

# OSURC Nightlog 20220525 UT

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**Special Assistants\*:**

**AO Operator\*:**

**Telescope Operator:** Josh Williams

**\* = from home**

## Plan:

may 23

☐ OSU\_XMDs\_LUCI/HS1028 UTC 04:00 - 05:30

**\*\*switch to LBC\*\***

☐ OSU\_monitor/N3077 UTC 05:50 - 06:10

☐ ND\_oldsn/sn21hpr\_BRVI UTC 06:20 - 07:20 (start at 7 at latest)

☐ OSU\_monitor/I2574 UTC 07:30 - 07:50 (must start by 7:30)

☐ OSU\_monitor/N4449 UTC 08:00 - 08:20

☐ OSU\_monitor/N4736 UTC 08:30 - 08:50

☐ OSU\_monitor/N6503 UTC 09:00 - 09:20

**\*\*switch to LUCI\*\***

☐ UVa\_nirjets/G49.27 UTC 09:40 - 11:00

## Summary:

We started with LUCI to observe OSU\_XMDs\_LUCI/HS1028 and its telluric and then switched to the LBCs where we first observed ND\_oldsn and then the OSU\_monitor targets: N3077, N2574, N4449, N4736, N6503 and N5474 ( $\frac{2}{3}$  only - B and Uspec on the LBCB and 4 of 6 R-Bessel images). We switched to LUCI and observed G045 into twilight. The OB completed, however onwith about 6 L1 and 3 L2 images to go in the last filter set, the wavefront sensing was lost because the sky background became too high. The last 3 images L2 images were all very elongated or had a jump, though the IQ on all of the SX images is good. The background at PaB rose, perhaps about  $\frac{1}{2}$  way through though it was hard to tell because there was also cirrus. The last 2 PaB images definitely have higher background.

The LBC IQ summary is here: [20220525.fwhm](#)

## Issues:

There was one LBC image with a jump, but this was from a procedural error. We retook it.

There was an RPC error with the LBC Red camera, which was eventually resolved by turning off/on the LBCs.

## Weather:

There were clear skies at the start of the night, although some thin cirrus moved in towards morning. The seeing was pretty good - although at the lower elevation fields it was just over 1" (1-1.3"). The temperatures were a little unstable - rising by almost a degree from 3:30 to 5 UT and then dropping by just over a degree to 6.2 C at 2am.

## Preparations:

mods[1,2][b,r].20220525.0NNN.fits

luci[1,2].20220525.0NNN.fits

lbc[b,r].20220525.hhmmss.fits

## Overview (times are given in UT):

02:02 Josh is opening the vent doors. I repeated the 1" slit flats since the script did not finish last night before we had finished the reconfiguration, and I took the unbinned 0.8" slit flats before opening. All dual mode. The image numbers are listed in the table below.

02:21 Josh opened the enclosure

02:38 Slewing to a pointing star near the first target, HS1028

02:46 And now to a collimation star... FWHM after collimation ~1"

## OSU\_XMDs\_LUCI/HS1028

HS1028

02:57 Slewing to HS1028

L1: 573 & 574, 575 → dx,dy = -0.2863, -0.4995" to put obj @ 1035.17, 1047.72 → 576, a bit to the right, dx=-0.12" → 577&578, now a bit to the left, dx = +0.6" → 579, looks well-centered  
 L2: 3 & 4, 5 → dx, dy = 1.9813, -0.0964 to put obj @ 1031.47, 1044.09, → 6, well-centered

03:30 Starting the spectroscopic observations

UT	L1	L2	FWHM on the SX/DX guiders	AM
03:30	580-585	8-13	1.13/1.03"	1.091

HeI10830 and Pa\_gamma are easily visible in the first spectra.

03:48 Average seeing has gone down a bit, to 0.97/0.92".

04:00 Looking at the first pair subtraction, we noticed that the sky lines did not subtract out very well - the line strengths are probably diminishing still.

## HD98989

04:37 Acquiring the telluric (avg fwhm 0.85")

L1: 586, 587 → -10.5042, 0.2026 to put star @ X,Y = 1035.25, 1048.78, dx=+0.12" → 589  
 L2: 14, 15 → -8.1563, -0.4510 to put star @ X,Y = 1028.61, 1045.86, dx=-0.12" → 17

04:45 Starting the spectroscopic observations

UT	L1	L2	seeing	AM
04:45	590-591	18-19	~0.7-0.85"	1.12

04:51 Reconfiguring to the LBCs

I copied the last good reference, from 20220523, to /tmp (telescope@robs) and turned on the TMS lasers. I started the active loop and kept it running as we slewed to the first target. Waited for a TMS update.

## ND\_oldsn/oldsn

05:14 Slewing to the copointing/collimation field. This is far north, and at ~40 deg elevation and setting.

The pair of copointing images taken after the TMS updates did still need to be collimated. Also, a large copointing correction will be needed.

05:23 Running FPIA - the red side required z4/z11 and the blue required a large z4, astigmatism and coma. Not converged after 5 iterations. Since a large copointing correction is needed, I'll do that and then resume collimation.

05:31 Copointing

Radial star offsets from rotator centers: BLUE 24.3" and RED 47.1"

lbcrangebal:

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COPOINTING: B=53158 R=53154

Pointing updates: delta\_IE = -21.81", delta\_CA = 8.60"

Mirror updates: dX(mm) dY(mm) dRX(") dRY(")

SX: 0.72 1.19 25.43 -15.46

DX: -0.72 -1.16 -24.81 15.36

05:35 Running dof pia to finish collimation - converged in 2 iterations

05:39 Taking the copointing images - collimation images were not copointed

Copointing again

Radial star offsets from rotator centers: BLUE 41.7" and RED 0.4"

lbcrangebal:

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COPOINTING: B=53955 R=53950

Pointing updates: delta\_IE = -0.58", delta\_CA = -0.22"

Mirror updates: dX(mm) dY(mm) dRX(") dRY(")

SX: 0.00 -1.92 -41.16 -0.03

DX: -0.00 0.01 0.31 0.10

The copointing image on the blue side did appear elongated left-right, so we'll see what the science exposure looks like.

05:44 Starting the exposures

blue: FWHM 5.1-5.2 on the blue and there is an elongation (left-right). I don't think FPIA achieved good collimation as the copointing images taken immediately afterwards also were elongated in the same way

red: FWHM ~ 4.2 pix near the center and good, round images.

b 060819 - looks like it is trying to guide on a resolved object FWHM 5.5-5.6 pix

r 060815 - FWHM ~ 4.2 pix

b 061405 - quite elongated , FWHM 5.2-5.3, although there is some variation in FWHM across the field.

06:32 Finished - the red IQ was pretty good and held well. The blue IQ also held, though there was an elongation present from the start, unfortunately.

## OSU\_monitor/N3077

06:32 Slewing to copointing field. Waited for a TMS update.

06:34 dofpia

The red side was collimated already, but the blue required Z4 = -450nm. In the 2nd iteration, the red side gave z22 = -19 nm and z4 = +338 nm.

06:38 Taking the copointing images

Radial star offsets from rotator centers: BLUE 1.0" and RED 4.6"

lbcrangebal:

-----  
COPOINTING: B=63914 R=63909

Pointing updates: delta\_IE = 0.44", delta\_CA = 1.39"

Mirror updates: dX(mm) dY(mm) dRX(") dRY(")

SX: -0.03 0.01 0.26 0.69

DX: 0.09 0.13 2.81 -1.88

On the copointing images, there is still some elongation...

06:43 Starting the science observation

b 064413 B-Bessel 6.2 pix (1.4)

r 064407 R-Bessel 4.6-4.8 pix (1.1")

## OSU\_monitor/I2574

06:56 Slewed to copointing field and waited for TMS update

06:56 Running dofia - converged in 2 iterations

07:00 Taking copointing images

Copointing (this was not really necessary - object was right next to the previous one)

Radial star offsets from rotator centers: BLUE 1.3" and RED 4.8"

lbcrangebal:

-----  
COPOINTING: B=70050 R=70044

Pointing updates: delta\_IE = -5.29", delta\_CA = 1.53"

Mirror updates: dX(mm) dY(mm) dRX(") dRY(")

SX: -0.05 0.19 4.09 1.14

DX: -0.01 0.03 0.71 0.11

On the LBCB images, there is still some L-R elongation.

07:04 Starting to take data

FWHM 5.2 pix on the first blue image (b 70425) and 4.6 pix on the first red image (r 70420). The blue is still elongated.

The FWHM seems worse on the second pair, though the object is setting.

Josh is clearing Active Optics on SX to see if this will remove the source of the elongation that we've been seeing. Stopped TMS loop before he did so, and resumed it as we slewed to the next target.

## OSU\_monitor/N4449

07:17 Slewing to the focus/collim field

07:19 dofia,/askme (interactive mode)

Converged in 2 iterations, however on the blue side, the final pupils still required z5=-325 and z6=-154 nm.

07:28 Copointing

The red image did not appear...

Retaking the pair

Copointing:

Radial star offsets from rotator centers: BLUE 11.0" and RED 13.4"

lbcrangebal:

COPOINTING: B=72859 R=72855

Pointing updates: delta\_IE = 11.44", delta\_CA = -1.72"

Mirror updates: dX(mm) dY(mm) dRX(") dRY(")

SX: -0.00 -0.03 -0.62 0.10

DX: 0.03 0.09 1.86 -0.55

07:32 Starting the science observation.

On the first pair, FWHM 4.8-5 pix on the blue and ~4.2 on the red

There is still some elongation on the blue, but it looks better than before.

07:44 Finished

## OSU\_monitor/N4736

07:47 Slewed to the target, but we had an RPC error on the red camera. lbckill/lbcstart to restart the LBC SW, but this did not resolve the issue. I turned off/on the LBCs - recovered at 07:55

07:55 dof pia

On the blue side it continues to drive in negative z5 and z6 (which may or may not be needed).

~08 Copointed

Radial star offsets from rotator centers: BLUE 2.1" and RED 0.9"

lbcrangebal:

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COPOINTING: B=80035 R=80032

Pointing updates: delta\_IE = -1.05", delta\_CA = 0.18"

Mirror updates: dX(mm) dY(mm) dRX(") dRY(")

SX: 0.05 -0.03 -0.68 -1.09

DX: -0.05 0.07 1.43 1.04

08:03 Starting the science integrations

The first blue image (B-Bessel 080437) has a jump. I think I may not have waited for the TMS update after the slew from copointing to science field (the slew is only a few degrees but I was waiting on the previous fields, per procedure. I think that I forgot this time). The jump looked like it was ~2-3".

We repeated the first pair of B & R images to recover the image with the jump.

08:17 - [http://people.lbto.org/~cveillet/Chris/lbclQ\\_DIMM\\_20220525z.png](http://people.lbto.org/~cveillet/Chris/lbclQ_DIMM_20220525z.png) is updated every ~2mn and gives a plot of IQ with DIMM - seems to work, but it is the first time I let it run by itself, so no guarantee ;) Note that the data are for now retrieved from the Tucson repository, so there is some delay. Next step will be to run the process from the mountain (but not for tonight!) (CV)

## OSU\_monitor/N6503

08:23 Slewing to the focus/collim field.

08:27 dofia — Converged in 3 iterations with net negative z22 on both sides. But the first pupil images had bright rings around the outer edge (similar to the model pupil with +z22); did not notice whether there was an inner ring as well.

08:33 Copointing

Radial star offsets from rotator centers: BLUE 8.0" and RED 5.5"

lbcrangebal:

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COPOINTING: B=83307 R=83303

Pointing updates: delta\_IE = 1.43", delta\_CA = -6.57"

Mirror updates: dX(mm) dY(mm) dRX(") dRY(")

SX: -0.05 0.05 1.01 1.07

DX: 0.06 -0.00 -0.11 -1.26

On the copointing images, LBCB IQ 4.8 pix and LBCR IQ 4.2 pix - both look rounder than before.

08:35 Starting the science observation after waiting for the TMS update at this position.

On the first pair (b 083656 and r 083650) FWHM ~ 4.3 and 3.8-3.9 pix, respectively. The PSFs are round.

08:51 finished

## OSU\_monitor/N5474

08:51 Slewing to the focus/copoint field

08:55 dofia - there are only 2 (blue) and 3 (red) stars in the collimation region that are bright enough to be used. It would be good to select a new copointing star, which has more stars with R~15-16.5 within the collimation region, for this target.

Radial star offsets from rotator centers: BLUE 3.2" and RED 3.3"



lbcrangebal:

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COPOINTING: B=90427 R=90422

Pointing updates: delta\_IE = 1.55", delta\_CA = 2.34"

Mirror updates: dX(mm) dY(mm) dRX(") dRY(")

SX: 0.03 -0.01 -0.32 -0.66

DX: -0.02 0.05 1.14 0.50

09:09 Starting the observation after the TMS update arrived.

The plan is to stop the OB after the first 4 images in each camera have been taken (4/6 R-Bessel images and the 2 B-Bessel and 2 Uspec images) in order to have time for the nirjets program before it gets too light.

09:18 FWHM on first pair, b 5.3 pix and r 4.8 pix

09:34 Stopped the OB.

09:34 Reconfiguring to LUCI

09:57 Josh is sending the pointing preset, and collimating. The FWHM was ~0.8"

## UVa\_nirjets/G045.12+00.13

10:04 Starting the observation

UT (start)	filters	L1	L2	seeing
10:06	K+K	592-602	20-30	0.72"-0.65" @ K, 0.9"-0.8" on the guider
10:25	BrG+H2	603-617	31-45	0.62" @ BrG, 0.78" @ H2 (not simul)
10:52	J+H	618-628	46-56	varying - 0.6-0.7" at J & H, L1 627 is elongated. ~0.8" on the guiders

11:15	PaB+FeII	629-643	57-71	L1 642,643 have higher bkgnd - increase may have started $\sim\frac{1}{2}$ way, though there was some variation due to cirrus, too. L2 69-71 have poor IQ
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10:30 The satellite map shows that cirrus has been coming in from the NW - it was visible on the allsky image when the moon rose.

11:28 L1 638 - lost WFS on the SX side and L2 66 is ok still

11:30 WFS on SX lost, but for L2 67 it is still working on DX — despite this, IQ on 640 is good (0.6")

11:33 L2 69 - no longer wavefront sensing. There is a jump or elongation in this image - whether related to WFS or not.

11:36 on L2 70 and L2 71 also, there are jumps, too. All are in the same direction.

11:38 The script finished.

All of the L1 images look good, but the last 3 L2 images are elongated. The sky backgrounds were varying due to cirrus, but there does seem to be an upward trend for the last  $\sim 7$ , especially the last 2, at PaB.

11:42 Josh is closing up.

Finishing calibrations -

12:26 mods1 red expdone required after image 22...the exposure control had hung at "Exposure Done, Cleaning up..."

## Closed Dome Calibrations

### MODS

mods[1,2][b,r].20220525.00NN.fits

	m1b	m1r	m2b	m2r
1" slit flats	3-5 6-8	3-5 6-8	3-5 6-8	3-5 6-8

0.8" slit flats	9-11 12-14	9-11 12-14	9-11 12-14	9-11 12-14
1x2 binned calibrations				
bin12 0.8" slit flats	15-17 18-20	15-17 18-20	15-17 18-20	15-17 18-20
bin12 pixflats	21-25 26-30	21-25	21-25 26-30	21-25
bin12 biases	31-35, 36-40	26-30, 31-35	31-35, 36-40	26-30, 31-35
unbinned				
5" slit flats	41-43 44-46	36-38	41-43 44-46	36-38

## LUCI

Repeating the set of spectroscopic flats and arcs (the ones done last night, though, were fine).

	L1	L2
1" G200 zJ flats & arcs	644-648 649-653  654,655 656,657  658,659 660,661	72-76 lamp off 77-81 lamp on  82,83 lamp off 84,85 Ne  86,87 lamp off 88,89 Ar

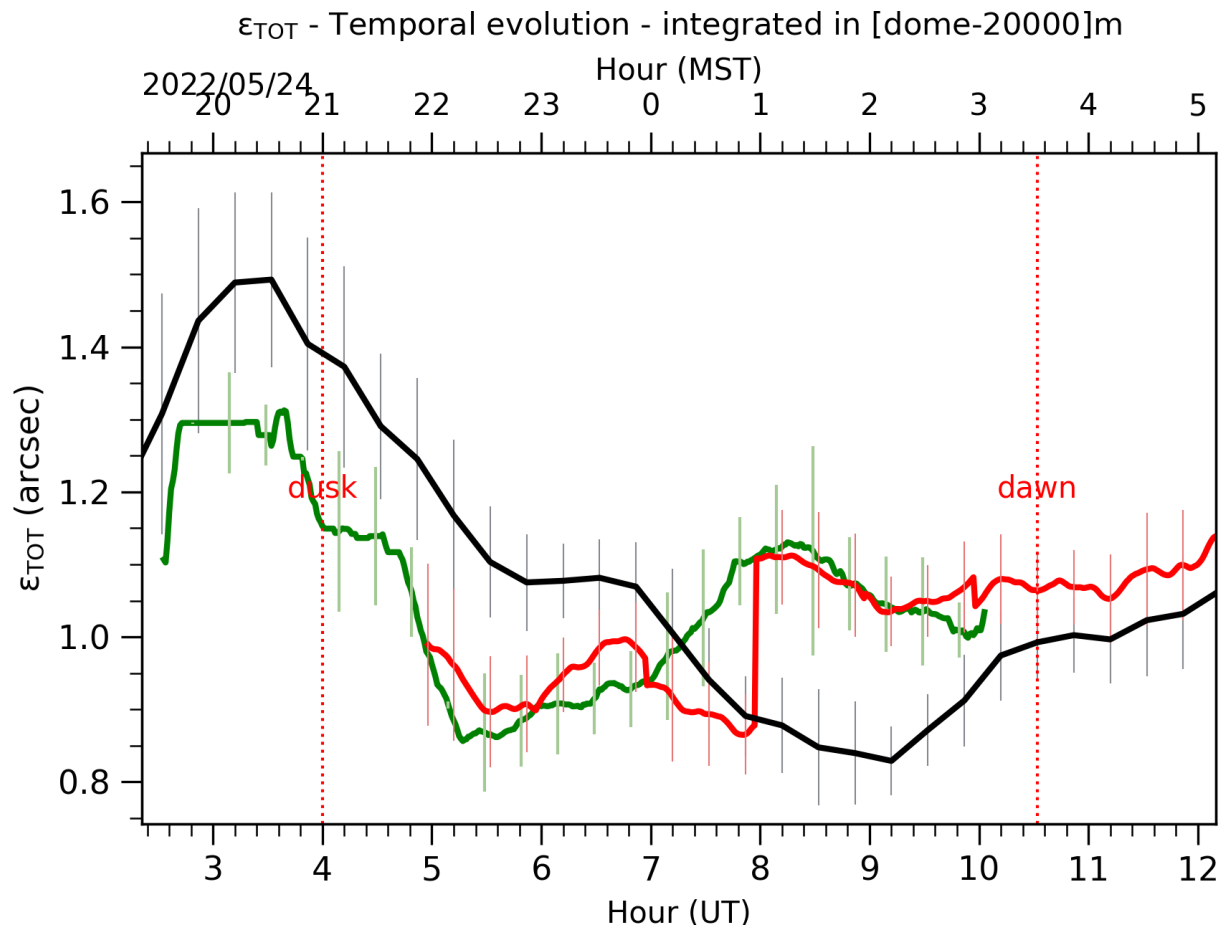
## LBC

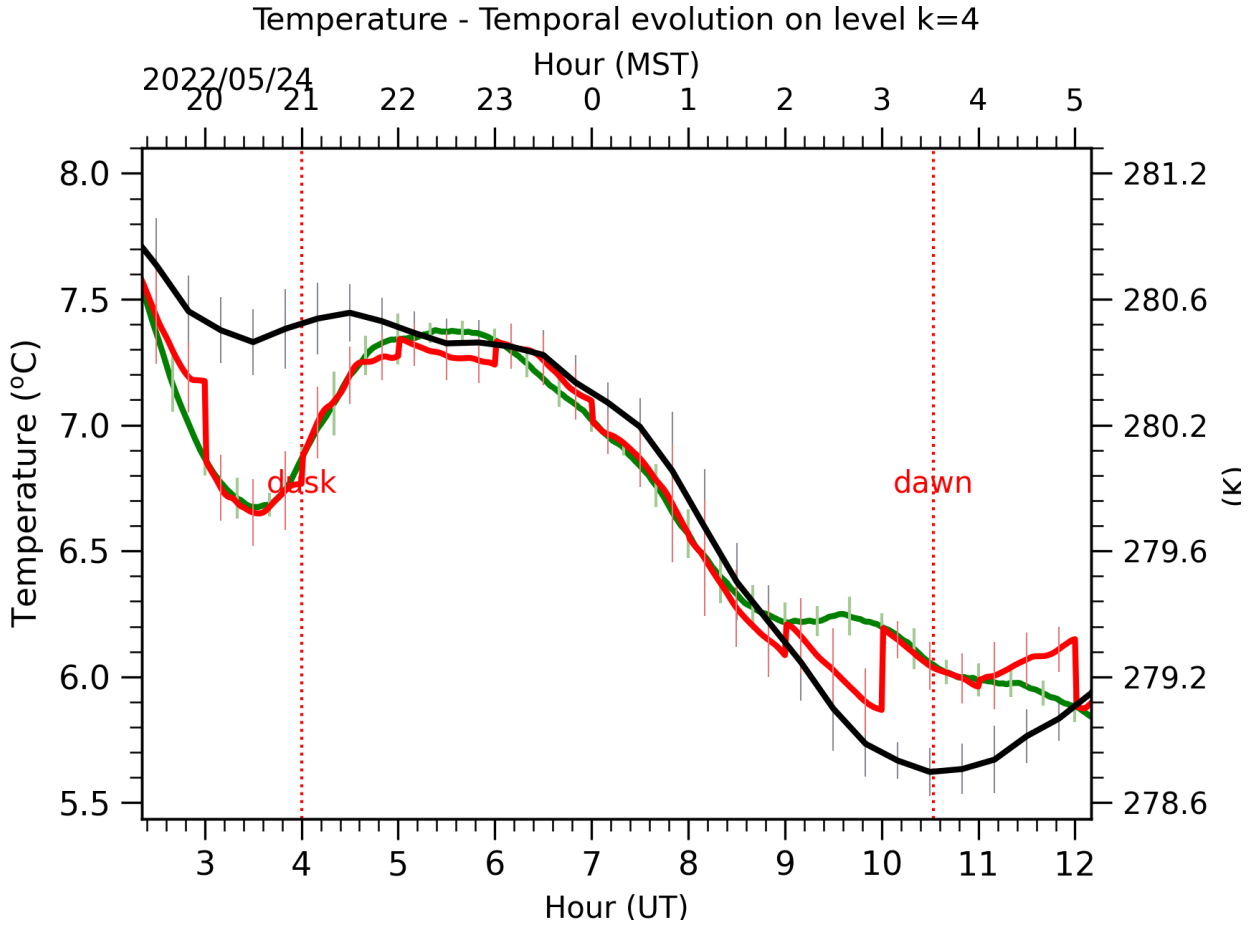
11:56 25 biases - there is substantial banding on the LBCR biases.

12:12 Starting a new set. Again, banding — but as it tends to settle down, I'll continue.

12:56 Finished 2 sets of 25. The end of the first and the second set are OK.

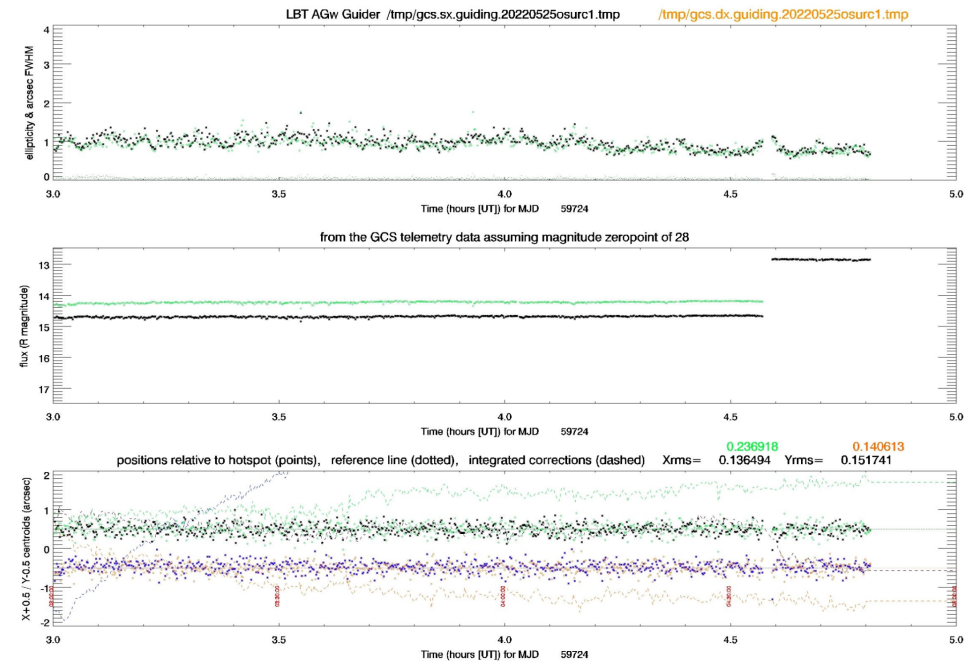
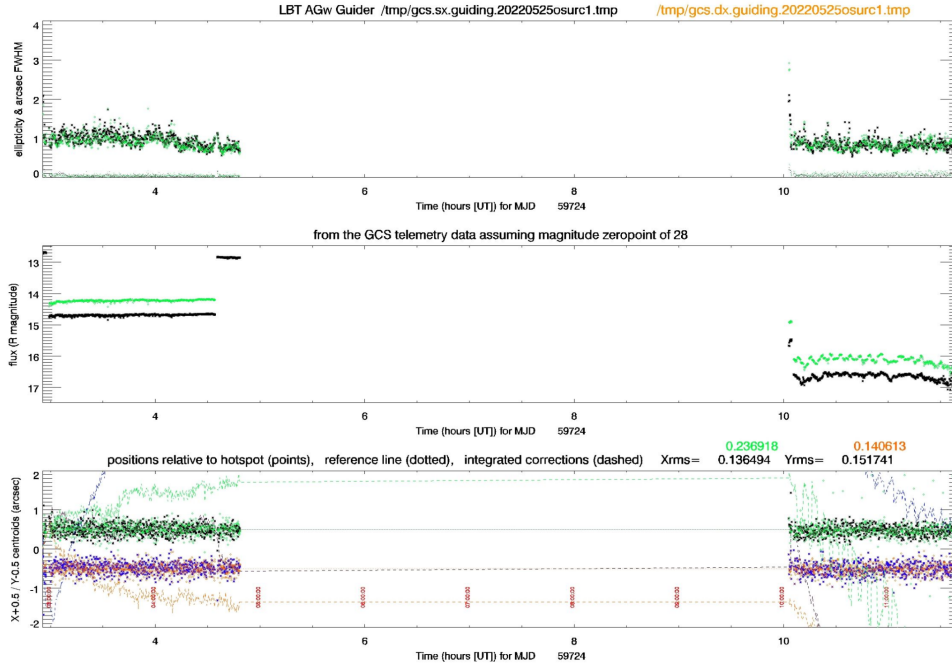
## ALTA predictions

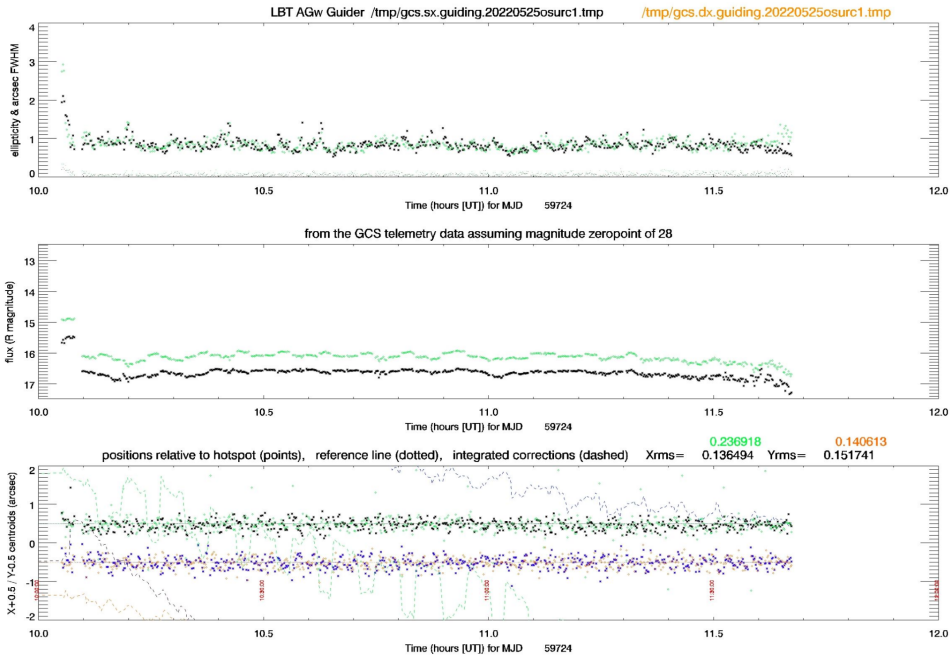




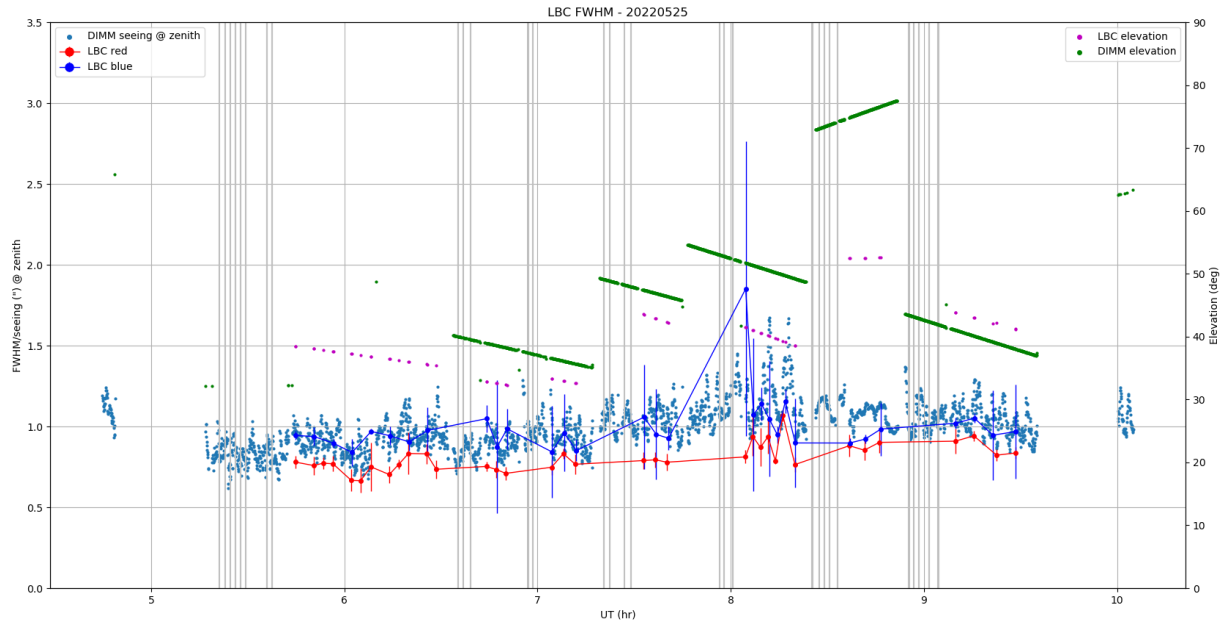
## LBTplot

The guide star FWHM (top) and flux (middle) as a function of time for the SX (black) and DX (green). These plots only apply to the times when LUCI was used - at the start of the night (until 5 UT) and at the end of the night (UT 10-11.75)





When the LBCs were used, the plot below (courtesy of Christian) shows the LBC image quality scaled to zenith, in comparison to the DIMM seeing estimate (blue dots; also scaled to zenith).



The DIMM seeing estimates as a function of time are below. The black crosses represent the measured seeing and the purple, the seeing scaled to zenith.

