

The SONYC survey: Brown dwarfs all the way down

Aleks Scholz (St Andrews)

with Kora Muzic, Vincent Geers, Ray Jayawardhana, et al.



SONYC

= Substellar Objects in
Nearby Young Clusters





How deep can we go?

For nearest star forming regions
($d=150\text{pc}$, $A_v=5$):

5 Jupiter masses means $J=18$, $K=17$

→ about the limit for spectroscopy
for 8-m class telescopes



SONYC 2006-2015

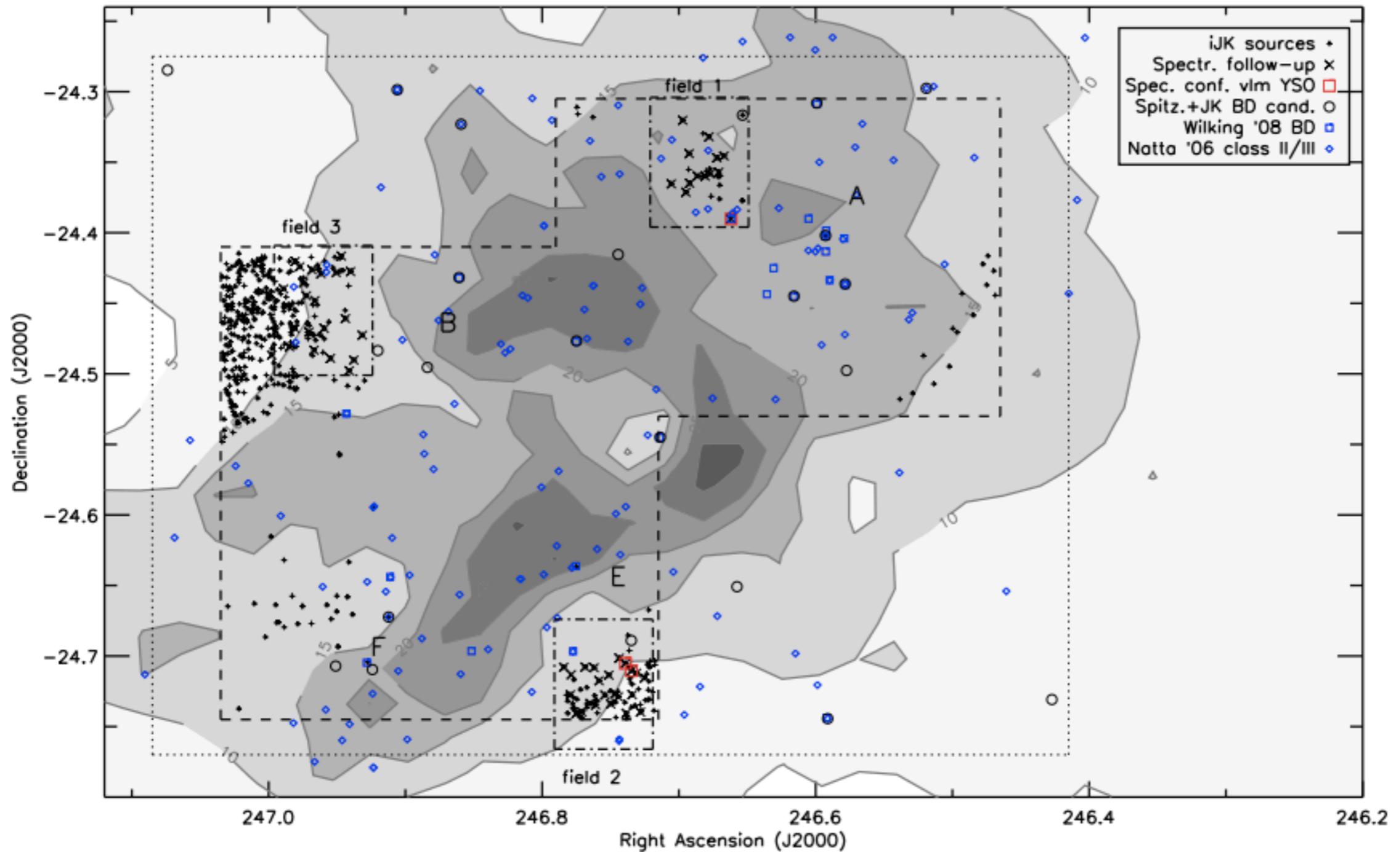
15 nights at 8-m telescopes

5 regions, 50 confirmed objects

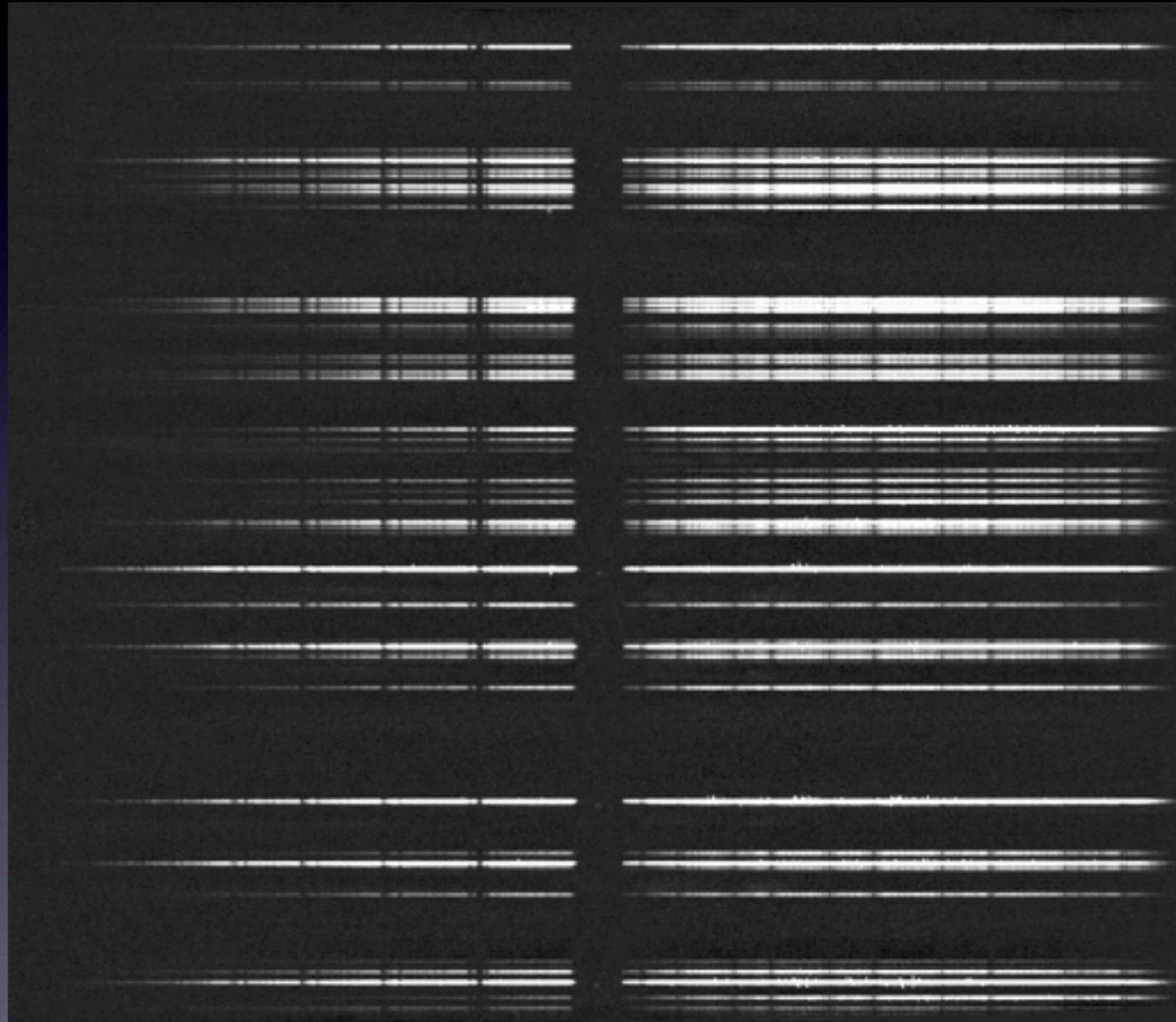
10th paper out soon

browndwarfs.org/sonyc

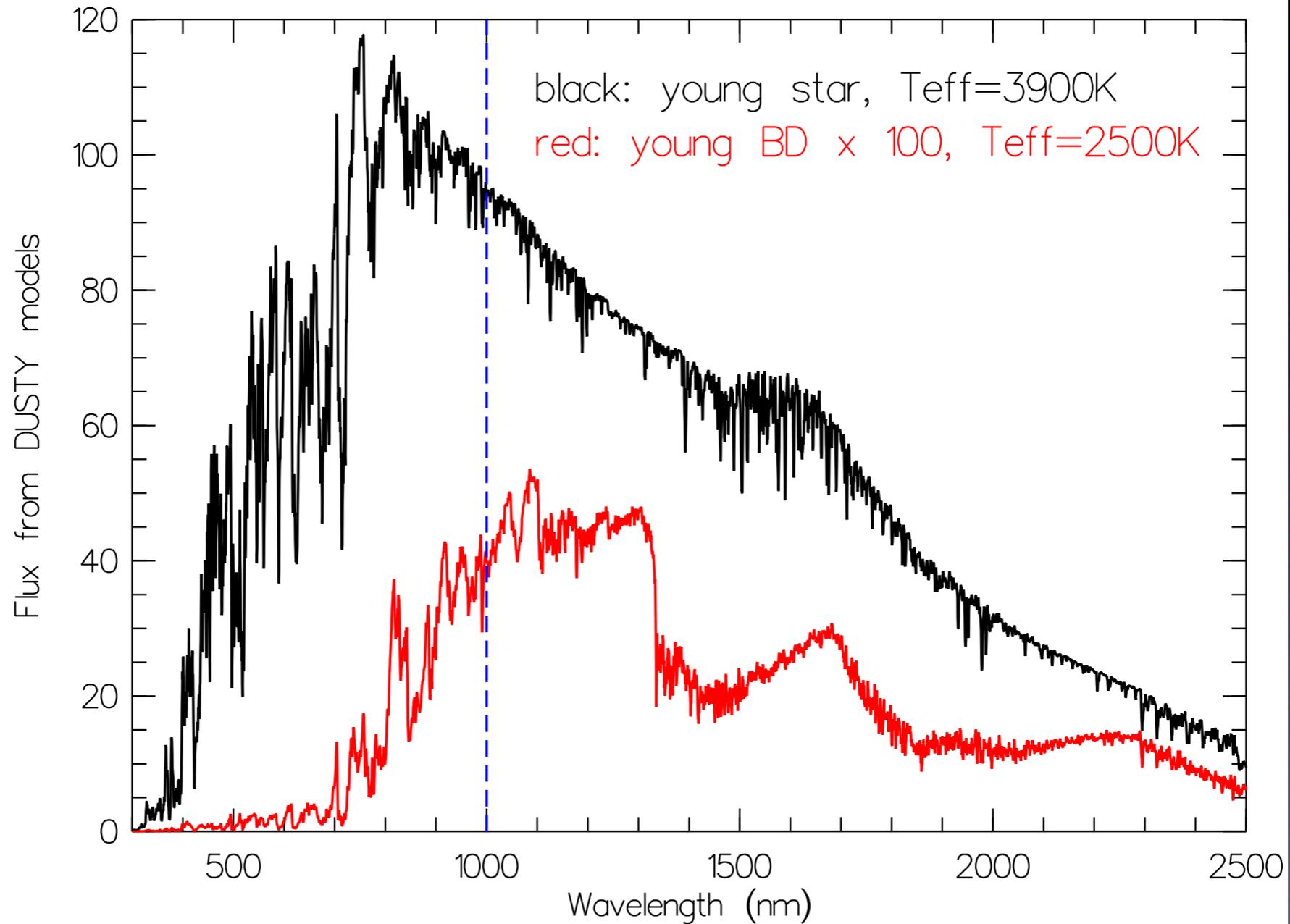
Needle in haystack

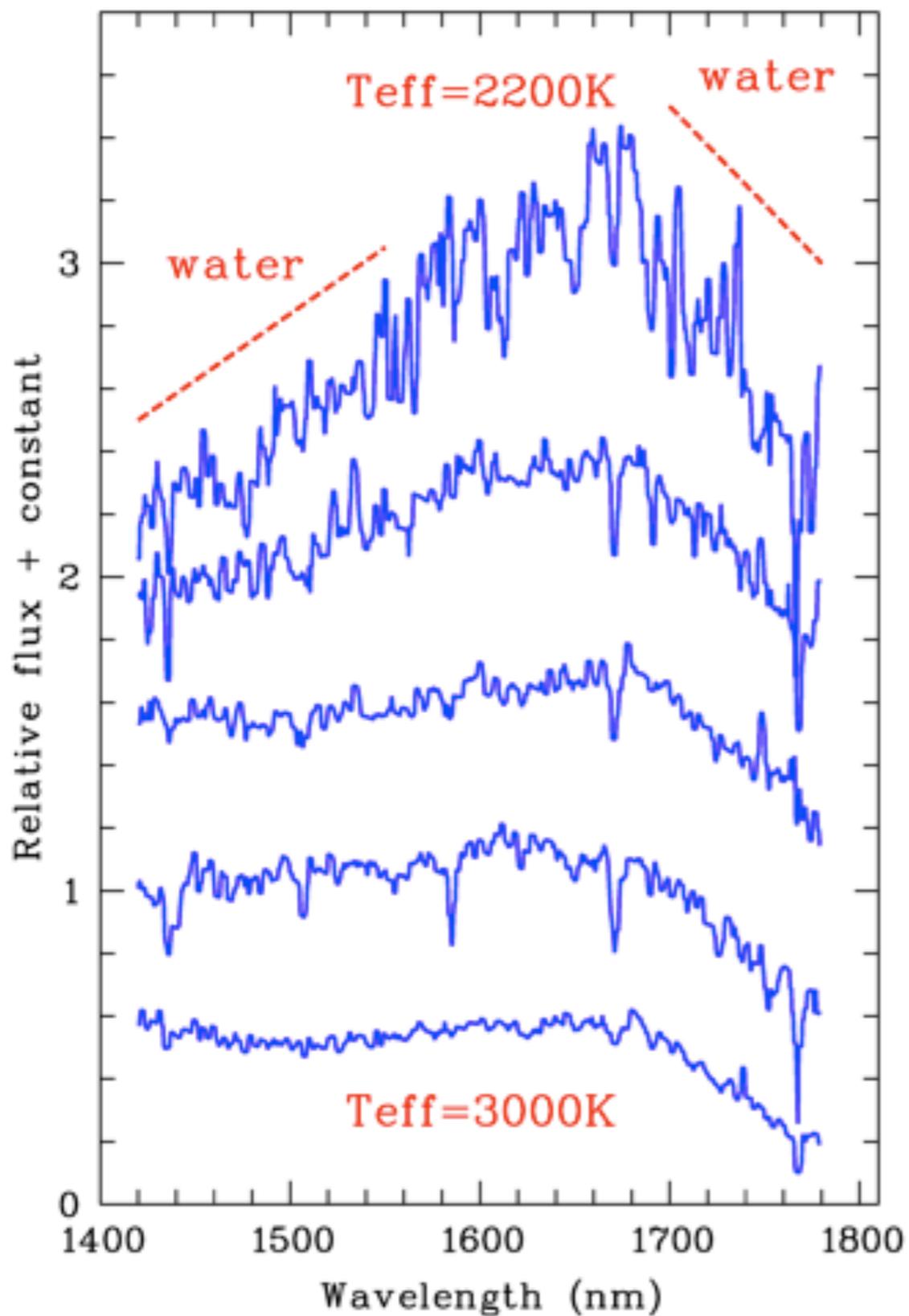


Spectroscopy mandatory



Stars vs. brown dwarfs





planetary mass
object (6 Mjup)

brown dwarfs

substellar boundary

giant
planets

?

brown
dwarfs

low-mass
stars

1

10

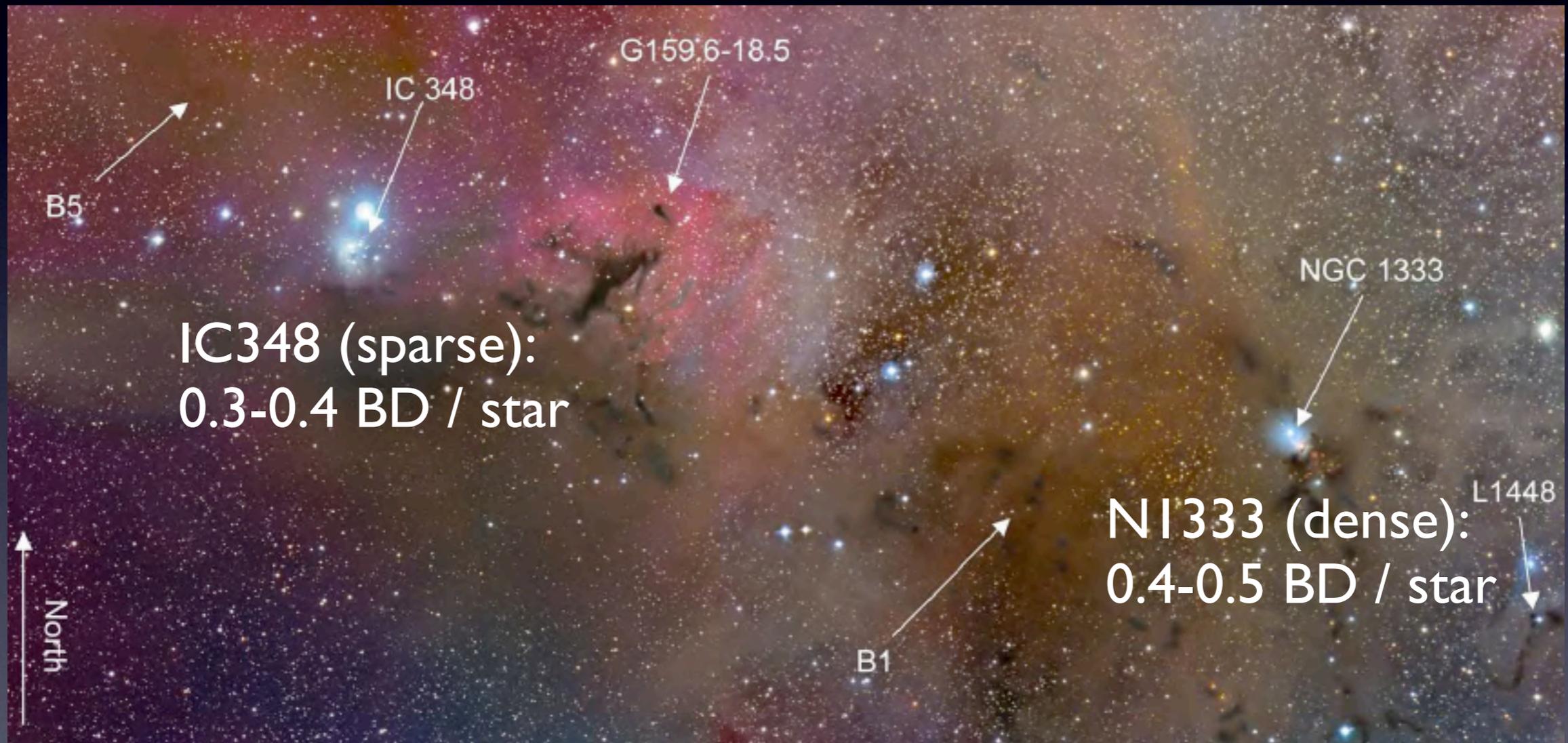
100

1000

mass in M_{jup}



Dense cluster = more BDs?



Scholz et al. 2013

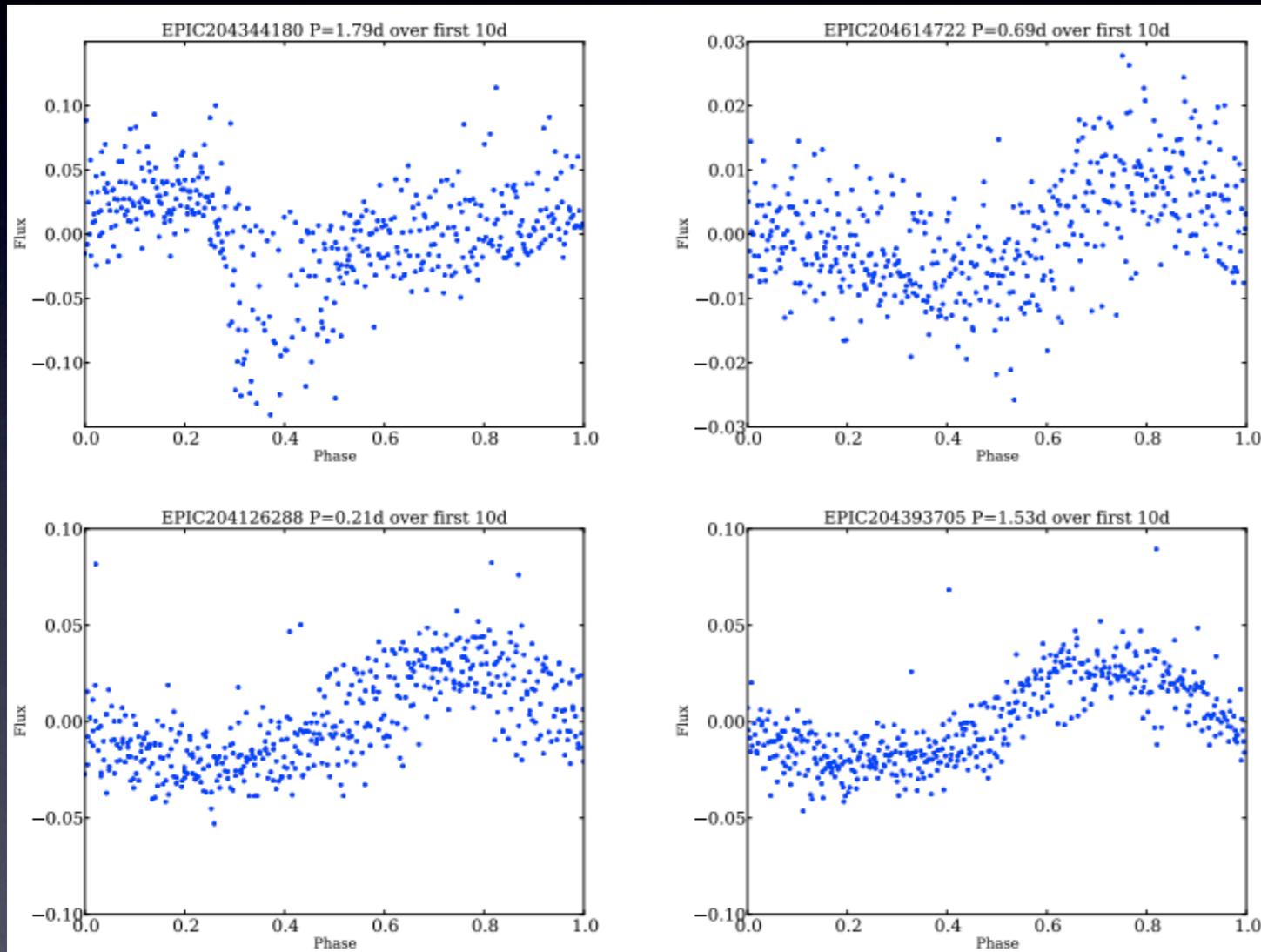
Disks with ALMA

*grain growth + low disk masses =
miniature planetary systems*



Ricci et al. 2012, 2014

Rotation with K2



*angular momentum
conservation:*

*no disk-locking in
brown dwarfs*

Scholz, Kostov, Jayawardhana, Muzic 2015

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