A Wide-Field Search for Young Brown Dwarfs Near Taurus and Upper Scorpius

Cathy Slesnick

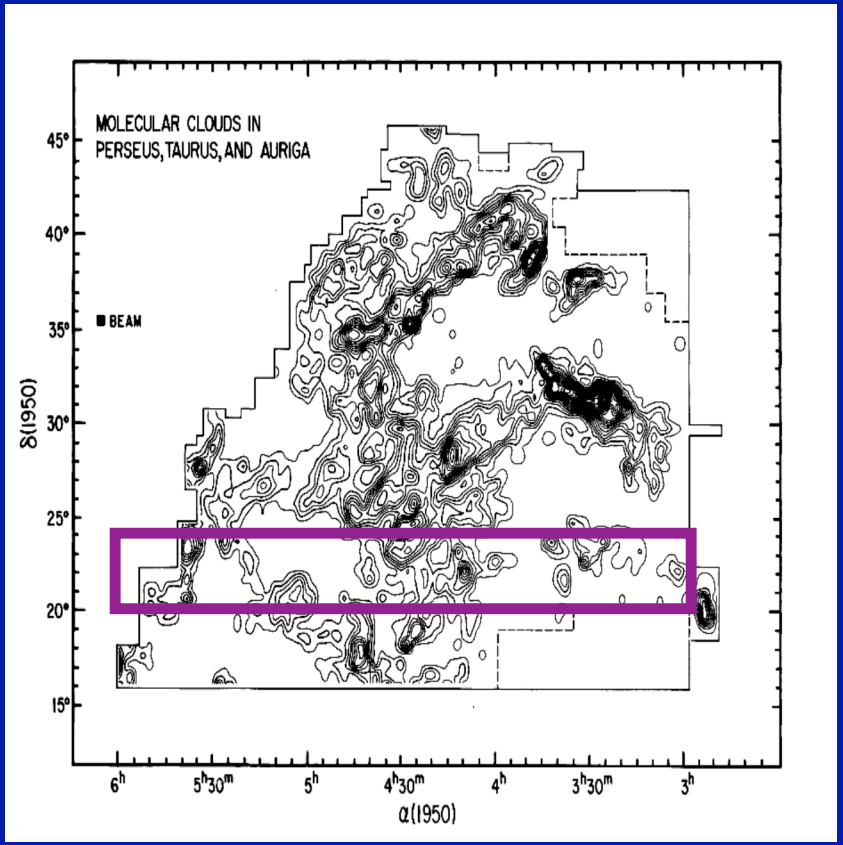
John Carpenter, Lynne Hillenbrand

A Wide-Field Search for Young Brown Dwarfs Near Taurus and Upper Scorpius

- Motivation
- Quest-2 Imaging Survey
- Spectroscopic Follow-up
- Initial Results
- Scheduled Future Observations

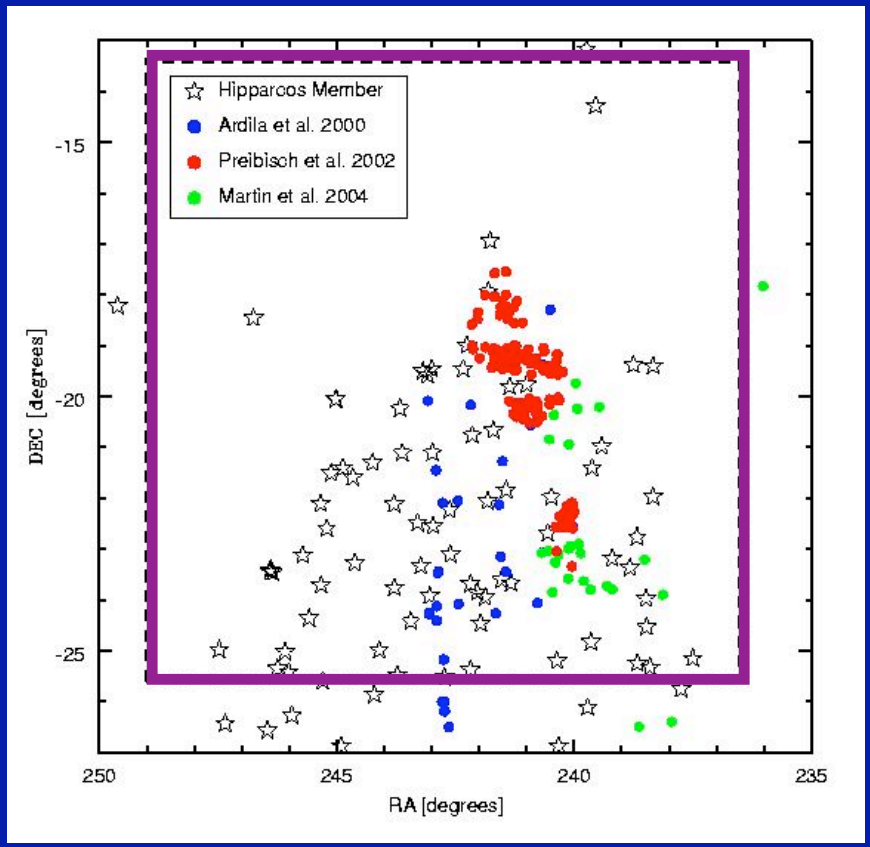
Photometric Survey Regions

Taurus

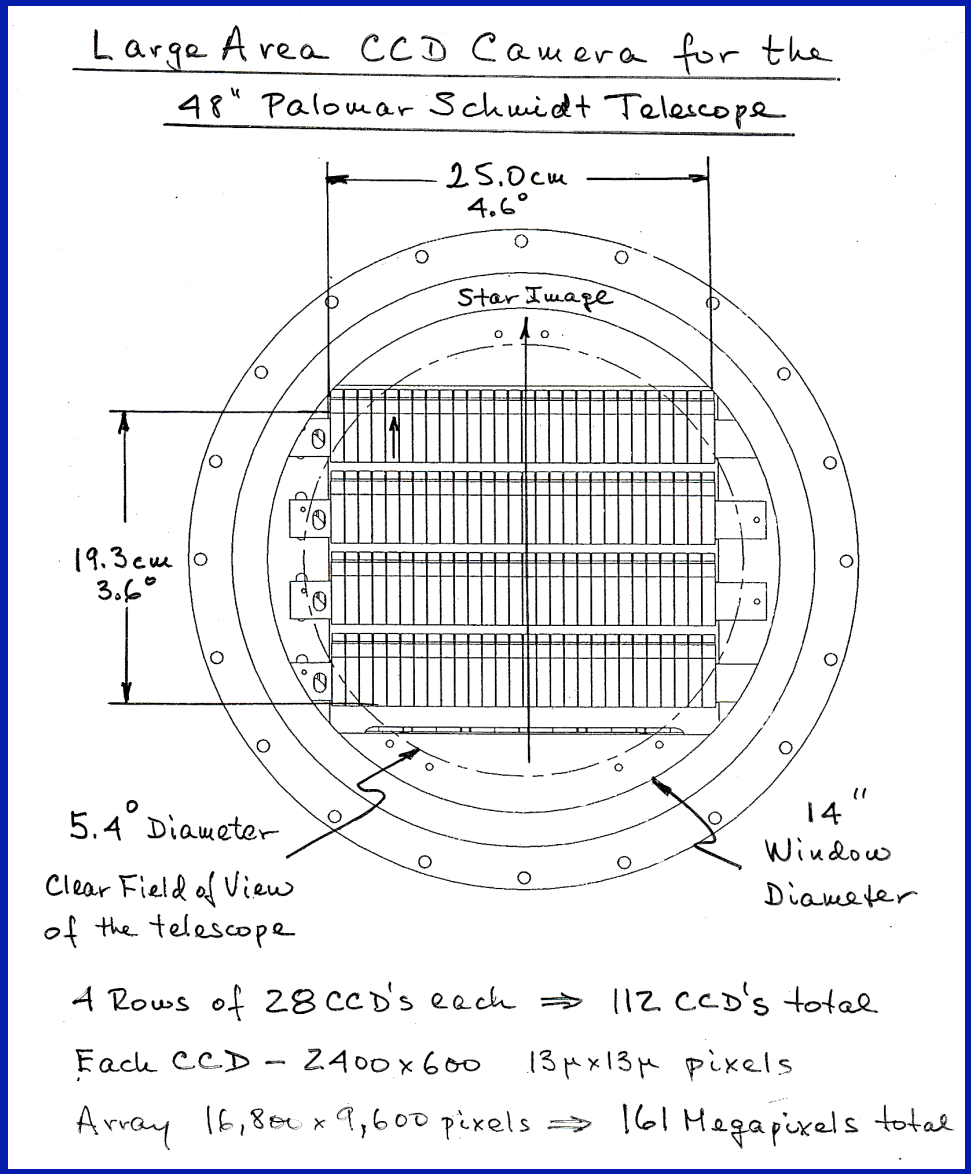


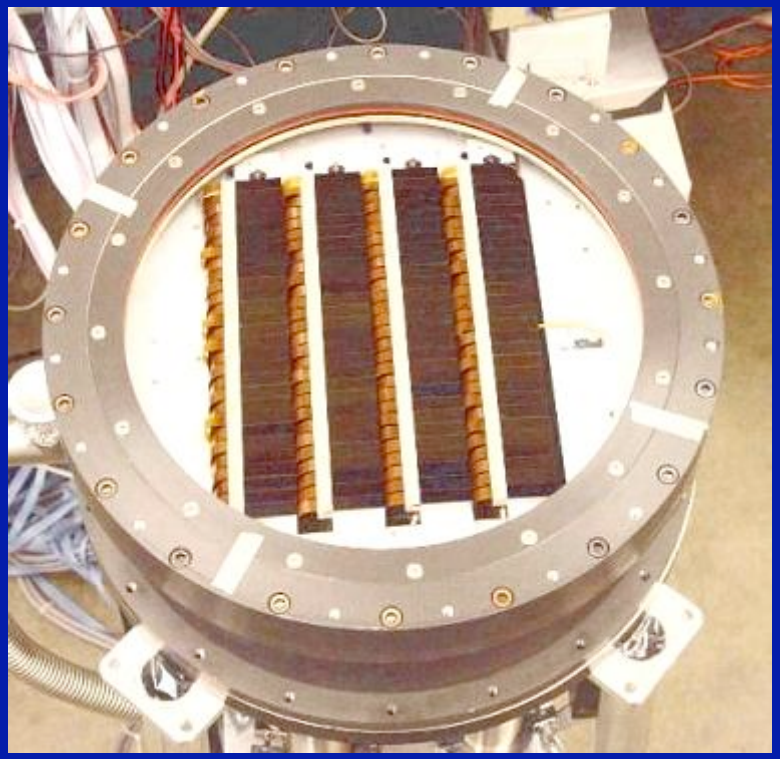
Ungerechts & Thaddeus 1987

Upper Sco

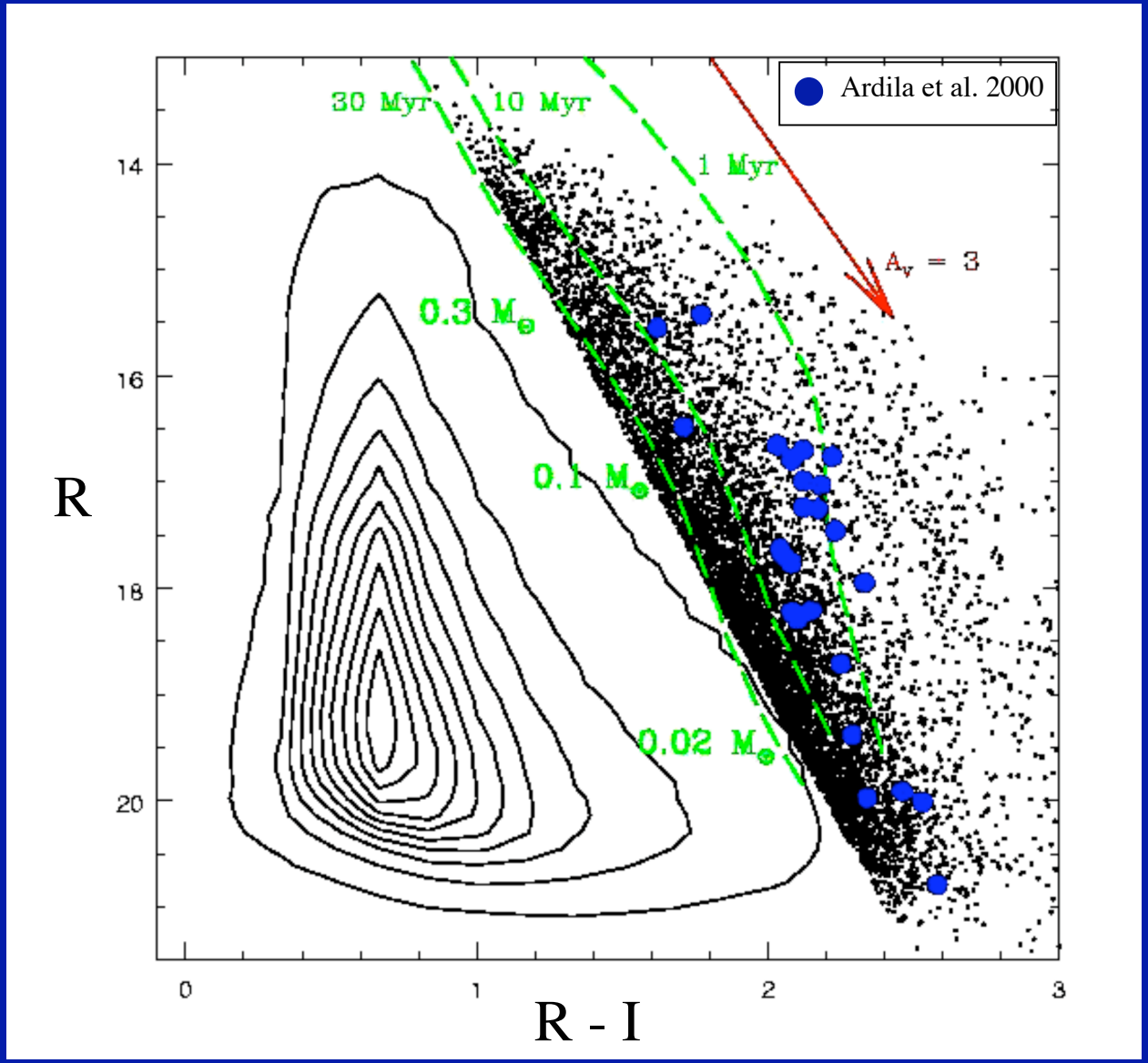


Quest-2


Large Area CCD Camera for the
48" Palomar Schmidt Telescope
25.0cm
4.6°
Star Image
19.3cm
3.6°
5.4° Diameter
Clear Field of View
of the telescope
14"
Window
Diameter
4 Rows of 28 CCD's each ⇒ 112 CCD's total
Each CCD – 2400 x 600 13μ x 13μ pixels
Array 16,800 x 9,600 pixels ⇒ 161 Megapixels total

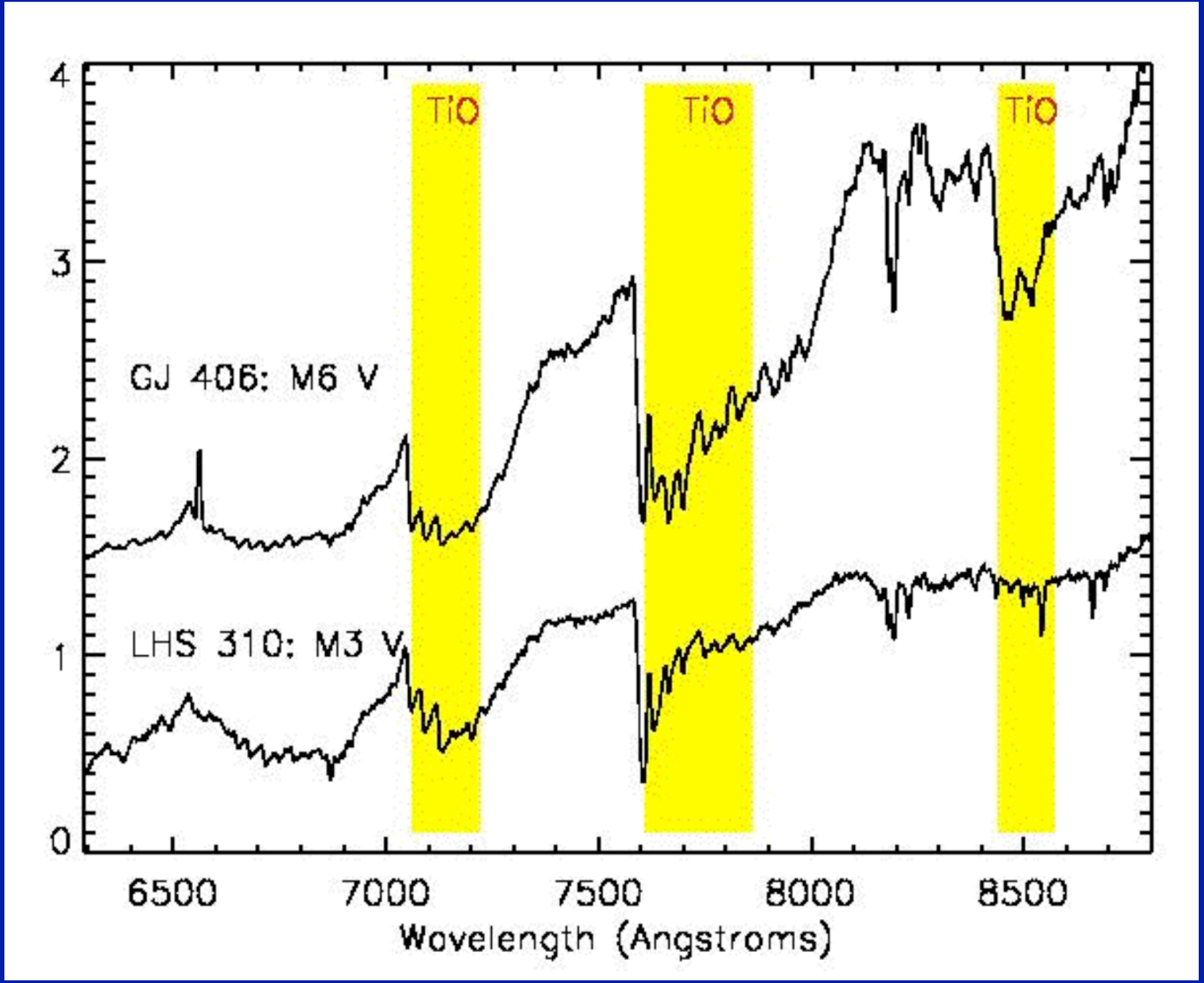


PMS Candidate Selection

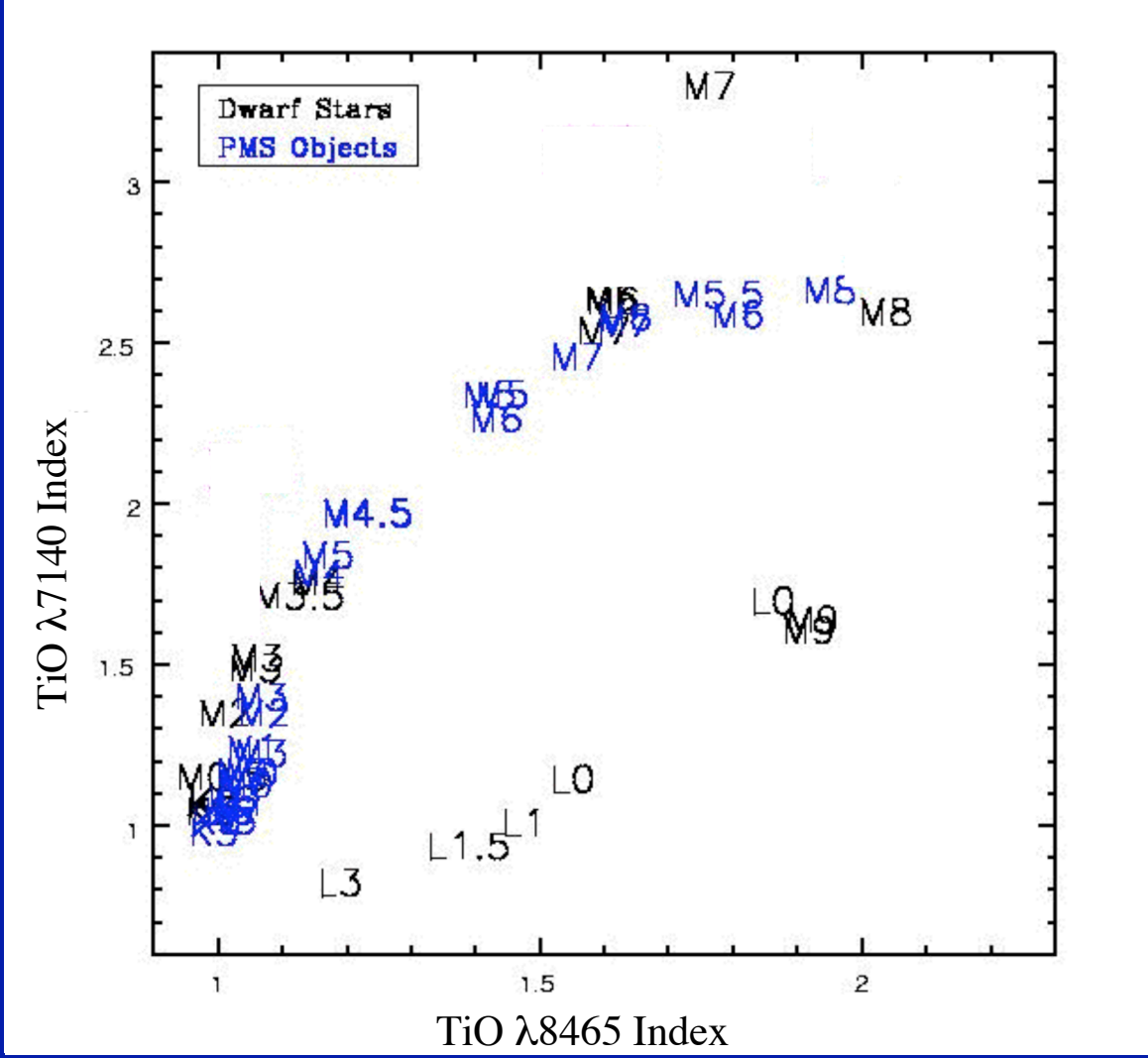


- > 6 million sources in each cluster
- required objects to appear < 30 Myr
- selected 2000-3000 candidates from optical and NIR (2MASS) colors and magnitudes

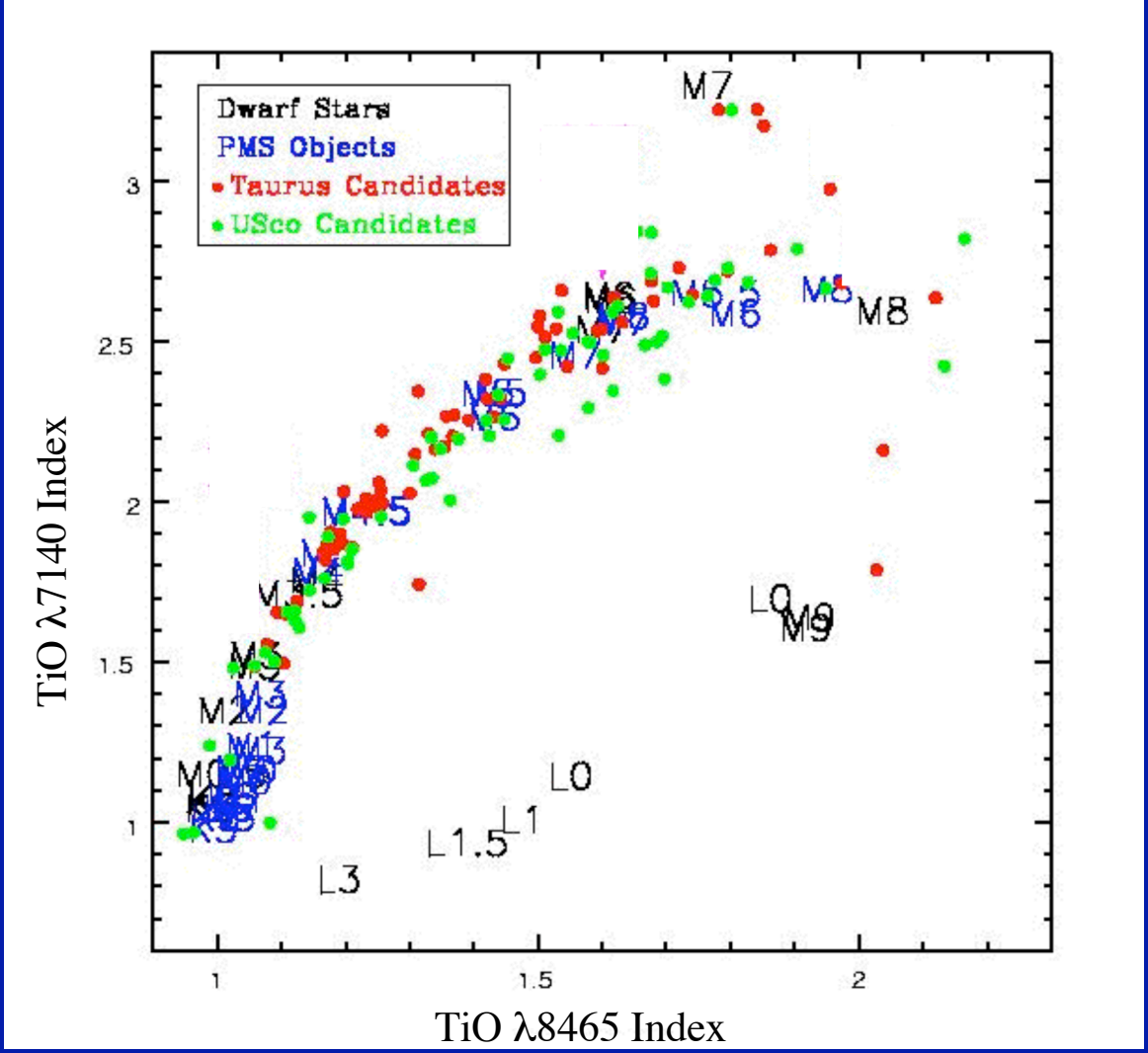
Spectral Classification: Temperature



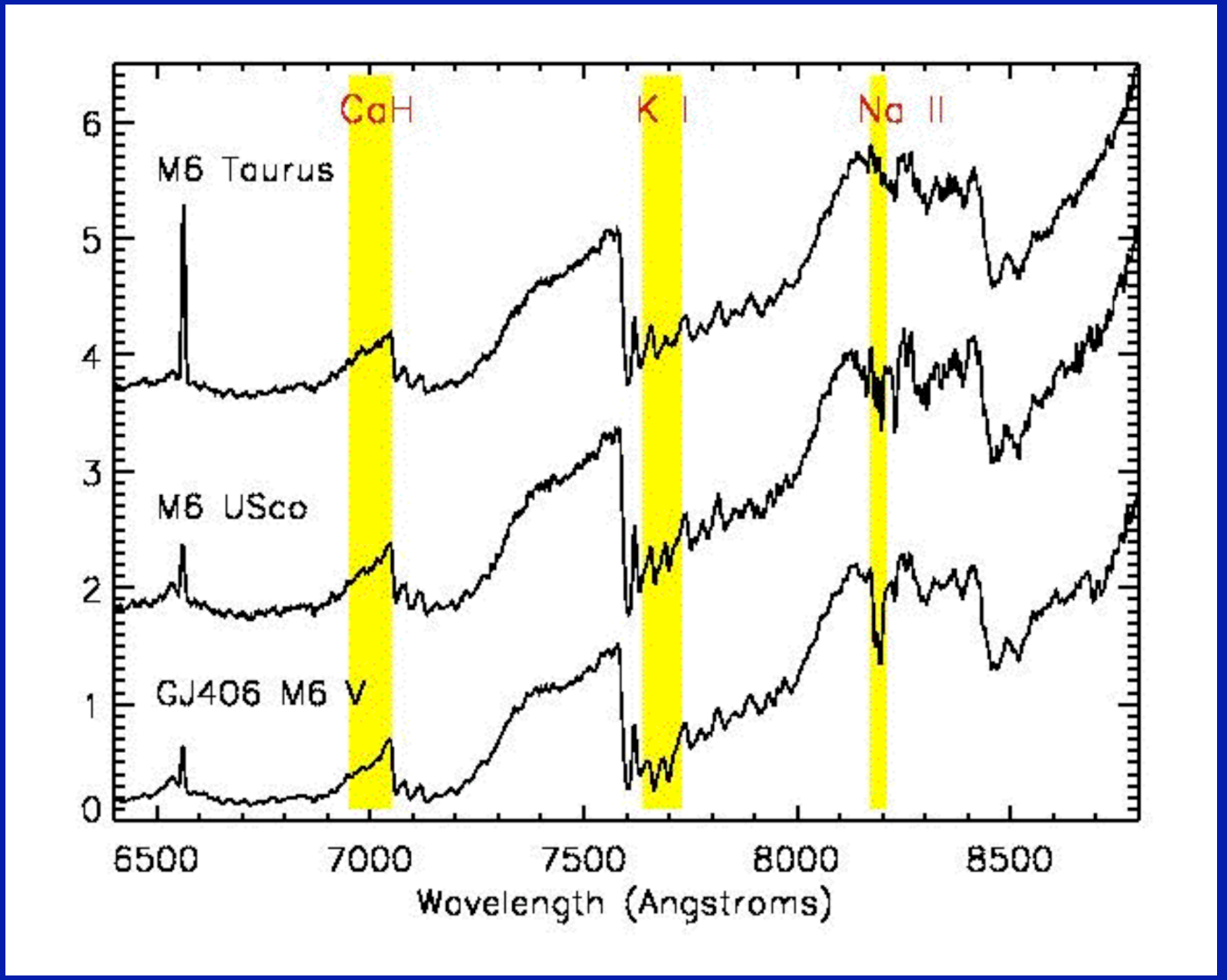
Spectral Classification: Temperature



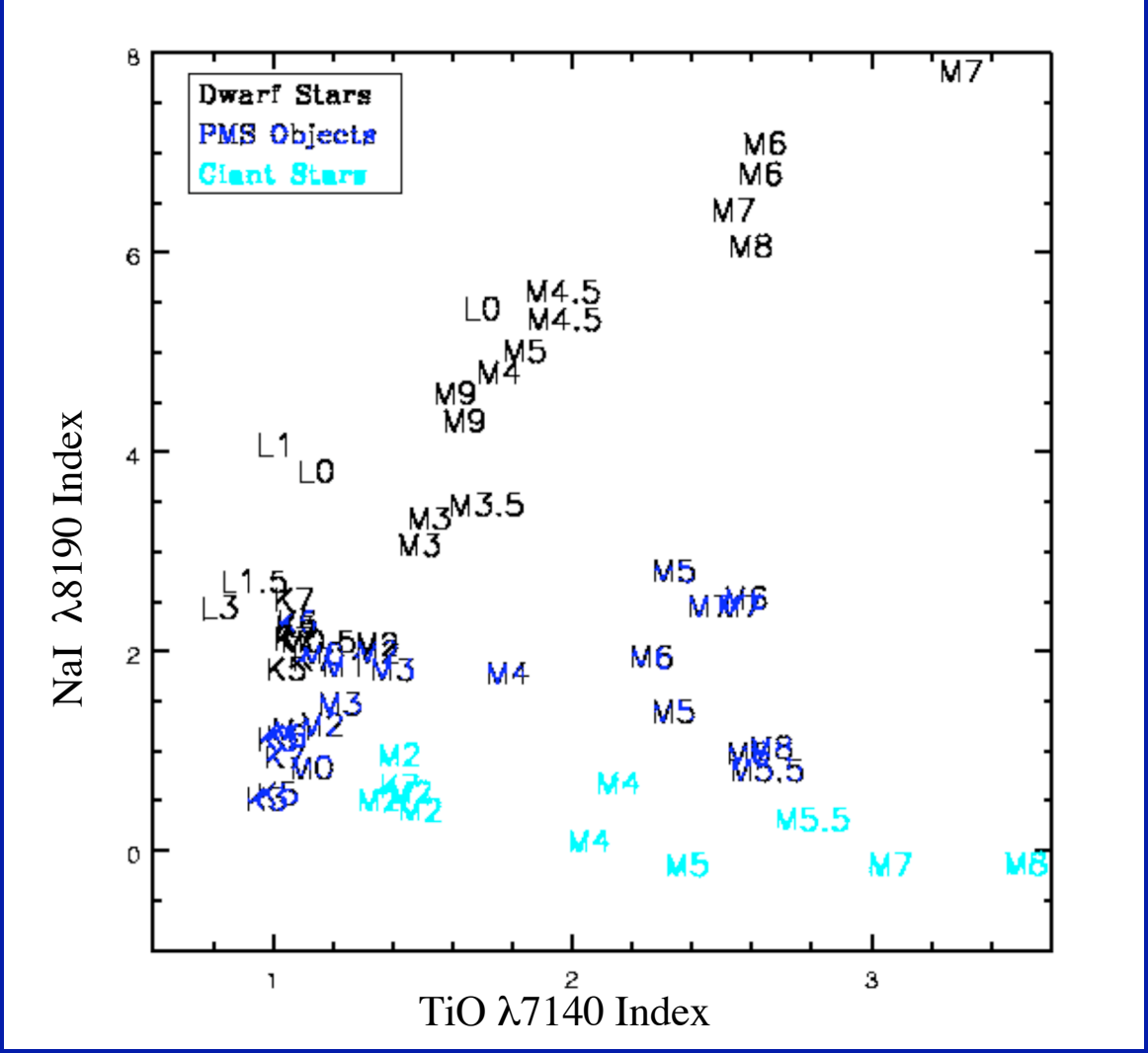
Spectral Classification: Temperature



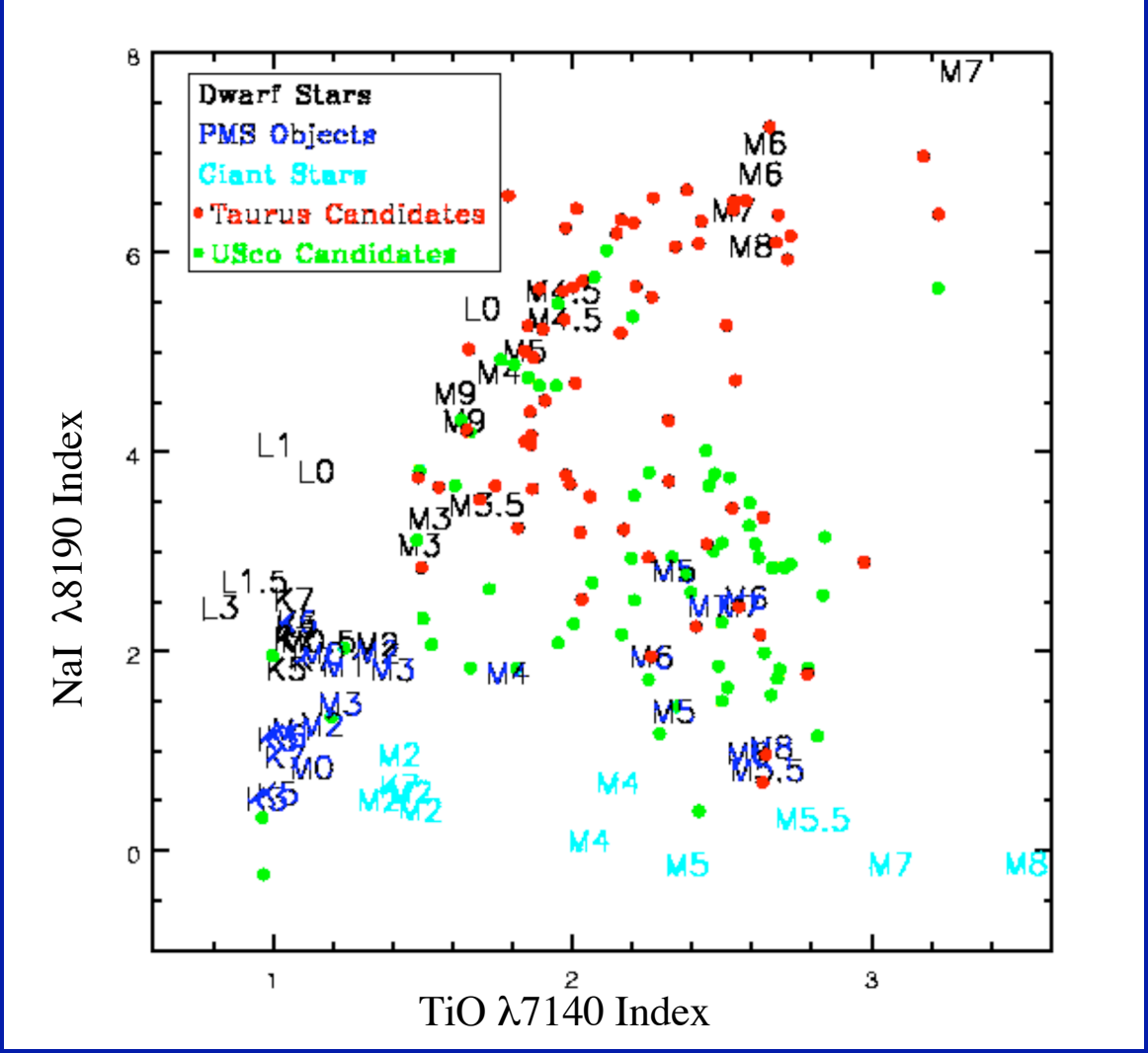
Spectral Classification: Gravity



Spectral Classification: Gravity



Spectral Classification: Gravity



Preliminary Results

Upper Sco:

Spectra of 65 Candidates

42 determined to have low (pre-main sequence) gravity

30 new brown dwarfs

Taurus:

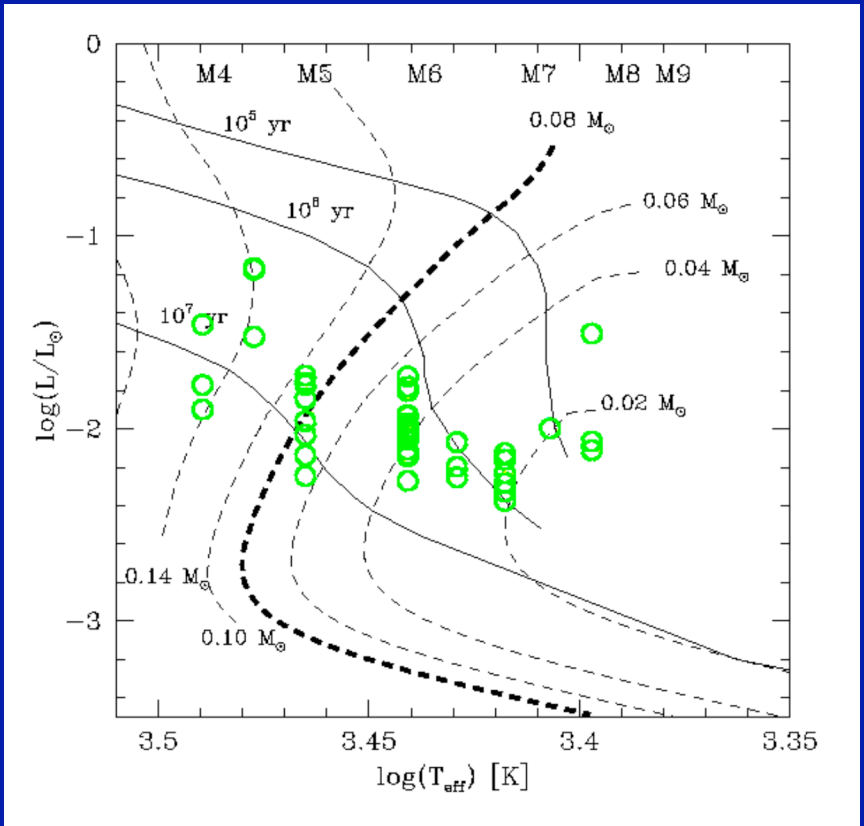
Spectra of 65 Candidates

18 determined to be low (pre-main sequence) gravity

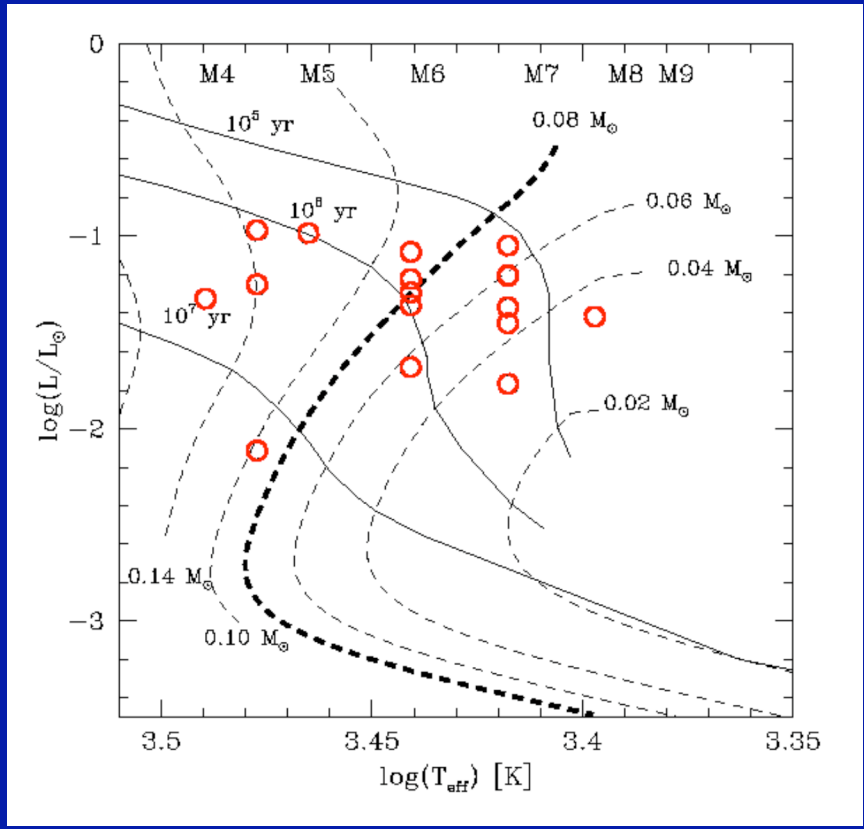
12 new brown dwarfs

Preliminary Results

Upper Sco

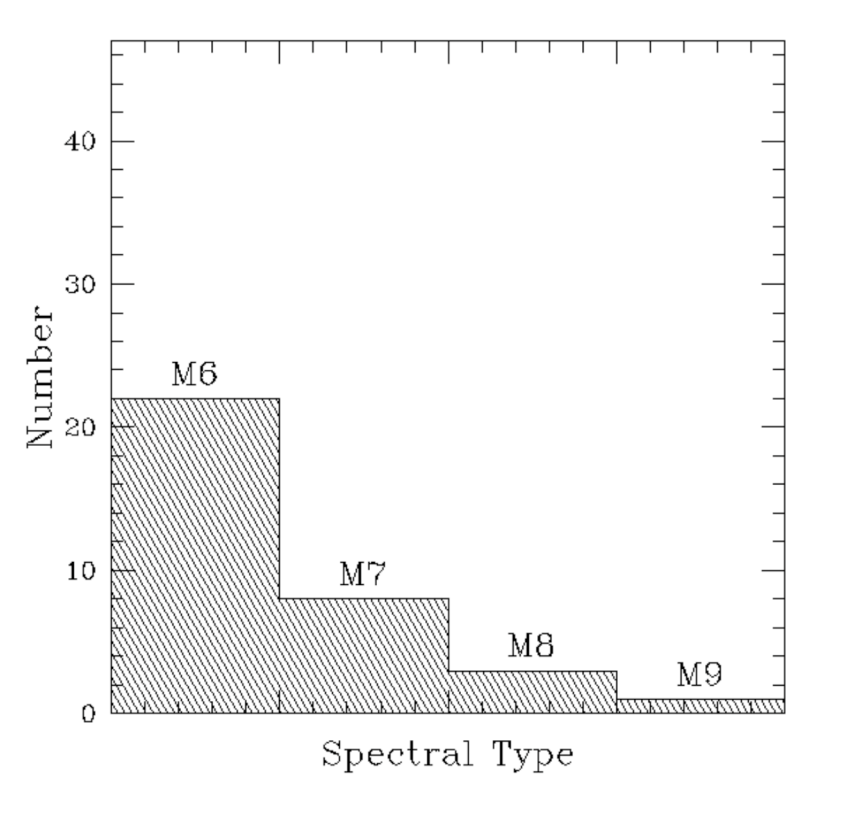


Taurus

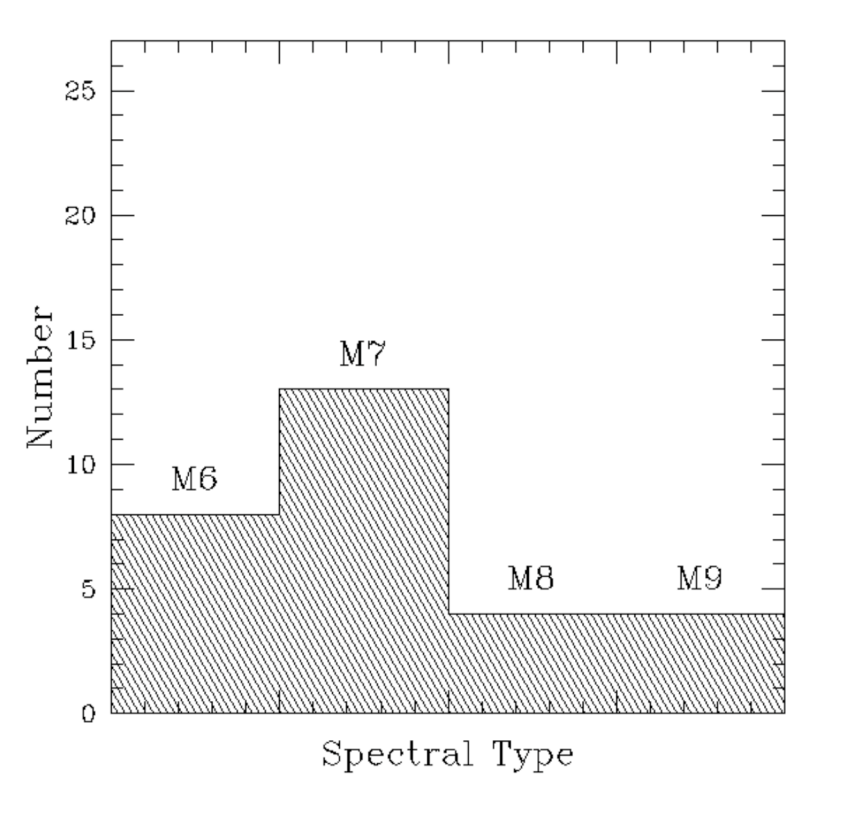


Preliminary Results

Upper Sco

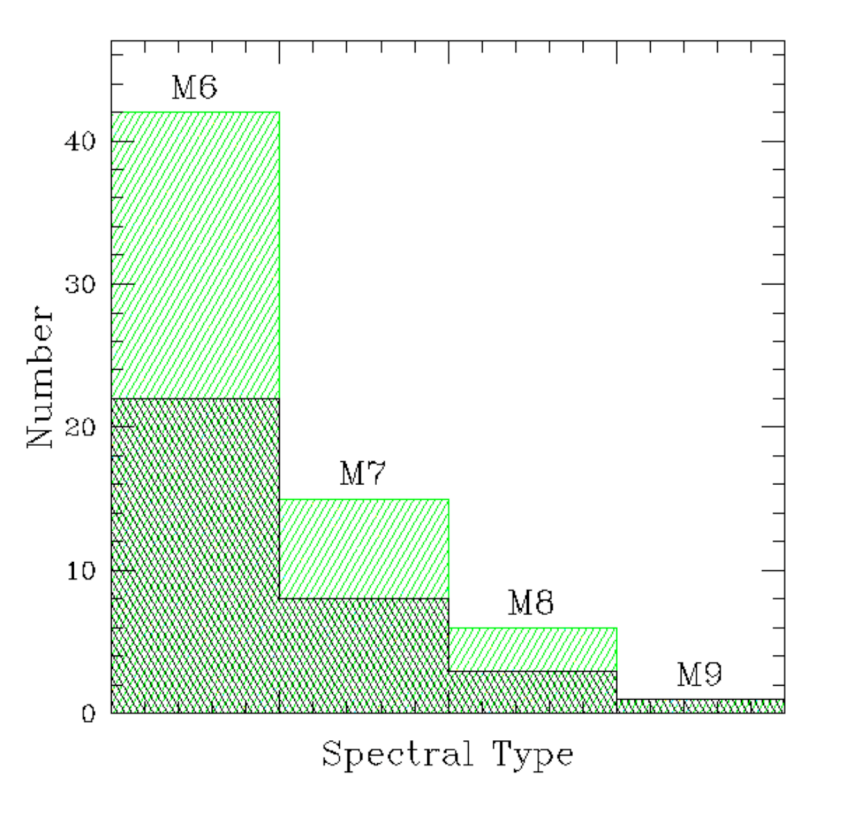


Taurus

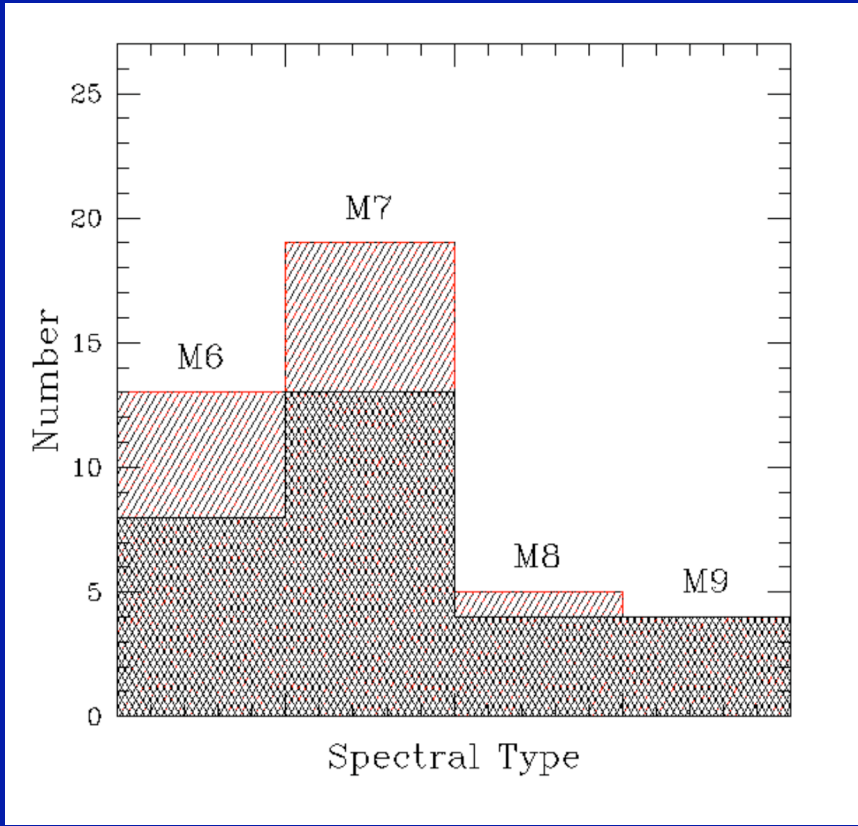


Preliminary Results

Upper Sco



Taurus



Future Work

Palomar 200” Observations of Taurus Candidates

Target higher mass objects and re-derive Taurus IMF

CTIO Observations of Upper Sco Candidates

Spatial grid of observations over entire survey area

Target higher mass objects and re-derive USco IMF

Spitzer Observations of new Upper Sco brown dwarfs

IRAC, MIPS 24 micron

Explore disk properties of more evolved (~5 Myr) brown dwarfs