Breakout Group #5: Connections Between Star and Planet Formation

…or, the "-anes" and the "-ibles"

3rd System Workshop - Phoenix, November 2006

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Priority Science: Killer Aps

➔ Gas & planet formation: accretion processes, gas-phase chemistry (H-alpha, Br gamma, CO fundamental spectroscopy, CH_4, organics, etc.)

➔ Dust & planet formation -- making rocks: solid state disk components (PAHs, silicates, angularly resolved disk spectroscopy, etc.)

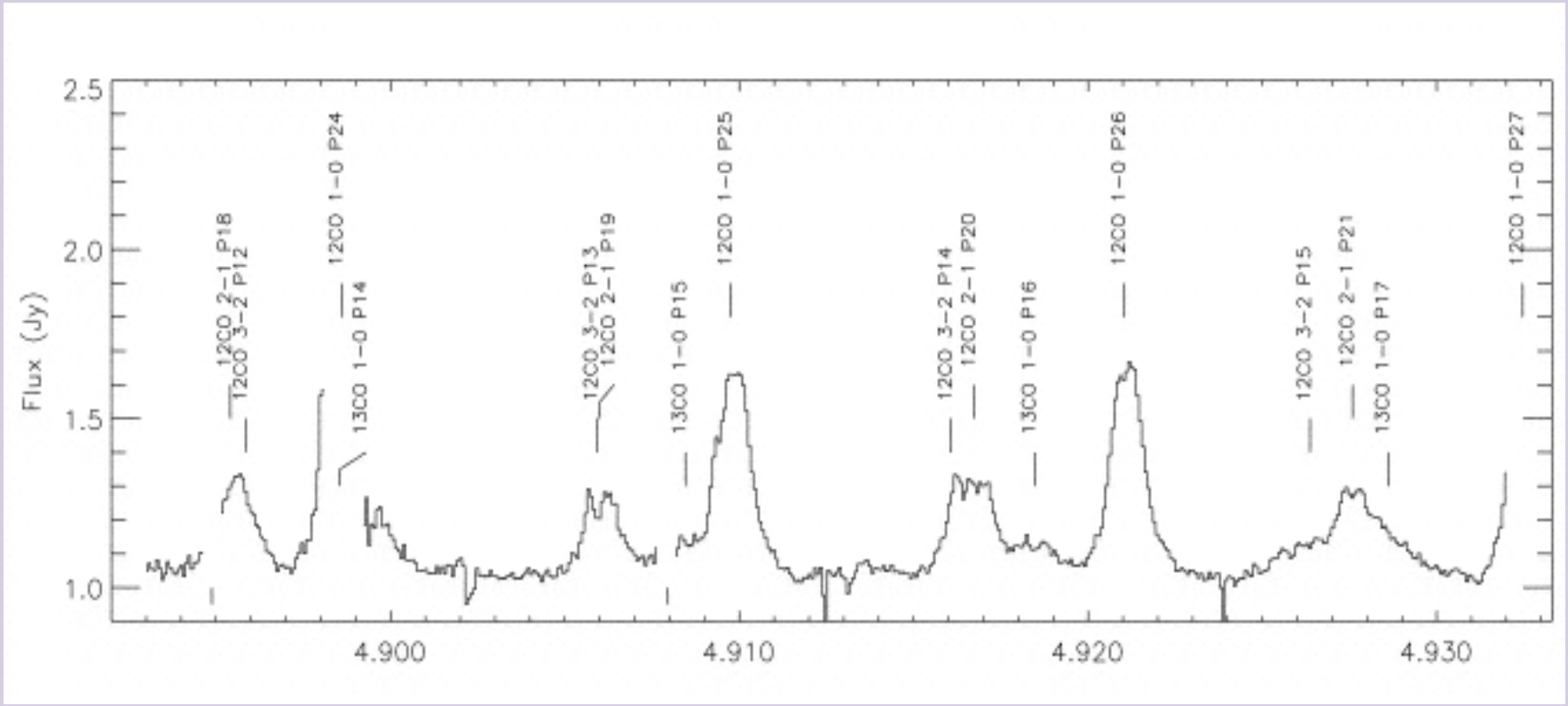
➔ How stars form & interact in youth: meeting the roommates -- short peiod stellar, brown dwarf and planetary companions…

How common are solar systems like our own?

Priority Science: Continued

➔ Fundamental star formation: when do stars bulk up and how do they move on to the main sequence? Improved models for star formation and evolution.

CO fundamental gas in circumstellar disk



(Najita et al. 2003)

Instruments: High Priority

➔ High-resolution 1- 5 micron spectroscopy with maximum possible wavelength coverage (cross-dispersed): **R>50,000**

➔ High-resolution 8-25 micron spectroscopy with maximum possible wavelength coverage (cross-dispersed): **R>100,000**

➔ High-angular resolution: adaptive optics, IR wavefront sensing, towards all sky LGS-AO at the **diffraction limit**

Instruments: Other

➔ Need to maintain optical echelle spectroscopy capabilities at national facilities -- a standard workhorse instrument that is disappearing!

➔ Polarimetry - the time has come: near- and mid-IR

➔ Narrow-band wide field imaging - cold is best

Modes and Capabilities

➔ Visitor instrument capability

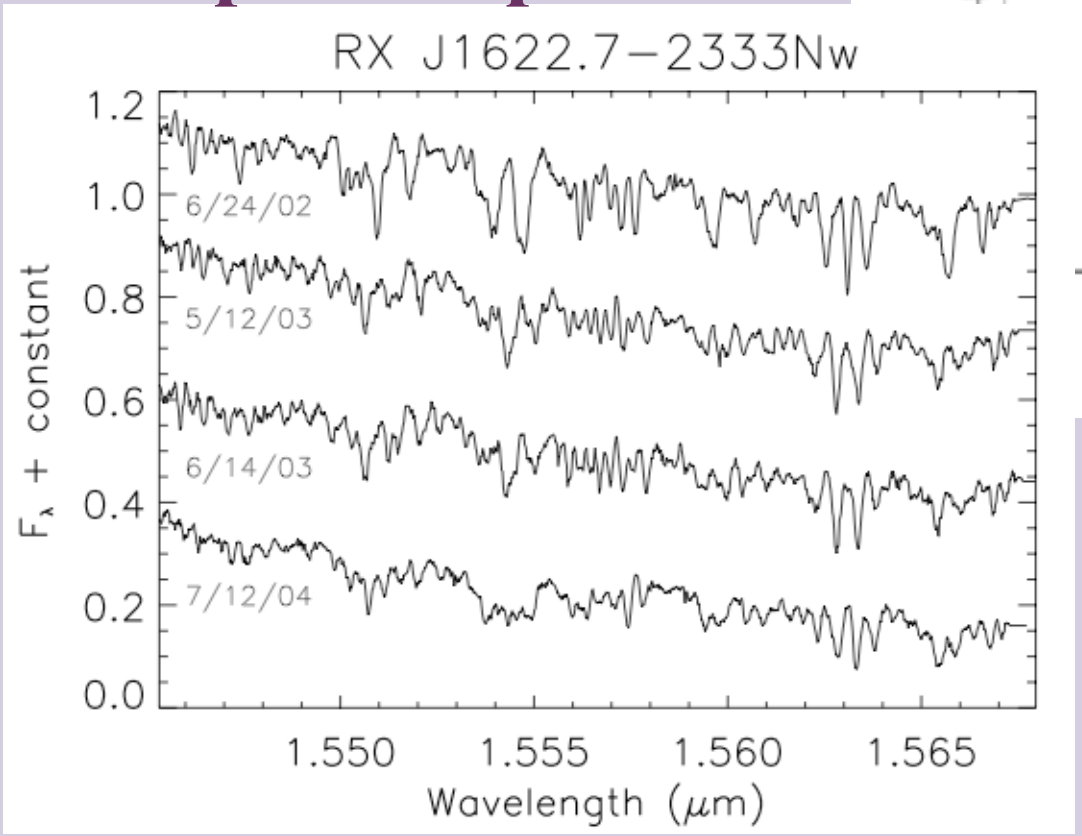
➔ Time domain crucial

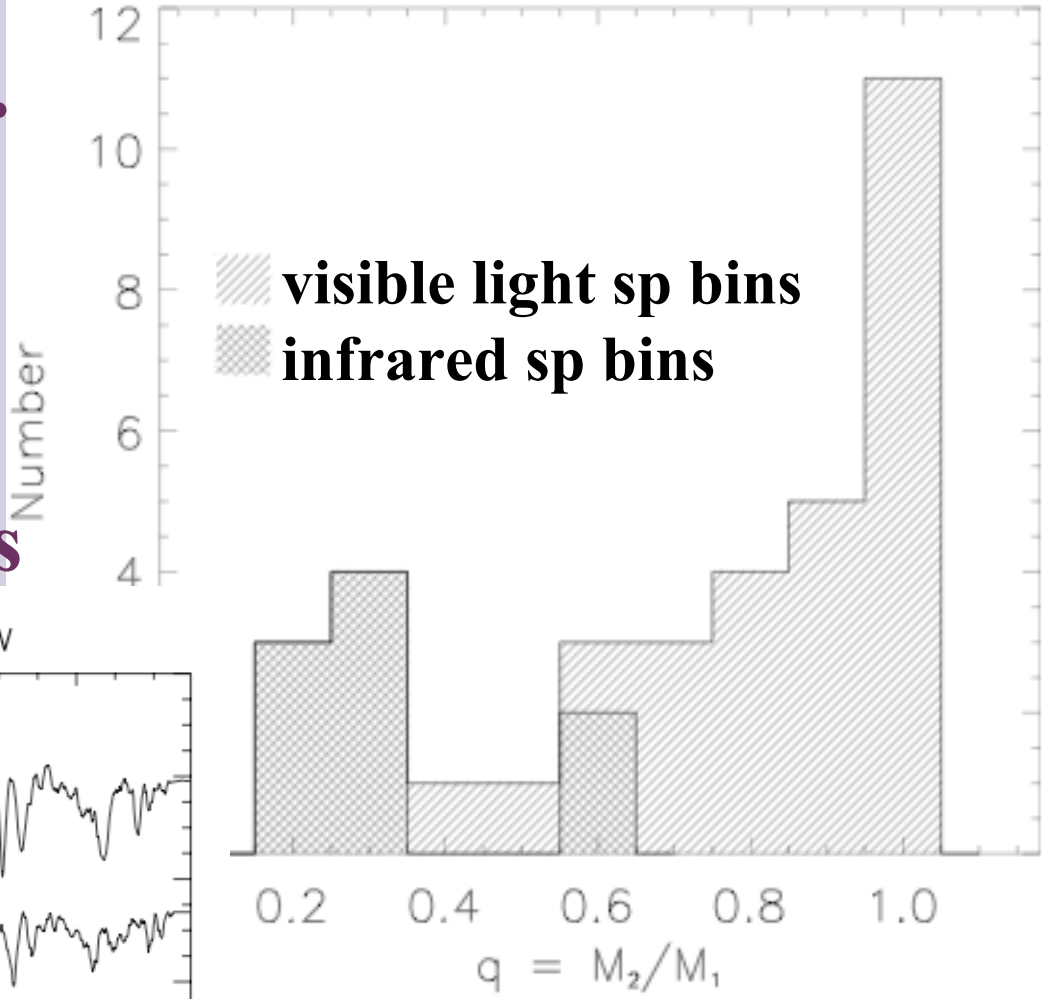
➔ Versatile 2-4 meter facilities:
short-term followup
simultaneous observations
synoptic observing - all time scales

➔ North-South / Bright-Faint:
diversity of utilization

The IR Advantage…

Survey young stars for short period sp binaries





(Prato et al. 2002)

(Prato 2007)