

27 Nov 00 IBTF JL, MR, DJ, BZ, BG

bpeg. 0001  $\beta$  Peg image  
 2  $\beta$  Peg 82 812.15 in order 5 blk+shiny reversed  
 3 guiding  
 4 seeing - diff lt.  
 5 change focus first went to -4.1 : worse  
 6 " then more negative  
 7  $C_2H_2$   $\Phi$  730.53 in order 3 guiding  
 8 seeing sky noise RH = 45%  
 9 increase num to 4  
 10  
 11  
 12 bad x d gratly bounce

1251.0013  $C_2H_2$  N 7538 00:23 LST 1.275 AM  
 14 go to  $Z = -4.5$  @ pr 11

go to imaging mode  
 because appears extended. didn't flip  
 01:06 1 red pair  
 16 red pair

1251.0015  
 16  
 17  
 18 getting something  
 19 RH = 58%  
 20  
 21

22 1:28 LST  
 23 1:51 AM

24 1:40 LST  
 25  
 26  $\bar{D}_{225}$  now 0.06%  
 27

RCAS 028 2:03 LST 1:30 AM  
 029  
 030 2:10  
 031

RCAS 0032 Go to 17  $\mu$  slit setup  
 33 02:44 142 nm 17  $\mu$   
 34 seeing looks poor

off until noted - RCAS 34  
 Zuse out? 11/80

on-axis TV hitting obstruction, can't get in focus  
 but better than last month

pupil also better, if not perfect (in Nov 00 / test)

focus on  $\beta$  Peg : -4.3

off axis TV now good FOV  $\approx 1'$  autoguiding seems to work

$T_{225} = 0.06$

best signal may be at more neg. focus than best sharpness  
 take -4.4 for good compromise

move to 2538 3.5 w. 20 is normal L&L pos.  
 ← guiding a bit to peak pos. change bias to -4.5 @ pr 11  
 0013 not too good focus  $Z = -4.6$  @ pr 14  
 pinhole @ (148, 158) long slit (138, 164)  
 adjust focus  $Z = -4.75$  3.1w 3.0V @ center of slit  
 Note: we see another source in imaging mode  $\sim 10''$  N of 1251.

← move collimator screwdriver to look @ edge of order  
 fooling w/ focus  
 still " seeing like you want to go negative about -0.15  
 but seems like too much

Rh ~ 80% install Zuse switch to X780 cm<sup>-1</sup>

BN 035 bounce measure C2H2 RS 3:29 LST 1.31 AM 765 cm<sup>-1</sup>  
 36 3.15 3:36 (5) R(15)  
 37 1, 8, 11, 16  
 38 1, 10

IRC2034 1/2 offset 4E 6S 3:45 UT 1.25 AM  
 40 1, 11  
 41 3, 7, 10 3:53  
 042 4:00  
 043 4:09  
 044  
 045  
 046  
 047 04:17 1.18 AM  
 048  
 49 04:25 LST 1.16 AM  
 50  
 51  
 52 04:36

line profiles varying pos. due to guiding

BN 053 shells rel to later 04:42  
 54 First few pairs had weak positive skew 1-2  
 55  
 56

775.5 cm<sup>-1</sup>  
 echelle = 55.275 R(19)

2 pairs before closing dome for humidity  
 open again 06:15  
 moved echelon paraboloid ~ pair 9, last pair messed up

use these  
 06:31 - source moved to edge of slit  
 bad shells

irc264  
 65 sky noise increasing, negative falling off slit  
 66 not great  
 67 start with this one  
 68  
 69  
 70  
 71  
 72 closed after 3 pairs

pal  
 focus & bulb @ -4.75 100% mod. offset  
 abs. coord 15.0° -25"

Signal I 35

Offset pretty constant @ 0.075  
 net offset from  $\theta_1$  24.9 W 51.0 N 15.35° -36° av. coord.  
 ↳ S40 132314

Good IAC2 offsets from  $\theta^1 C$  = 24.9 W 47.0 N  
 Good BN offsets = 29.7 W 55.0 N

Current BN offsets 40.9 W 45.8 N  
 Current IAC2 36.1 W 37.8 N

28 Nov 00 dz, MR, DJ, & Z, DG nodding 10' N (off slit) 1:39S AM

mcep .0001  
mcep .0002

23:38 ST move to N7027 offset from ~~50463~~ 17" S S40 50433

offset 4E 2W  
nod 20" N 0:00 ST 1:36 AM H<sub>2</sub> S(4)  
0:04  
0:11 1:44 AM  
00:18  
00:47 ~1.6 AM

ocet.0010 ~~927~~ 01:17  
.0011  
.0012 927 02:09 through pinhole + CVF feature mislabeled  
.0013 moved CVF using mirror  
14 919 cm"  
15 moved CVF stare mode  
17  
18 aborted after 2 pairs  
19 709 cm" 02:36  
20 slit, Jupiter setting 1:01 AM

W3B 21 4:23 EST 1:46 AM cirrus rotate slit N-S scan made

W3B 22 4:34 some detectors but clouds are thick. map made

W3B 23 5:04 fix bug in map vnhel - no "line" @ ends now true S- 1:57 AM

W3B24 5:13 1:59 AM same as 23 but 7" S  
W3B25 5:21 1:62 7" N ?

745 cm  
Mon 12 028 6:31 1.12 Go to long slit mode MNRZ Felk + Dwyer well nod  
029 6:39 1.13 Back in cross-disp BAD - 155 only 4"  
7. left base 030 6:40 1.13 set NOD to 20" S good  
031 6:55 12" N same as 29 otherwise  
033 6:58 12" N still nod 20" S abort  
NOD 40" S  
Go to MNRZ MS3 745

Mcep ZNSE DN 1/30  
focus on ~~sky~~ image z = -4.3  
WX patchy cirrus Turb ~ 0.08  
center of 550um slit 88,110 slit rotated 65° E of N  
8um setup for S(4) line

go to 32 nodes Guide Star Catalog 0317600708

rotate slit to 10° W of N

Cirrus overhead  
set up for next  
4 scans center 9" S of Colley pair scan steps 12" W scans  
in 0.5" steps 24" long 48 steps 1" steps.  
"Map mode" sets up @ 0,0 offset -12,0 1" steps 24 scan pts  
Nod 20" S. Note: Telluric work @ 0,0 of  
no rot what we removed. off 6" W.  
Go 12" E in 1" steps 25 pts. 2 scans. NB header pair probably  
(1st pair in scan.)

Note: Scan coords are zeroed in header  
@ ~~0,0~~ 9 S ~~1000~~ WSB.

nodding 20" S  
nodding 20" N. Still much cirrus  
Note: we didn't check for 1541 after rotating back to N-S

06 05 20.0 - 06 22 41  
Map 16 pts 1" 2 scans start 7.5" W.

Autylene 23 HCN 210

Have trouble peaking in.

Just want

1RS3 034 8:20 1.37 AM MONR2 1RS3.  
 035 8:28 1.30 2225 = 0.098  
 036 8:37 1.42 AM  
 Go to  $\alpha$  CMG = BS2491  
 5x faster than 1RS3  
 SIR 037 9:03 1.55 AM  
 skynote ~ 25  
 038  
 039 9:20 1.66 AM  
 040 9:26 1.72 AM  
 Go TO RLED, Same spectral setup.  
 RLED 041 9:44 1.01 AM  
 042 9:51 1.01 AM

EIM) Much cirrus @ dawn

745 re-tip collimator to opposite side of beam  
 (now going to be blue.)  
 0607 48.9 - 06 23 04 (2000)  
 moved 13.7E 7.8 s to set Sirius in. basalt.  
 Check w/ camera note BS is about ok.

29 Nov 2000 UT IRIF JL, MR, DJ, QZ, DG  
225 2 0.07 @ sunset sky is clear.  
Set up @ 17m EPAur SAO 145652 focus - 4.2

epagr. 0001 H<sub>2</sub> setup H<sub>1</sub> in 3rd order guiding x 6 center

uran. 0002 23:33 1.52 Am 32 rods  
0003 23:41 1.57 25 rods  
0004 23:51 1.62  
0005 00:00 1.68

Go to EPAQR same spectral setup.

epagr 0006 00:11 1.34 Am  
0007 00:19 1.38 Am

recheck bore sight - go to 7538 res 1 same setup.

IRS 7 0008 00:36 1.39 Am move scope 2" N.  
stop doing the B/C we forgot

SVS 0009 SVS 13 01:24 1.16 Am  
0010 01:24 1.14 Am still @ 0,0 pos.  
11 @ -2E ON  
12 @ 2E ON  
13 reset on SAO star 5" E 1" N

utau 0014 Guiding  
15 α Tau 2:10 1.22 Am  
16

abaur 17 AB Aur detect continuum in accum. Tried  
18 2:29 1.22 1" E + 1" W for  
19 diff → no improvement  
20 2:51 1.16 Am 16 rods now nodding 15" N (off slit)  
21 2:57 1.14 32 rods 15" N off slit  
22 15" S  
23 3:18 1.10 15" N nod.

Go to α Tau check bore sight Dead on

Go to β Tau set up w/ guide star

GCTAU0024 3:27 1.03 Am 32 rods 5" N.  
25 3:48  
26 3:59 1.01 Am  
27 4:11 1.00 Am  
28 4:22 1.00

Observe all 164 w/ Z-sect  
350 um slit ~1.8" 12" Lens N-S.

Last 4 frames are CRAP start @ 0.7E 3S  
move 1.5E N<sub>sun</sub>=7  
move 0.5" E 1" S N<sub>sun</sub>=6  
now @ 4.2E 4.4S

fooling w/ guiding PR 6-9 - took (-) beam off.  
PR 23 chase focus.  
set up nod 10" E. slit still N-S.  
object peak ~ 1.2" W of channel. offset guiding is on.  
it is on top of CO<sub>2</sub>.  
very brought, focus on R10 PER  
offset from SAO star (56467), use guide star Didn't see continuum at 0.1" ± 1"

nodding 5" N-S.

225 now 0.11

to

32 rods N<sub>sun</sub> = 6 388 sec int. time.

very brought @ end

29 Nov (cont'd)

61551.0030

After 66 Tau, went to  $\alpha$  Tau  $\rightarrow 0.5''$  W, Went to SAO 93976 saw neg beam in accum

0031 05:03 1.01

0032 5:15 1.02

0033 5:27 1.03

0034 5:39 1.04

ATAU 035 05:51 1.05

036 05:57 1.06

Rotate slit to E-W set up for S.D.  $1233 \text{ cm}^{-1}$  Center up on BN - start scan Center of slit

IRC2 0037 6:45 1.16 AM S.D. band center scan

1310! IRC2 0038 BN  $1256.5 \text{ cm}^{-1}$  scan from 4th going south

IRC2 0039 7:20 1.24 AM

40 start scan  $2.5''$  4.5E 3N of BN otherwise same.

41 BN 07:32 1.27 AM

42 3E3N from BN

43 7:43 1.31 AM

44 7:49 1.34 Same as above but now 8 scans. last of SL. band

45 7:59 1.36 AM another 8 scans.

BN 00 46 8:14 BN itself 16 pairs  $10''$  EWD after 13 pairs. Go to spectroscopy make same X as scan mode

IRC2 0047 8:4 1.41 AM  $9.4''$  LOS  $\rightarrow$  = 120 Z.

Go to  $1233 \text{ cm}^{-1}$  (S.D. Band Ctr)

IRC2 0048 8:28 1.54 AM

Go to  $1263 \text{ cm}^{-1}$

Use looney et al par. check SAO @ end  $\rightarrow$  move  $0.4''$  E  $0.5''$  S to set it in. out of scan. As usual -  $0.9''$  W is max. USE  $1''$  W  $1.9''$  N. Check SAO \* move scope  $0.3''$  E  $1.25''$  S to center.

use 1.0 W 1.9 N

SAO: move  $0.6''$  E  $0.6''$  S to center @ end.

use 0.9 W 1.9 N

move  $0.9''$  E  $1.4''$  S to center SAO star @ end

move  $2.6''$  E  $0.7''$  S to center SAO star.

Go to 200  $\mu$  slit. ( $2''$  long) E-W + N-S. offset to start scan  $4''$  W  $3''$  E. Steps  $0.5''$  S 2 sec integration 31 steps.

7:17 1.23 AM.

Change order on Echelle to get rid of overken. Stop after 1 pass

START 3E, 3N of BN scan  $0.2''$  E,  $0.5''$  S each step 33 steps

add another  $1''$  E before start of 3rd scan. center  $1''$  E before start.

BN now @  $5.1''$  E  $2.7''$  S ] this is due to tracker drift + moving to center of slit.

move scope further E during scan. obs.

can't see IRC2 in track

29 Nov cont'd.  
 IRC2 49 adding 10" E a Leve 1263 cm<sup>-1</sup> 8:35 1-58 Am  
 50 32 pairs searching (some are negative) searching guiding slot  
 6.0051 16 on it for most  
 52 1233 cm<sup>-1</sup>  
 IRC2.0053 1233 stably went until gone at end  
 06.0054 OH @ 239 wandering all over 28:20  
 55 on it v=1-0 + 2-1

$\tau_{225} = 0.081$

feature = band center  
 (erroneously) for all

30 NOV UT JL, MR, HLD, DJ, PZ +20  
Go to M Cep B 8316 in camera node.  
lx = low but white nodding

Multip.0001	23:16	1.36	nod off slit
	Go to 7027		
N 7027-0002	23:30	1.26	4E 2N slit ctr.
.0003	23:40	1.24	
.0004	23:50	1.32	
	re-offset from		guide star - so full to
.0005	00:04	1.38	4E 2N
.0006	00:17	1.43	4E, 5N
.0007	00:27	1.48	4E, 2N ←
.0008	00:38	1.54	4E, 2N

B Pers. 0004	Shift in Beam	00:52	1.11	peck up <del>to</del> during focus during.
.0010		00:56		
11		01:00	1.13	Good scan, not feeling good.
12	rotate slit to E-W			Go back to B Pers
Lub 12 0013		01:36	1.42	offset 2.5 for then corr + 3.7
0014		01:39	1.42	
0015		01:50	1.45	
0016		2:01	1.49	
0017		2:11	1.52	
	Go to B And			
BAWD 0018		2:24	1.68 m	Peaking up while taking.
0019		2:29	1.79 m	

Rotate slit to 10 DE 6 w at N orth  
Best focus Z -4.4 in camera  
Go to α Tau

20 Nov				
Sup 0021	3:17	1.03	⇒ camera node	14" E of ctr
22	3:21		" "	0,0
			set up for CZH4	250μ slit.
23	3:33	1.02	on center	0,0
24	3:44	1.01	moved echelle, upped Int Time to 2s.	
			verifies ET w limb	point center now 3.5"
Sup 25	4:04	1.00 m		
Sup 26	4:16	1.000	OE) 22-5N	Limb spectrum.
			Set up for scan	8s per point
27-28 Nov				
29	4:35	1.00	STEP MAP	
30	5:02	1.018	STEP MAP	

$T_{225} = 0.045$  take zise off  
slit is 65° E of N. RH -52  
550μ.

auto guiding

- autoguiding

Change down. cont. signal in mid slit  
 $T_{225} = 0.06$  cont. signal @ top of slit.

focus -4.6 } still nodding off slit 20N  
Bore-suit on + beam w 5" nod.  
= 6.2" NO GOOD - mirror in.

This one is 25 prs. nod 5" EW  $T_{225} = 0.066$   
re-center collimator.

node. Put in 250μ slit  
Limb 18.1N 25.7S ⇒ 3.8S  
30.4E 19W ⇒ 5E  
found center of slit in imaging node. set bore-suit

9SI cm<sup>-1</sup> set nod  
nod 60" N. Stop after 14 prs Tot=1.  
Time = 2 robust 2-s  
Change nod to 40 EW. re-center

Start @ 18.8W 20.0N ask for 1E 0.7N 10/step 31 prs.  
nod 15 N  
Start @ 26.8W 10.3N step 1E 0.2N 46 prs.



step map along central meridian  
 check center: found at 3" E (after setting up HCN)

0032 747.4 HCN RC(1) + C<sub>2</sub>H<sub>2</sub> no flat

0033 1 scan moved to red good

0034 adjusted spectrum again nod 1E 6N

0035 06:57 1.20 AM HCN 745 cm<sup>-1</sup>

36

37 07:07 1.21 AM N<sub>2</sub> 6 nod (-0.6, 4) now sled up. 951 cm<sup>-1</sup>

39 LST = X = nod (0, 4) 587 cm<sup>-1</sup>

40 07:47 1.31 don't use! - guiding/tweaking for boresight nod (0, 6)

40 07:51 1.33 questionable; were focusing

41 07:56 1.34 now focused nod (0, 6)

42 07:57 1.35

NGC 2346 43 08:17 1.12 ns = 16 offset is 15" W, 3" N

W filament 44 08:22 ns = 32 nod 25" W

45 08:32

46 - 1.18

NGC 2440 47 09:03 1.36 nod = 20" west no offset; north lobe

N blob flat no good - mirror in

48 09:13 1.40

49

50 09:35 1.47

R Leo 51 09:47 1.011

52 09:51

End observations for tonight

step map along central meridian  
 start SW, 30 N of center  
 step 4" S, 0.7" E  
 nod 40" E

Don't see much. Fisht around still fishing

Rotate slit to NS orientation

H<sub>2</sub> 17 μm line

some indications of "grating bounce" RH = 11%  
 τ = .058 (-1.5 mm)

moved 0.4 E

looks clear!

No sign of a line

No obvious line.

Atmosphere "standard" - Half a slit off.  
 (think about differential extinction.)

01 DEC UT: JL, MR, HLD, DS, QZ + DG

Go to setup star EP Agr, SAO 145652 (same as 29 Nov)

	LST	X	Line	nod	nsun
epagr.0001	23:09	1.155	H <sub>2</sub> S(2)	(0, 4" W)	4
uran.0002	23:19	1.450			
.0003	23:24				

ignore these

Take ZnSe window out

uran.0004	23:34	X=1.52			
.0005	23:39				

look for varying H<sub>2</sub> - guiding

check bore sight on epagr; it didn't change  
 epagr.0006 23:51 - not good (bore too high)  
 .0007 23:53

uran.0008	23:59	1.67			
09	00:05	1.71			
10	00:11	1.76	unod = 32 now		
11	00:21	1.85	"		

bpeg.0012	00:43	1.095		6	
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Switch to  $744.3 \text{ cm}^{-1}$  HCN + C<sub>2</sub>H<sub>2</sub>  
 $747.5 \text{ cm}^{-1}$  HCN R11 + C<sub>2</sub>H<sub>2</sub> R7

bpeg.0013	00:58	1.127			
14	01:05	1.142			
15	01:12	1.116	small shift in $\lambda$		

NGC 7538

IRS 1 = irs1.0016	01:30	1.49		(0, 5" N)	
17	01:41	1.52			
18	01:52	1.55			

New  $\lambda$  setting;  $760.8 \text{ cm}^{-1}$  HCN(R16), C<sub>2</sub>H<sub>2</sub> (R17)

irs1.0019	02:13	1.62			
20					
21	02:33	1.70			
22	02:40	1.75			

set up for  $12.27 \mu\text{m}$   $814.424 \text{ cm}^{-1}$   
 350  $\mu\text{m}$  slit, NS slit position  $T=0.05$ , clear  
 Insert 8" long slit. (decker) Focus = -4.2

unod 16

ZnSe window is on

drifted 1.6 W, 0.4 N  
 drifted 0.9 W, 0.2 S (had to compensate 0.9 E, 0.2 S)

Background is lower now  
 guiding good to 0.3, 0.2 (still drifting a little; ~0.3 W on each set)

flat was trashed; mirror was in

tracking is good now!  
Bore sight

16

250  $\mu\text{m}$  slit, 11.8" decker

moved S 1.2" at file 11 (because negative beam was falling off the array)

Autoguiding

Peak up @ 2.3" W, 1" N  
 same guiding around on 17 (pair 5 or so); best = 2.5 W, 1" N

{ Guiding a little bit.  
 } all very good

3peg.0023 case  $\lambda$  in it after 6 pr.  $X=1.70$   
 24  
 rca3.0025 same  $\lambda$  brighter but cooler  $X=1.562$   
 03:19 focusing ~ pair 14  
 good by pair 24  $F=4.25$   
 26 08:29  $X=1.63$

change to  $C_2H_4$   $Q$ -branch  $730.5 \text{ cm}^{-1}$

(W3) irs5.0027 03:46  $X=1.40$  - no good! Not finding it.

Look in camera mode; put it close.

28 start of good data  
 29 04:06 1.44 adjusting position  
 30 04:14 1.45 adjust posn  $1\frac{1}{2}$  by 0.5w 0.2w  
 31 04:22 1.46 adjust focus  
 32 04:30 1.48 Am  
 33 04:39 1.50 Looks great  
 34 04:47 1.52  
 35 04:55 1.54 Am  
 36 05:03 1.56  
 37 05:11 1.59

Go to  $\alpha$  Ori

Aori 0038 5:27 1.03 Am  
 Go to BN

BN 0039 5:44 1.106 Am 33.3 w 50.1 N from  $\theta$  C  
 BN 0040 5:57 1.11 Peaking up  
 41 6:07 1.12  
 1RC2 42 6:25 1.13 Am Peaking up on 1RC2 w to sample 10" S NOD  
 1RC2 43 6:39 1.15 moved 1.5" S at pair 23 mag 4.1 skip = 1.2" S  
 BN 44 7:12 1.22 instr not map - large shift ~ 1.5" skip  
 BN 045 7:41 1.32 35.8w 57.4N Not seeing it  
 46 Very good! water deeper than 0041

$\tau_{225} = 0.05$

bad 2nd derivative source

new  $Z = -4.4$  looking good after PC8

← This was really 1RC2? It's not BN, but I don't know what it is. There are 2 sources there.  
 good from pair 9. 35.8w 57.4N

Findings extended emission including 1RC2 + double source.  
 NOD 20" S scan start 38" W 53" N  
 0.4" steps 26 steps. 4 hrs, 1 rd @ pair posn  
 starts @ 37-9w 51.5N.  $\tau_{225} = 0.255$   
 - found it around PR 16. 31.7W, 57.4N.

atau.0047 ~~08:09~~ ~~X=1.576~~ No signal - too faint?  
 (α Tau) 08:30 X=1.77  
 aori.0048 08:35 1.32 Good signal; change in λ?  
 (α Ori) something moved; tweak wavelen th  
 setting. (moved echelle)  
 0049 08:40 1.34 Good signal; not in focus  
 Good around scan 10.  
 0050 08:45 1.37 Good

Imaging mode - look for Mar R2  
 & branch

ir53.0051 ~~09:01~~ ~~1.56~~ not good data, t=0.1  
 (Mar R2) see continuum - moving a little to check signal  
 integration only 0.1 sec  
 0052 09:06 1.59 First with 32  
 53 09:11 1.63  
 54

Go to α Hyd to check boresight; H<sub>2</sub> S(2) line  
 (B53748)

Put in the longslit; tweak setting NS slit, 1.4 wide  
 ahyd.0055 09:38 1.14 moving object on  
 slit at beginning  
 also guiding  
 K3 -1.1 DM see N lobe + set on it

n2440.00506 9:46 1.52 nnod=16, nsum=4  
 NOC2440 switching (nodding) 20" N  
 N knot

.0057 adjustments: K mirror (re: vignetting)  
 increase nsum 10; nod wait 1.5 sec

0058 10:02 1.60  
 (K)

~~Reset~~ Moved with respect to previous boresight.

Watch out for flat (maybe low res. was being moved out)

RIT = 6%  
 H<sub>2</sub>O ~ 1 mm

Grating bounce

knot = 1.012

τ<sub>2</sub> = .051

02 Dec 2000 18:15 Jv, MR, MD, DJ, RZ, B Bezd + BG  
nr = ulaw + winds  $T_{225} = 0.047$  @ sunset

mkep.0001 23:13  
(a Cop) 2 23:17

Rotate slit PA to  $65^\circ$  E of N  
H<sub>2</sub> sc(2) line  
Tweaking while taking data

n7027.0003 23:26 = 1.25 nsum = 6 nnod = 32  
4 23:36 1.28 nod = 20" N residual CO<sub>2</sub>  
5 23:49 1.32  
6 00:00 1.36  
7 00:12 1.41  
8 00:21 1.45 → 1.5  
9 00:35 1.52 → 1.585  
More shutter, reoffset  
looks noisier, weaker

bpeg.0010 00:59 1.13 nod = 10" N  
Go to  $1156 \text{ cm}^{-1}$ , CH<sub>3</sub>D, rotate slit to Jupiter NS PA  
250µm slit

ata.0011 01:54 1.28 peaking up while accumulating  
(a Tau) ← labelled bpeg  
0012 01:57 1.26 correctly labelled

jup.0013 centered limb-to-limb, nod 40" E  
(Jupiter) zero the offsets  
0,0 position  
02:16 1.13  
0014 02:27 1.107 nnod = 32

jup0015 02:52 1.061 Change track rates.  
ending on pair 7

jup0016 3:01 1.05 now centered @ 0,0  
jupiter 0617 3:03 1.05 now exactly 0,0  
move to  $744.5 \text{ cm}^{-1}$  (10) (10)  
jup 0018 3:33 1.015 SCAN Jupiter N to Jup S.  
0019 3:48 1.006 Same scan  
GO TO CH4  $1232 \text{ cm}^{-2}$  move focus to

datefile Nov00/32  
focus from last night  $z = -4.45$   
slit width = 550µm; length = 8"  
Focusing @ -4.2 wind ~30 mph

Radio peak → 4" E, 2" N  
seeing it! (we think) In fact, we see structure

Atmosphere is getting worse (high air mass)  
(not too bad, though) wind ~20 mph

bq bounce  
(= 10° W of NS)  $\tau = .043$  (= 1 µm H<sub>2</sub>O)

bad bounce  
seeing is pretty bad! (3-5")  
due to winds  
focus - 4.3

14 → steadily drifted off planet - completely off at pair 19  
Rate wrong.  
Re-find center of planet E-W

Did not adjust N-S before starting this.  
now re-center N-S. need to move  $\frac{1}{7}$ " S to re-center  
- MISTAKE - MOVED 6.8" North for this ip. 14" N of ctr.

Bump focus to  $z = -4.4$   
start @ 4.2 W 28.3 N move ~~off~~ 0.7 E 4.5 out sky. MSOK to 1"  
 $z = -4.3$  pointing - need to move scope 1" W.

02 DEC cont'd  
Jup 20 04:40 1.000 AM

nod scan from N to S.  
16 steps x 2 x 4 = 128  
Flat @ 116"E (3 x nod distance)

21 04:56 1.014

22-24 Jull

25 6:09 1.15 AM. mp @ N L.P

20" W to E  
marked  
celestial markers

Jup 26 06:53 1.25 AM

Sun Pn ariden 20-0 N 3.7 W

aur. 0027 07:58 X=1.35 peaking up  
(Capella) 28 slit PA  $\Rightarrow$  NS  
no good (saved a  $\lambda$  cal file)

aur. 0029 08:15 1.412 nod 5" N  
change to 816 cur<sup>-1</sup>; Mg I setup  
offset collimator to center the feature

0030 08:20 1.43 changed focus on pair 5; guiding  
more moving around;  
both beams on slit

acmi. 0031 08:28 1.06 n nod = 32

(Procyon) .0032 08:39 1.07 nod = 4" N

aur. 0033 37 09:06 1.72

acma. 0035 09:22 1.665  
(sirius) 36 09:27 1.705

37 09:38 1.789

stopped at pair 28

acmi. 0038 09:49 1.219  
0039 10:00 1.26

WIND ~ 30 mph

40" E nod, same nod start 28.30 4.2 W  
step 45 0.7 E each step

Step now change 18.7 W 19.9 N nod by 15" N.

add 4" S to N. in steps of 1" @ 0.2" N. } absolute coords  
more starting point 4" S for 3rd scan. } uncertain.  
End after 3rd scan.

focus TV, offset from ID to Sup ctr  $\rightarrow$  now have accurate coords  
Optical focus -3.7 1x -4.3 start seeing ~ 2"  
out to west N limb 21 W 3.5 W (center at 2" S of Jup N)  
1" W 0.2" S.

File 135 saw funny black-white pattern  
seen earlier in data - looks to DJ like  
the chip.

Check Pts on ID. Have to move scope 3 S 0.4 E  
to get to ID.

wind 25 mph

03 DEC 2000 IRTF JL, MR, HD, BB, EvD + BF

250 um slit, NS PA, <sup>C2H2</sup> Q-branch, 729 cm<sup>-1</sup>,  
beta Peg LST=23:38 X=1.02 nod=5"N nmod=16  
2 bump up nsum take nod to 4"  
3 looking good some grating bounce

4  
5 NGC 7189 IES1 Searching; grating bounce  
on it after 16 pairs

6 good about 1/2 of beta Peg  
7 "  
8 " drifted off a bit near 16  
9 "

10 moved wheel n.05 cm<sup>-1</sup> red to get 8(9)

11  
12 Capella different grating bounce, went away  
too faint to be useful on it after ~8 An=1.5

13 ignore  
14 Betelgeuse on it after 8 grating bounce An=1.9  
gone after ~12

15 switching to 816.5 cm<sup>-1</sup> H2 S(2) + H2O, slit low=10  
Betelgeuse LST=2:30 X=1.58  
2 setting tweaked

17 Capella 2:39 1.34 nmod=4"N  
18 " fell off the slit around pair 12  
19 " 2:51 1.30 focusing  
note: readers say C2H2, not H2

20 DG Tau 3:01 1.07 detecting cent. in each

21 " fishing > pair 5 3:09 1.06 nmod=32

22 " 3:25

23 " 3:55 1.01

24 " some bad grating bounce > pair 10

25 " look ok to me

27 GW Ori a bit of guiding grating bounce early, settled

28 " move down 0.5"

29 " go long

30 readers say H2 S(1) instead of S(2)

31 6:29 nod 0 30"N (off slit)  
32 fell off slit somehow after pair 5  
telescope focus -4.4

prediction for 31 mm H2O

Beginning of night: T=4.7 C, RH ≈ 0% (4% @ UKIRT)  
nod 5"N, slit 11.8 T=.051

focus z = -4.1; base window is off; NNE=15 mph  
background drifting (left screwdriver in!)  
drifting down after pulling screwdriver out

switched nod to 4"N somewhere around here

ending air mass = 1.65.

T=2.6 C

winds ~ 10 mph

Mg I seen in emission focus = -4.4

testing pupil motion

pair

45° S of zenith 2nd mag moved up on screen

N down 10%  
E right 20%  
W left 10%

Apparently the G10 tabs started slipping  
There appears to be both gradual and sudden shifts  
with position of the telescope.

03 Dec. cont'd. focus now -4.1  
 bgem.0033  $\beta$  Gem comparison  $\times$  for  $H_e$  obs  
 34  
 35 ignore  
 36  $\beta$  Gem 735.6 cm<sup>-1</sup> HCN R(7)  
~~37~~ 3.0037 Mon R2  
 38 "  $\text{rad} = 6''$   $n_{\text{sum}} = 8$  no obvious line  
 39  
 40 signal fading stop after 28  
 20ri.0041 Belegause  
 42 stop early  
 gl961.0043 G6961-B the brighter of the two

either laws shifted or we were in bad focus  
 $T = .1$

(ores partly in for 33-42

too faint to measure spectrum  
 don't know why  
 it must be double again



04 DEC 2000 IRTF JL, MR, HD, BB, EvD + BG

[Boresight on  $\mu$  Cep - BS 8316 in camera mode]  
Filter Tests

- 0001
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13

$\mu$  Cep 23:30  $x = 1.379$  - short (1 nod) only  
 - 16 nodes  
 established focus around pair 12; -3.7  
 checking boresight; all set @ pair 7  
 stopped on pair 12.

Rotate slit PA to  $65^\circ$  E of NS

n7027,0017 NGC7027 00:10  $x = 1.403$  nod = 20" N  
 1.440

18 end; seem to be losing continuum signal - check pairs in 17, too pair 2 nodes  
 Go check boresight on  $\nu$  Cyg - shifted a little couple of

19 " 00:54  $x = 1.64 \rightarrow 1.94$   
 20 " 01:13 1.78 good - still seeing  
 gratiny bounce - 15-16 pairs  
 possible drift (but also large air mass)  
 end at 28 prs. harder to see after page 25  
 Go to camera

21 NGC7027 camera mode - with slit in (saturated)  
 22 " shorter int. time  
 23 " without slit 20" nod  
 24 " shifted to center of field

Temp =  $7.0^\circ\text{C}$ , RH=20%, 7 mph

Focus  $z = -3.4$

check boresight & focus  
4" N nod

check & mark boresight on  $\mu$  Cep (again)

offset 4" E, 2" N from radio position  $\text{H}_2\text{O} = 3 \text{ mm}$

arc sec); we recentered the boresight along the slit N-S

continuum

$x = 2.04$  ! These are  $11 \mu\text{m}$  continuum images

04 DEC cont'd.

Go to  $\beta$  Peg to calibrate

bpeg.0025  $\beta$  Peg  $X=1.304$   
Cut this short because spectrum is full of stellar lines!

Rotate slit PA back to NS  
 $\alpha$  Aur in imaging mode to find boresight

raur.0026  $\alpha$  Aur  $X=1.42$  G star - better  $\oplus$  calib'r.

- use 2.5" slit, feature  $CH_2D$   $1156\text{ cm}^{-1}$  Source = SATURN

sat0027: image Saturn

sat0028: " " 2.3" E

sat0029: garbage

sat0030: jump in DC around pair 12

low-res was not moved all way out  
we checked pointing on satellite Rhea (we were 2" W, 1.3" N)

sat0031: OK

sat0032: OK

feature  $CO_2$   $951\text{ cm}^{-1}$

overlapping echelle  
orders

sat0033: OK  
sat0034: OK

} the slit may be 1.1" instead of 1.5"

check pointing  
move 7" E from S's center to increase S's curvatures and  
enhance emission features

sat0035: jump in DC at pair 15, end at pair 35

check pointing. We had drifted 2" E  $\rightarrow$  off the limb

marker Saturn, move 7" E

sat0036: OK

sat0037: OK

~~sat0038~~

sat0038 OK (limb was checked before the spectrum)  
feature  $1232\text{ cm}^{-1} CH_4$   
shift at 7" E from center of Saturn  
+ slit

39 Imaging mode - ending air mass = 1.72  
black saturated; first few pairs suspect

at DEC cont'd.

HCN R(11);  $748 \text{ cm}^{-1}$

irc2.0040 IRC 2 - Camera mode  
(on in BN/KL)

40" nod focus -4.3  
North

.0041 IRC 2 spectrum

20" nod

tried going off to the

X = 1.40

East; signal dropped, back on center at pair 9

.0042 "

(32 pairs)

43 "

X = 1.53

offset to BN; ~ 7" N, 6" W. Now peak.

bn.0044

BN - try to peak on it

X = 1.623

offset 3" E, 8" S of here

irc7.0045 IRC 7 -  
+ source  
"m/l"

nod now 20" S  
on pair 4, break further E+S; then west  
now at 3.1 W, 2.4 S as of pair 9

X = 1.73

Go to camera mode; look for  $\alpha$  Hya in  
large slit mode, 350  $\mu\text{m}$  slit, camera mode  
 $\text{H}_2$  S(4) line

ahya.0046

$\alpha$  Hya

X = 1.14

focus = -4.1

20" N ~~off~~ nod

large slit

rotation

but = .012

n2440.0047 NGC 2440

X = 1.52

16" N nod

8

n nod = 32

(put N lobe ~~at~~ "S of center)

" 48

" 49

X = 1.64

check at end - still centered.

bad offset?

saturating on black; locate IRC 2 on this image

(No grating bounce recently)

Centered the N lobe on the cross-hairs, then offset  
8" S in order to keep the whole structure on the slit  
(N & S blobs ~ 10" apart)