

Brown dwarf variability: *Expectations and current results*

Bertrand Goldman (MPIA)



Motivation:

atmosphere models

the L/T transition

current results

prospects

conclusion

History: early searches for variability

Went & Tolley (1999), Bailer-Jones & Mundt (1999)

vers:

computer analogy (Gelino & Marley, 2000)

rapid rotators

magnetic activity

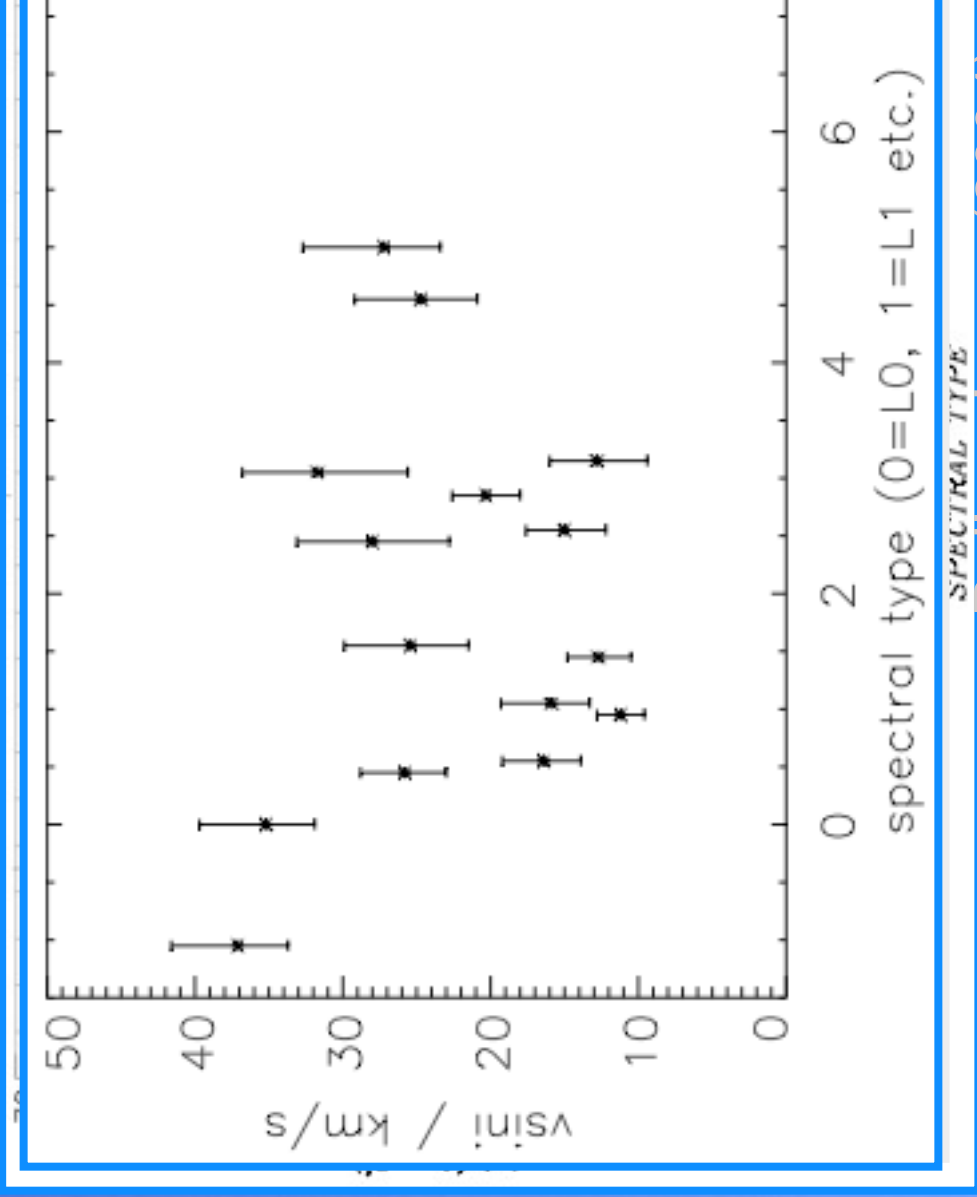
theoretical predictions

QuickTime™ et un décompresseur GIF sont requis pour visionner cette image.

Basri et al. (2000)

Monahan & Basri (2003)

Miller-Jones (2004)



Monahan & Basri (2003)

neoretical approach:

neutral atmosphere, no coupling to the magnetic field

ino et al. (2002)

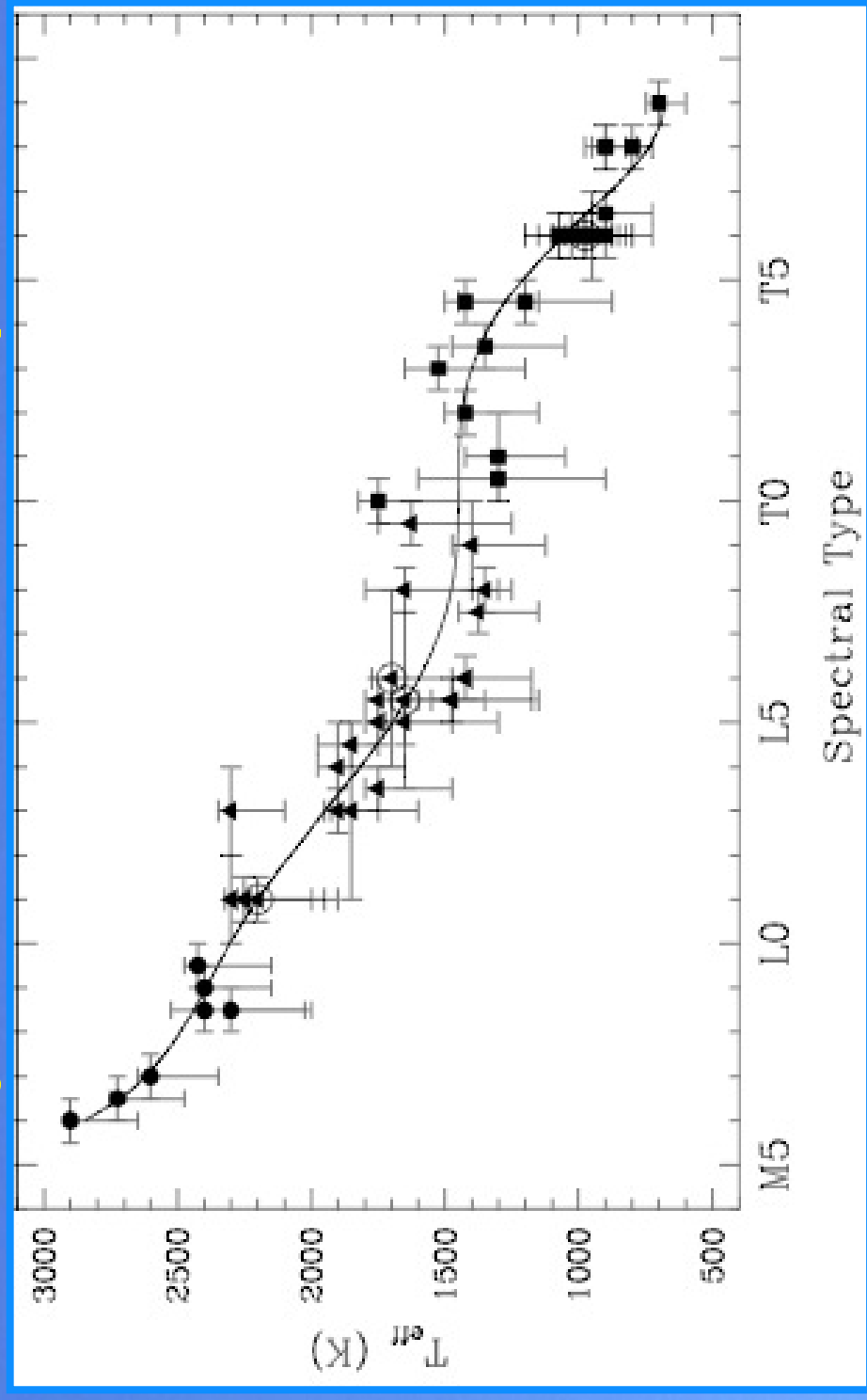
nanaty et al. (2002)

radio flares and H α variations:

M7 to L5 dwarfs: Burgasser & Putman (2005)

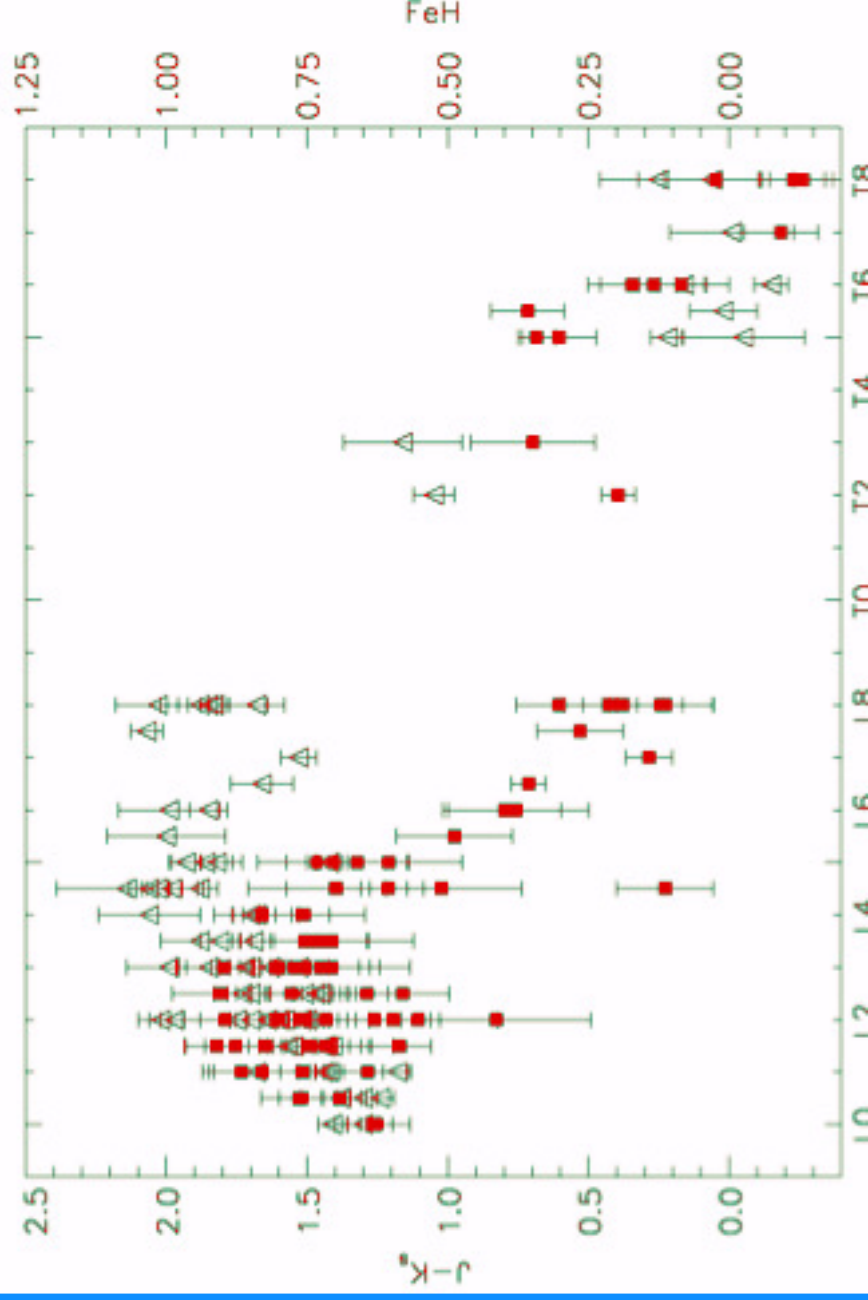
Iu 1: Clarke et al. (2003)

seminal paper by Burgasser et al. (2002): transition between cloudy and clear atmosphere



Golimowski et al. (2004)

original paper by Burgasser et al. (2002):
transition between cloudy and clear atmosphere
appearance of FeH 0.99 μm absorption feature

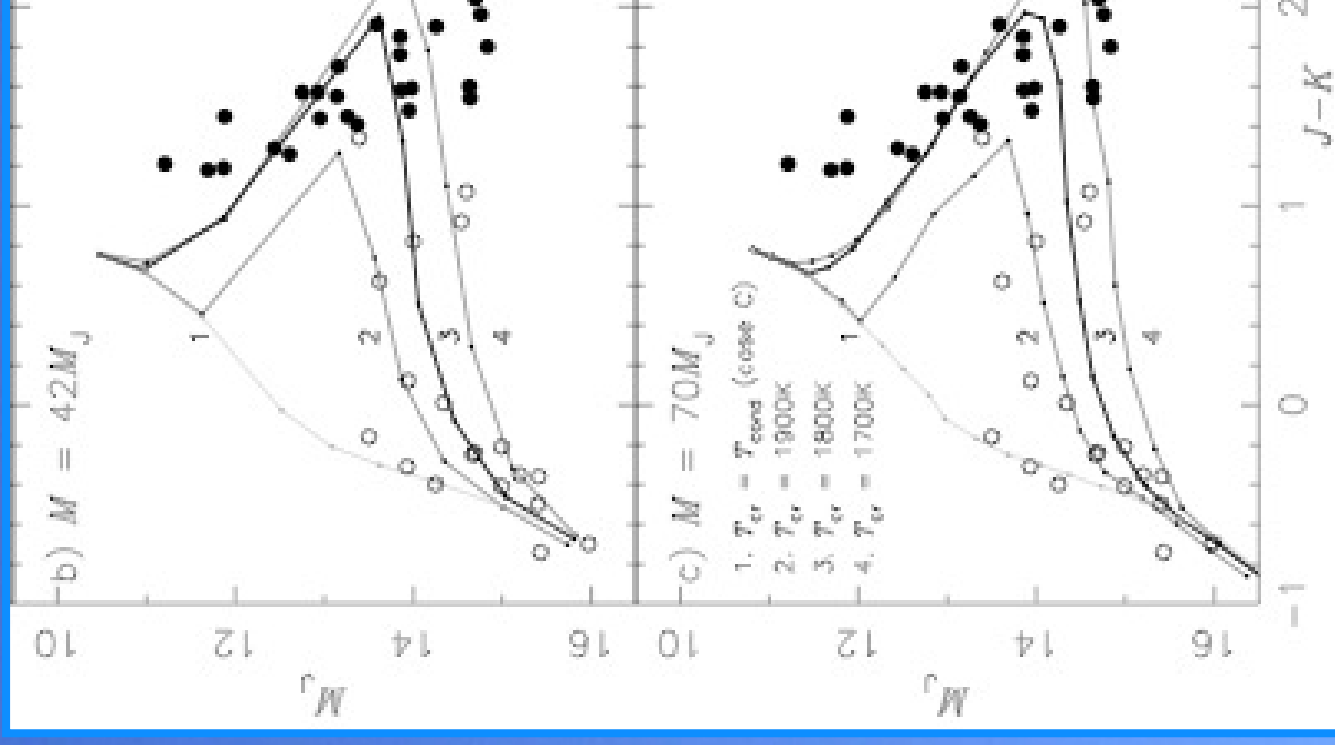


Minimal paper by Burgasser et

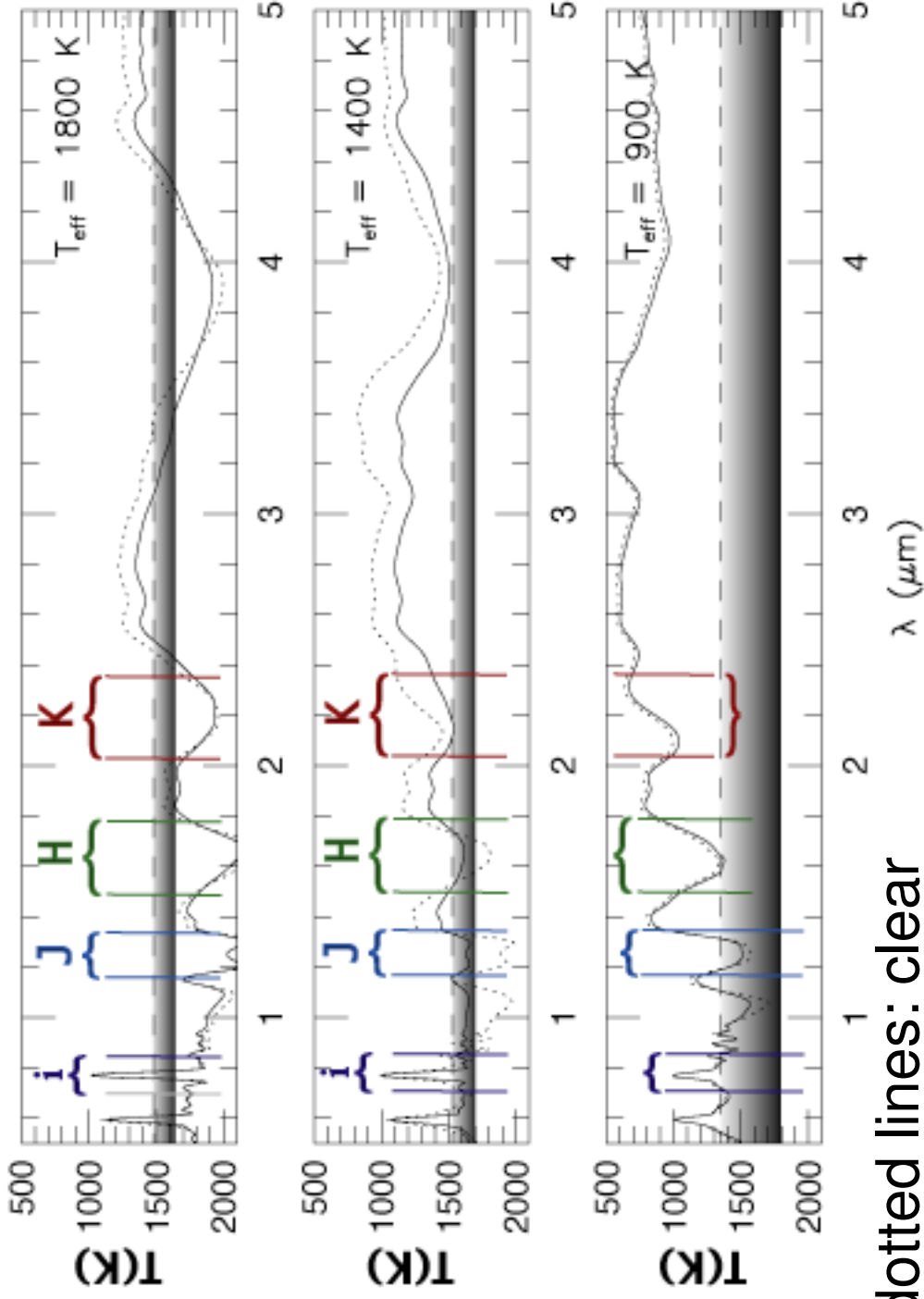
tion between cloudy and clear atmosphere
appearance of FeH 0.99 μ m absorption feature

competing model: UCMS

ji et al.



Tsuji (2005)



dotted lines: clear
 solid lines: cloudy

Ackerman & Marley (2001)

motivation

current results:

broad band photometry

narrow band photometry

electroscopy

prospects

conclusion

photometry

Optical

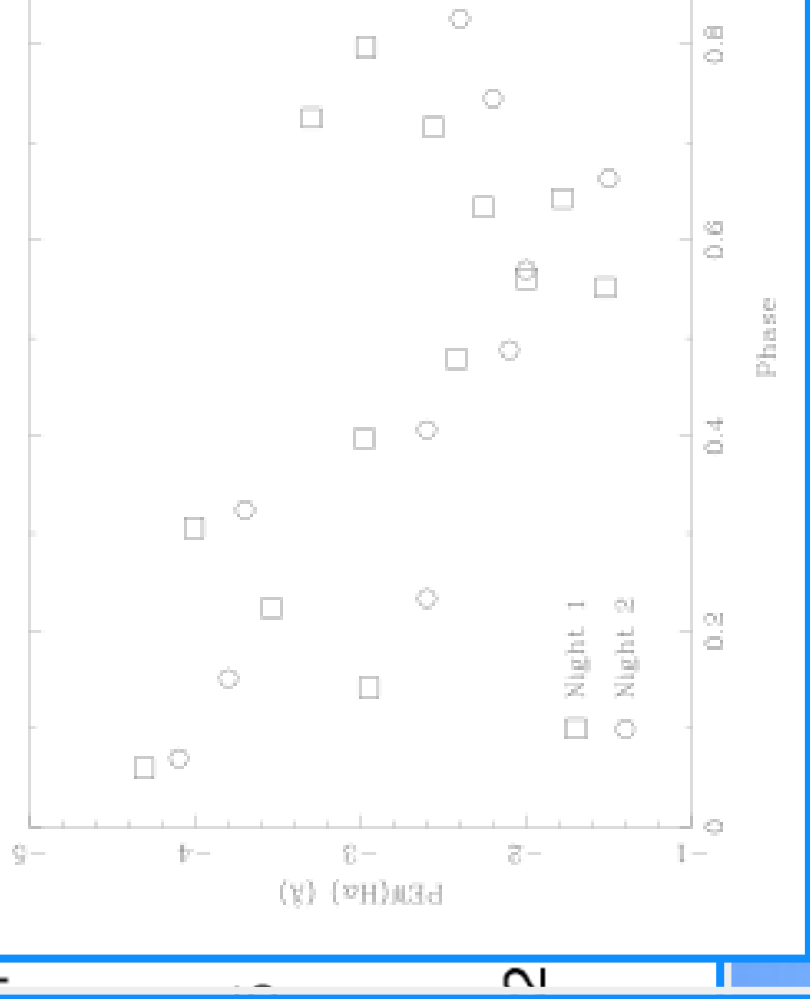
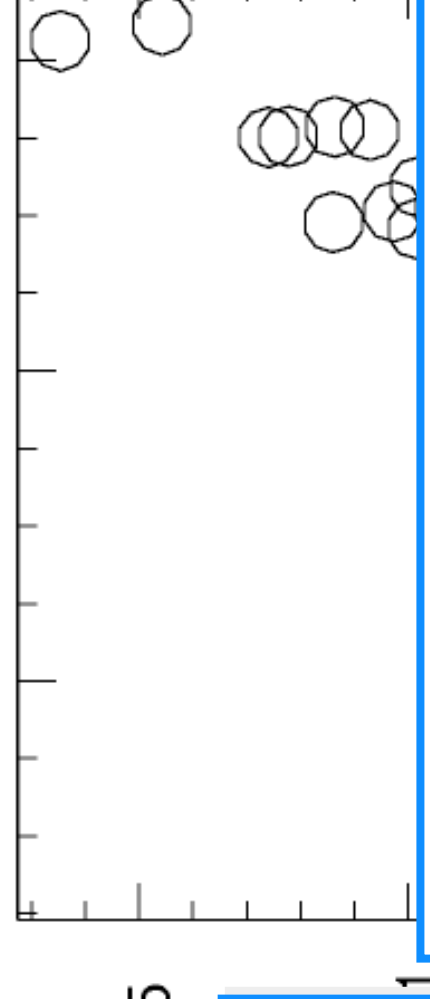
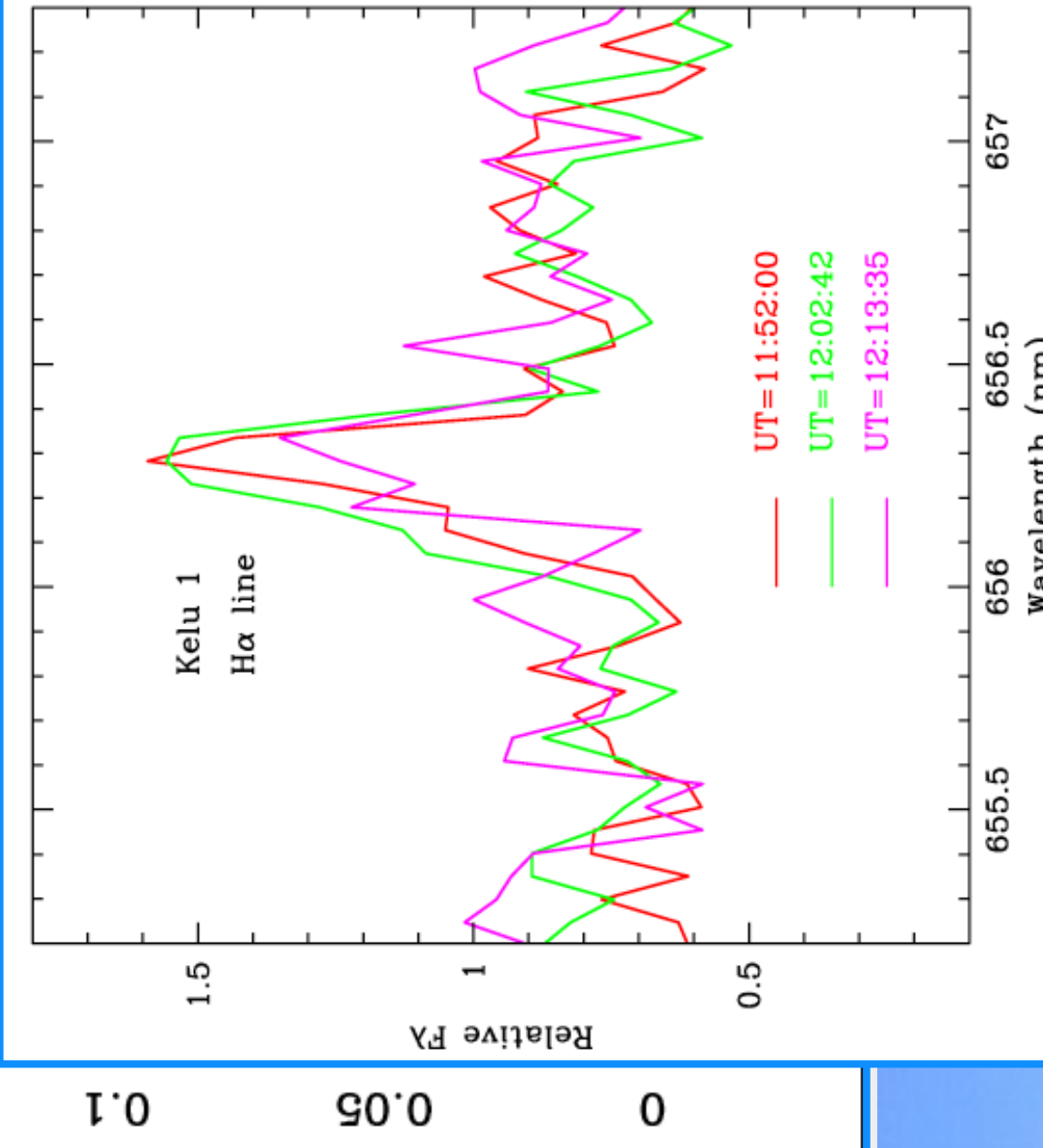
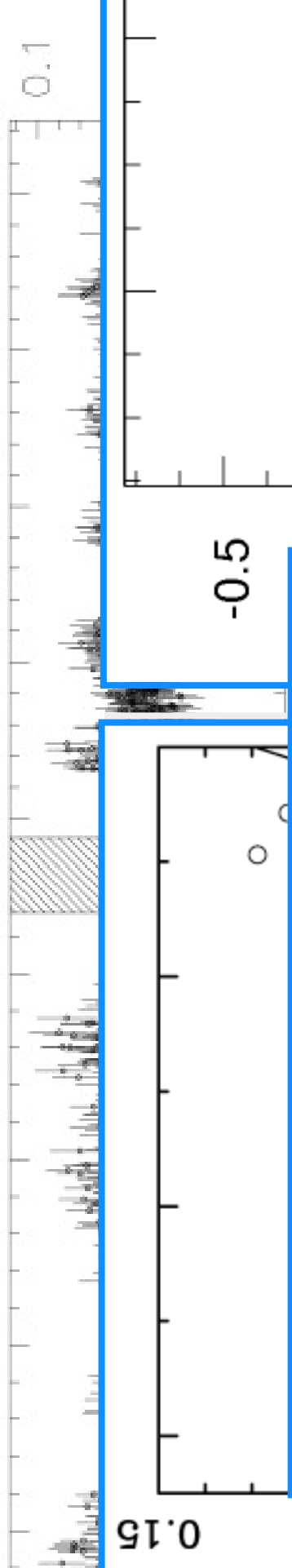
near IR

high SNR for Ms and Ls
small telescope aperture

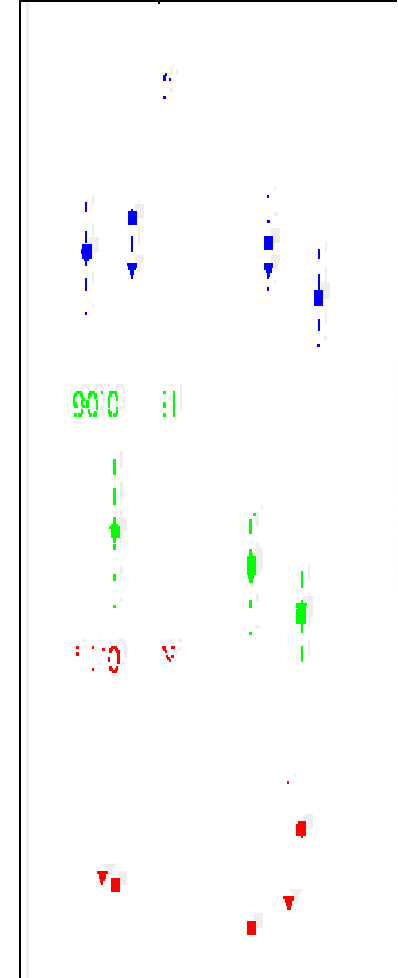
higher SNR for Ts

large field of view
ringing

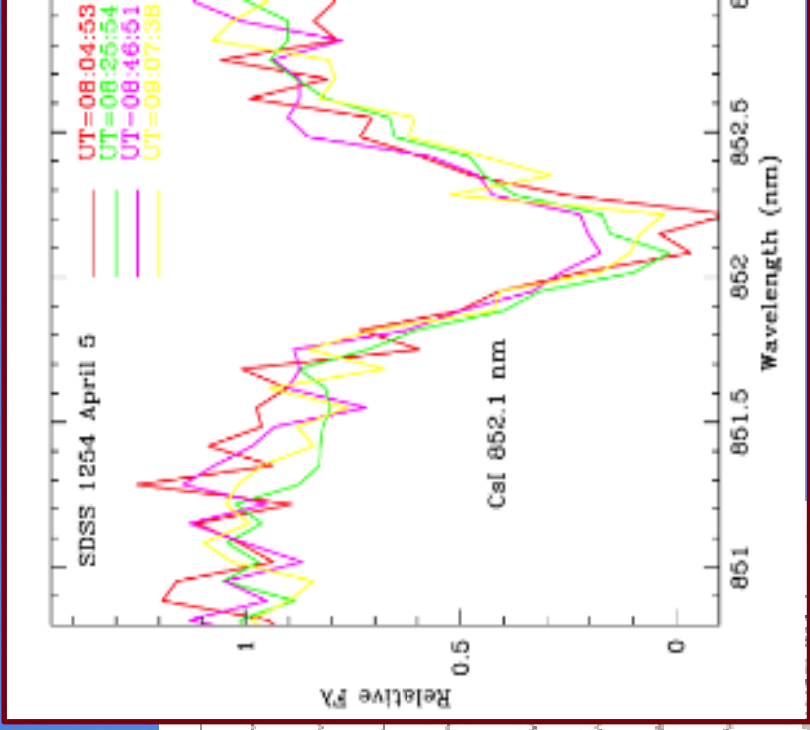
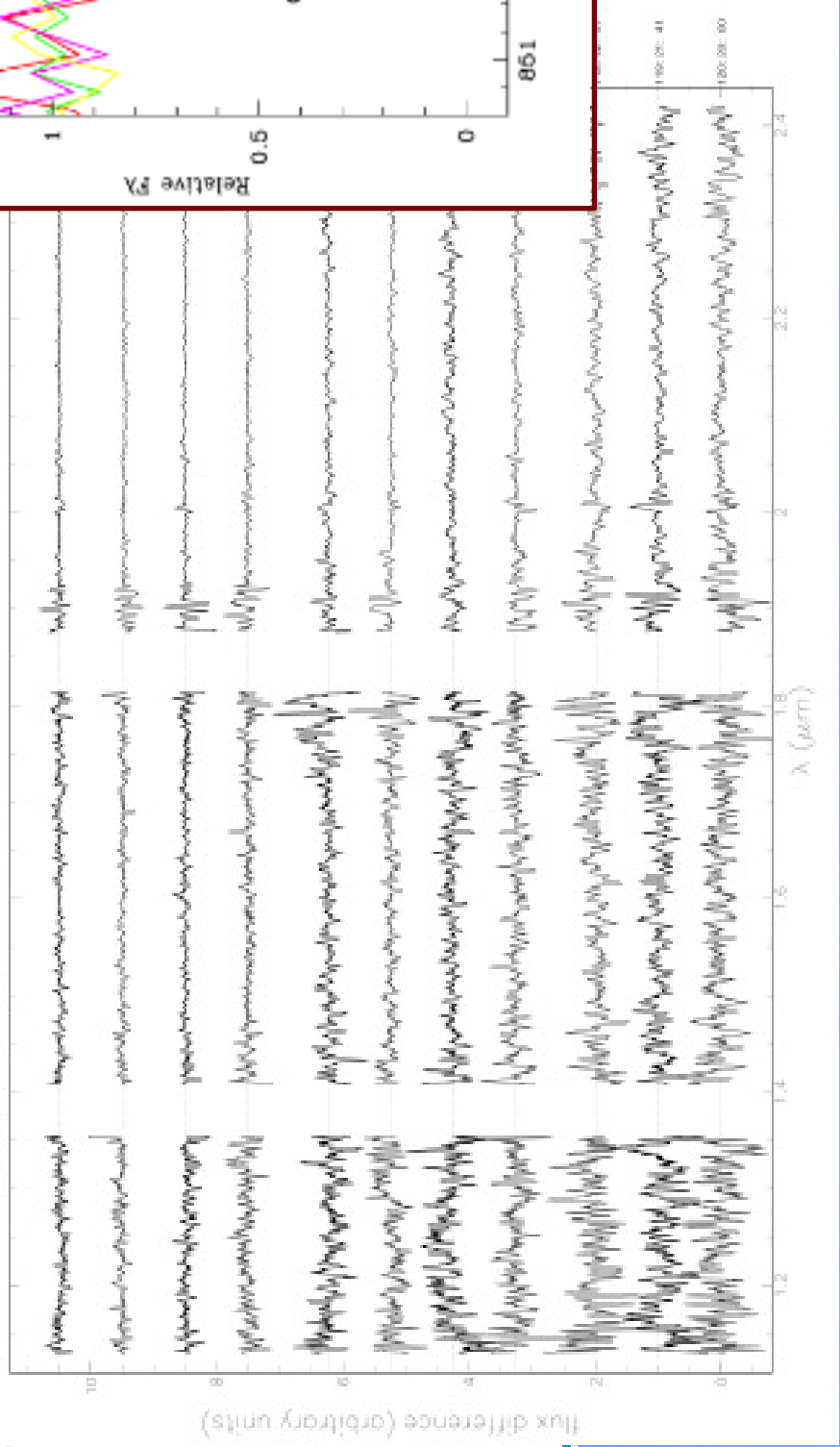
few comparison stars
lower precision
atmospheric water bands



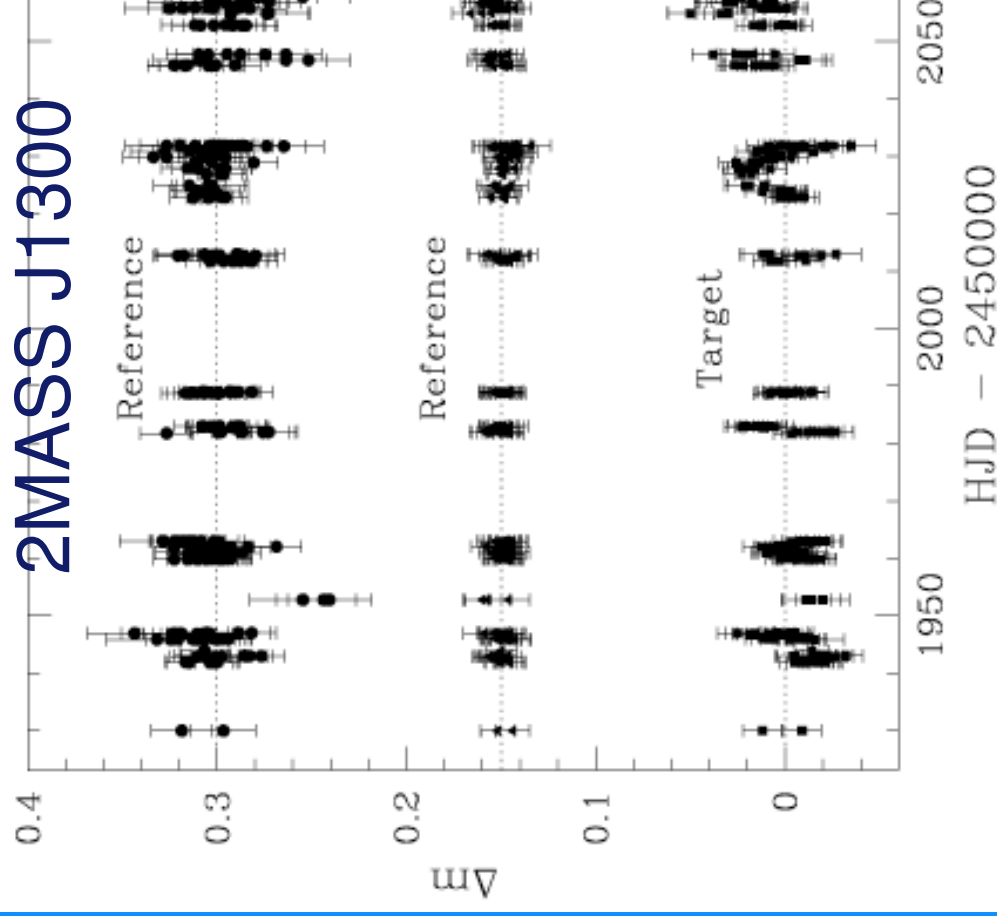
12
13
14



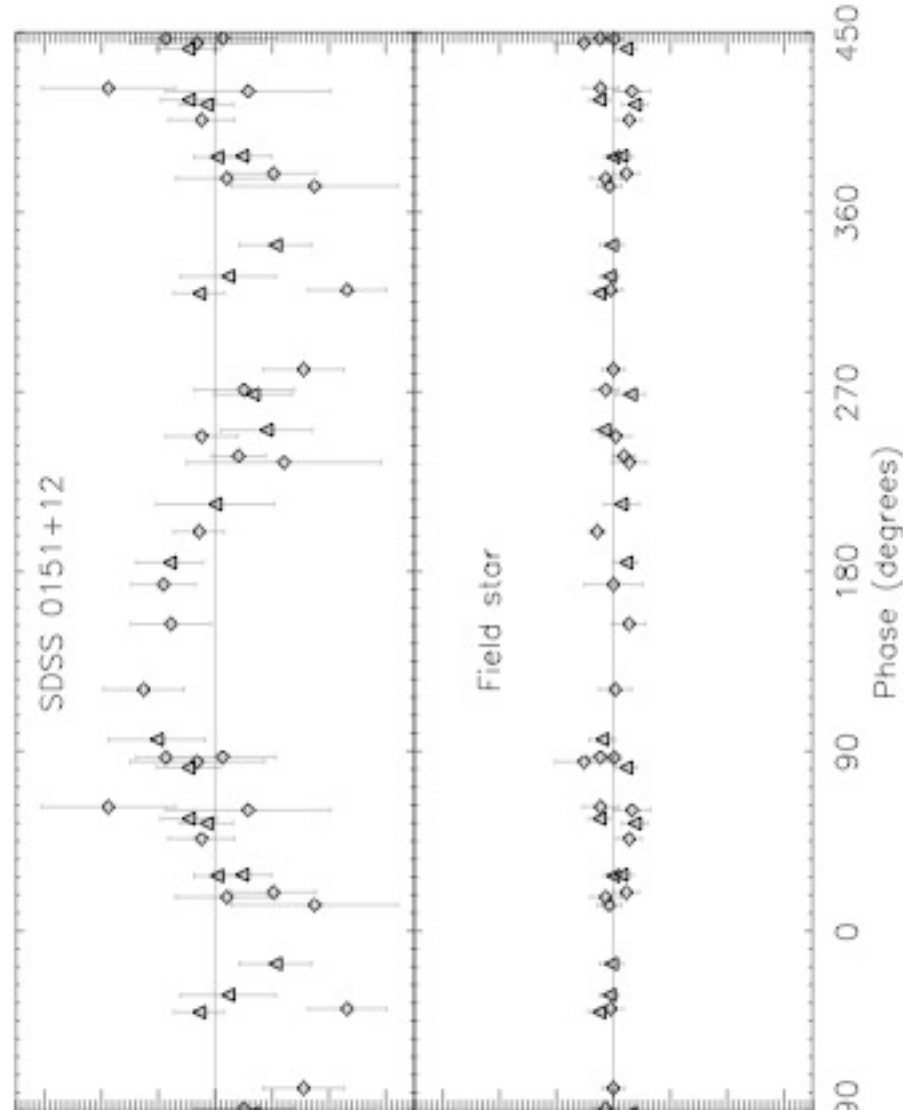
SDSS J1254-0122



2MASS J1300

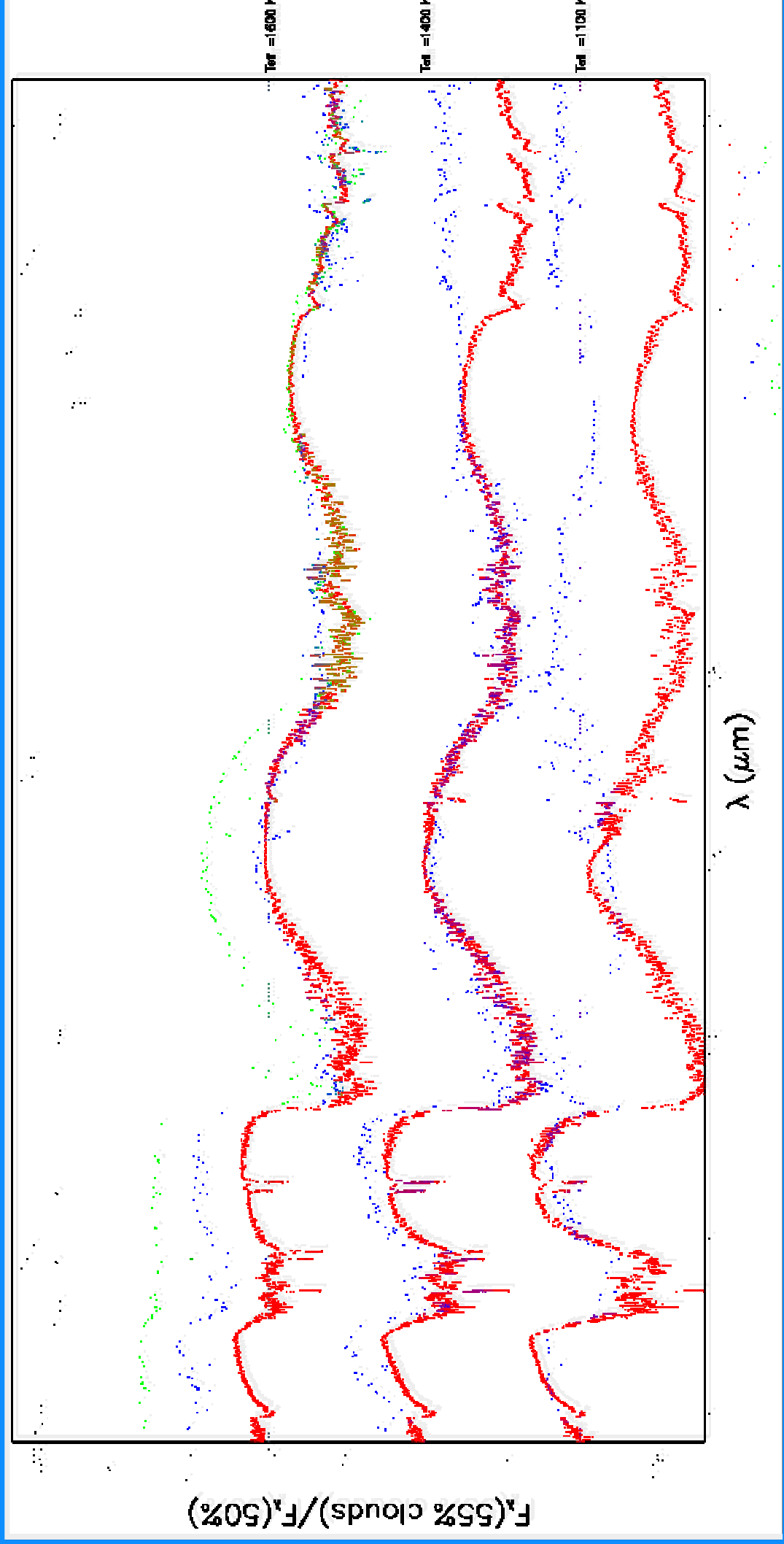


Gelino et al. (2002)



Enoch et al. (2003)

structure



motivation

current results

aspects:

face observations

parimetry

conclusion

observations

ST/NICMOS

i B a (T1) & b (T6)

SS J0559 (T5)

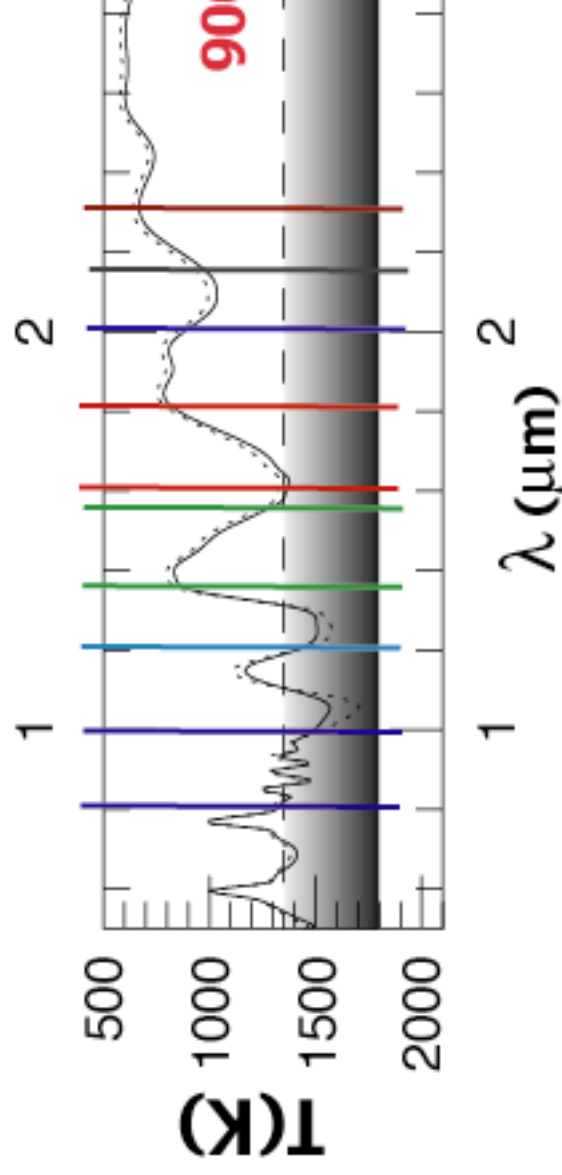
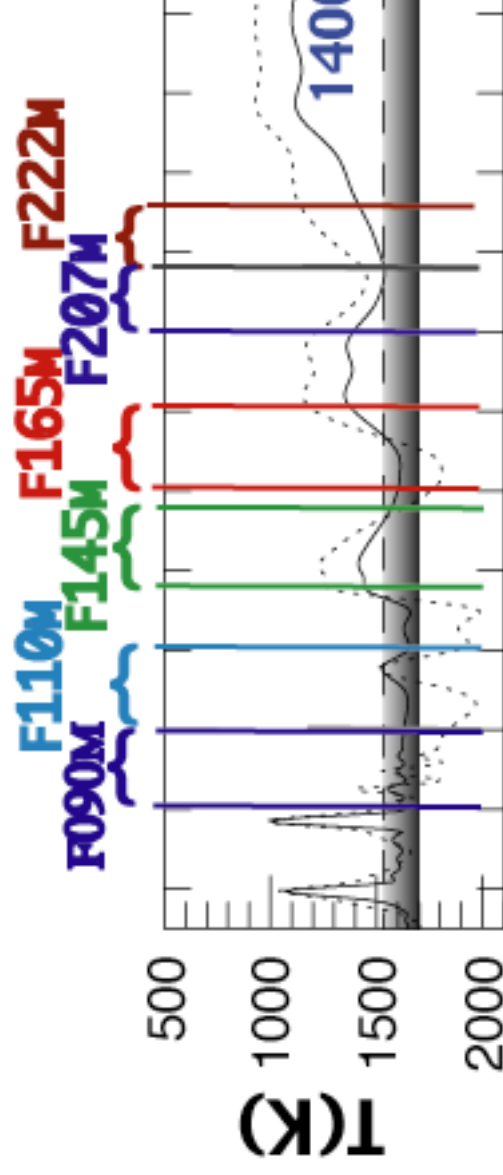
S J1254-01 (T2)

uses:

atmosphere

n stability

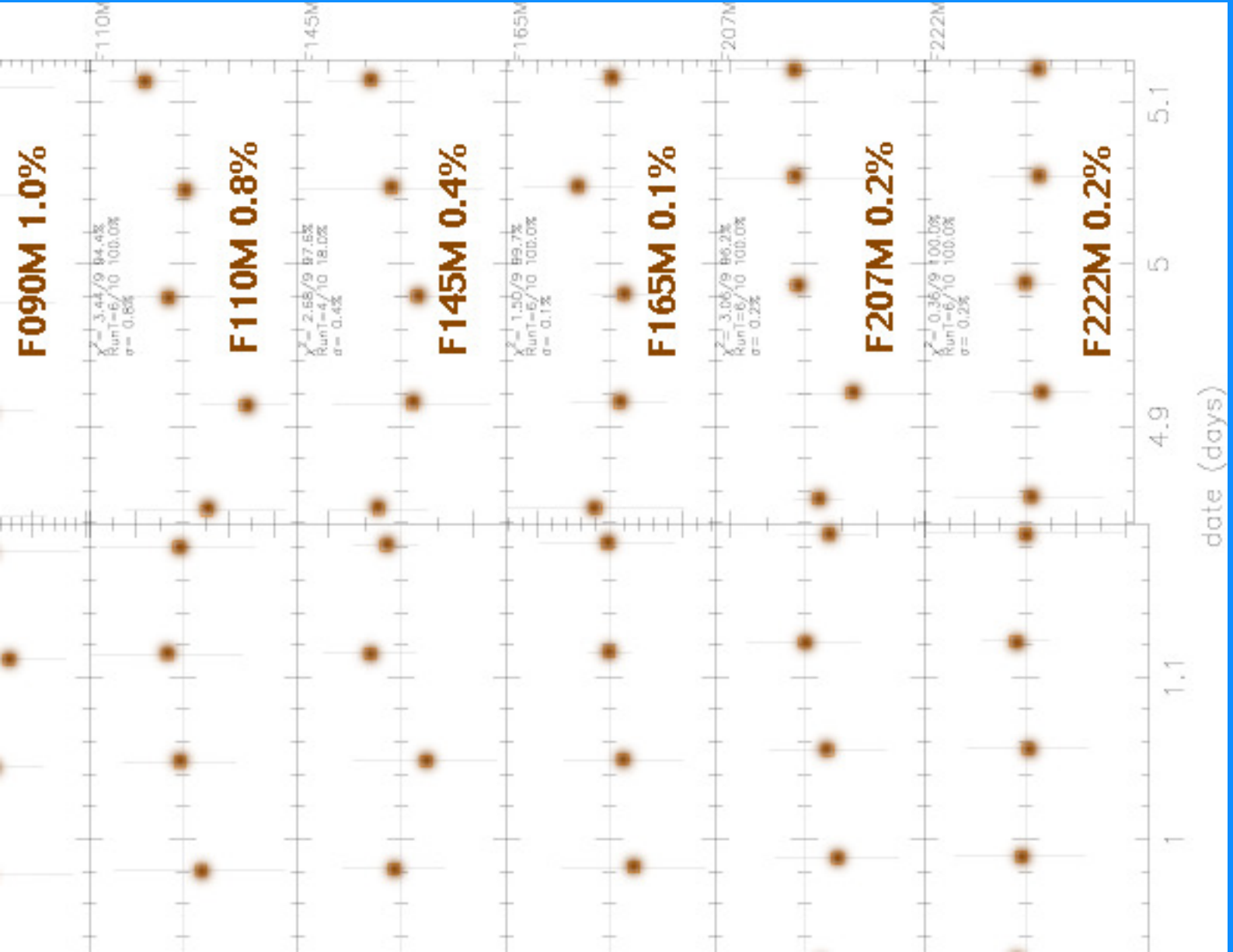
nus:



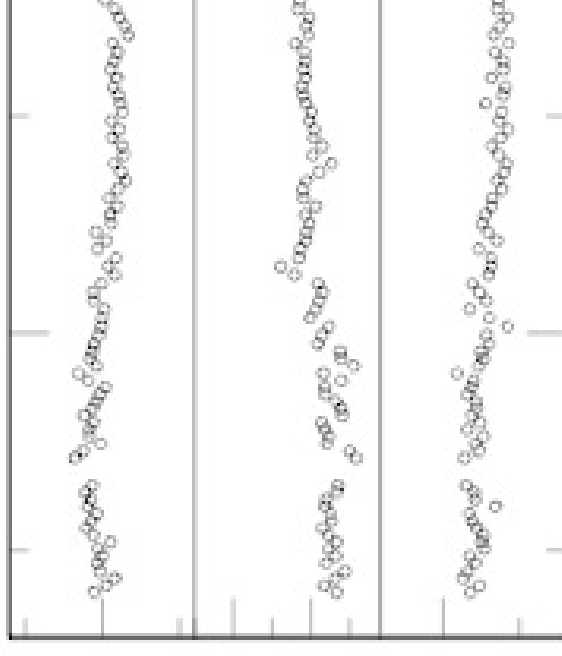
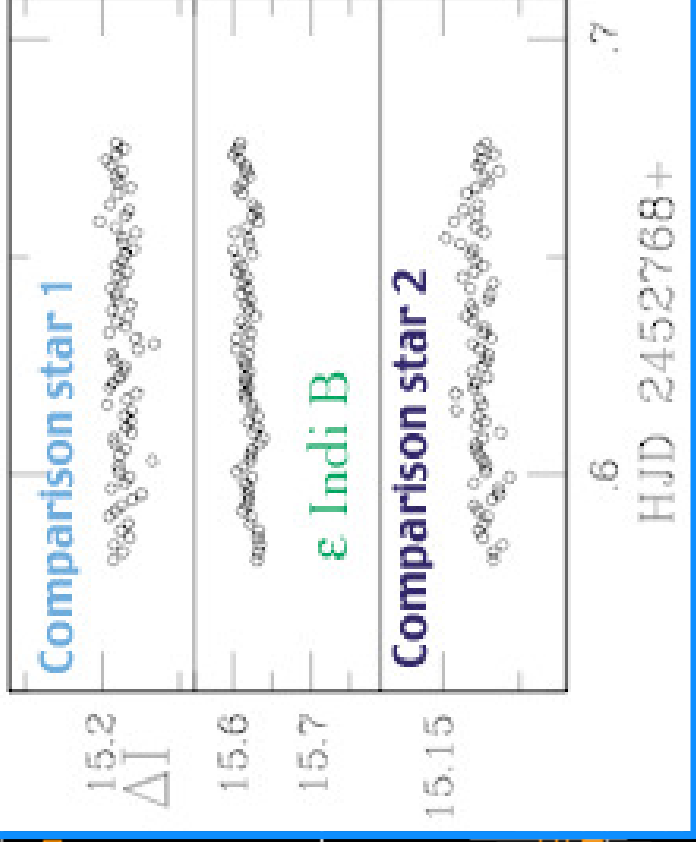
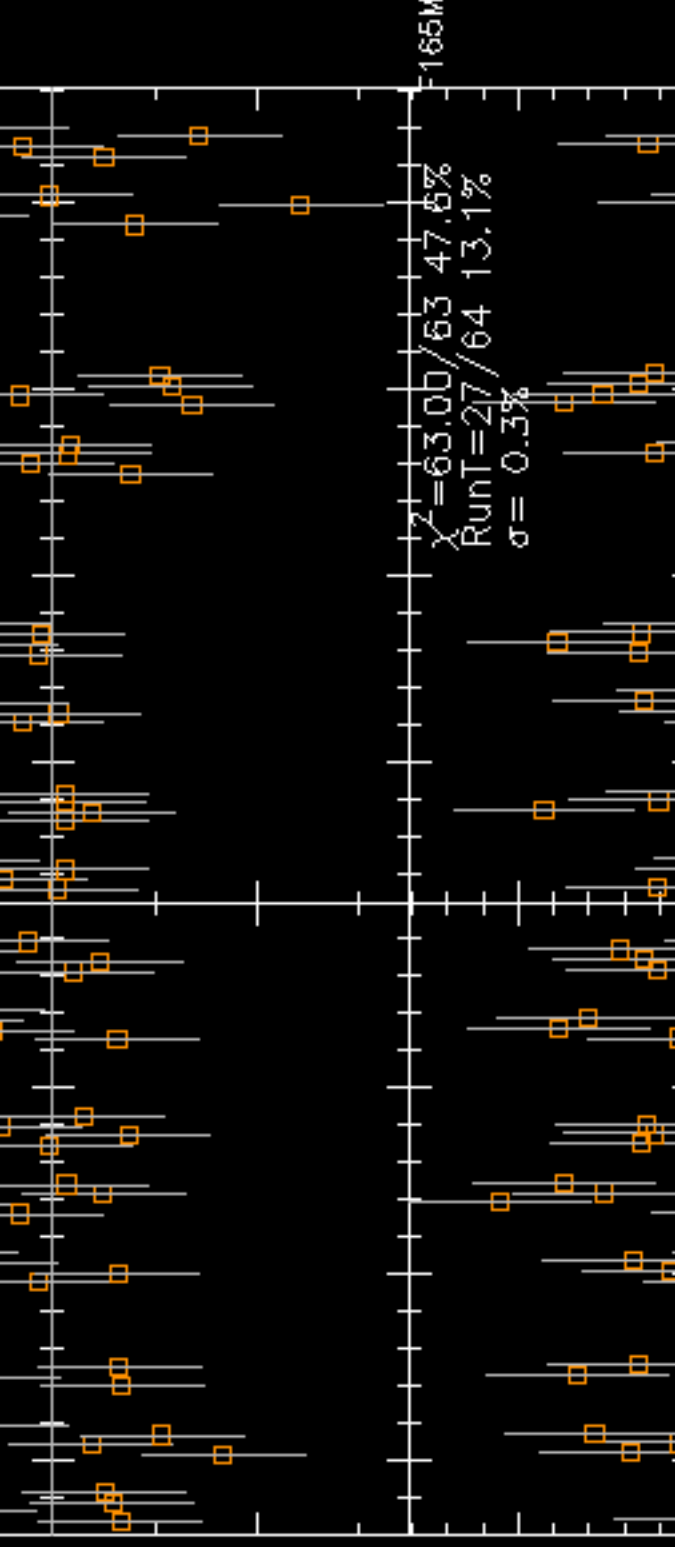
Ackerman & Marley (2001)

all FOV -> no comparison star

Preliminary NICMOS results SDSS J1254 (T2)



NICMOS ϵ Indi Ba (T1+T6)



Koen (2003)

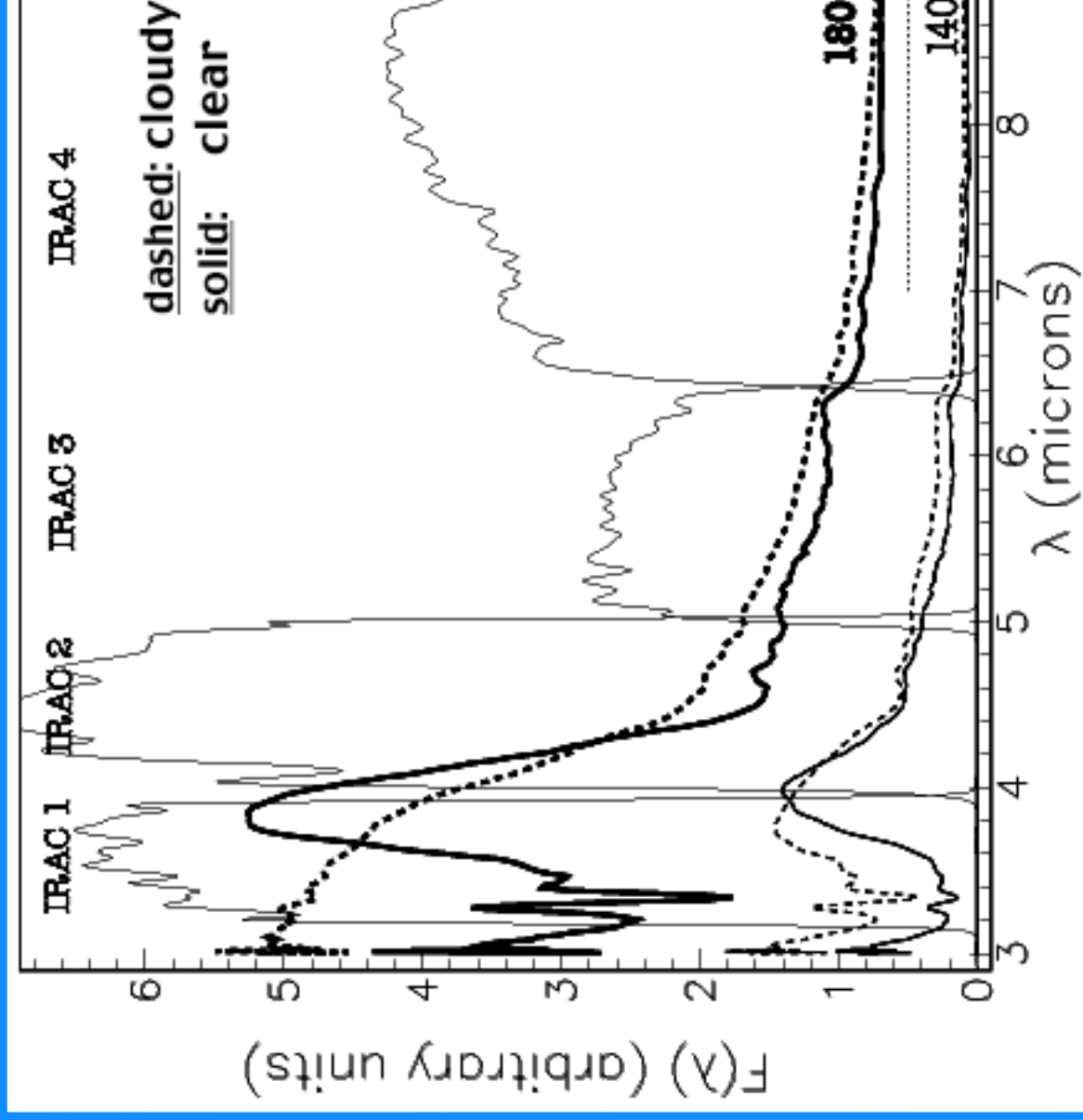
observations

mid IR broad band
hours to observe

ASS J1507-16

SS J1254-01

lu 1



few nice, secure detections
many non-detections (or to be confirmed)
periodic variations lasting a year or more
little constraints on the atmosphere structure
strong constraints on the existence of large
islands/holes

needed for 3-D dynamical atmosphere models

Mike Marley (NASA/Ames) & Mike Cushing (UA)

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S.Gamesh, U.C.Joshi, J.Joshi, V.Mohan et al.