

# OSURC Nightlog 20220523 UT

**Observer\*:** Olga Kuhn

**Lead Partner Observer\*:** Jack Neustadt (OSU)

**Other Partner Observers\*:**

**Special Assistants\*:**

**AO Operator\*:**

**Telescope Operator:** David Gonzalez Huerta

**\* = from home**

## Plan:

LBC. All programs require seeing  $< 1.1''$

Twilight flats:

need Uspec, B- and V-Bessel on LBCB and R-Bessel on LBCR. ND\_olds also uses I-Bessel on LBCR. I'll prioritize V+I and B+R since we have some Uspec flats from earlier this month, but no LBCB-V or LBCR-I for 2 and 1 month:

<https://wiki.lbto.org/Instrumentation/LogOfLBCTwilightSkyFlats>

☐ OSU_monitor/N3489	UTC 04:00 - 04:45
☐ OSU_monitor/N3344	UTC 04:55 - 05:40
☐ OSU_monitor/N3627	UTC 05:50 - 06:35
☐ OSU_monitor/N4214	UTC 06:45 - 07:00
☐ OSU_monitor/N4236	UTC 07:10 - 07:25
☐ OSU_monitor/N4395	UTC 07:35 - 07:50
☐ OSU_monitor/N4826	UTC 08:00 - 08:45 (NEEDS TO BE START BY 8)
☐ OSU_monitor/N4605	UTC 08:55 - 09:20
☐ OSU_monitor/M101	UTC 09:30 - 10:10
☐ OSU_monitor/N6503	UTC 10:20 - 10:40 (change to N6946 if ahead)

may 23

☐ OSU_XMDs_LUCI/HS1028	UTC 04:00 - 05:30
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**\*\*switch to LBC\*\***

☐ OSU_monitor/N3077	UTC 05:50 - 06:10
☐ ND_olds/sn21hpr_BRVI	UTC 06:20 - 07:20 (start at 7 at latest)
☐ OSU_monitor/l2574	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 observed OSU\_monitor targets with LBC all night, completing the observation blocks for N3489, N3344, N3627, N4214, N4236, N4395, N4826, N4605, M101 and N6946. FWHM on the images varied from about 1" - 1.5" and the DIMM seeing varied considerably. The FWHM log is [20220523.fwhm](#).

I ran TMS in active mode all night. The temperature dropped by 2 degrees over the course of the night and, although collimation generally held over the slew, there were two instances when FPIA was slow to converge on the red side. I think this was due to problems fitting z22 and the large z4-z22 crosstalk coefficient which caused z4 to bounce around too much before coming down within the convergence criterion. On the last field, the red image quality was a little worse than the blue, most likely because FPIA had not truly converged - it met the criteria and exited, but may have driven in too much z22.

## Issues:

The z22 issue was the more significant one. At the end of the night, there was an RPC error for the blue trackers which was cleared by stopping/restarting the LBC software (lbckill/lbcstart).

## Weather:

The sky was clear at sunset, although when the moon rose during the 2nd half, we could see thin cirrus on the images from the allsky camera. The cirrus is part of a band of clouds moving from the NW. The temperature dropped from 7.5 to 5.2 C during the night and the humidity rose from 35-50%. Winds were ~10 m/s. The seeing was variable from about 0.9-1.4".

## Preparations:

I copied the last good TMS reference (from 20220507) to /tmp (telescope@robs) so that it may be used to help the initial collimation.

Before opening, ran the TMS active loop to set M1 using the old reference.

## Overview (times are given in UT):

19:14 David is opening the enclosure.

19:37 Starting Uspec - pairing it with Y since it is too bright for R or I. We got 5 Uspec flats counts (mean for chip2): 46k-23k. The first are a bit high, but the rest are fine.

19:43 Starting B + R flats: We got 5 at each filter with counts: B 47-16k and R: 27-11k

19:50 Starting V + I flats: Trying to 2 diametrically opposed PAs:

PA=0 We got 5 in each filter with counts: V 32-15k and I 37-19k

PA=180 We got 5 in each filter with count levels also in the range 30-15k

20:13 Slewing to the focus field for the 1st target, N3489

## OSU\_monitor/N3489

20:18 dof pia — converged in 5 iterations. On red, it was close except for z4 & z11, but on blue there was some astigmatism and then some oscillation of z4 probably due to the c

20:30 Set the reference and sent the script to take the pair of copointing images.

20:33 copointing -

Radial star offsets from rotator centers: BLUE 33.9" and RED 34.8"

lbcrangebal:

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COPOINTING: B=33038 R=33032

Pointing updates: delta\_IE = -31.55", delta\_CA = 12.50"

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

SX: 0.38 0.22 4.75 -8.19

DX: -0.36 -0.13 -2.88 7.74  
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20:33 Preset was cancelled - off-source?

20:36 Repeating the pair of exposures to verify that the copointing correction was made - it was. FWHM about 4.4 (LBCB) and 4.5 pixels (LBCR) on copointing images.

20:40 18-deg twilight is at 20:53. We'll recollimate - the red side needed z4 = -389, just out of convergence criteria, but the first blue image was converged (z4 = -304).

20:50 Starting the science observation: on the first pair, 5 pix (1.24", LBCB) and 4.5 (1", LBCR). DIMM (zen corr) is 1.2-1.35".

Uspec: 040359 looks a bit elongated and FWHM ~ 5.5 pix, red also 040327 but FWHM ~ 4.5 pix.

21:20 The guide star FWHM are now lower (1.1"/0.9") than previously when they were ~1.3" (LBCB) but 1.6"(!) (LBCR). The DIMM is also dropping to sub-arcsec.

## OSU\_monitor/N3344

21:29 Slewing to the focus/copoint field

21:32 dofpia - the pupil images had bright rings around the outer edges for both LBCB & LBCR - fpia gave -Z22 corrections and converged in 3 iterations

21:37 Setting reference

21:38 Taking the copointing exposures

Copointed:

Radial star offsets from rotator centers: BLUE 9.0" and RED 11.0"

lbcrangebal:

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COPOINTING: B=43908 R=43901

Pointing updates: delta\_IE = -4.02", delta\_CA = -8.91"

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

SX: 0.08 -0.06 -1.26 -1.68

DX: -0.01 -0.10 -2.16 0.19

21:44 Starting the science observation (started at 21:41 but saw the guide star jump - I had not waited for things to settle after slewing from copoint->sci field and as we were 50-sec into the 250-s exposure we stopped and restarted)).

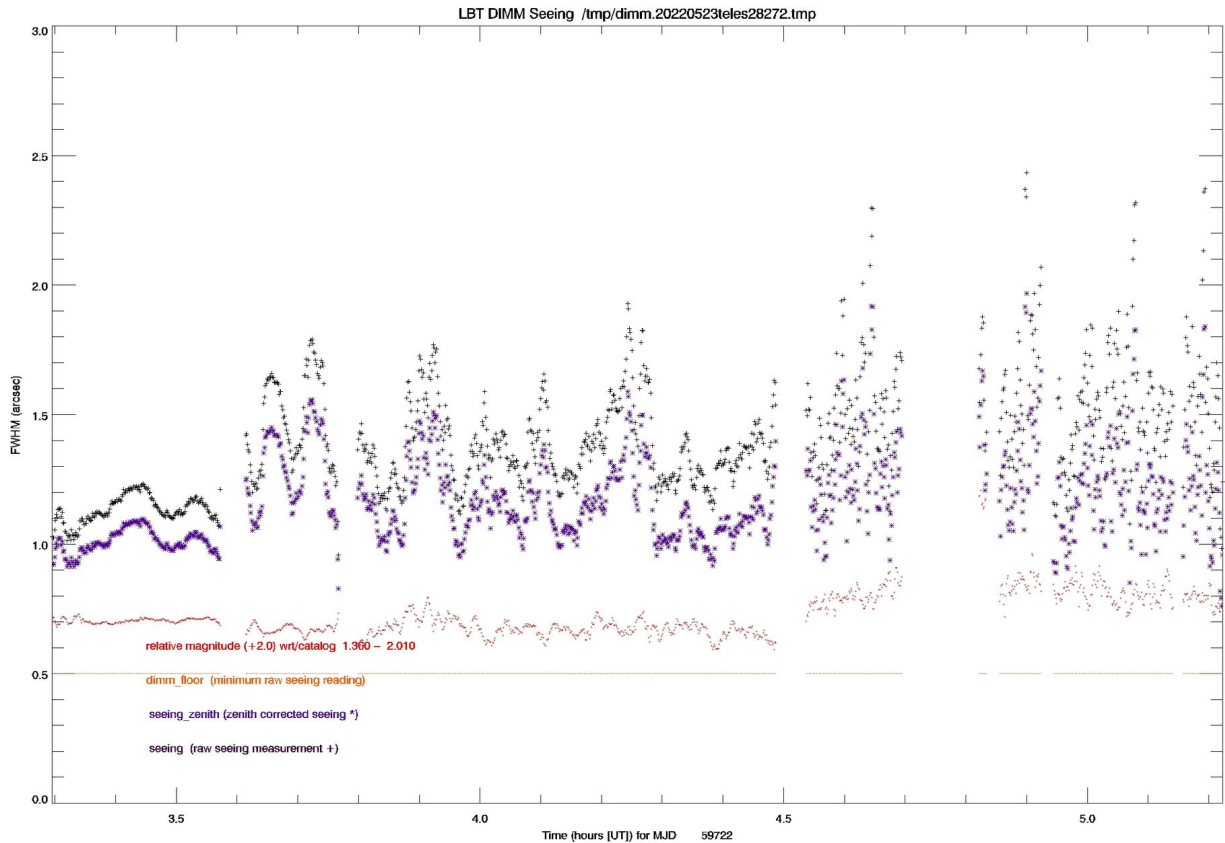
FWHM on guiders is 1.6, 1.9" - DIMM is reading 1.6 and varying.

First pair of images: LBCB 6.4 pix(1.44") and LBCR 5.5 pix (1.24").

045447: b 5.4 pix and ~4.9-5 pix on r 045424

05:04 - red IQ is a bit worse than blue: 5.05 vs 5.2 pix

The DIMM readings have really started to vacillate -



## OSU\_monitor/N3627

05:16 Slewing to the focus/collim field

05:18 dof pia - again dof pia corrected +z22.

05:23 Setting the reference

05:24 Taking the pair of copointing images

05:27 Copointed:

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COPOINTING: B=52502 R=52459

Pointing updates: delta\_IE = 0.04", delta\_CA = 6.95"

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

SX: 0.29 -0.03 -0.69 -6.26

DX: -0.31 -0.03 -0.62 6.61

05:27 Started the science OB but waiting for the TMS update

05:29 Started the science OB

The first red image 52951, looks a bit elongated  
06:00 - near the end - FWHM 5.5 and 4.5

06:10 finished

## OSU\_monitor/N4214

06:10 Slewing to the focus field - took a pair of copointing images while waiting for the TMS correction, but these were exposed before the correction - not a good check on IQ.

06:12 dofpa - converged in 2 iter on blue and 1 on red

06:16 setting the reference

06:17 Taking the pair of copointing images

Copointing:

Radial star offsets from rotator centers: BLUE 6.6" and RED 8.1"

lbcrangebal:

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COPOINTING: B=61759 R=61756

Pointing updates: delta\_IE = 2.21", delta\_CA = -0.05"

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

SX: -0.07 0.20 4.26 1.46

DX: -0.16 0.24 5.14 3.40

IQ on copointing images looked very good on Red, but some PSF variation across the field on Blue which seems unusual. FWHM was about 4-4.5 pix blue and < 4 on red.

06:20 Starting the observation - the first pair has IQ similar to the copointing image, 4-4.5 pix on blue and ~3.8 or 3.9 pix on Red

06:30 finished

## OSU\_monitor/N4236

06:30 Slewing to focus/collim field - there is a lot of background light from a ghost on the red

06:34 running dofpa - 2 iter

06:40 setting the reference

06:41 taking the pair of copointing images

Radial star offsets from rotator centers: BLUE 8.3" and RED 14.8"

lbcrangebal:

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COPOINTING: B=64208 R=64204

Pointing updates: delta\_IE = -8.98", delta\_CA = 6.56"

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

SX: -0.02 0.16 3.40 0.45

DX: -0.03 -0.21 -4.53 0.64

06:45 Starting the science observation

First pair: 5.5 pix B and 5 pix R. DIMM (zen-corr) 1.35"

06:58 finished

## OSU\_monitor/N4395

06:59 Slewing to focus/collim field - wait for TMS update

07:02 dof pia - there is some focus correction needed, especially on red - how much is just focus and how much is because of the spherical is a question

07:07 Setting the reference

07:08 Taking the copointing images

07:11 Slewing to the target and waiting for TMS update - it took a little longer this time - I started the loop after copointing vs before as I have usually done though I don't think that should have mattered).

07:14 Starting the science observation — FWHM ~ 4.5-5 pix on red and about 5.5 pix on blue.  
DIMM ~ 1.2" (zen-corr)

## OSU\_monitor/N4826

07:26 Slewing to focus/collim field and waiting for TMS update

07:29 Starting dof pia -

the blue was converged, but the red had a focus correction and then gave negative z22 which affected z4 and z4 started to bounce around. Eventually converged in 7 iterations. (The z4-z22 crosstalk and z22 fitting needs work).

07:44 Taking the pair of copointing images

Radial star offsets from rotator centers: BLUE 5.7" and RED 4.3"

lbcrangebal:

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COPOINTING: B=74405 R=74402

Pointing updates: delta\_IE = -5.03", delta\_CA = 4.51"

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

SX: 0.05 0.21 4.41 -1.13

DX: -0.08 0.08 1.72 1.74

07:46 Slewing to the target and waiting for TMS to send a correction at the field

07:48 Starting the science observation.

b 074851 has FWHM ~ 5.5 but up to ~5.8 and down to 5.2

r 074844 has FWHM ~ 4.6

b 075300 has FWHM 6.1-6.2 (1.4")

r 080040 has FWHM ~ 5.7-5.8 (1.3") - consistent with the DIMM (zen-corr ~ 1.2-1.3")

r 081239 is pretty elongated and b 081320 is also - the elongations are in the same direction, from lower left to upper right.

The next blue/red image, b 81728 and r 81637 do not look elongated and FWHM is similar to what it was before.

## OSU\_monitor/N4605

08:28 Slewing to the focus/collim field and waiting for the TMS update (discarded the copointing images taken while waiting - the update came during one).

08:29 Running dofpia - the first pupil images were collimated. Setting the reference and starting the TMS loop.

08:33 Taking the pair of copointing images

Copointing

Radial star offsets from rotator centers: BLUE 5.2" and RED 10.0"

lbcrangebal:

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COPOINTING: B=83418 R=83415

Pointing updates: delta\_IE = -6.62", delta\_CA = 7.87"

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

SX: -0.14 0.23 4.90 2.95

DX: 0.01 0.04 0.83 -0.25

FWHM 5.4 (LBCB) and 5.2 pix (LBCR)

08:36 Slewing to the target and waiting for a TMS update

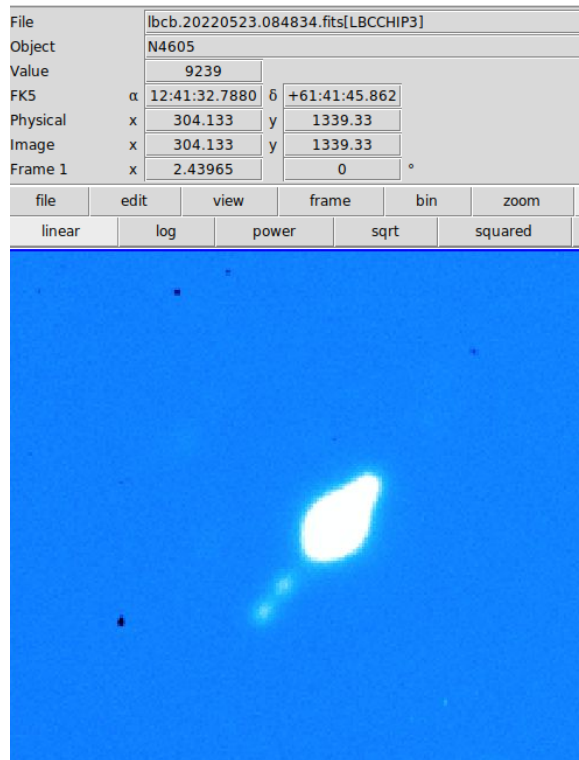


08:38 Starting the science observation

6.5-6.8 pix FWHM on the red side and about 6.8-7 on the blue. The raw, not-zenith-corrected DIMM seeing is around 1.5-1.6".

On the 2nd pair, the red FWHM decreased but blue FWHM got worse (B-> Uspec).

08:48 On the blue image of the 3rd pair (lbc.20220523.084834.fits) there was a jump.



08:54 Repeating the science observation. The FWHM is a bit worse than earlier - 7.2 on the blue and 6.8-7 on the red side.

The FWHM decreased for the next pair - the seeing is variable - b 85935 6.8 (Uspec) and r 85925 has FWHM 5.5-5.8 (R-Bessel)

## OSU\_monitor/M101

09:11 Slewing to the focus/collim field

09:12 dofpa - converged in 2 iterations. Set the reference & started the active loop

09:17 Taking the copointing images

Copointing:

Radial star offsets from rotator centers: BLUE 3.5" and RED 6.6"

lbcrangebal:

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COPOINTING: B=91830 R=91827

Pointing updates: delta\_IE = 3.41", delta\_CA = -1.75"

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

SX: -0.07 -0.22 -4.78 1.52

DX: 0.02 0.14 3.05 -0.39

09:22 Starting the science OB

On the first pair, FWHM~5.4-5.5 pix on the blue (B-Bessel) and 4.4 pix on the red (R-Bessel)

094136, Uspec, has FWHM ~ 6.7 pix 094109, R-Bessel, FWHM ~ 4.8-5

09:54 finished

## OSU\_monitor/N6946

09:54 Slewing to focus/collim field.

09:57 dof pia - waiting for files message, though the files have appeared in /newdata

The red took some time, as before, with a too-large z4 correction which may have been driven by the z4-z22 crosstalk coefficient. There were 3 iterations and a net z4 = -508, z11= 50 and z22 = 112. For blue, the net z4=30, z11=154 nm and z22 was 52 nm.

The IQ is worse on red than on blue - on red, ~5.2-5.8 or even 6 near the top of chip2, while on blue, ~ 4.5 pix.

The seeing is getting better

10:48 Finished — end of partner science

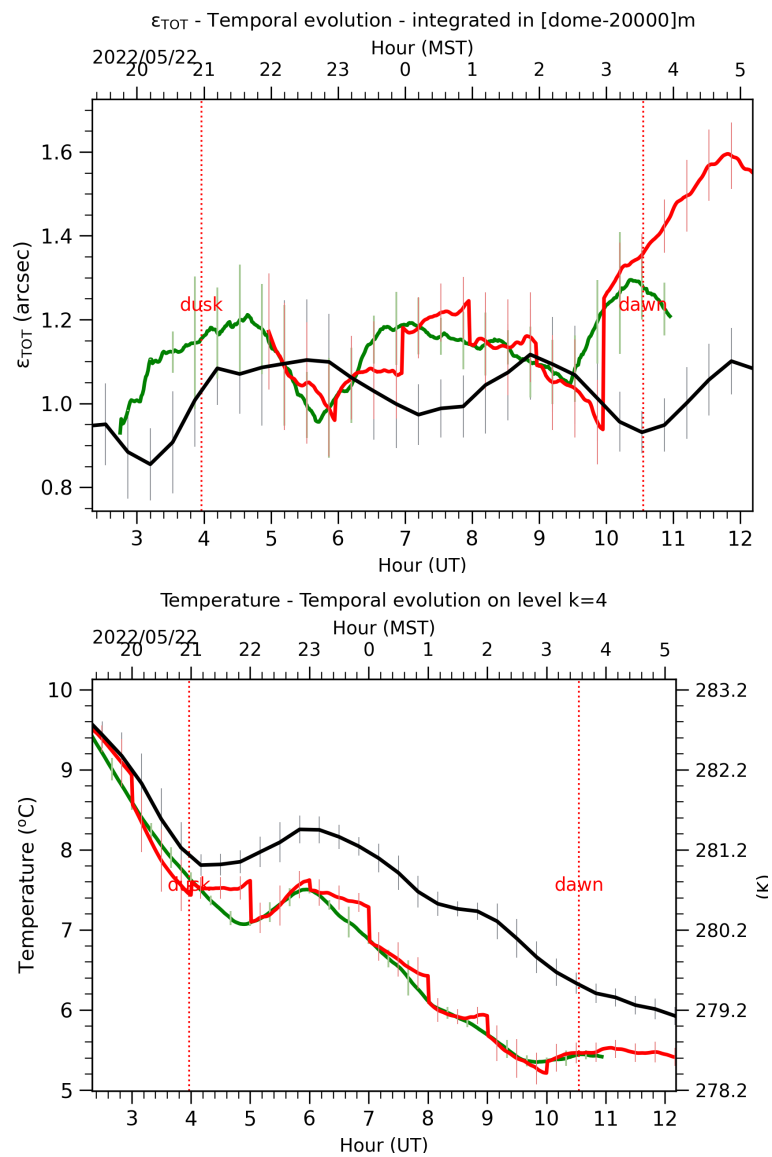
10:58 I ran dof pia again on this field. On both sides, it gave negative z22.

11:07 Took a pair of science images (no TMS - just to see the image quality after recollimating). The FWHM now looks better on Red. Averaging over the variable seeing, it looks like FPIAs poor handling of z22 on red caused the degradation of IQ for the last target, but it's not clear if recollimating at that time would have helped.

11:18 Setting the reference to take a few more images with tmS



## ALTA predictions



LBTplot

