

## FEB 26 OBSERVING

~3:00 Arrive, Temp = -0.92

Hump. 20%

Focus 4865

Wind 33 MPH W.

Astr. Twi today - 15:30

1 14 14

T = -1.01 focus 4865  
centering focus star

slay 1546-1576

Schmidt tel 1550-1600

nothing!

2 14 16 33

x 970 y 1024

~21-11 arcsec in x

FWHM 4.57

max is 28219

Can't help it. plus @ 4610 OK

3

48

FWHM

focus

|   | time     | focus | $\Delta x$ | $\Delta y$ | FWHM |
|---|----------|-------|------------|------------|------|
| a | 14 24:38 | 4850  | 0          | 0          | 3.9  |
| v | 14 24:55 | 4855  | 0          | -20        | 5.2  |
| c | 14 25:23 | 4860  | 0          | -40        | 4.7  |
| d | 14 26:00 | 4865  | 0          | -60        | 3.6  |
| e | 14 26:33 | 4865  | -20        | -60        | 4.8  |
| f | 14 27:22 | 4870  | -20        | -40        | 4.8  |
| g | 14 28:08 | 4875  | -20        | -20        | 5.6  |
| h | 14 28:40 | 4880  | -20        | +10        | 4.6  |

4 Variable Focus - do 3 @ each focus

T = -1.01

|   | time     | focus | $\Delta x$ | $\Delta y$ | FWHM |     |
|---|----------|-------|------------|------------|------|-----|
| a | 14 38:42 | 4850  | 0          | 0          | 4.1  | 3.9 |
| b | 14 40:36 | 4855  | -20        | 0          | 3.9  | 4.1 |
| c | 14 41:48 | 4860  | -40        | 0          | 4.2  | 4.7 |
| d | 14 43:10 | 4865  | -60        | 0          | 5.0  | 4.5 |
| e | 14 44:26 | 4870  | -80        | 0          | 6.4  | 4.8 |
| f | 14 45:52 | 4875  | -100       | 0          |      | 6.0 |
| g | 14 47:20 | 4880  | -120       | 0          |      |     |

14:50:1 needed out

That's enough

slay 1623  $\pm$  7 ADU OK - we have our flat frame?

could go w/ either 4850 or 4855.

Choose 4855

- close to old focus

- besides they're both great.

5 15 00 02 0 0  
15 00 45 -75 0  
15 01 19 -75 76  
15 01 55 0 76

photo 13

6 15 04 30 0 0  
15 05 03 -75.2 0  
15 05 34 -75.2 -76  
15 06 02 0 -76

photo 53

From now on, flush before  
1st of each exposure

7 15 08 21 0 0  
15 08 52 -75.2 0  
15 09 22 -75.2 75  
15 09 55 0 75

photo 33

8 15 12 47 0 0  
15 13 15 -75.3 0  
15 13 45 -75.3 75  
15 14 19 0 75

photo 35

~~New pattern~~ - check flush for 1<sup>st</sup> only  
read for last only  
Too dangerous

9 15 16 20 0 0  
15 17 00 -75.2 0  
15 17 29 -75.2 75  
15 18 59 - 0 75

photo 11

15 18 15 read

Check focus? Sure, we're 16 min ahead  
of schedule

10

|      | time 15: | $\Delta\sigma$ | $\Delta\alpha$ |    |
|------|----------|----------------|----------------|----|
| 4830 | 21:51    | 0              | 0              | 20 |
| 4835 | 22:45    | -20            | 20             | 20 |
| 4840 |          | -40            |                |    |
| 4845 |          | -60            |                |    |
| 4850 |          | -80            |                |    |
| 4855 |          | -100           |                |    |
| 4860 |          | -120           |                |    |

W.O.T.

|      | $\Delta\sigma$ | time 15:  | $\Delta\alpha$ | $\Delta\alpha 2$ | FWHM |
|------|----------------|-----------|----------------|------------------|------|
| 4840 | 0              | a (24:20) | 0              | (24:45) 20       | 3.9  |
| 4845 | -20            | c (25:20) | 20             | (25:50) 0        | 4.0  |
| 4850 | -40            | e (26:20) | 0              | (26:45) 20       | 3.8  |
| 4855 | -60            | g (27:20) | 20             | (27:45) 0        | 4.5  |
| 4860 | -80            | i (28:20) | 1              | (28:47) 20.1     | 3.4  |
| 4865 | -100           | k (29:15) | 20.1           | (29:40) 0        | 4.7  |
| 4870 | -120           | m (30:20) | 0              | (30:43) 20       | 5.8  |

read 15:31:00

4860

11

|    |    |    |       |    |
|----|----|----|-------|----|
| 15 | 36 | 45 | 0     | 0  |
| 15 | 37 | 10 | -74.2 | 0  |
| 15 | 37 | 38 | -74.2 | 75 |
| 15 | 38 | 07 | 0     | 70 |

PW 15

15:38:23 read

12-14

Danks

15:53 Temp = -1.6  
Hum 20%Wind 30-40 MPH  
West

## FEB 26 analysis

Don't know yet how we're supposed to subtract darks from mosaics.  
Does it accumulate dark the whole time? It must.  
The dark current may be from FLUSH to FLUSH  
= exp end of readout - end of readout.

1 10s. 2  
13 10s dark  
14 600s. dark

Question #1: what is the bias level?  
+ how does cedproc actually handle it?

Question bias min max  
0143 1548 1530 1565

014 1548 1531 1567  
001 1547.5

cedproc — bias mean is 1548.234 for 014.

YES — The bias region is used to find  
ONE MEAN bias, which is subtracted  
from the frame. Good.

After bias subtraction, what's left?

0143 013:13.16

014: 9.8

001: 13.8

Darks will take some looking into —  
+ hearing reports from Andrew.

It looks small for 10 min (5 4 pix, except  
hot pix),

So to be safe, ALWAYS FLUSH 1ST.

Playing w/ daophot, daofind.

Got daofind to make a coo.

Plot's really w 1828 w 1186, 890, 174 map  
found w 1185.9 890.14 -4.993 0.457  
19 mags off!

Do again w/ photpar. zmag = 34

zmag = 34

Run phot  
zmag = 25

no change

Mag of 37 (plot) is 24.261  
mag " " 15.26

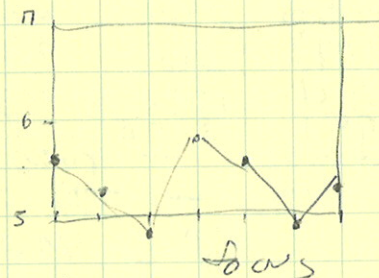
→ photpar - zmag = 23.75

FEB 27 OBSERVING

13:10 Arrive 'scope

Dave W. says Andrew P. says dark current is small - few  $e^-$  in 20 min.Separation tonight:  $0''.57$ 13:22  $T = -3.13$  Temperatures are for TOP of TUBE  
Focus = 4825 Humid. 25%  
Winds 10-20 W (abt dropping)13:28  $T = -3.15$  Dave re-focusing  $\rightarrow 4815-4822$ 

1 14:11:44 focus star.

14:12:44  $T = -2.9$ min 1556, max 1556 FWHM 7.06  
X 1010.9 Y 999 5" no big deal.  
exp. time ok.

| focus | $\Delta\delta$ | $\Delta\alpha$ | W.T.        | FWHM |
|-------|----------------|----------------|-------------|------|
| 4810  | 0              | 0              | 14:20:20 20 | 5.54 |
| 4815  | -20            | 20             | 14:21:25 0  | 5.43 |
| 4820  | -40            | 0              | 14:22:35 20 | 4.97 |
| 4825  | -60            | 20             | 14:23:40 0  | 5.7  |
| 4830  | -80            | 0              | 14:24:40 20 | 5.8  |
| 4835  | -100           | 20             | 14:25:41 0  | 5.72 |
| 4840  | -130           | 0              | 14:26:33 20 | 7.28 |

 $T = -2.95$ 

winds 20-30 MPH W (or WSW)

Focus is good. Stick w/ 4820? CHECK FWHM after each mosaic

|               | $\Delta\alpha$ | $\Delta\delta$ | FWHM | Bmax       |
|---------------|----------------|----------------|------|------------|
| 3 14:39:08    | 0              | 0              | 4.5  | 4925 to 31 |
| 14 39:42      | -75.2          | 0              | 4.3  |            |
| 14 40:09      | -75            | 75             | 4.0  |            |
| 14 40:47      | 0              | 75             | 4.0  |            |
| 11 41:05 read |                |                |      |            |

 $T = -3.09$ 

Not bad!

Keep this focus  
until T changes or  
FWHM  $\nearrow$

Feb 27 obs...

photo 51

|   |          |       |    |
|---|----------|-------|----|
| 4 | 14:45:24 | 0     | 0  |
|   | 14:45:58 | -75.6 | 0  |
|   | 14:46:29 | -75.6 | 75 |
|   | 14:46:59 | 0     | 75 |
|   | 14:47:10 | read  |    |

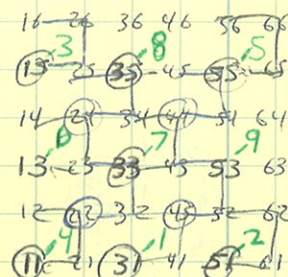
FWHM

(4.6)

5.0

7.5

4.8

focus  
star sat?  
N2.

|   |          |       |     |
|---|----------|-------|-----|
| 5 | 14:50:24 | flush | 0   |
|   | 14:51:00 | -75.6 | 0   |
|   | 14:51:30 | -75.6 | 75  |
|   | 14:52:08 | 0     | -75 |
|   | 14:52:24 | read  |     |

FWHM

4.8

4.1

(3.97)

4.5

photo 15

2 minutes from flush to read.

|   |          |       |    |
|---|----------|-------|----|
| 6 | 14:56:46 | 0     | 0  |
|   | 14:57:17 | -75.2 | 0  |
|   | 14:57:49 | -75.2 | 75 |
|   | 14:58:27 | 0     | 75 |
|   | 14:58:45 | read  |    |

FWHM

4.5

(4.2)

4.5

(4.2)

photo 11

|   |                  |       |    |
|---|------------------|-------|----|
| 7 | <del>flush</del> | flush |    |
|   | 15:03:56         | 0     | 0  |
|   | 15:04:23         | -75.3 | 0  |
|   | 15:04:56         | -75.3 | 75 |
|   | 15:05:24         | 0     | 75 |
|   | 15:05:40         | read  |    |

FWHM

4.16

4.24

4.45

(3.67)

photo 55

T = -3.21

|   |          |       |    |
|---|----------|-------|----|
| 8 |          | flush |    |
|   | 16:08:52 | 0     | 0  |
|   | 16:09:26 | -75.2 | 0  |
|   | 16:09:53 | -75.2 | 75 |
|   | 16:10:22 | 0     | 75 |
|   | 16:10:50 | read  |    |

FWHM

4.9

4.6

(4.5)

4.6

photo 13

T = -3.23

Feb-27 obs..

| 9        | f     | flush |             | FWHM | photo 33 |
|----------|-------|-------|-------------|------|----------|
| 15:13:56 | 0     | 0     | 4.46        |      |          |
| 15:14:24 | -75.2 | 0     | 4.27        |      |          |
| 15:14:52 | -75.2 | 75    | <u>4.20</u> |      |          |
| 15:15:22 | 0     | 75    | 4.52        |      |          |
| 15:15:40 | read  |       |             |      |          |

T = -3.24

| 10       |       | flush |            | FWHM  | photo 35 |
|----------|-------|-------|------------|-------|----------|
| 15:19:09 | 0     | 0     | 4.5        |       |          |
| 15:19:59 | -75.3 | 0     | 4.6        |       |          |
| 15:20:26 | -75.3 | 75    | <u>3.8</u> | ~0.84 |          |
| 15:20:56 | 0     | 75    | 4.4        |       |          |
| 15:21:13 | read  |       |            |       |          |

T = -3.28

| 11       |      | flush |            | FWHM | photo 53 |
|----------|------|-------|------------|------|----------|
| 15:24:33 | 0    | 0     | 4.6        |      |          |
| 15:25:00 | -75  | 0     | 4.4        |      |          |
| 15:25:33 | -75  | 75    | <u>4.6</u> |      |          |
| 15:26:00 | 0    | 75    | 4.7        |      |          |
| 15:26:17 | read |       |            |      |          |

T = -3.33

| 12       |       | flush |  |  | photo 22 |
|----------|-------|-------|--|--|----------|
| 15:30:20 | 0     | 0     |  |  |          |
| 15:31:09 | -75.2 | 0     |  |  |          |
| 15:31:41 | -75.2 | 75    |  |  |          |
| 15:32:31 | 0     | 75    |  |  |          |
| 15:32:41 | read  |       |  |  |          |

15:42:00  
start last B  
(no more FWHM)

| 13       |       | flush |     | FWHM | photo 24 |
|----------|-------|-------|-----|------|----------|
| 15:34:23 | 0     | 0     | 5.4 |      |          |
| 15:34:57 | -75.3 | 0     | 5.9 |      |          |
| 15:35:30 | -75.3 | 75    |     |      |          |
| 15:35:59 | 0     | 75    |     |      |          |
| 15:36:20 | read  |       |     |      |          |

## Feb 27 obs.

14

|          | Push  |    | FWM | photo 45                    |
|----------|-------|----|-----|-----------------------------|
| 15 39 03 | 0     | 0  | 3.9 | sky = 1574                  |
| 15 39 31 | -75.3 | 0  |     | $T = -3.45$                 |
| 15 40 05 | -75.3 | 75 |     | <u>note</u> <u>watch</u> in |
| 15 40 34 | 0     | 75 |     | 1 sec slower than           |
| 15 40 50 | read  |    |     | TCS                         |

(watch was set to TCS on Feb 22)

|             | Push  |    | FWM | photo 44    |
|-------------|-------|----|-----|-------------|
| 15 15 43 22 | 0     | 0  | 5.6 |             |
| 15 43 54    | -75.3 | 0  | 5.0 | $T = -3.55$ |
| 15 44 36    | -75.3 | 75 | 4.9 |             |
| 15 45 25    | 0     | 75 | 7.2 | sky 1580    |
| 15 45 38    | read  |    |     |             |

New

|             |               |
|-------------|---------------|
| 16 15 51 22 | } 10 s. darks |
| 17 15 52 48 |               |
| 18 15 54 40 |               |
| 19 15 56 42 |               |
| 20          |               |

AT 6:00 - 2 sky flats.

20 16 01 07 sky flat 80 s  $\Delta$  25  
pos'n photo 44 0 75

22 16 04 21 2298 sky counts  
50 s 3 min later,  $\Delta$  25  
position photo 44 0 0  
sky 2465

22 16 07 20 30 s pos'n photo 44  $\Delta$  0 25-75

187,970 K 273,338 on decade

Also on anaconda made

ls - lt > fidelist

— dates of writing.

Feb 27 obs... ; Feb 27 anal

Night end:  $T = -3.6$   $H = 27\%$   $Wm \approx 20 W$ 

## Feb 27 analysis

Goal today: - make DARKS for entire run,  
 - reduce (cook) 25-27.  
 - decide how good non-twilight flats are.

What darks do we have?

|                         |                     | <u>MEANS</u> | combined |
|-------------------------|---------------------|--------------|----------|
| 25 Feb 29 - 25 Feb 031  | 15s dark            | $\sim 8.5$   |          |
| 25 Feb 032 - 25 Feb 034 | 10s darks           | $\sim 8.5$   |          |
| 26 Feb 014              | 600s dark           | $\sim 9.8$   |          |
| 27 Feb 016 - 27 Feb 018 | 10s dark            | $\sim 8.5$   |          |
| 27 Feb 019              | 120s dark           | $\sim 8.9$   |          |
| <del>27 Feb 020</del>   | <del>80s flat</del> |              |          |

Tasks: read in all

|                | <u><math>\sigma</math></u> | <u>mean</u> |
|----------------|----------------------------|-------------|
| 25 Feb 29 - 31 | 3.2                        | 8.48        |
| 32 - 34        | 3.2                        | 8.53        |
| 27 Feb 16 - 18 | 3.4                        | 8.56        |
| all short      | 2.1                        | 8.52        |

Subtract zero from long darks

26 Feb 14  $1.287$  in 10 min =  $0.257$  in 2 min  
 27 Feb 019  $0.353$  in 2 min =  $0.353$  in 2 min

ANSWER - I have my zeros  
 I also have my DARKS, if I choose to use them.