OSURC Nightlog 20220212 UT

Observer*: Olga Kuhn
Lead Partner Observer*: Patrick Vallely (OSU)
Other Partner Observers*: Tharindu Jayasinghe (OSU), Subhash Bose (OSU), Dragon Reed (UM)
Special Assistants*: none
Telescope Operator: Josh Williams
AO Operators*: Doug Milller (until 2300 MST) and Greg Taylor (from 2300 MST)
* = from home

Plan:

- ☑ ~~UM_IPTAU/IPTAU~~
- ☑ ~~OSU_XMDs_LUCI/SDSSJ114827~~
- ☑ ~~— Switch to PEPSI —~~
- ☑ ~~c/2MJ1417m0028~~
- ☑ ~~OSU_AbundLowZ/2MJ1423p0032~~
- ☑ ~~OSU_AbundLowZ/2MJ1458p1331~~
- ☑ ~~OSU_AbundLowZ/2MJ1445p0950~~
- ☑ ~~OSU_AbundLowZ/2MJ1546p3531~~
- ☑ ~~OSU_AbundLowZ/2MJ1558p0203~~
- ☑ ~~OSU_AbundLowZ/2MJ1634p1736~~
- ☑ ~~OSU_AbundLowZ/2MJ1613p0515~~
- ☑ ~~OSU_AbundLowZ/2MJ1440p0958~~
- ☑ ~~OSU_AbundLowZ/2MJ1442p2159~~
- ☑ ~~OSU_AbundLowZ/2MJ1325m0217~~
- ☐ OSU_AbundLowZ/2MJ1424p2838
- ☐ OSU_AbundLowZ/2MJ1326p0938

Summary:

We started the night with LUCI1-AO, to execute the UM/IP_Tau and UVa_nirjets program. We collected about 3 hours worth of data on IP_Tau; although could not catch it before it crossed the meridian, we observed it from elevation 84 deg (rotator angle 12) down to elevation 54 and (rotator angle 71 deg). We had some problems with the AO and problems with the

LUCI-AO interaction as described below. The FWHM measured on the corrected star images were as good as 0.06".

Then we moved on to UVa_nirjets/S255, but the adaptive secondary went into a failure state just before the Ks sequence finished. Greg and Guido recovered it and set the flat for seeing-limited observations, and because the OSU_XMDs target (SDSSJ114827) was available by this time, we opted not to continue with the AO but to move on.

We completed the observations on OSU_XMDs_LUCI/SDSSJ114827 and switched to PEPSI.

With PEPSI, we observed all but 2 of the OSU_lowZAbund targets.

The log of PEPSI observations is here: 20220212_pepsi_obs.log

Issues:

With LUCI1,
- filter wheel #2 error (IT 7839)
- 2 camera wheel errors, one going from N3.75 → N1.8 and another moving from the N1.8 → N30. (In recovery, I doubled up the FM4 offsets and have to check pupil & FS alignment).

WIth the LUCI-AO:
- the subwindow was cleared whenever the script sent an instrument configuration change
- On some offsets, the star disappeared - Doug noted that the bayside stage motion was much larger than the offset would have indicated.
- sometimes, but not always, the script would not resume after the loop was closed - the telsvc GUI showed "Waiting for IIF…"
- the observer execution panel greyed out all off offsets prematurely (when I skipped to an item, all the items below came back). This is not a terrible problem, but it makes it hard to follow the script progress.
- On the UVa_nirjets observation, the adSec went into a failure state because of an actuator which showed a bad gap value. Greg & Guido recovered it and removed the actuator from the list.

Problems closing the left shutter door in the morning - it's closed but not torqued.

Scripts:
- UVa_nirjets skyflats scripts use no mask, but they should have the N30 Field Stop
- OSU_LowZAbund program: After getting only SNR~50in CD2 for a few of the first targets, we bumped up the integration times from 15 to 20-min. This usually gave SNR ~70-100 in CD2.

Weather:

The skies were clear, winds picked up too close to the limits before midnight, but then calmed down.

Preparations:

luci[1|2].20220212.0NNN.fits
mods[1|2][b|r].20220212.NNNN.fits

Checked and adjusted the alignment of the N30 field stop.

Overview (times are given in UT):

01:05 Josh opened the enclosure
01:05 sunset
01:09 Preparation for OSCO

02:32 Sending collimation preset. There's a lot of coma at the start. Converging to about 1" FWHM.

01:35 Sending OSCO script. Doug says that the AO WFS is reporting not such good seeing. DIMM reports 1.24". Also that there's an edge problem (the OSCO star is bin 1)- loop opened. Doug is moving the re-rotator to see if that helps to remove the edge.

There are some problems with the edge & with the skip frames for the OSCO star (bin1). We'll take the data with NCPA on, only, skipping the NCPA off set to save some time.

The LUCI script was hung on the first item. Doug closed the loop, but the script did not progress and on the telsvc GUI, it reported "Wait for collimation…". I clicked the button to "skip wait for collimation" but that did not help. Then, in the telsvc gui, I clicked Reconnect to IIF - I got a popup saying it's busy, but after I acknowledged this, the new script which I had loaded (IP Tau collimation) sprung to life - reconfiguring the instrument.

UM_IPTAU/IP_Tau (LUCI1-AO ADI observation)

01:58 Sent the collimation script. The high background is back. The WFS error went to 191 nm.

02:01 Sent IP_Tau script

- put pauses in to set & check subwin
- subwin 256x2048 needed

02:04 Doug said the star flux as seen by the AO WFS seems to be fluctuating, but we don't have clouds.
02:04 WFS sees 13.4. Script had R-12.46. Consistent with the ~1mag offset.
02:08 Optimized gains, but then started to see skip frames.

luci1.20220207.0005.fits: Star is at X = 1235

02:10 Setting the SW: subwin SW 1 1107 1 256 2048
 Checked with exposure 11 (Sorry this took me too long - I had it correct at the beginning but the zoom on Aladin confused me and I thought it was not getting all of the rows. Wasted 10 minutes on this.)

02:24 Starting the observation, elevation 84 deg, posangle = 16.

02:46 Suddenly full frame.

FWHM 4.03 pix (0.06045") on cube stack 18.

02:49 Subwin stopped at or after frame 28 - this was when the filter was changed.
Aborted and reset the subframe.

02:53 Going again - taking the first observation at Jhigh and offset position 0.28 10.22 manually, through the readout gui.

02:54 posangle 54 deg now.

03:09 Doug noted that every once in a while we are getting a burst of skip frames, but the image quality looks pretty stable. On 0043, FWHM = 0.063"

03:13 Going to change filter - next image 44. The subframe was lost. I aborted & reset subwin. 44 is ok, but on 45 the loop paused and image has FWHM 17 pix. Doug is re-closing the loop. (DIMM 1.13")

03:22 Starting again the first sequence at J_low and offset -0.31, 11.36".
  48-52. On 50 3.75x 3.33 pix 0.0531".
03:22 posangle now 65 deg.

03:29 Offset to -0.09 -2.87" failed. Bayside stages moved and telescope moved, but there was no light in the WFS so the resume AO failed. Doug moved the stages around and found the star. He reclosed the loop

03:39 Resuming the script at the -0.09 -2.87" failed. The sequence zipped through all of the offsets at once. That was the problem.

03:45 - No, that wasn't the problem - I put a pause in, so it just did this one offset, but Doug saw the star move about 12" in the focal place. These are absolute offsets. To try to recover without sending a new preset, we sent an abs offset 0 0. The bayside stages moved a lot (1.7mm reported by bayside stages moved 15mm.)

03:51 We'll have to resend the preset.
This time the subwin was set to : subwin SW 1 922 1 256 2048

58-61 are the first 4 cubes at J_low and the offset position -0.09" -2.87". Position angle 70 deg.

04:32 On 70, the first at J_high, the channel boundaries are very pronounced. The star is also very close to the top of the detector - the offset was 0.61" 10.39". (I should have centered it better after the preset).

04:40 About 5 pix (0.075") on 75. Posangle 71 deg.

04:47 skip frames again - lots of tip-tilt. Frame 82.

04:48. Switched to J_low. Reset subframe. Starting now at 86. 86-89

04:59 Again the script blew through all of the items, although I don't know whether it really executed them. It then went back to take data. 91 - open loop. The star was off by only a fraction of a mm in the FP. Not like before.

05:02 Doug closed the loop again. But there are a lot of skip frames. (skip-frame during offset may be causing a problem - LBTI reported that).

Then I sent the abs offset 0 0. The loop paused. Then the star disappeared - it was off by 7mm

Centering up better in X,Y 94 is a test image 97.5 1330.81. Sending an offset 0.458" -4.6" Doug saw the star move by a lot. The stages moved by 16mm.

We're stopping here and moving on. The rate of change of rotation is slowing and there is a question about the LUCI-to-AO stage offset scaling or reference position. I'm not sure where the origin of this problem lies.
As to the execution, the clearing of the subwin with every filter change was unusual - something not seen before - and this contributed to the lost time at the startup. But I also failed to center the star in X,Y and only noticed this when it was near the top of the detector on a 10.x" offset.

Otherwise it did not appear to be extremely close to the edges - so I hope the data will be useful.

UVa_nijets/S255

05:21 Sending the preset to the field. There's a lot of background on the guide camera.

05:35 Stuck on Wait for IIF… Clicked Abort Wait for Preset. Now a script error. Continue both. Stop AO. Continued from the Error on the first item (Preset) but this sent a new preset.

05:40 Doug is having to reclose the loop. Now after Doug closed the loop, the telsvc GUI says idle and the script is continuing.

L1
95-104

The LUCI Observation window: When the offset happens, again all of the preset items greyed out and then when the loop resumed, the integration started and the box has a green background. The offsets remained greyed out.

Bin 3: On the stack of cube 98, the FWHM is 0.132".

05:57 On the sky frame, 104 the loop opened. adSec went into failure. Greg is working on recovering from it - but it may take a minute. This happened right before the final on-source Ks image.
06:06 I resent the preset. Guido noticed that actuator 468 is not working and it will have to be removed.

OSU_XMDs_LUCI/SDSSJ114827

SDSSJ114827 - target

06:19 Putting the 1" slit into the FPU, also blind filters for pointing correction.

06:32 Josh is checking pointing

06:36 Collimation preset. About 1.1-1.2" on the guiders.

J
06:39 Starting the acquisition: 0.9/0.96" on the guiders, but DX side blew up to almost 2 during acquisition.

L1 105 & 106, 107 → 0.483, 0.4441 to put at 1031.28, 1019.70 → 108
L2 1 & 2, 3 → 4 1.8945, 0.833 to put at 1009.60, 1034.31 → 5

It's hard to say that we've got the blob well centered - it is a blob, but the images 108-105 and 5-1 are not very convincing. taking a new pair now that the seeing is better (0.8"). It looks like I took a new image on L1 (109) but not on L2, however with some finessing of the stretch, I think we have managed to say that the object is in the slit.

	L1	L2	AM	FWHM
	110-115	6-11	1.18	1"

07:40 FHWM on guiders is ~1.4"

The first differences show the target spectra with emission lines. These may be a bit weaker on L1 than on L2.

HIP59147 - telluric

08:23 filter wheel 2 error "uknown" position

init in IMGUI did not work - sent it to zJ, but then moving to J landed us in Ks.
2022.02.12 08:23:29 s | error medium | luci.luc | Luci ONE | ONE_InstrumentM | FilterUnitClient.java#setPosition(80) | Error setting the position of the filter unit to 1 at "rmi://localhost:60001/ONE_FilterUnit_2"!

2022.02.12 08:23:29 s | system medium | luci.luc | Luci ONE | ONE_FilterUnit_ | RMIFilterUnitImpl.java#generateStatus(419) | filter unit 2 at position -1, status: unknown

Eleva 53 44 -
I set motion from "shortest" to "positive" and then initialized and set it to J.

08:31 back in business

L1: 116, 117 → 118, dx = 0.12 → 119
L2: 12, 13 → 14, ok

L1 Camera wheel error - camera in the negative limit.

UT	L1	L2	
	120-121	17-18	

Reconfiguring to PEPSI

08:43 Starting…

We're planning to go through the LowZAbund targets. All use the 300 mic fiber & CDs 2 & 4. The magnitudes are catalog magnitudes, and do differ from those in the readme.

Had to reboot the agw7-cam.

08:59 Sending a collimation preset

2MASS J14172892-0028004

09:07 Starting the exposure. Avg FWHM on guiders 1.4-1.5"
SNR CD2 51 and CD4 146

This was the faintest object in the list, V=13.49. May need to repeat for better SNR.

2MASS J14231963+0032034

V=11.29
09:26 Starting the exposure.

SNR CD2 73 and CD4 195

2MASS J14585602+1331276

09:44 - Slewing
Josh is checking pointing
09:46 - Slewing there again
09:50 Starting the exposures

Seeing 1.45-1.8"

SNR ~ 55 on CD2 and 158 on CD4. We may want to repeat (V=12)

2MASS J14450605+0950268

10:08 starting the exposures
SNR 55 on CD2 and 166 on CD4 (V=12.22)

2MASS J15462190+3531306

10:31 starting the exposures
V=11.67
I increased the exptime from 15 → 20 min
SNR = 101 CD2 and 257 CD4

2MASS J15581861+0203059

10:51 Slewing
10:53 Starting exposures
V=10.71

SNR = 122 in CD2 and 307 in CD4

2MASS J16343081+1736192

V=11.60
11:12 Starting exposures
Avg seeing ~ 1.3"

SNR ~ 93 CD2 and 240 CD4

2MASS J16132003+0515209

V = 11.61
11:34 Starting exposures
SNR 91 in CD2 and 221 in CD4

2MASS J14401389+0958353

V=11.83
11:57 Starting exposures

SNR 84 in CD2 and 212 in CD4

2MASS J14423207+2159181

V=12.53
12:18 Slewing — star not found, we need to check pointing
12:22 Slewing again -
12:24 Starting exposures

SNR 82 in CD2 and 215 in CD4

12:42 18-deg twilight

2MASS J13255077-0217086

V=12.2
12:45 Slewing
12:50 Starting exposures

13:10 Seeing bounced up to 3-4", 2" on average at the moment.

SNR ~52 in CD2 and 149 in CD4.

13:12 Starting another exposure.
13:28 Stopped it as the sky was getting bright.

SNR ~ 60 CD2 and 141 in CD4

Calibrations

PEPSI

300mic fiber, CDs 2 & 4, ThAr and traces

LUCI

LUCI1 darks for both subwindows used:

subwin SW 1 922 1 256 2048   luci1.20220212.0122-126
subwin SW 1 1107 1 256 2048 luci1.20220212.0127-131

There was a camwheel error going from N1.8 to N30 and I ended up doubling up the FM4 offsets so the N30 FS is not aligned. I need to correct this.

I corrected it, but the script removed the N30 FS mask and the sky is too bright to correct this.

Closed-dome flats for S255 observations
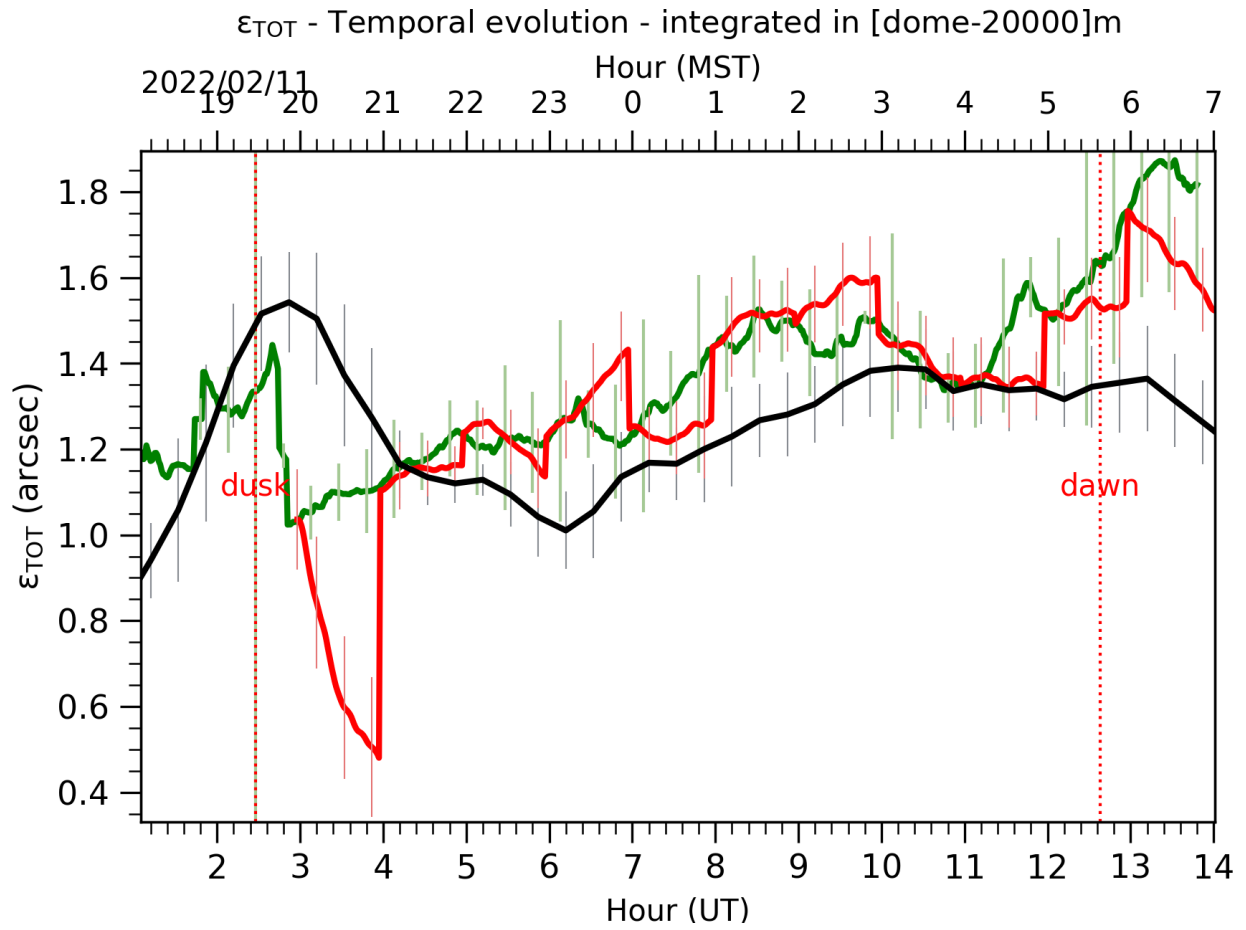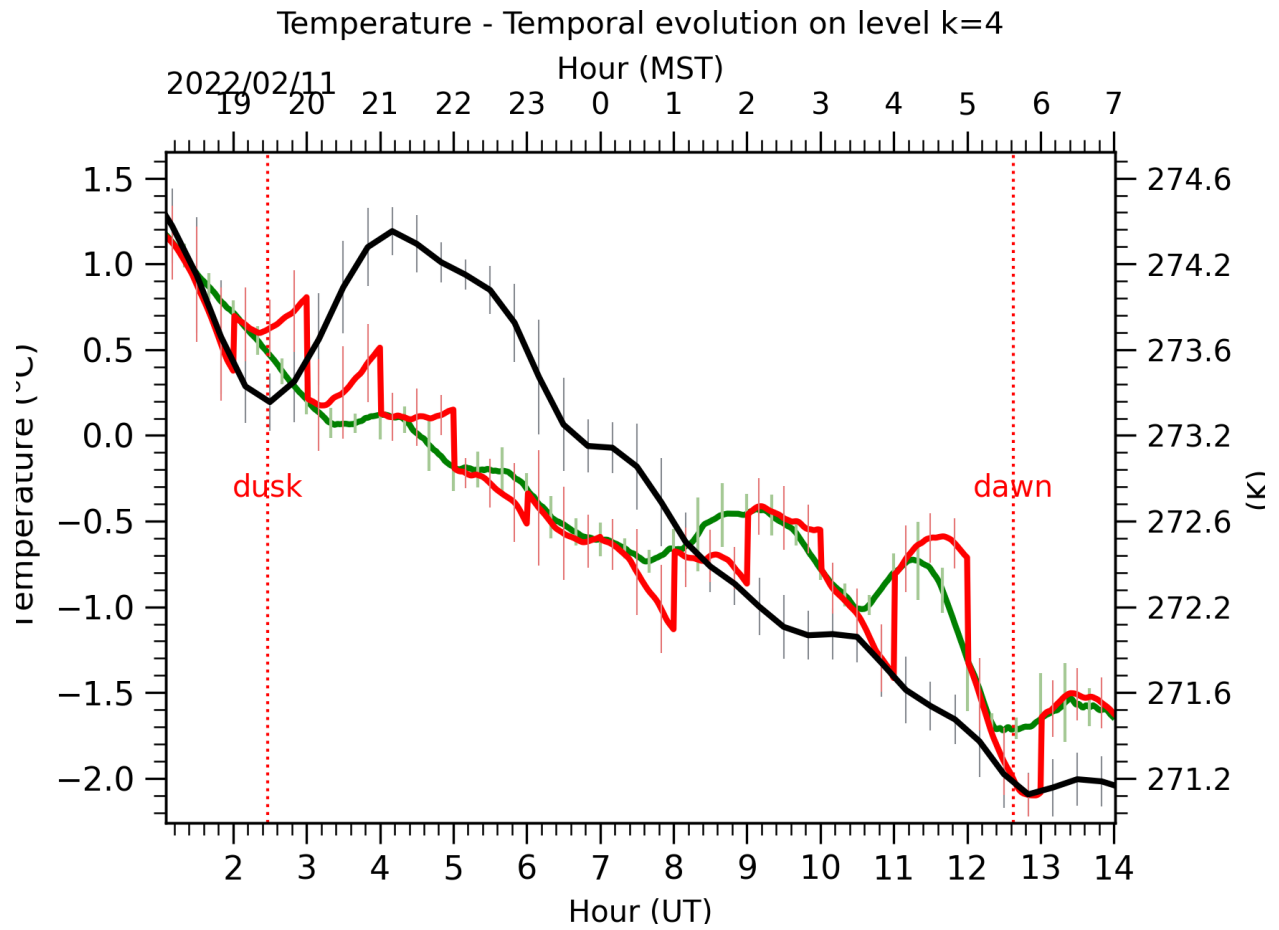N30 camera, N30_FieldStop, Ks
luci1.20220212.0146-0150
luci1.20220212.0151-0155

13:12 12-deg twilight
14:02 sunrise

ALTA predictions

ϵ_{TOT} - Temporal evolution - integrated in [dome-20000]m

Temperature - Temporal evolution on level k=4

LBTplot

LBT AGw Guider /tmp/gcs.sx.guiding.20220212osurc7639.tmp   /tmp/gcs.dx.guiding.20220212osurc7639.tmp

from the GCS telemetry data assuming magnitude zeropoint of 28

positions relative to hotspot (points), reference line (dotted), integrated corrections (dashed)   Xrms= 0.326853   Yrms= 0.290473
0.207435   0.224406