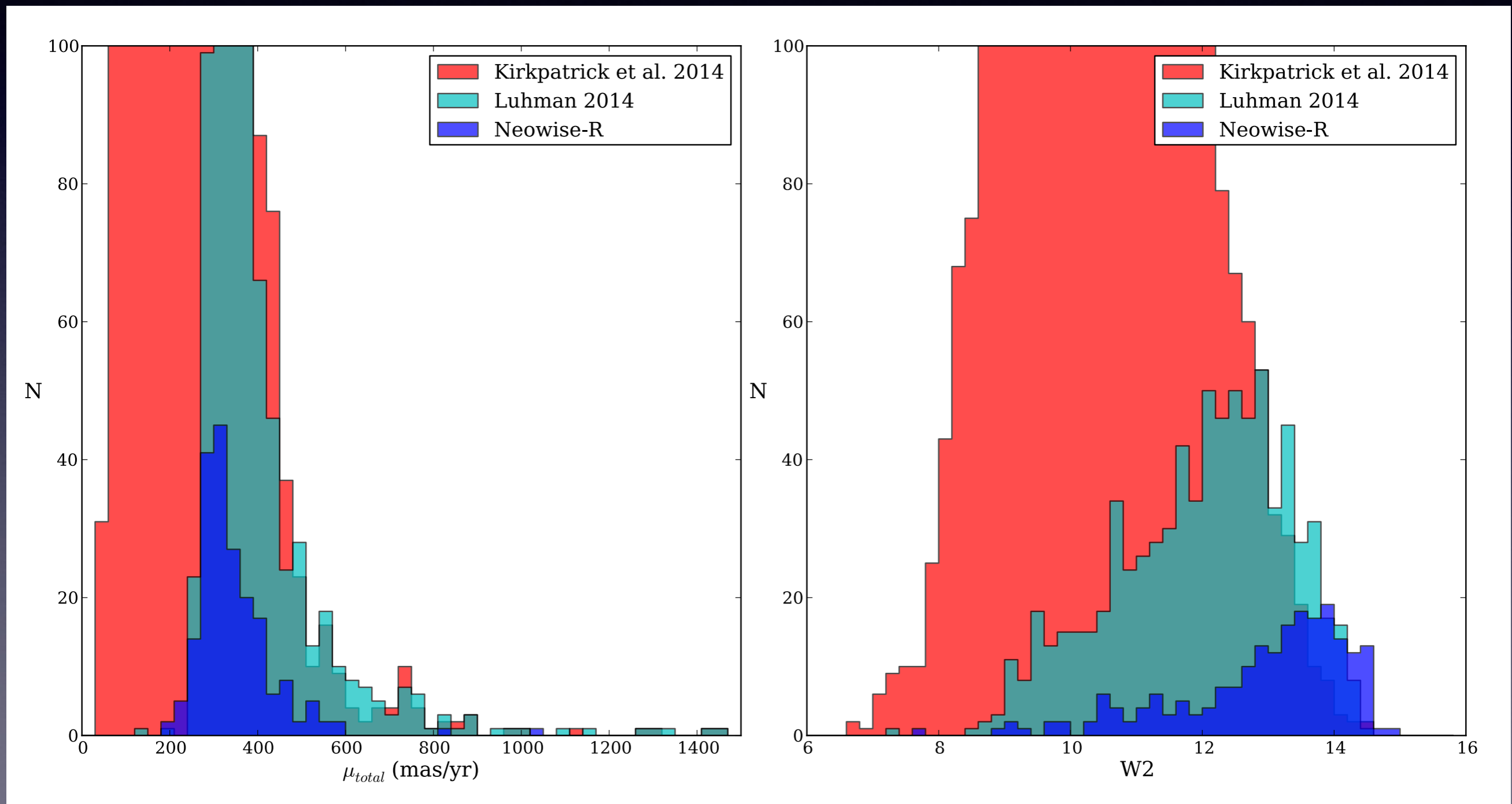
Progress...



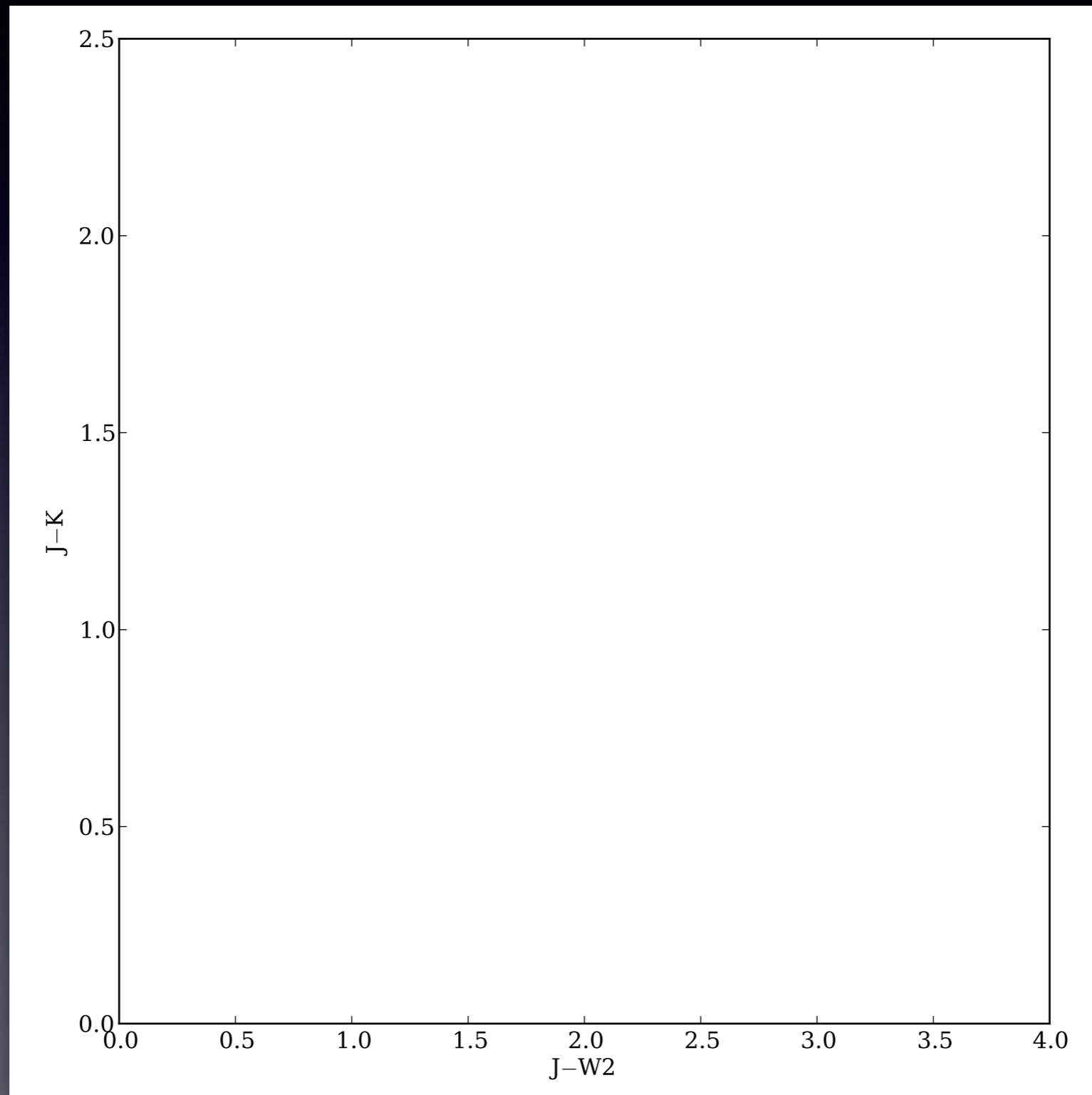
Comparison with previous surveys



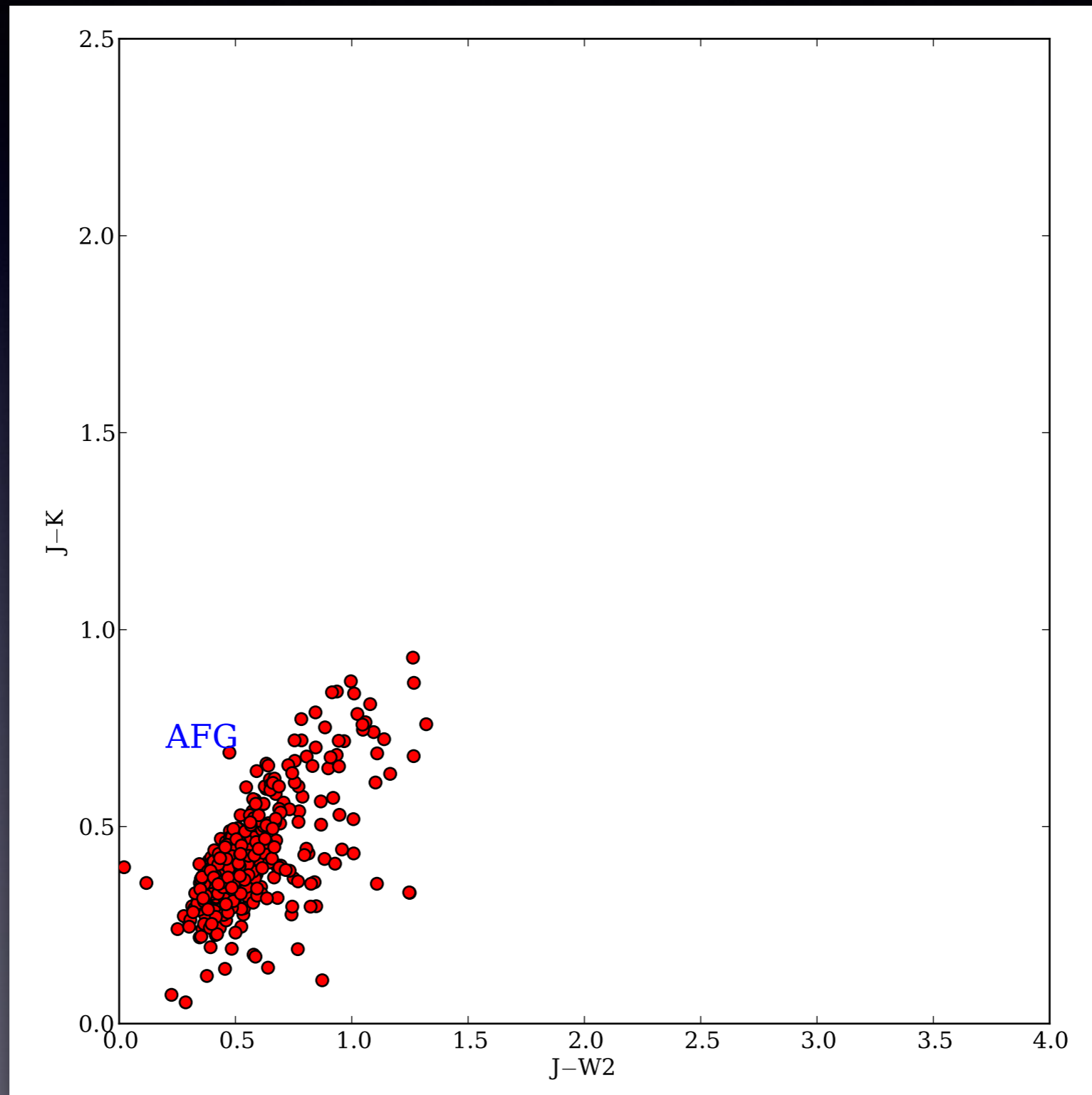
Comparison with previous surveys



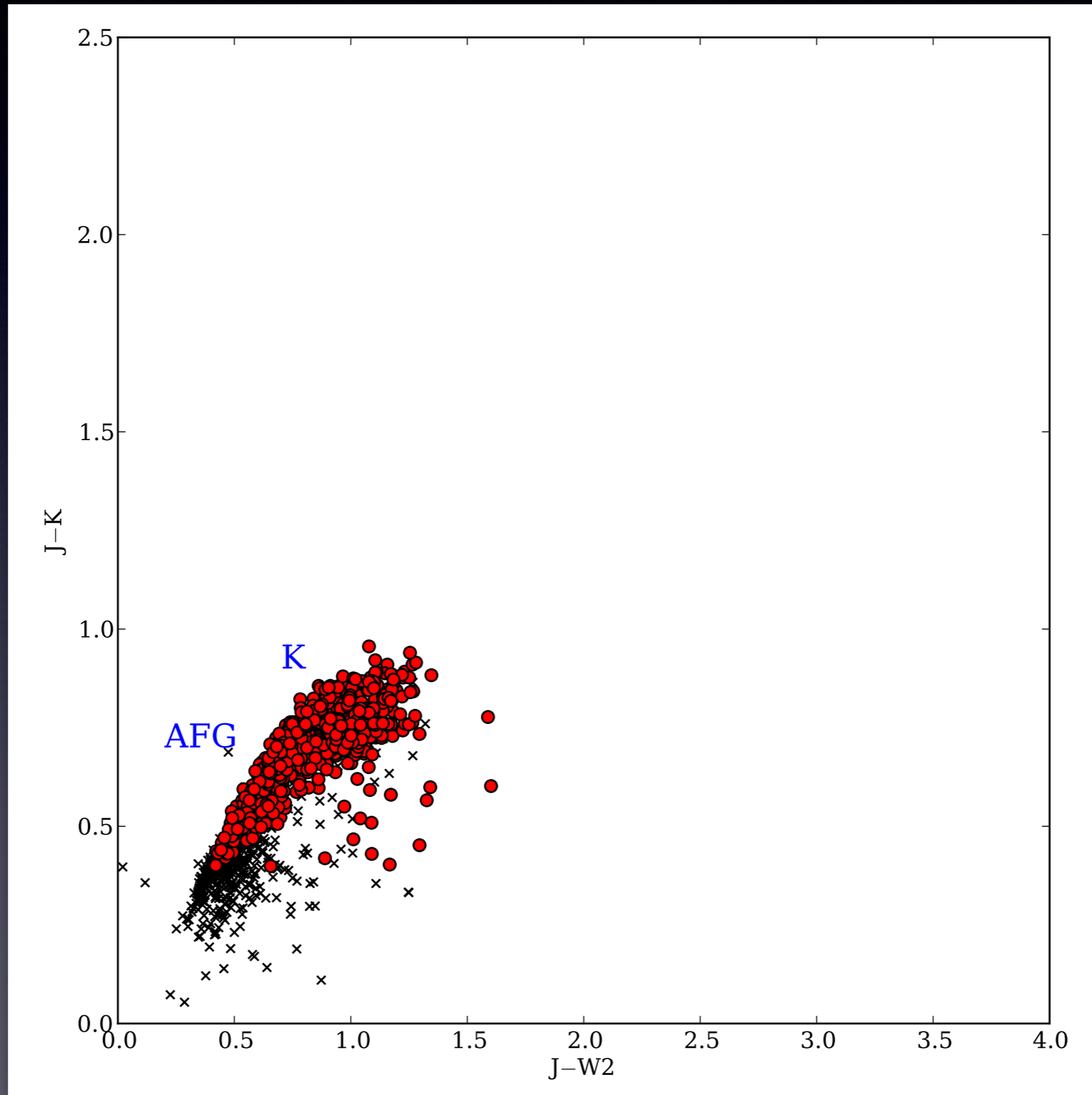
What are the new discoveries?



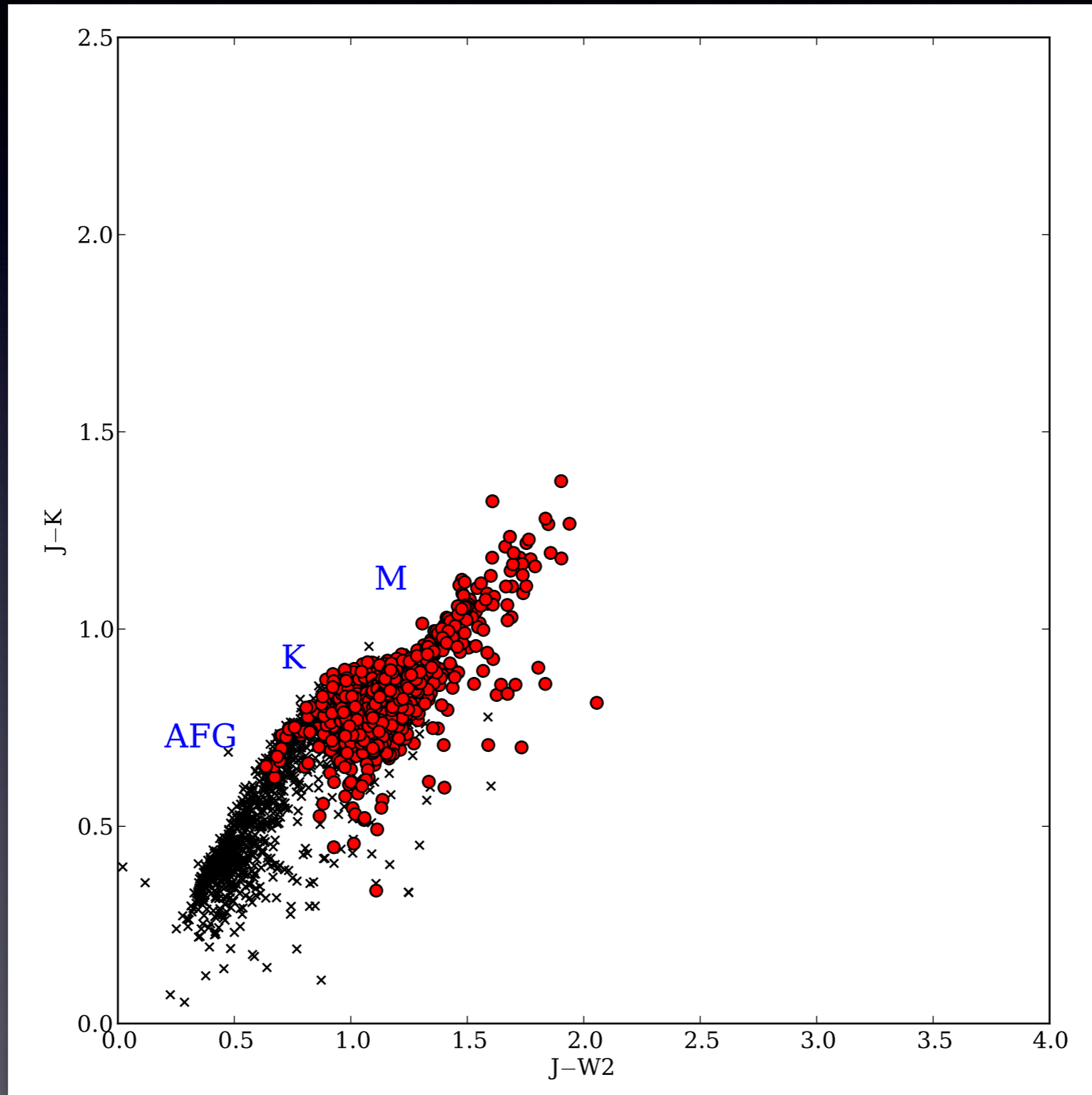
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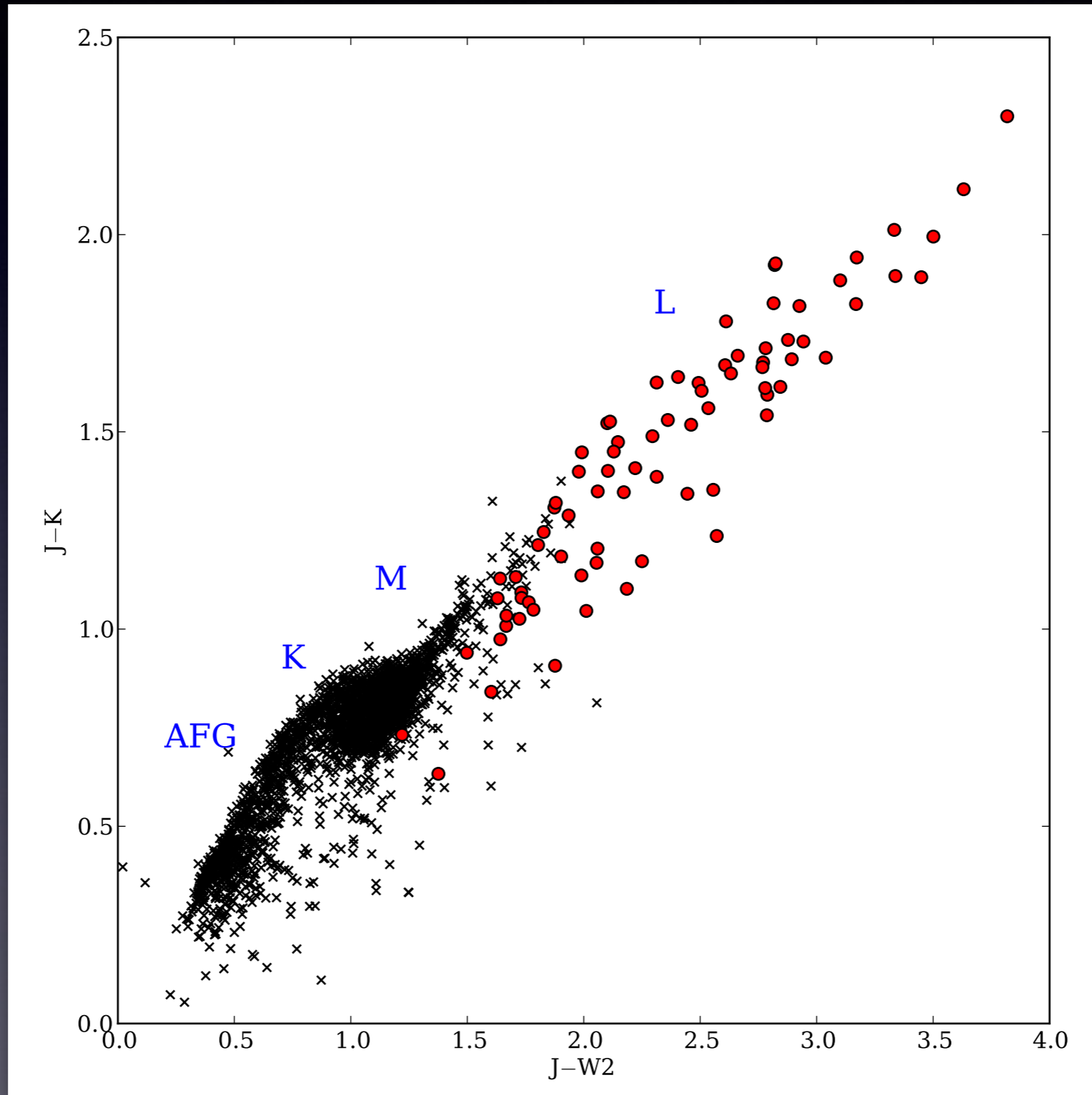
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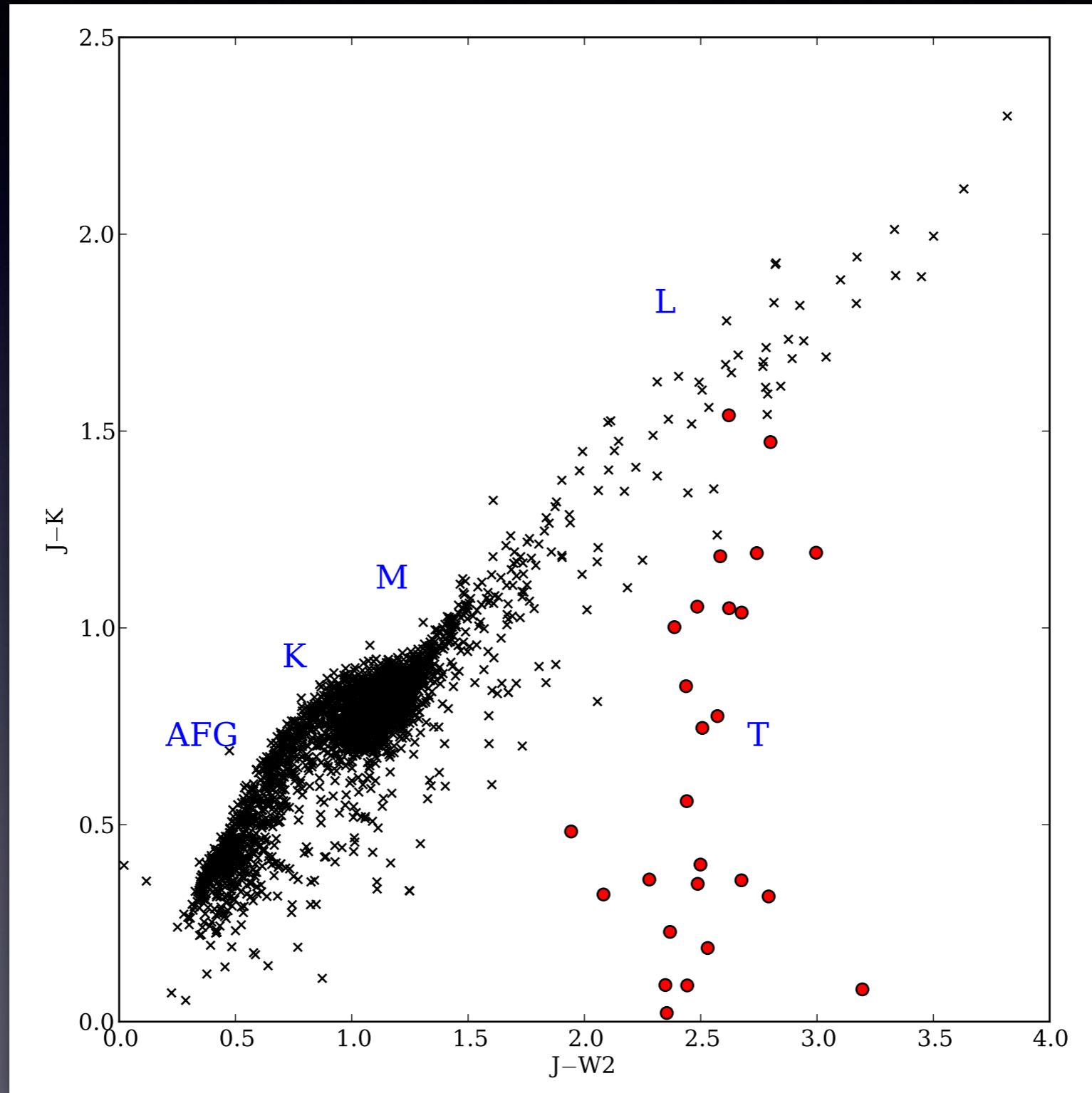
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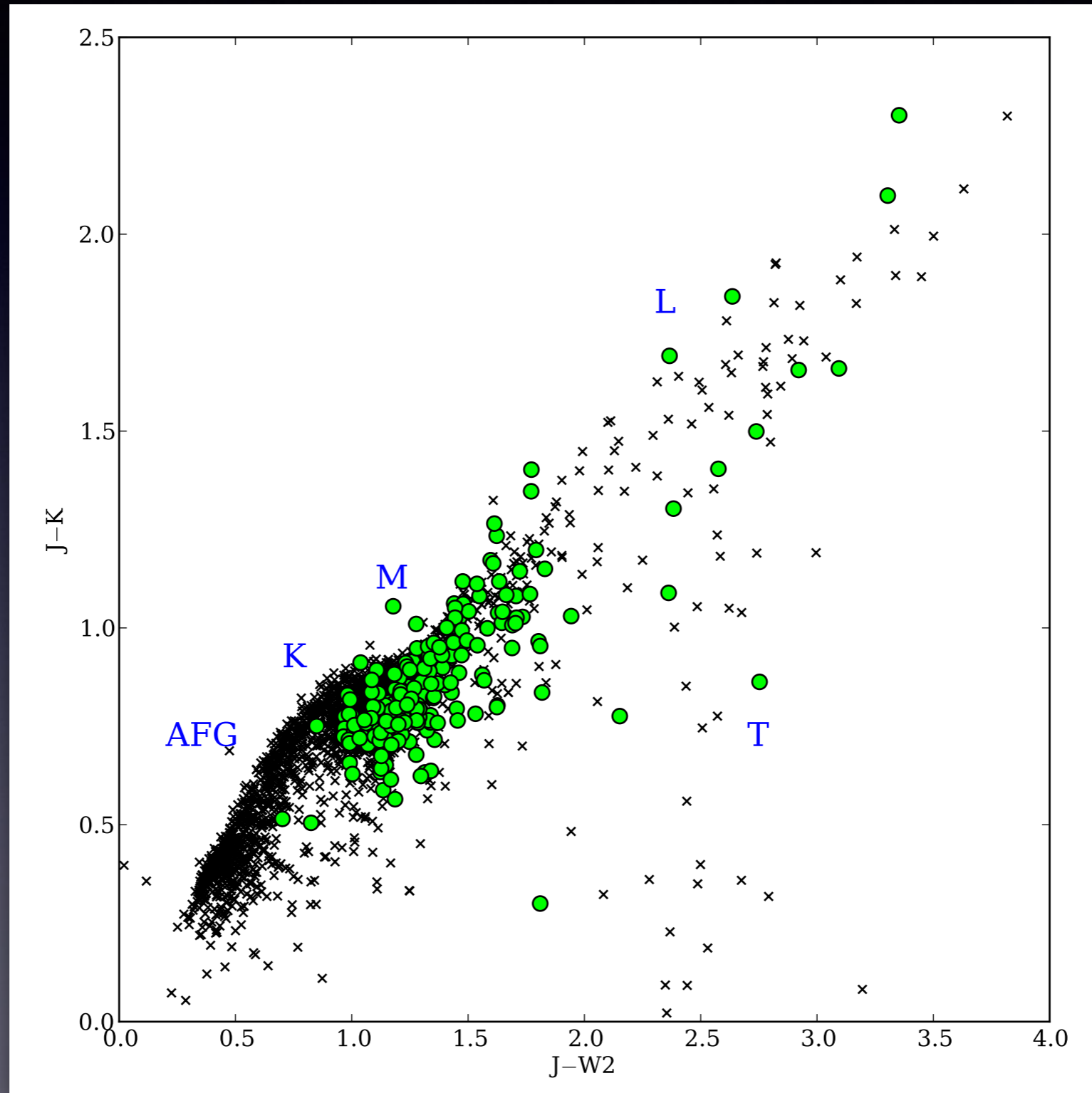
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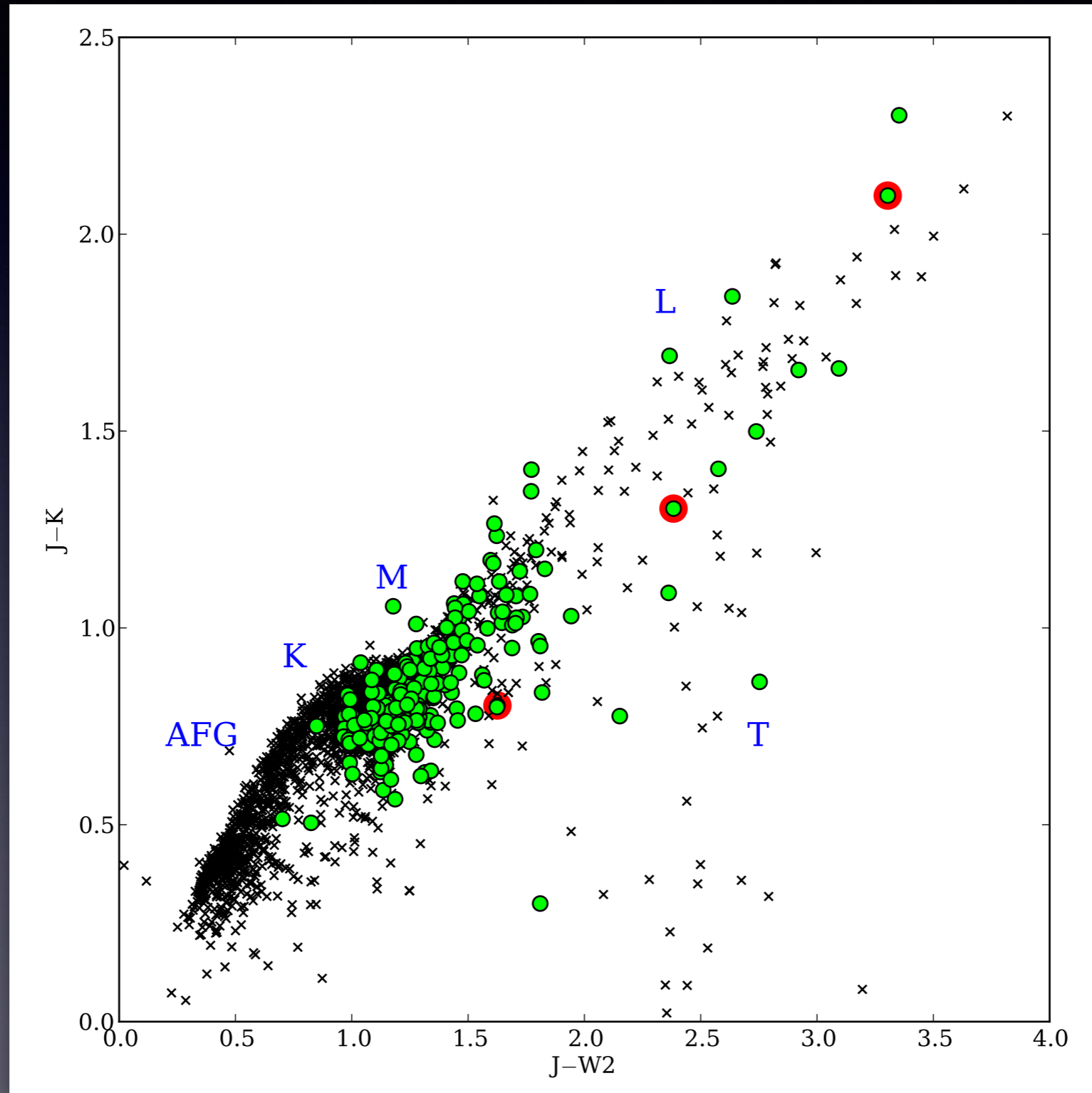
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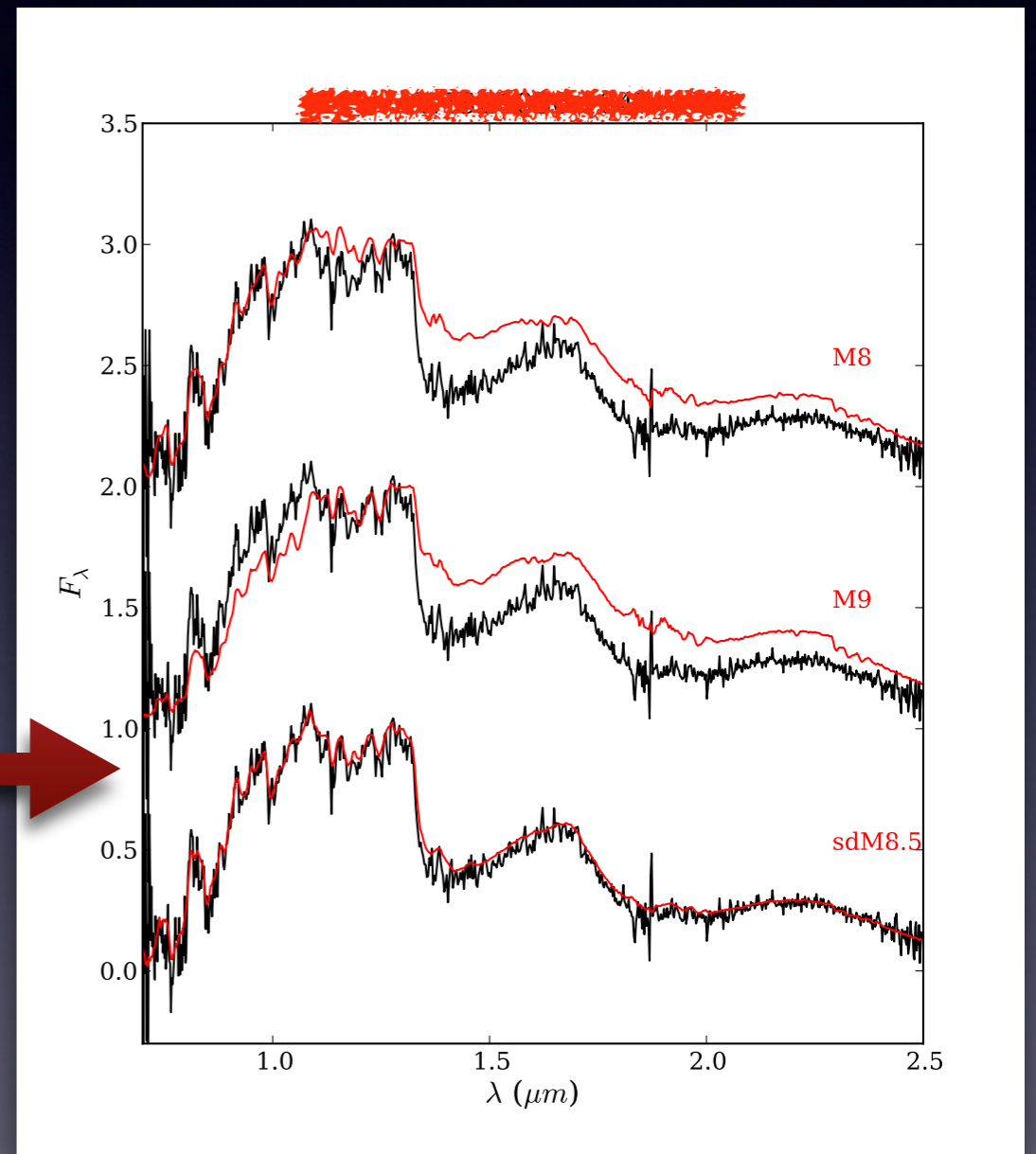
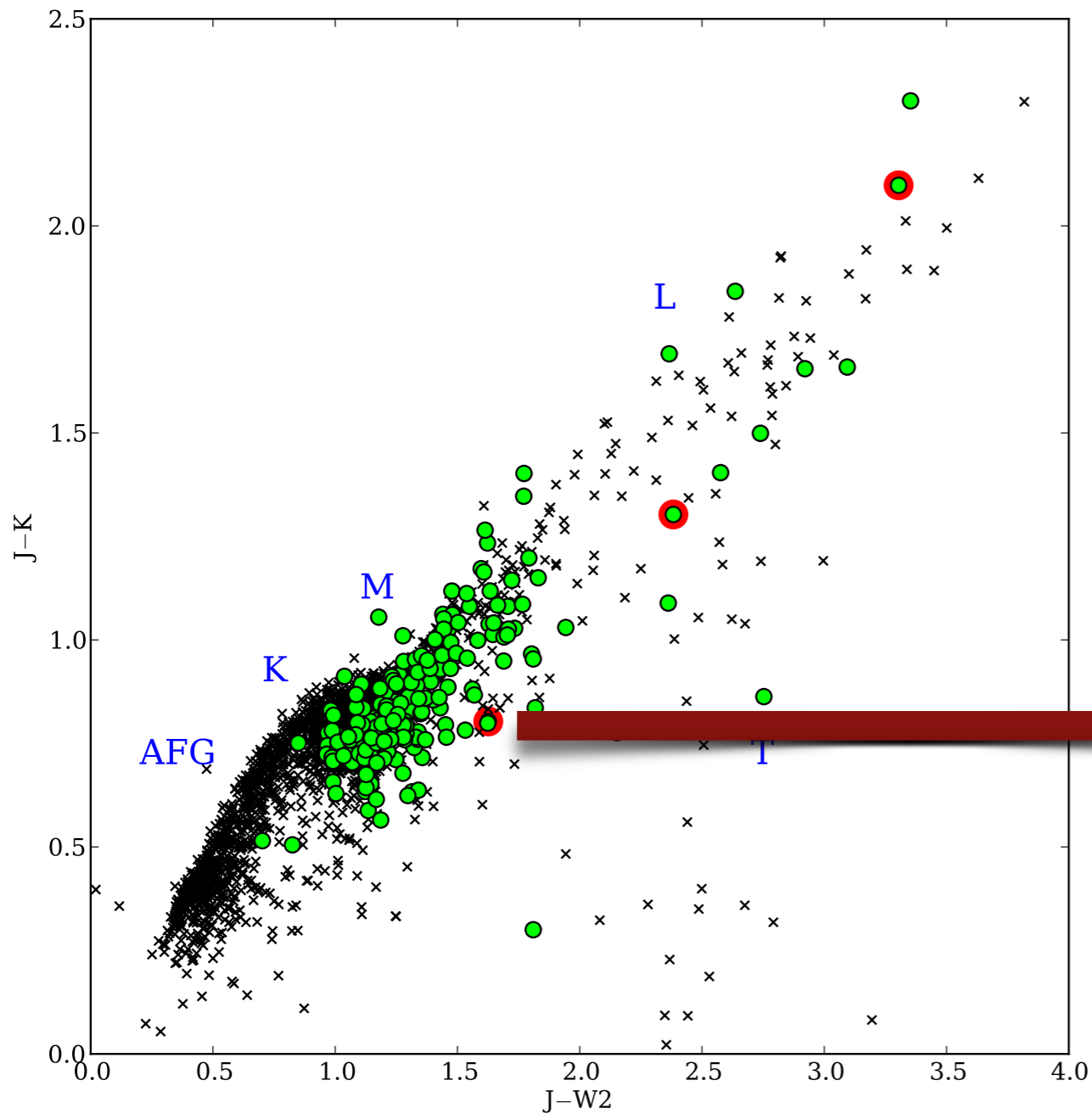
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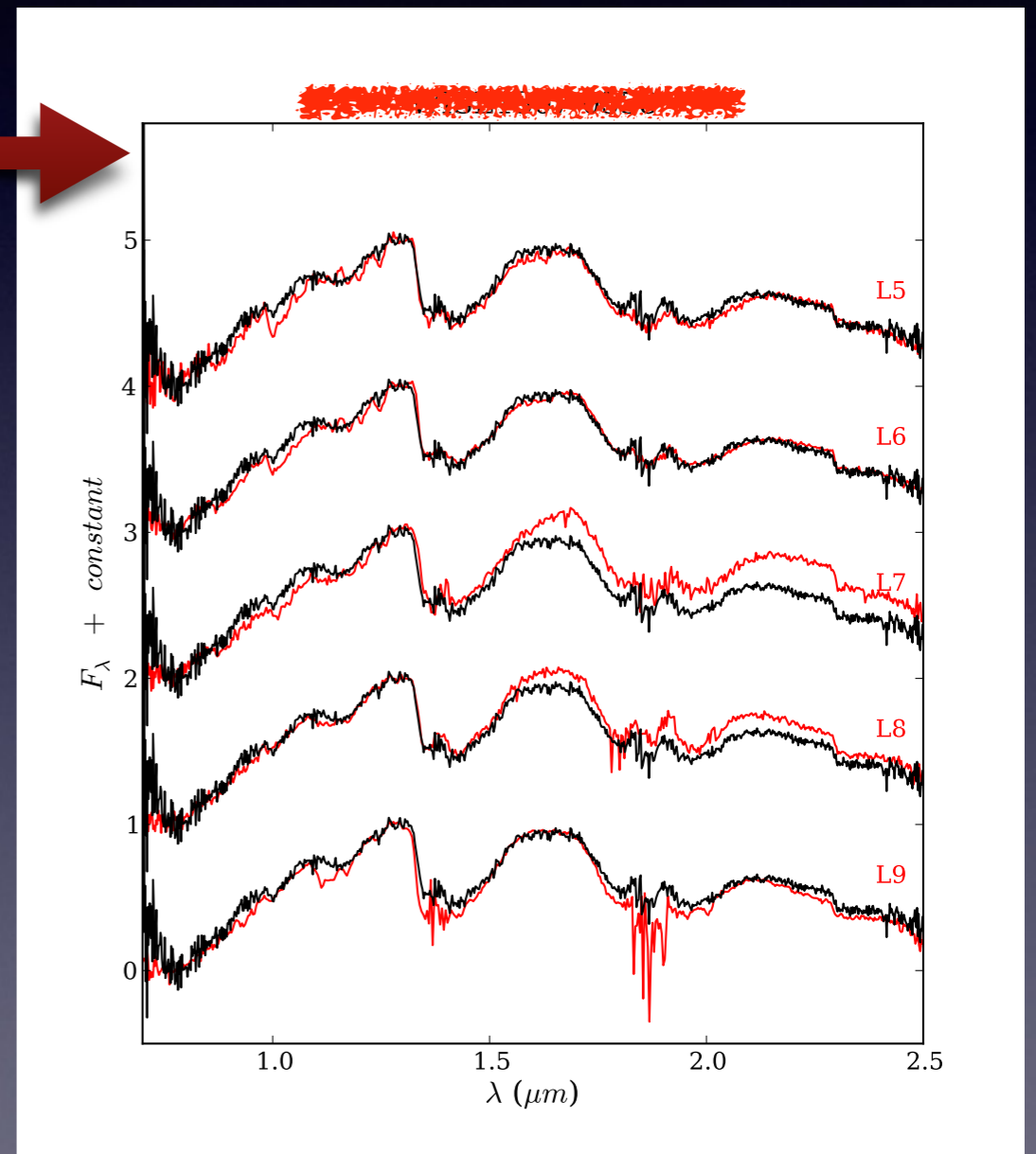
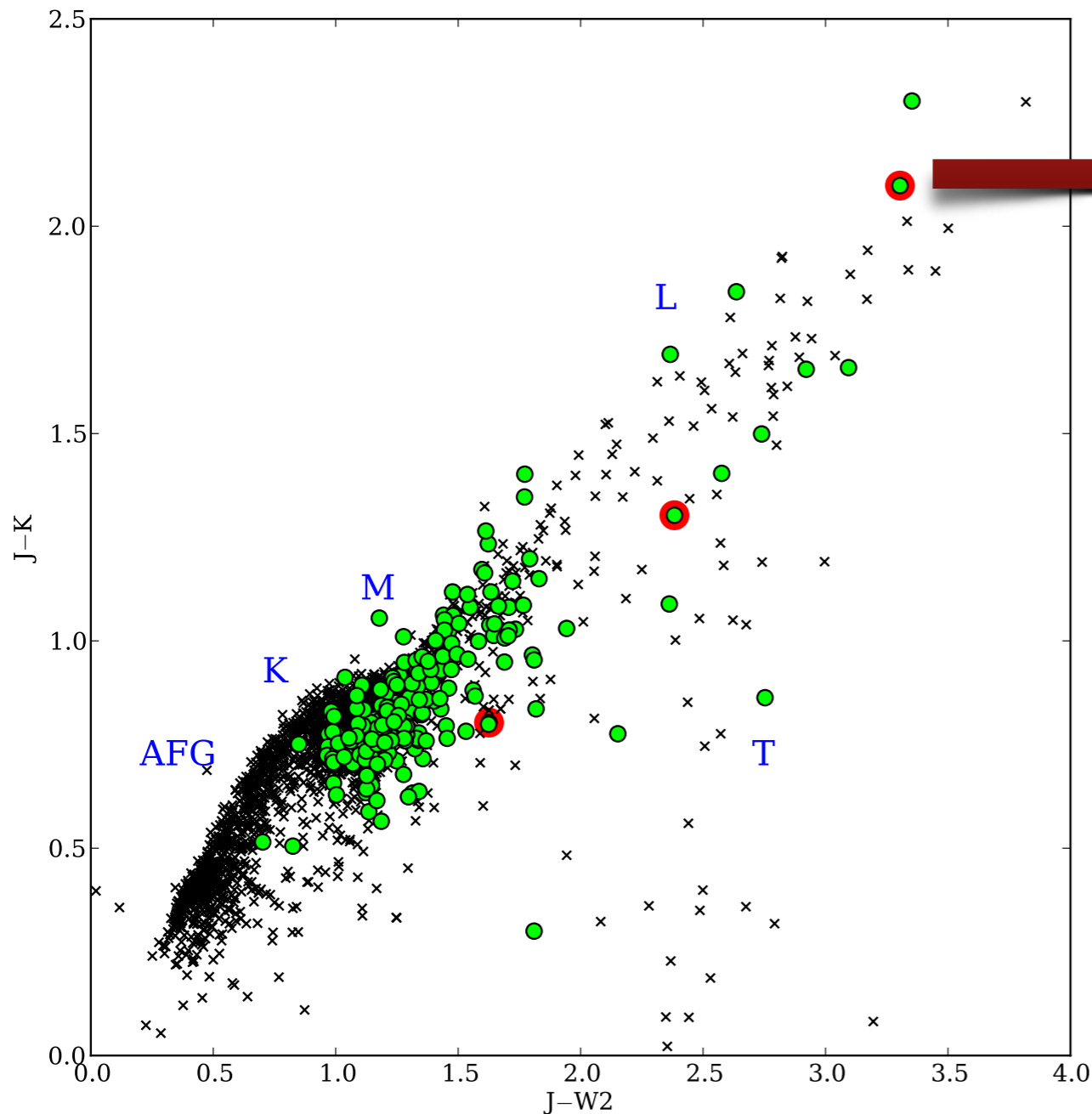


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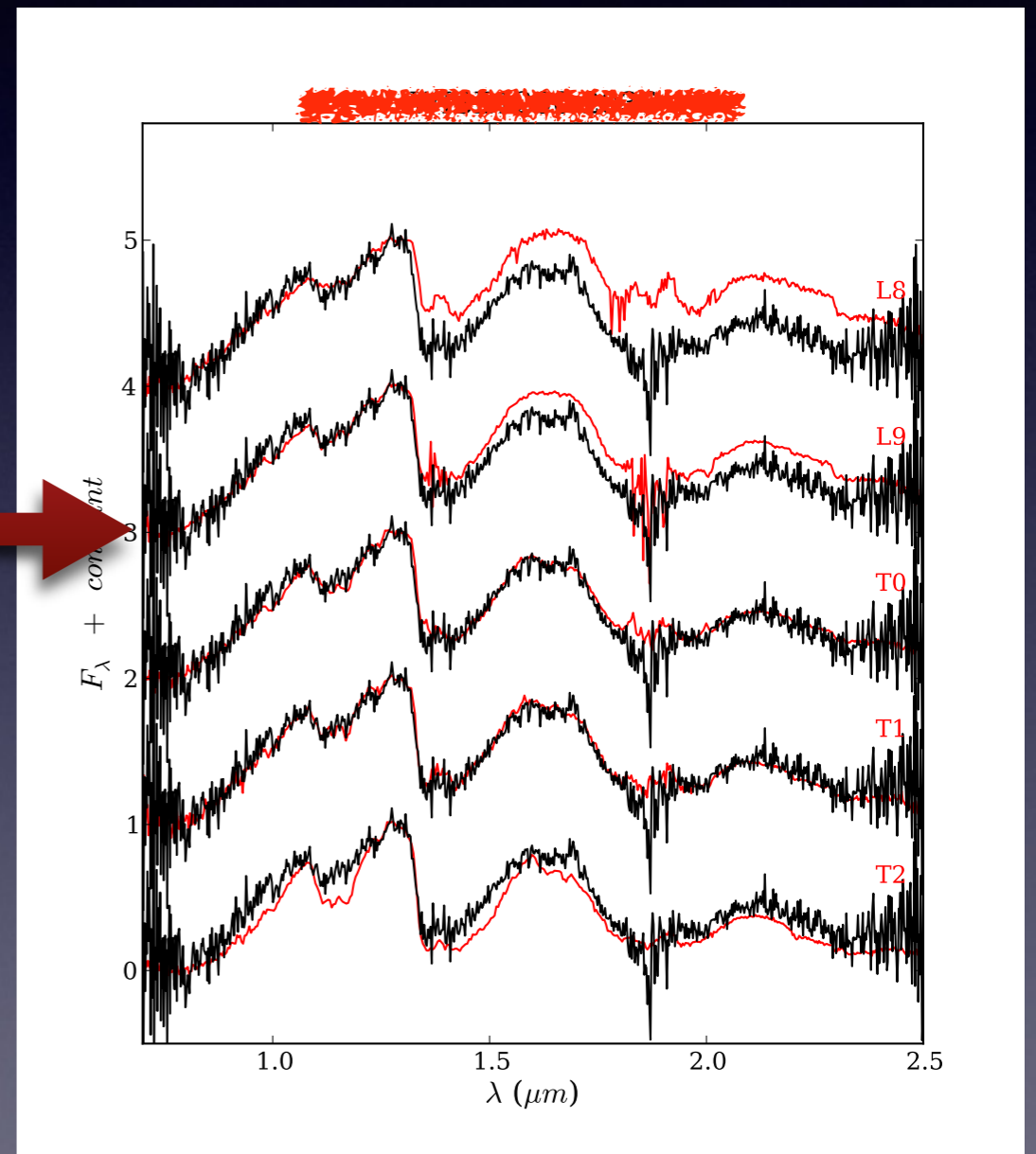
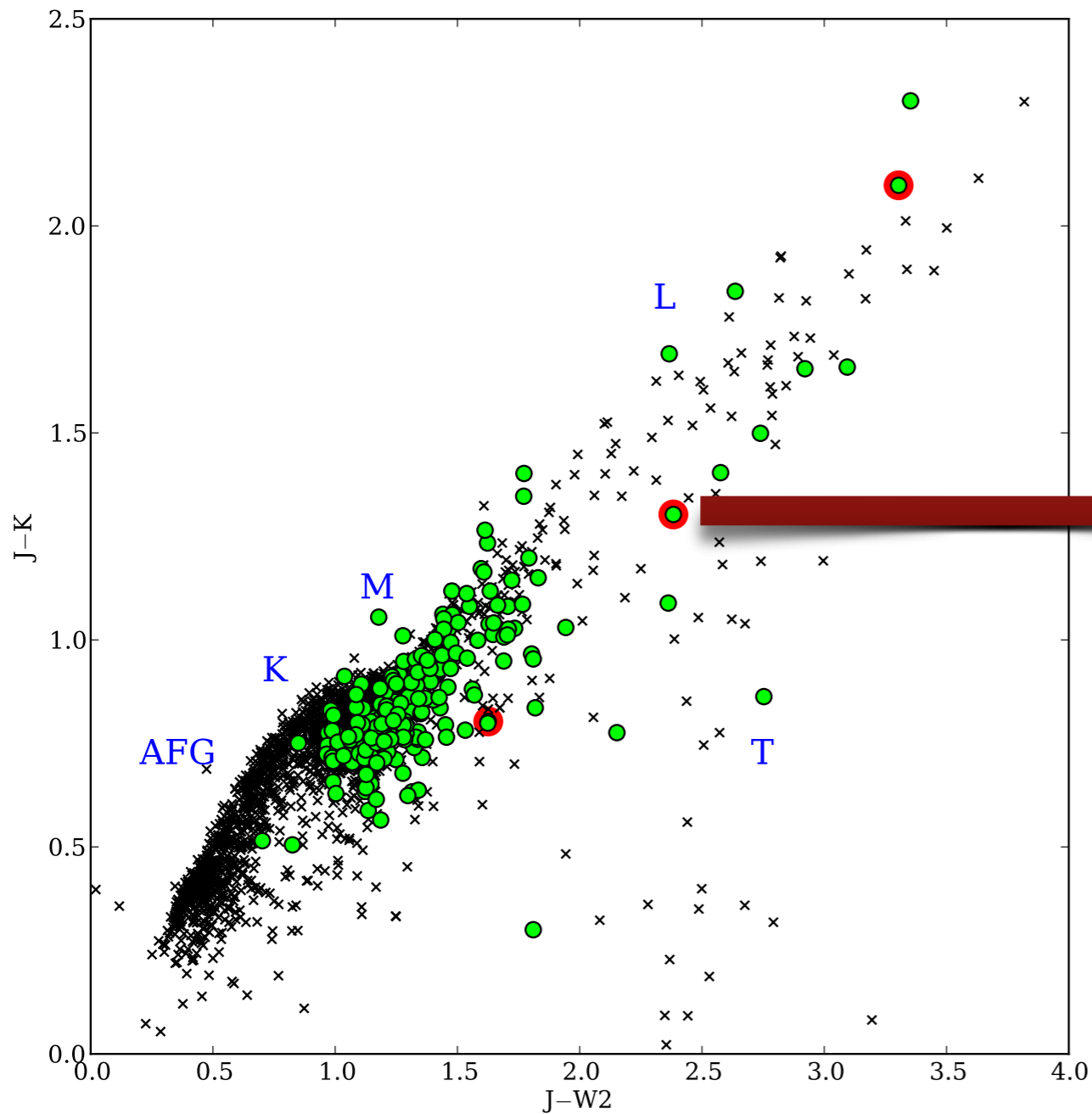
Standards from the SpeX Prism Library
<http://pono.ucsd.edu/~adam/browndwarfs/spexprism/>

What are the new discoveries?



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To Conclude...

- NEOWISE-R proper motion survey is underway
- Initial results promising
 - 210 high proper motion discoveries
 - 1 confirmed late-M subdwarf, 1 confirmed late-L dwarf, and 1 confirmed T dwarf

