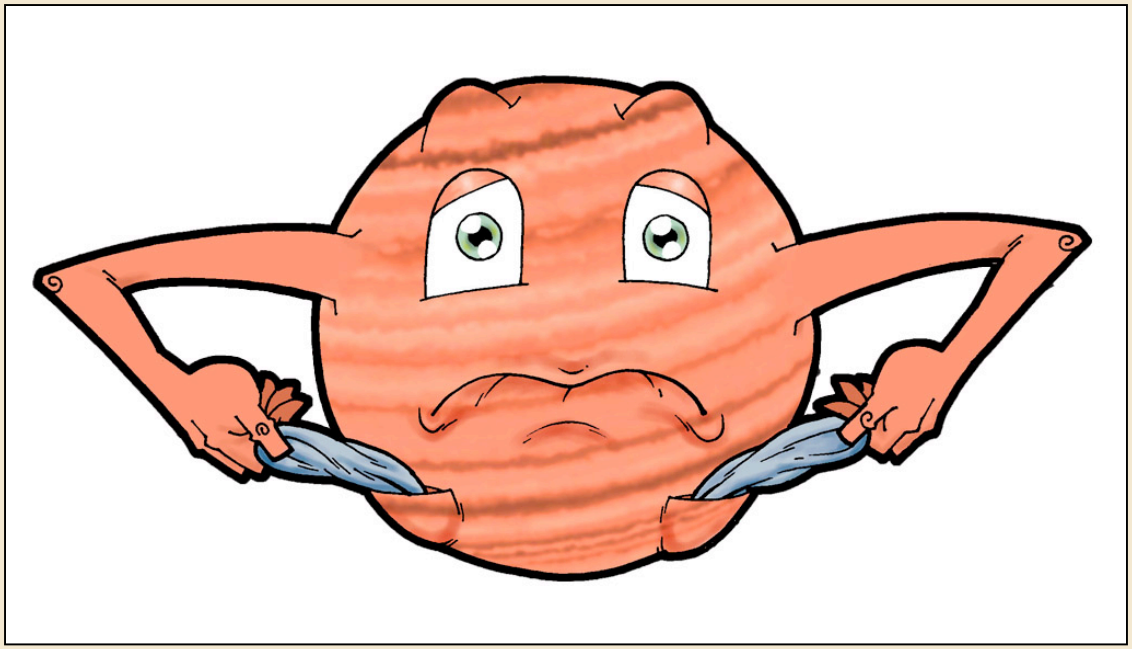
L Subdwarfs:

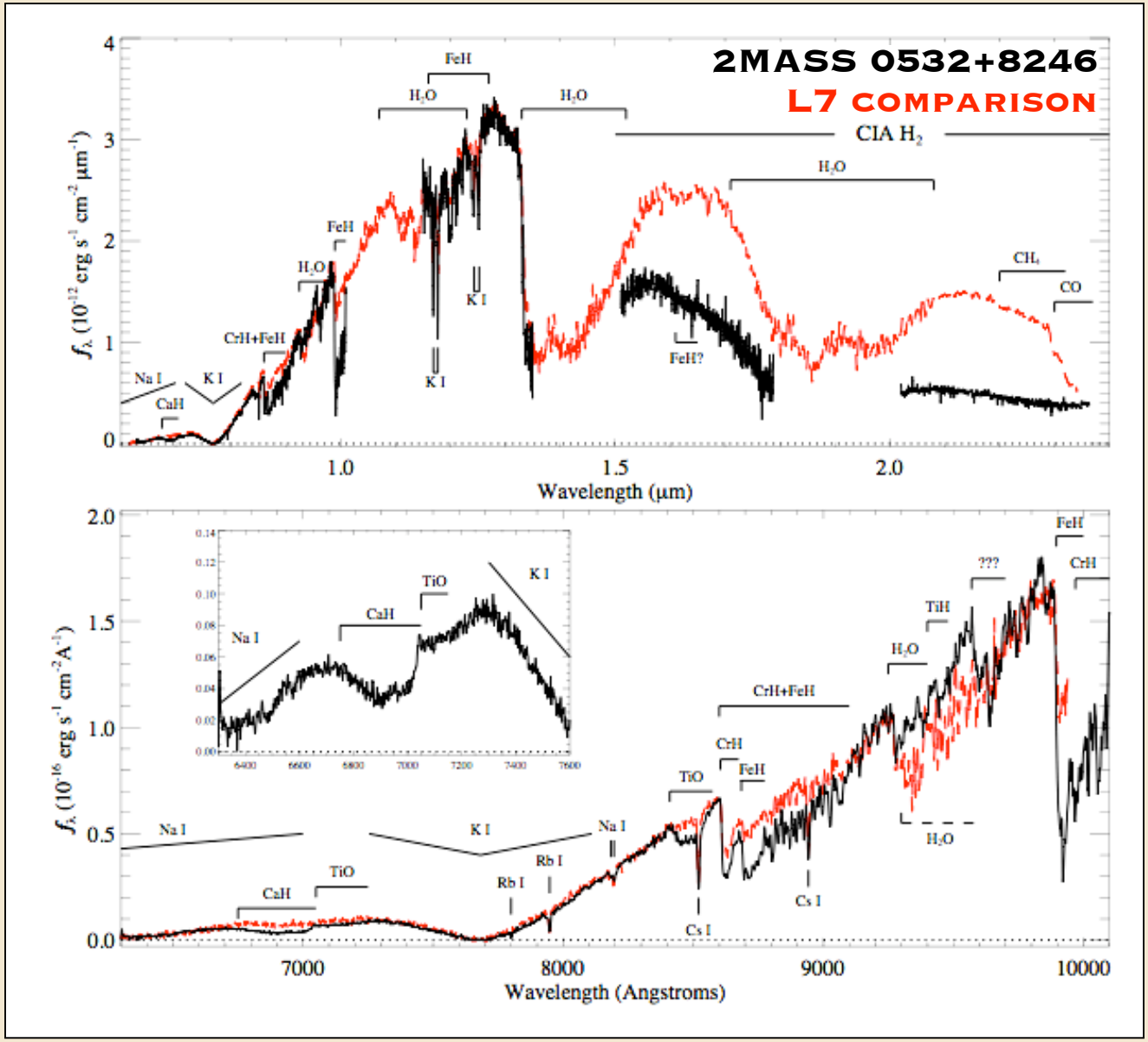
Classification, Distance Scale and Low-Metallicity Condensate Formation



Adam J. Burgasser (MIT)

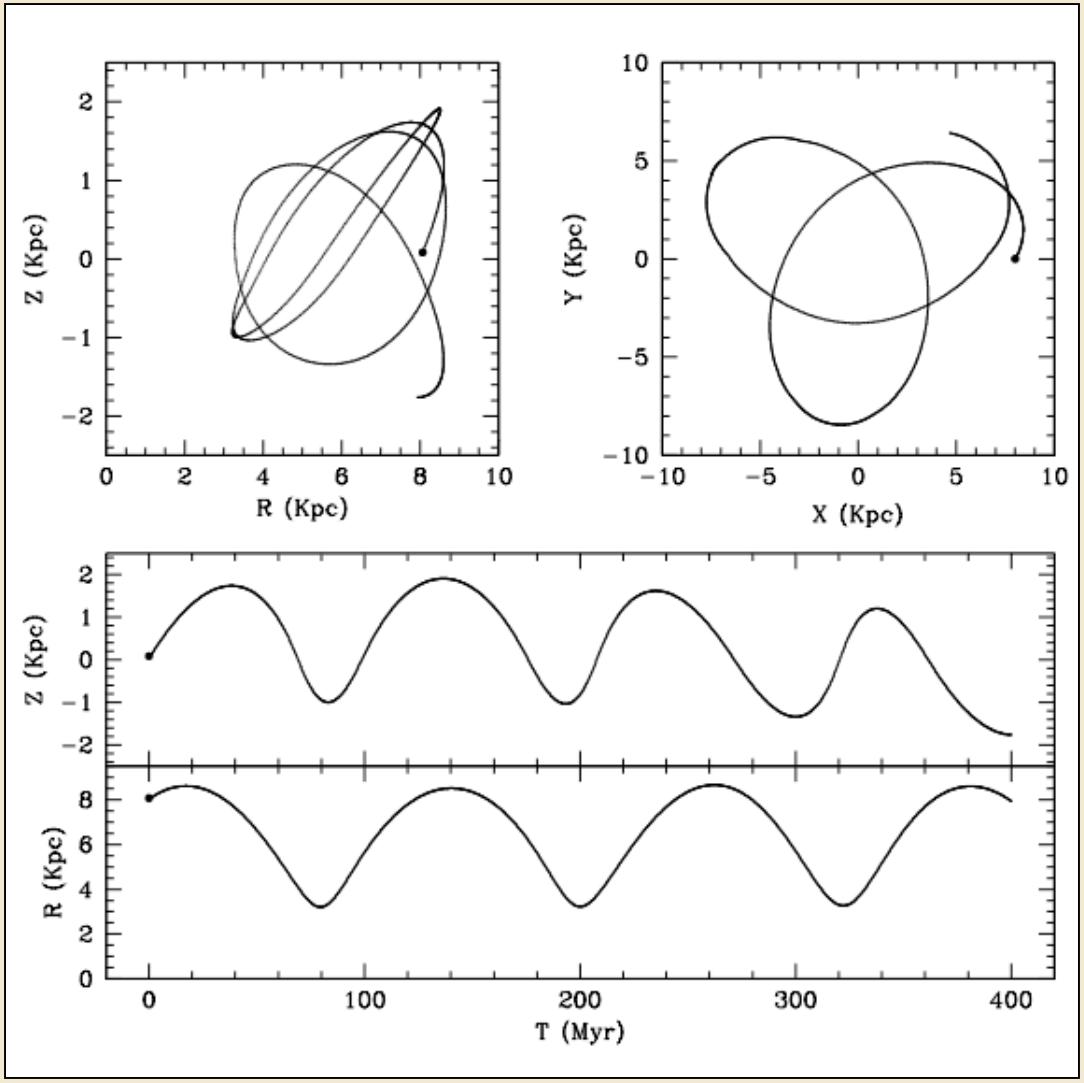
Cool Stars 15
Subdwarf Splinter

- Overview
- Classification
- Luminosity and absolute magnitude scales
- Condensation in L Subdwarfs



Burgasser et al. (2003)

Galactic orbit of sdL 2mass 0532+8246



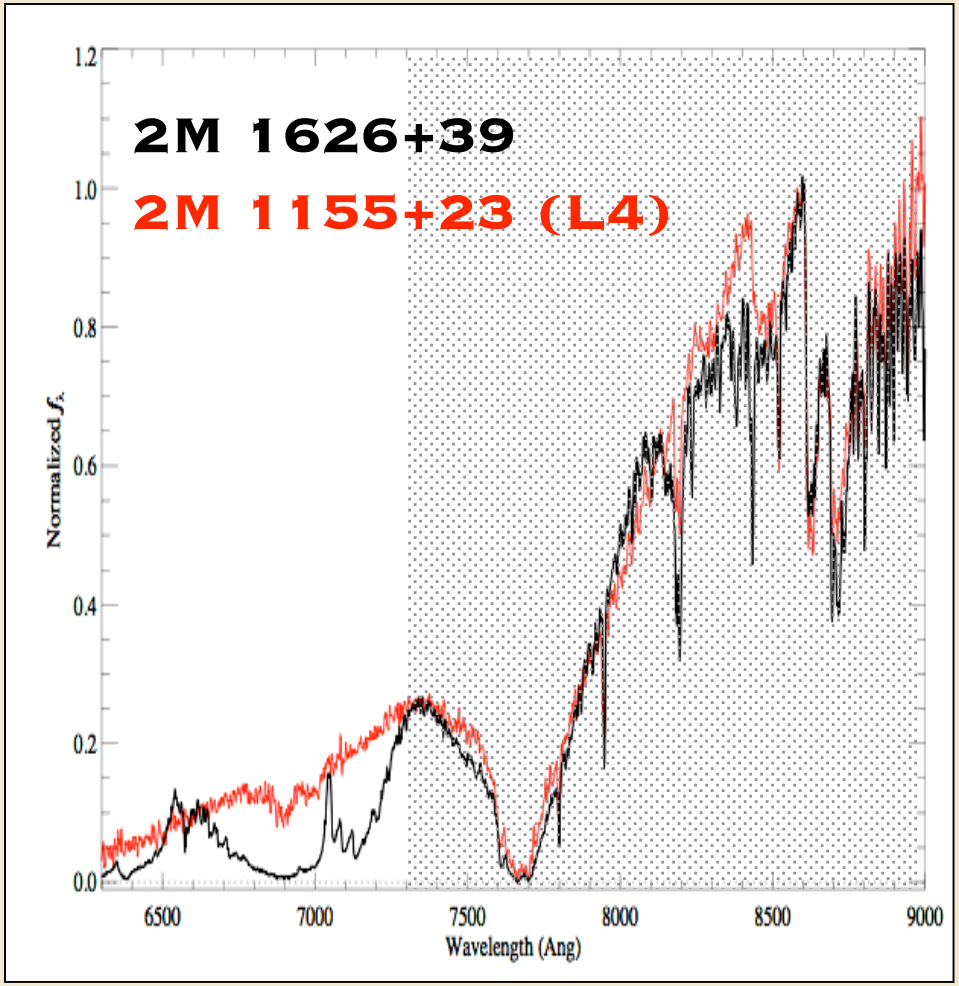
Burgasser et al. (2008)

Known L Subdwarfs

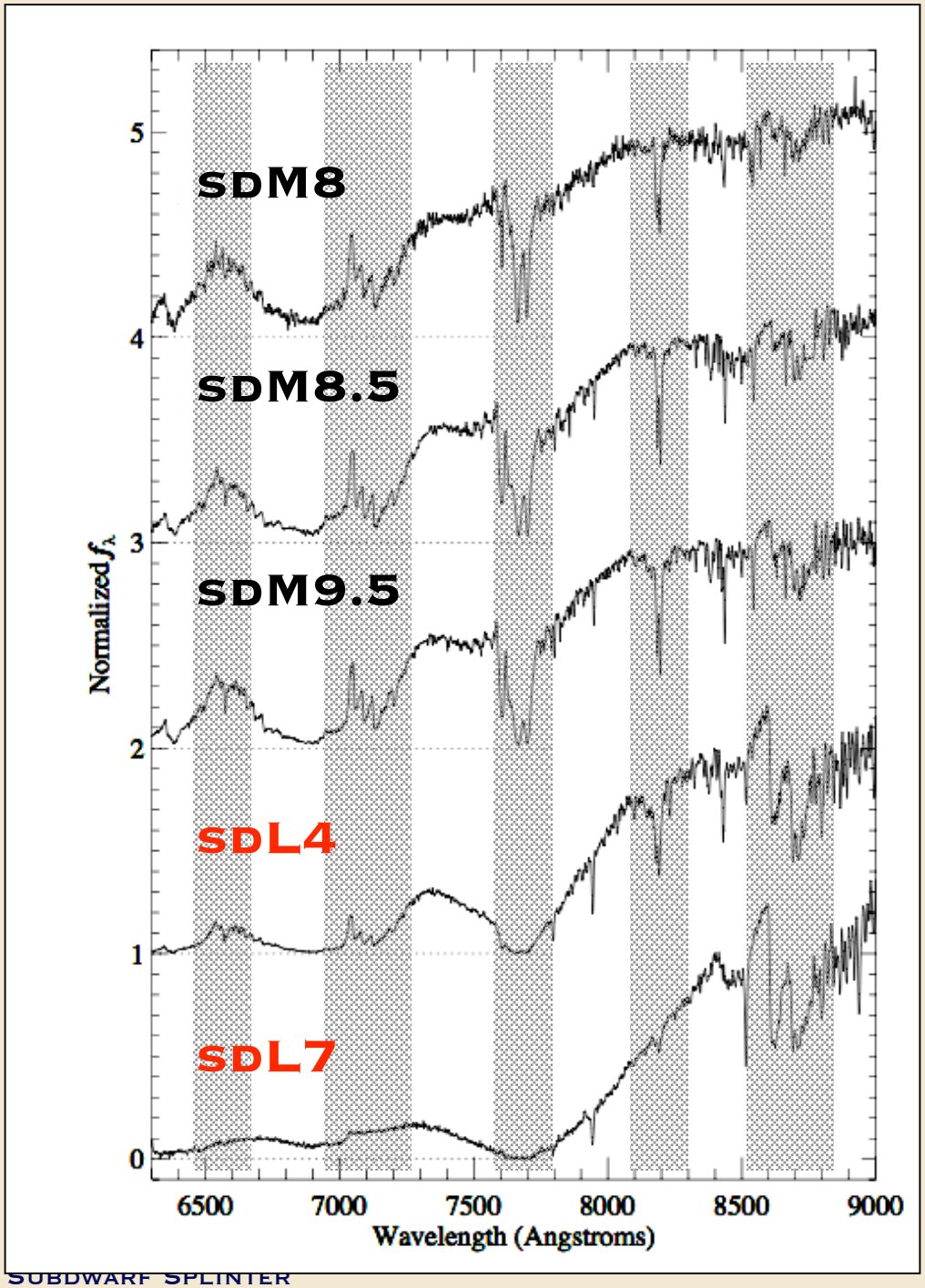
Source	SpT*	J	μ (“/yr)	Disc. Ref.
2MASS 0532+8246	sdL7	15.2	2.62	Burgasser et al. 2003
LSR 1610-0040(B?)	Early sdL?	13.0	1.46	Lepine et al. 2003; Dahn et al. 2008
2MASS 1626+3925	sdL4	14.4	1.27	Burgasser 2004
SDSS 1256-0224	sdL3.5	16.1	0.62	Sivarani et al. Unpub.
2MASS 0616-6407	sdL6:	16.4	1.50	Cushing et al. In prep.
SSSPM 1444-2019	d/sdL?	12.6	3.51	Scholz et al. 2004
2MASS 1640+1231	d/sdL?	16.0	0.82	Burgasser et al. 2007
2MASS 0014-4844	d/sdL?	14.1	...	Kirkpatrick et al. In prep.

L Subdwarf Classification

- Comparison of **7300-9000 Å** region to Kirkpatrick et al. (1999) L dwarf standards
- NIR spectra are completely different

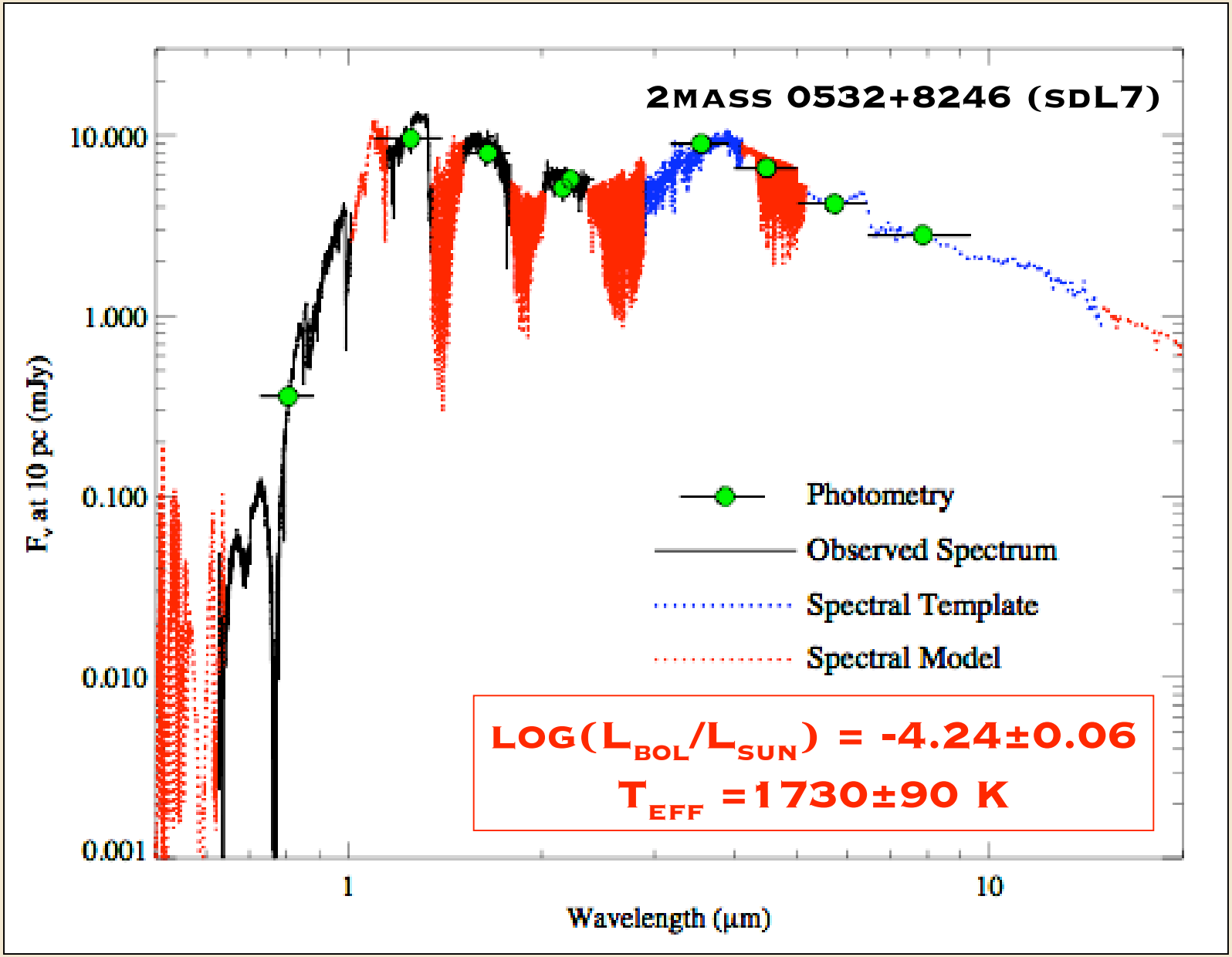


Burgasser, Cruz & Kirkpatrick (2007)

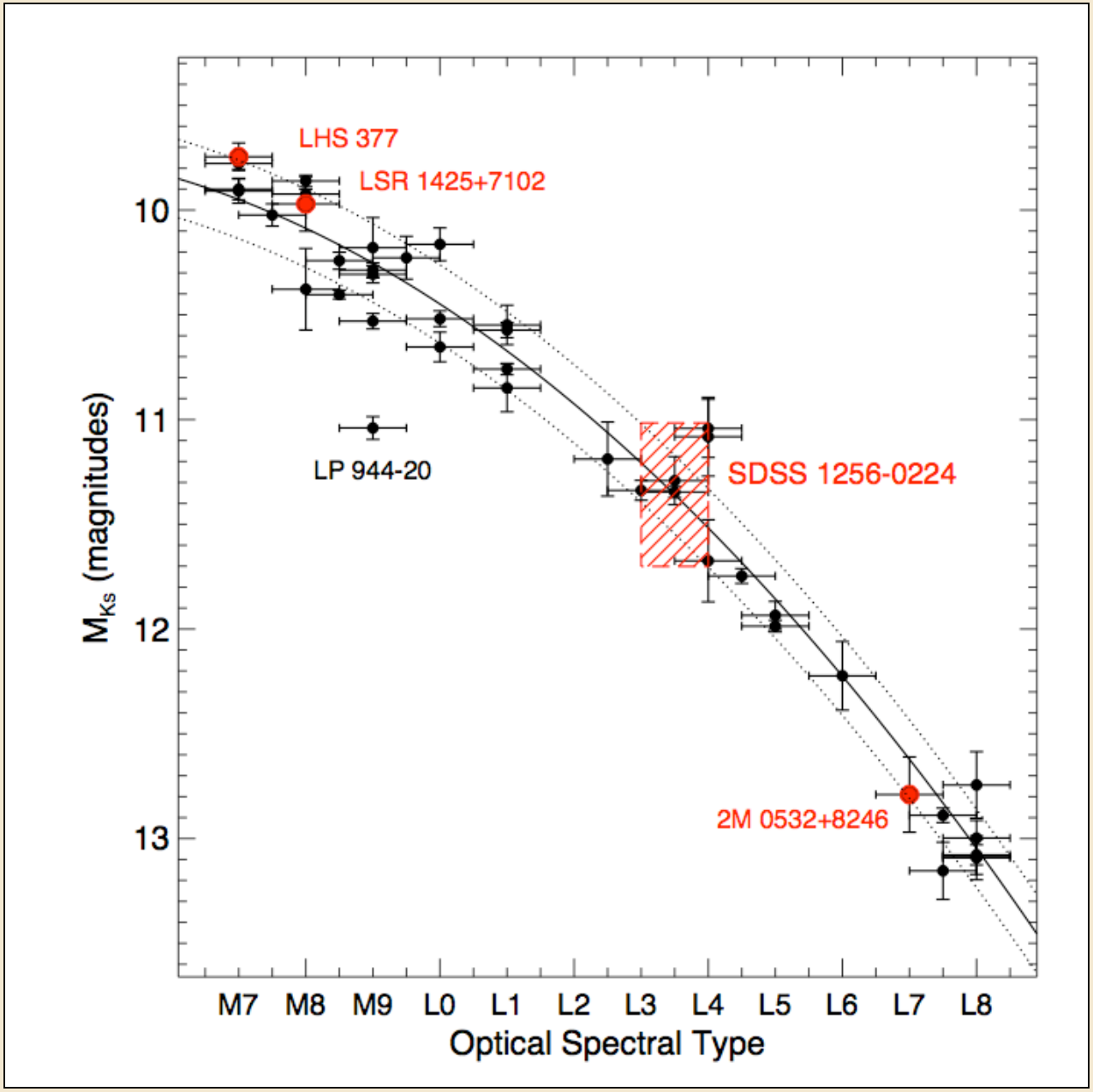


Ultracool Subdwarf spectral sequence

Burgasser, Cruz & Kirkpatrick (2007)



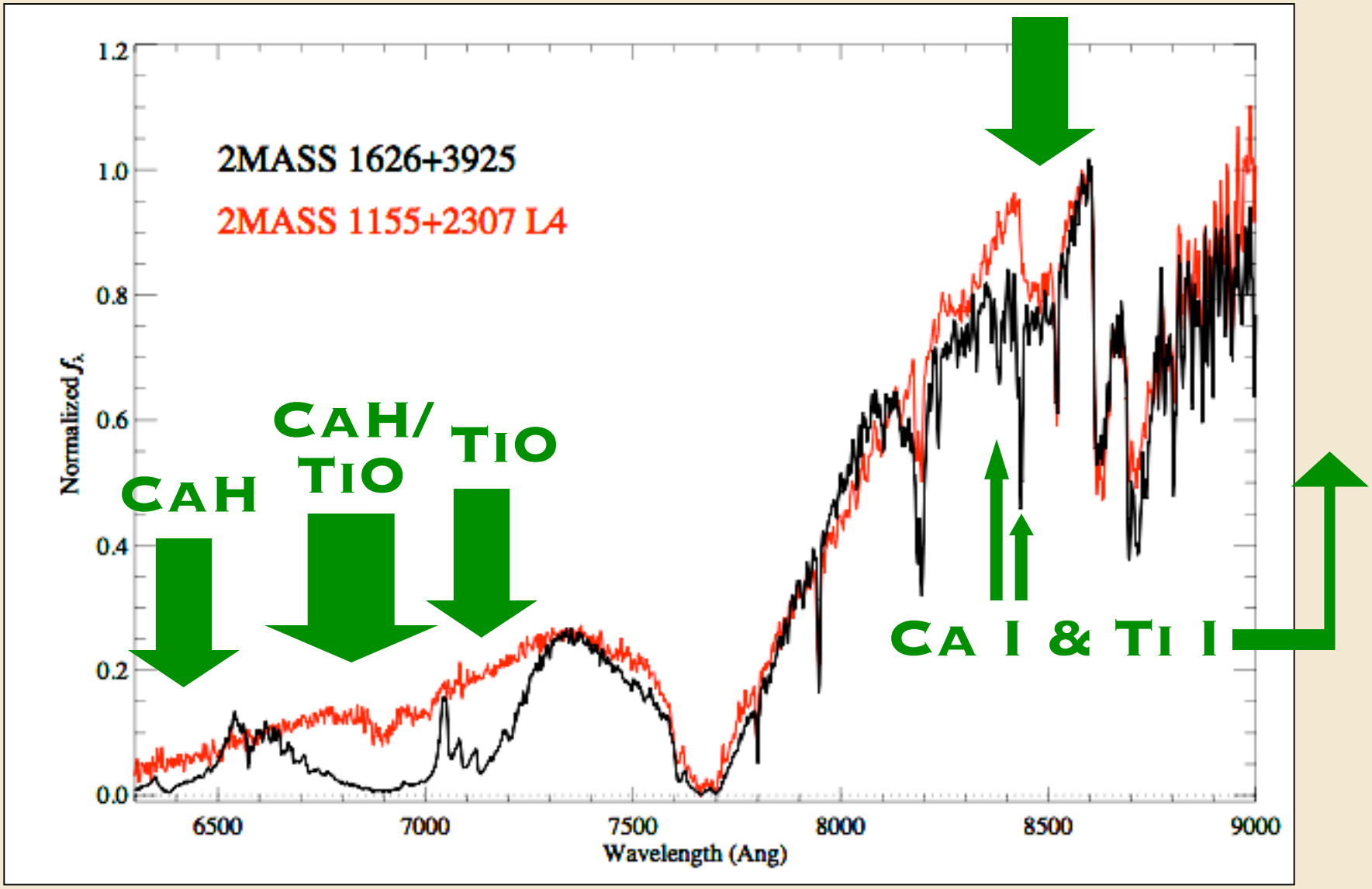
Burgasser et al. (2008) - USNO Parallax Program



Burgasser et al. (in prep)

Key L Subdwarf Problems

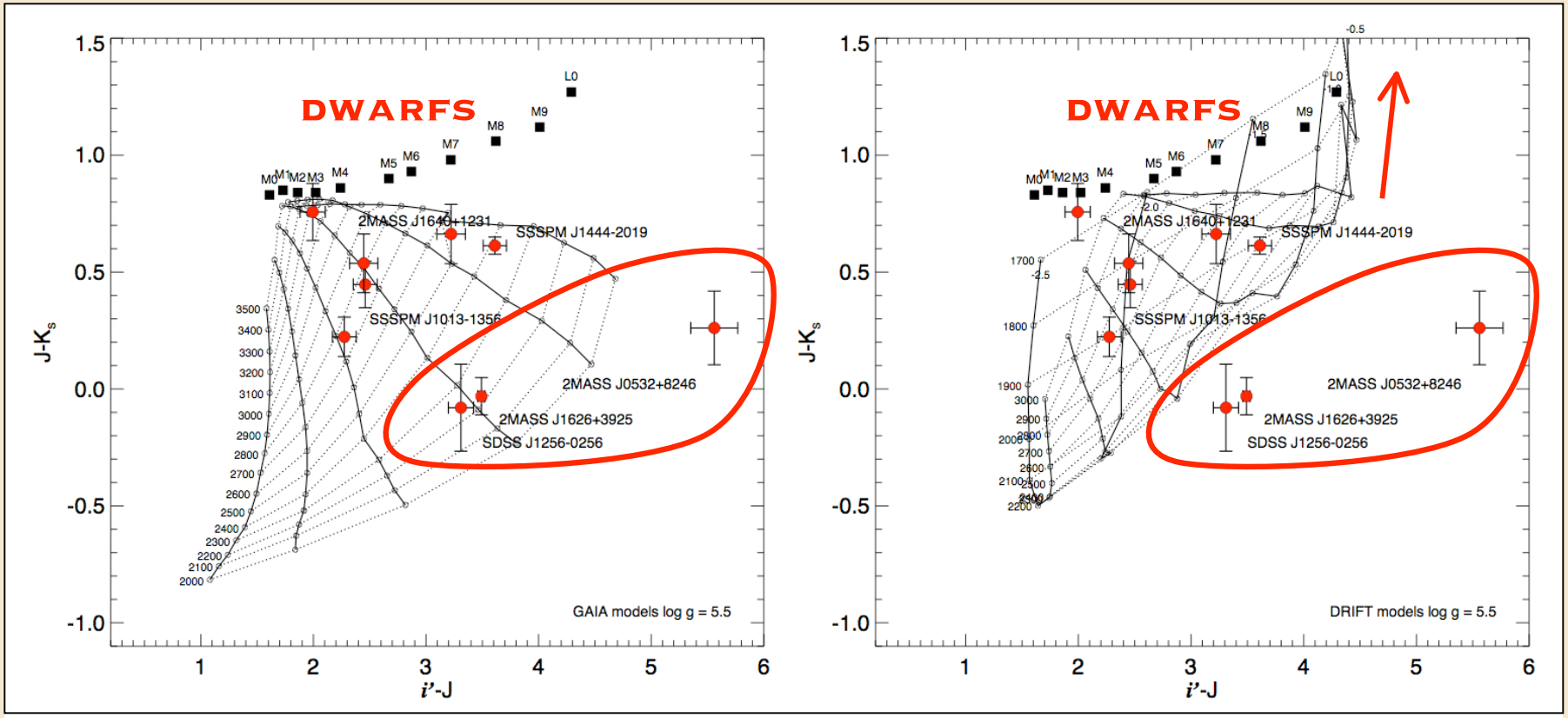
- Condensate formation: Suppressed?
- Atmospheric chemistry and spectral modeling (*B. Swift, next talk!)
- Temperature and Metallicity scales?
- Rotation - do L dwarfs ever spin down?
- Peculiar Galactic orbits
- Substellar mass limit - [M/H] dependency, Globular cluster pop.



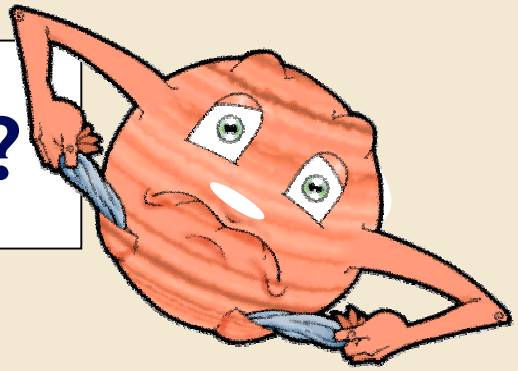
Burgasser, Kirkpatrick & Cruz (2006)

GAIA (COND) models

Drift models



Burgasser et al. (in prep)

See also Scholz et al. (2004)

Got Questions?