LBT Observing Log: 2025 Dec 22 UT

Observers: Olga Kuhn
Partner Observer: Evan Skillman
Telescope Operator: Josh Williams

Plan:

Forecast looks good.

We will start with LUCI to do flats and 2025plf and 2025pjx
Then switch to PEPSI and try to do some of the remaining programs (there is a deficit until about 23:00).
Then switch to LUCI at ~4am to do 2025adje

Summary:

Conditions were superb - clear skies and seeing stable at ~0.5" on average.

We started with LUCI N30 twilight flats for the UVa_nirjets AO program, but only got the Ks ones. Then we moved on to the OSU_SCAT-LUCI program to attempt 2025plf, but we could not see the source and moved on to PEPSI until 2025pjx got high enough. This one we did see and we obtained the full set of zJ & HK G200 spectra. Unfortunately, the LUCI1 spectra are not in as good focus as they could have been, but the traces are visible and the LUCI2 spectra look great. We ended the night with a third OSU_SCAT target, 2025adje - easy to see and the full set of G210 spectra @ K,H,J were obtained. We ended the night with a set of N3.75 twilight flats for OSU_SCAT - count levels a bit high, but still most were under <~30K.

In between LUCI targets, PEPSI was used to observe targets from OSU_PASTA: TOI6243, TOI963 and K2352, and various targets from the MWAbundDisp, MULTISTAR, BHBinaries programs. See the PEPSI log for details.

PEPSI log: OSURC_PEPSI_Log20241222.txt

Issues:

- Daytime troubleshooting to locate the debris/drop on LBCR did not clean it yet - daytime closed-dome flats confirm it appears in images through all filters and it most likely is on the dewar window.IT 9461

- Found an earlier email exchange regarding the OSU_PASTA program where these questions - about the mismatch in exptimes on blue and red channels and the request for calibrations before, during and after the science integrations were addressed. Resolution then - to set blue/red exptimes to be the same and to take calibrations just once - will be adopted.

BUT - there are a couple of target for which CD1 exptime is over 1 hr, (K2 185, mag 12.235, -4300 sec, 1:11:40 and K2 186, mag 12.143, 5000 sec, 1:23:20) and need to check if giving this same exptime to CD6 would saturate. (No - doesn't look like these 1+hr exptimes will saturate. For TOI 963, mag 11.00, 23-min in CD6 -> ~2000 cnts).

IT9117 "LUCI focus stage may be sticky"

IT7431 "some LUCI images not seen by RTD" - often have to keep "Add"ing images if they are already on the local machine, or syncing the last 5 or 10. Both sides - running as osurc@robs2. Did not add a note - the issue was closed and troubleshooting added, but it is annoying that the latest images are not consistently displayed.

Noise on the AGW8 guide camera. BIn4 does not smooth over it (tried bin3-5 or 6, but no real improvement in values other than the default 4), and it is constantly changing, which affects pepsi profile tracking on faint sources.

06:10UT – IGNORE pepsi(b,r).20251222.008,009.fits — taken on J0602-164/BHBin, but using the CD config & exptimes for the previous target (TIC260056937/Multistar). There was an error popup when I sent this target to the PEPSI@LBT interface. I "ok"ed it and the preset seemed to be fine, but this must have interrupted setting the exposure config/control.

10:35 - Preset hung, possibly related to IT9418

LUCI2 MOS error moving the 1" slit to storage IT6821

Weather:

Looks clear at sunset.

Overview:

LUCI twilight sky flats

for UVa_nirjets_AO AFGL437

00:17 Opening early to try NB twilight N30 flats.

The scripts did not have the N30 Field Stop, and that is used for AO observations to reject stray light. I edited the script to use it, but if this is not desired - the FS corners are not going to match the data perfectly, e.g. - we'll try again with no FS.

Getting NB twilight sky flats is difficult (counts very low) - going straight for the Ks ones right now and we can try the NB in the morning.

Ks - count levels with DIT x NDIT = 20. x 2 are 15000 - 8500. Looks OK so obtaining the set of 5 dithered flats with this setting.
Ks - repeating with DIT x NDIT = 20. x 5. thought it is getting dark and counts are dropping from 9000 -> 2000. Continuing in case the low illumination flats will still be of use.

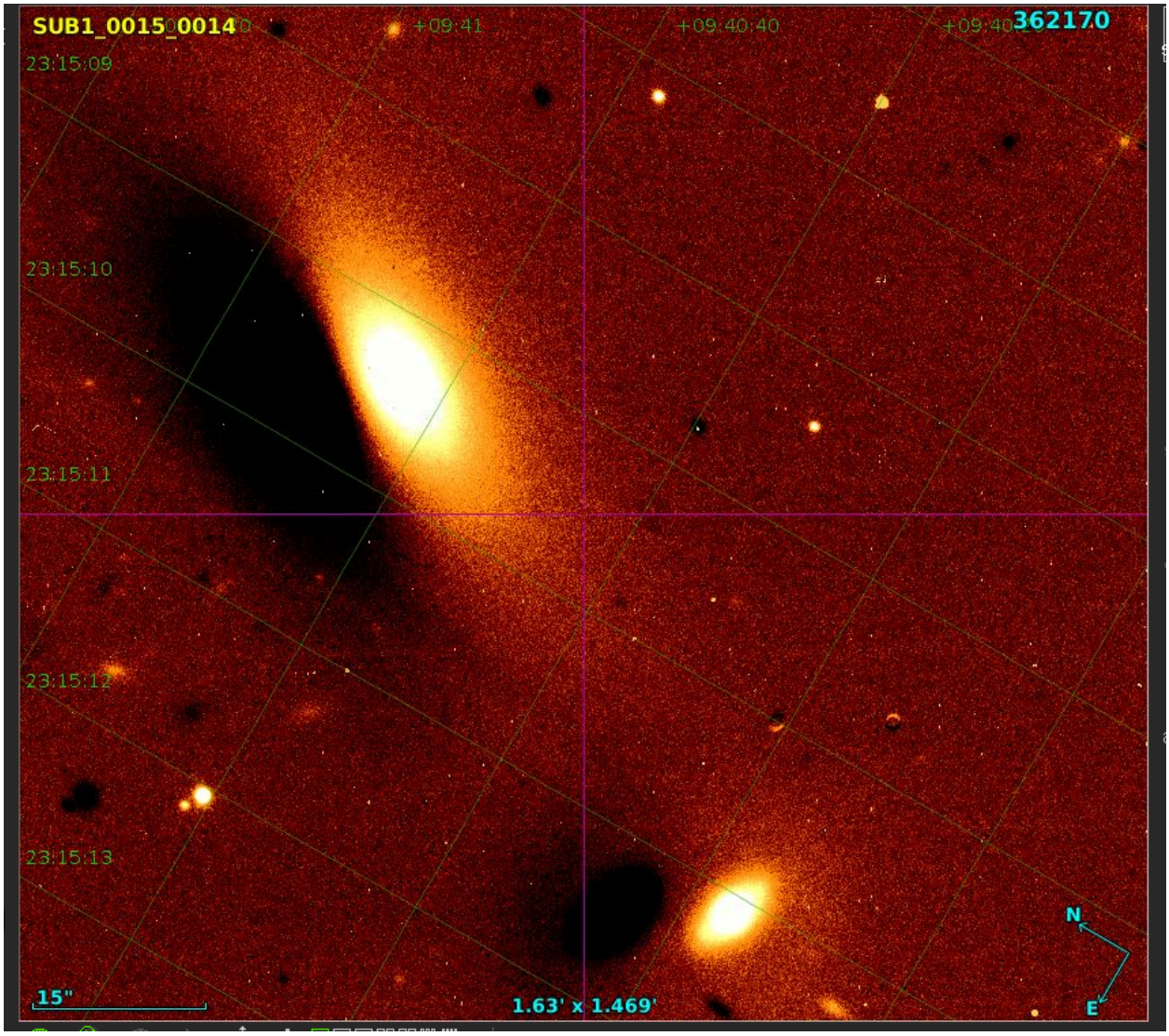
OSU_SCAT-LUCI/ 2025plf

00:54 Josh is pointing/collimating near the first target (2025plf - telluric will follow).

Telluric star is HD222753

01:07 - Slewing to 2025plf FWHM on guide star is ~0.6-0.7"

sky, tgt and slit images are:
L1: 14,15,16
L2: 14,15,16
We cannot identify a clear point source at the position of the target.



01:29 Switch to PEPSI

Josh is pointing/collimating

OSU_BHBinaires/1865106491944805760

2MASS J21062041+3159442
01:50 Slewing to the target.
01:52 Started the exposures
SNR CD3 69, CD5 78 (desired 50)

OSU_BHBinaries/1854840867274889984

2MASS J21173293+3339548

01:57 Slewing - DX side grabbed the wrong star. Josh is checking pointing
02:01 - 2nd try - again. Sending an acquire DX only preset so Josh can paddle it in
02:06 Starting the exposure
SNR CD3 67, CD5 79 (desired 50)

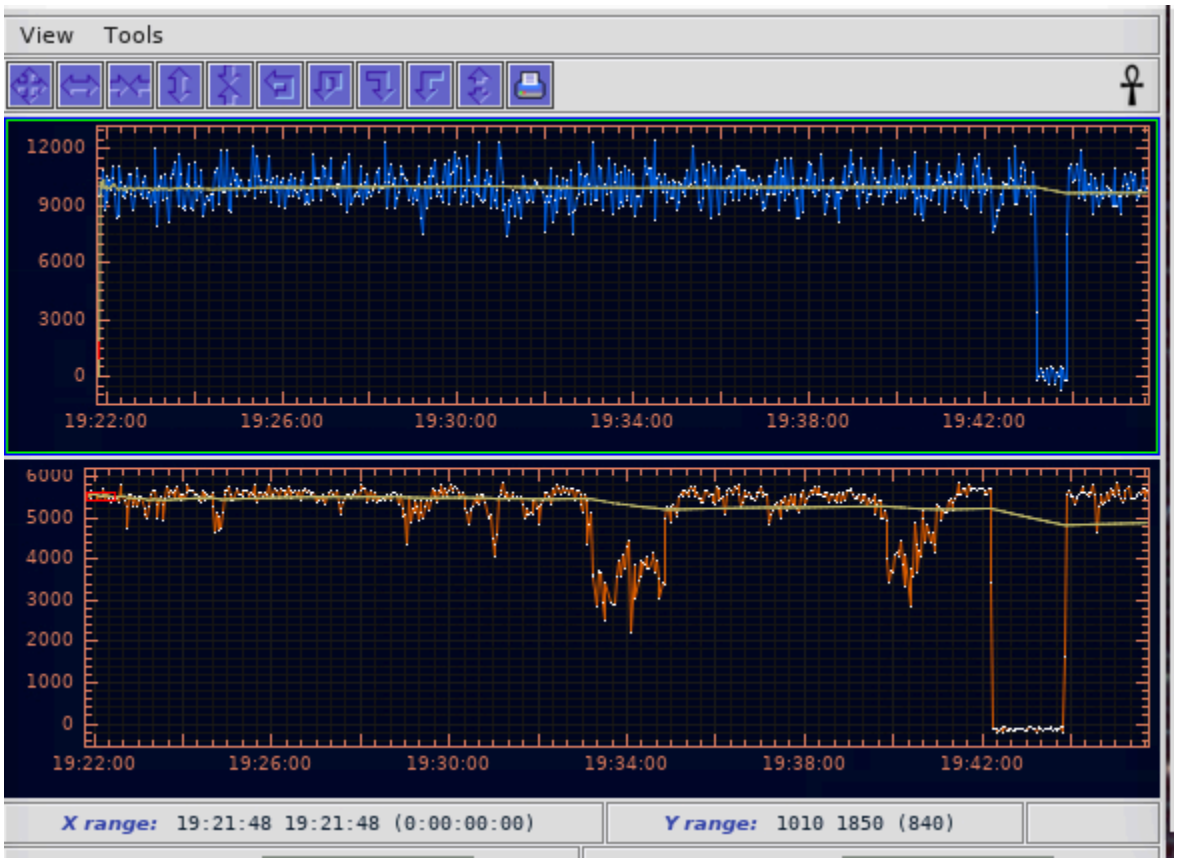
OSU_PASTA/TOI6243

02:14 Slewing - grabbed the wrong star on both sides. Sending a bino acquire preset to allow Josh to paddle the star in.

02:21 Starting the series of exposures:
06:20min SNR CD3 , CD 5
11:35min SNR CD2, CD 4
30-min SNR CD1, CD6

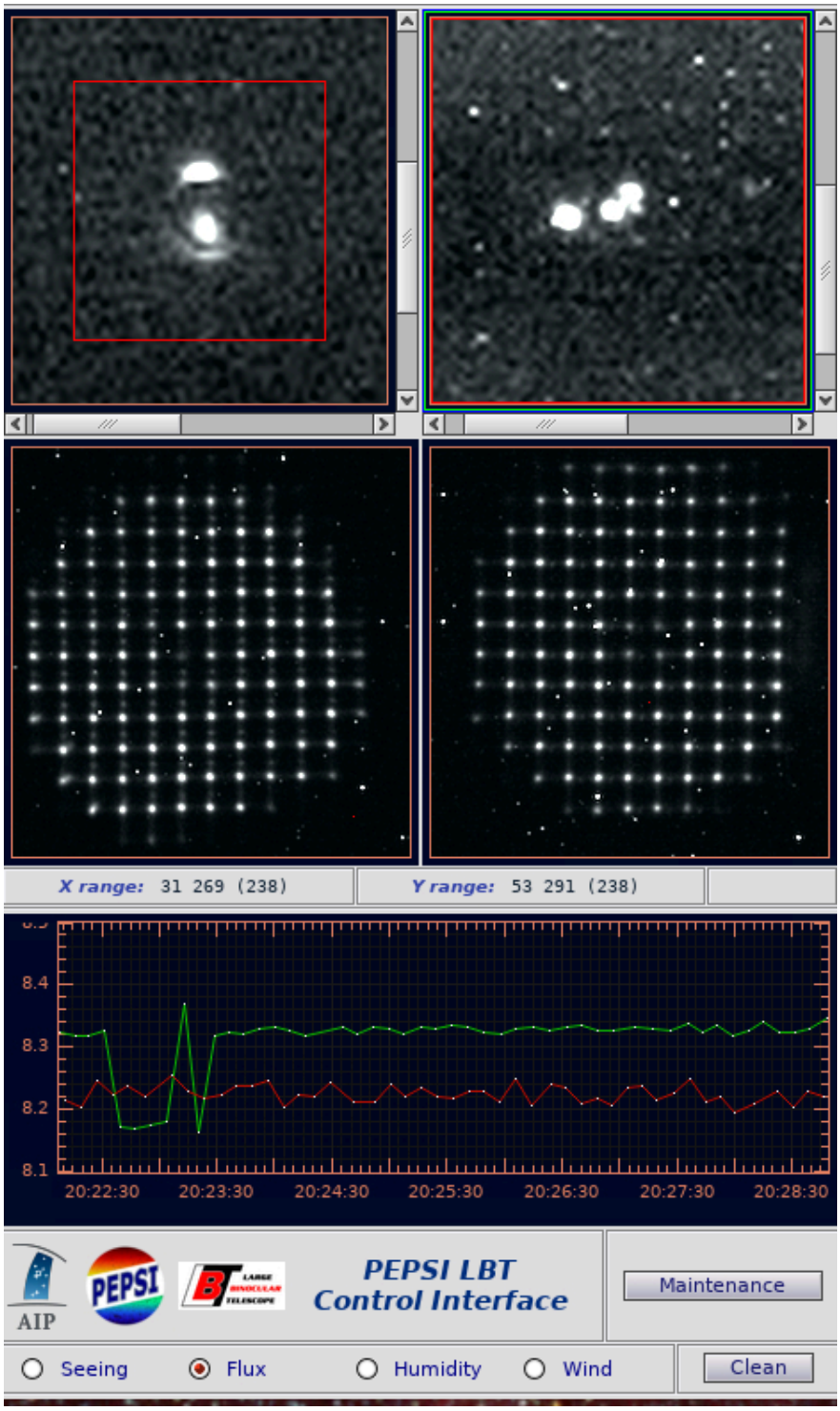
02:43 We're having some trouble keeping the star on the fiber on DX — the background on the guide camera has some structure. Resent the DX preset which has worked, but the plot below shows the flux going into the spectrograph on SX (top) and DX (bottom).

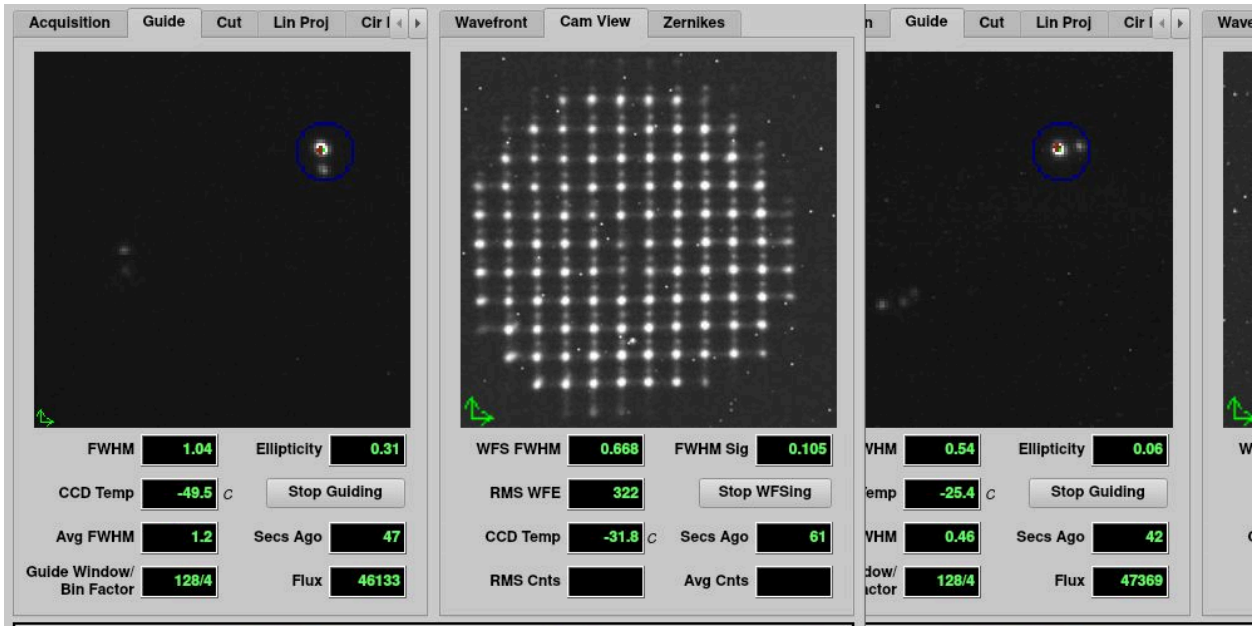
The DX guide camera has a changing background, which is affecting the profile tracker. I ended up turning off the profile tracking on DX but keeping an eye on the photon counter plots (like below).



OSU_BHBinaries/2705338537553104256

03:10 Slewing - The star has a close companion, within 1", and we're struggling to get the DX side to lock onto the brighter star. Fiber diameter is 2.3" -
We'll see if the gcs can hold onto one/brighter target.





We think we are looking at the same target on both sides - fluxes are similar (8.2 vs 8.3).

SNR CD3 90, CD5 142

UVa_MULTISTAR/TIC260056937EB

03:34 Slewing -
03:44 Starting

SNR CD3 143, CD6 148

03:48 Back to LUCI

03:55 Pointing/collimation presets

OSU_SCAT-LUCI/2025pjx

04:04 Slewing to the target.

Acq images are 17(bck), 18(obj) and 19 (slit)

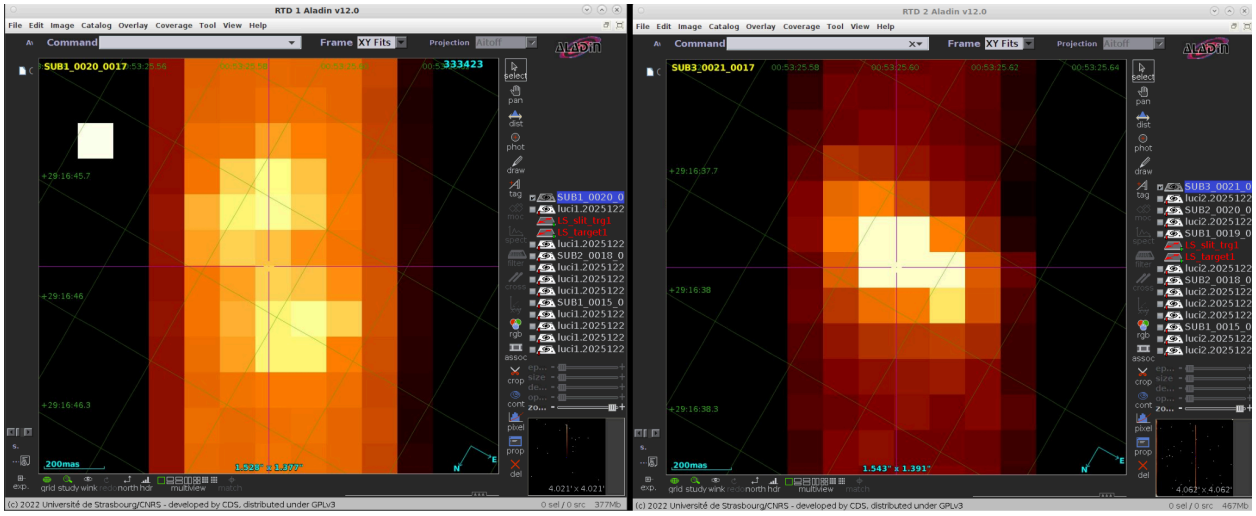
It’s there!!!!

L1 offsets -0.38", -0.01" to put object on slit at Y=1000.63
L2 offsets -1.8635, -0.1226" to put obj on slit at Y=1062.88

L1 acq images look a bit out of focus/collimation - both sky and obj - but we will switch filters for spectroscopy and centroids look good, still. FWHM on the guiders 0.45" both sides.

Tweak L2 by -0.14" -> image 21

L1 - Toggled to z and back to J to check that the detector focus is working - 357 for J. Slit appears in focus, though - just stars. The guide star looks fine. Hmmmm… Taking image 21



Final acquisition images 21-17 on both L1 (left) and L2 (right). FWHM averaged 0.45-0.5 on the guiders.

04:33 Starting the spectroscopic observations. Detector config is DIT x NDIT = 100-sec x 3 in MER mode, savemode = normal, which will write out 3 individual 100-sec spectra per dither position.

Actually, the sky lines do appear to be slightly fuzzier on SX as compared to DX. WIll pause after the first AB pair and reinit detector focus and reset configuration to see if this helps. ALI of this is downstream of the focal plane, so it will not affect the object centering in the slit.

04:45 Reinit detector focus, move from zJspec to z and then back to zJspec. Resume script.

Can follow the troubleshooting in IT9117 "LUCI focus stage may be sticky" to move focus stage to positive and negative limits while we are observing with PEPSI. Reinitializing the detector focus stage might have done this to some extent, but I didn't check that it was touching both limits.

After the script completed, I ran the LUCI1 det focus stage to +700 (pos limit did NOT come on), -700 (neg limit did NOT come on), then repeated. This time at +700, the pos limit did come on, and at -700, the neg limit did come on. One more repeat which also touched the limits. Seems promising now.

L1 & L2 zJ: 22-33
L1 & L2 HK: 34-45

Telluric star HD9711

05:28 acquiring telluric

L1 is in focus now.

L1 46 (obj), 47 (slit), 48 (through-slit)
L2 46, 47, 48 (same)

05:36 Starting spectroscopic observations.

L1 & L2 zJ: 49-52
L1 & L2 HK: 53-56

05:44UT Switching back to PEPSI:

OSU_BHBinaries/2991347071288585472

(2MJ06024026-1646042)
06:10 Starting integration
SNR CD 3 & 6… no… we are executing the wrong script, the one for TIC260056937

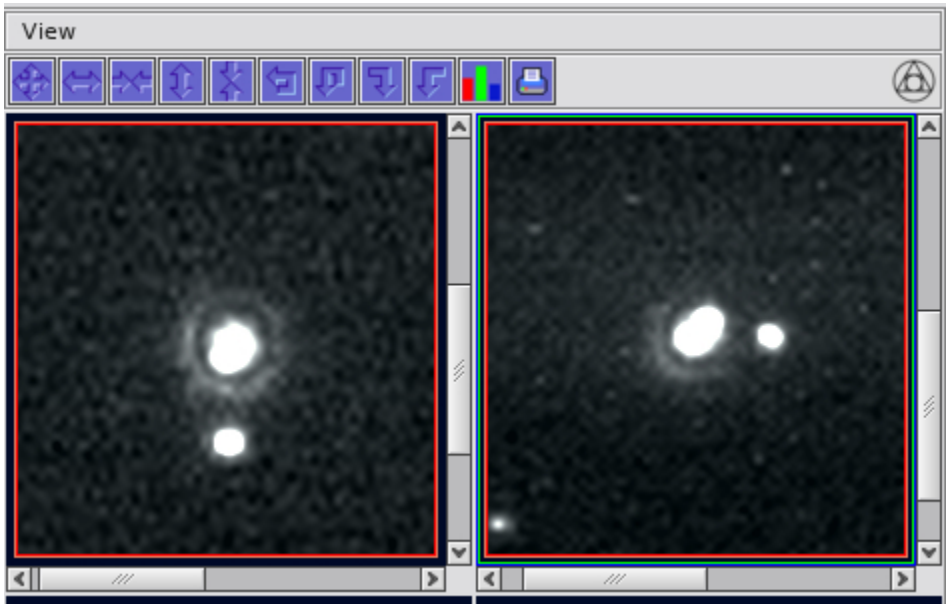
IGNORE pepsi(b,r).20251222.008,009.fits — taken on J0602-164, but using the CD config & exptimes for the previous target (TIC260056937/Multistar). There was an error popup when I sent this target to the PEPSI@LBT interface. I "ok"ed it and the preset seemed to be fine, but this must have interrupted setting the exposure config/control.

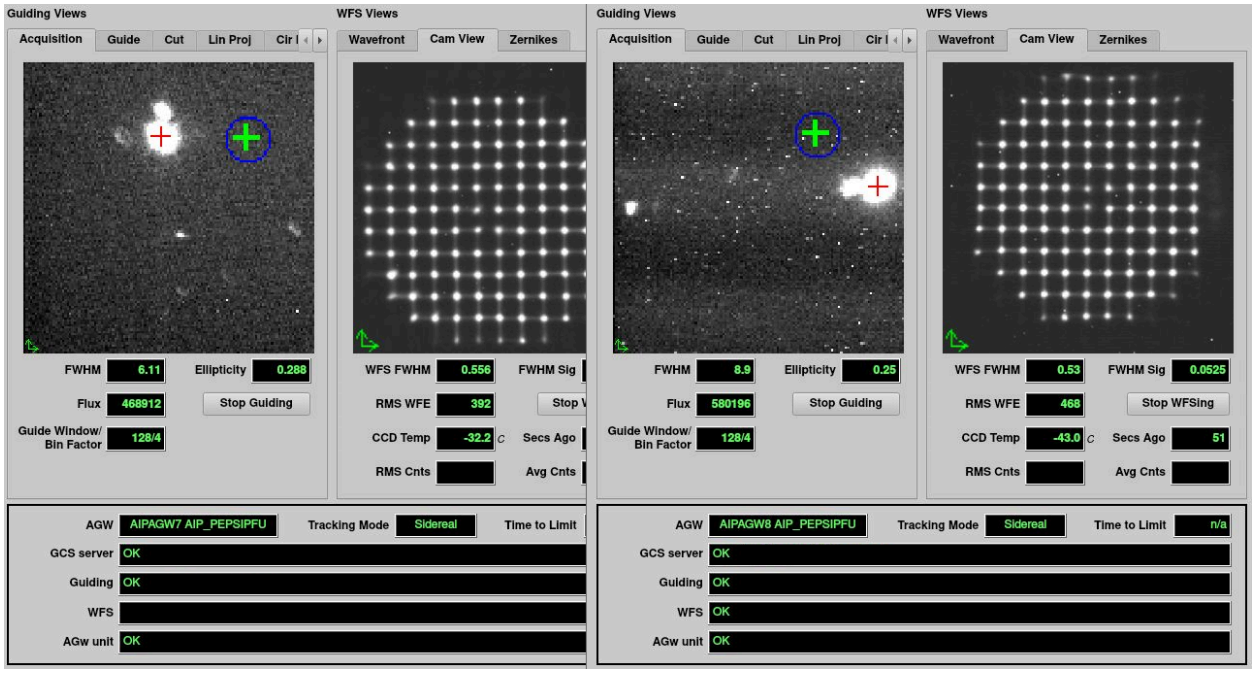
06:17 Starting integration, this time CDs 3 & 5 with 08:20 exptime and correct header.
SNR CD3 92, CD5 158

UVa_MULTISTAR/TIC317863971EB

06:32 Starting

Another one with a close companion - the guider and back-reflected images for comparison with the earlier one - confirming we had the same source on both sides earlier.





SNR CD3 147, CD6 115

Note that the DX photon counter is showing -100 counts, but intensity of SX and DX traces look similar, so DX light was going into the fiber. Next target, again the DX photon counter is down at -100 - something happened to it.

OSU_MWAbundDisp/2MJ0838+2255

06:41 starting exposures
SNR CD 2 209, CD4 405

OSU_PASTA/TOI963

06:53 Starting exposures
06:59 - restarting, now using FWHM 32/39 to avoid the companion throwing off the profile tracker.
23-min yielded only 2000 counts in CD6 for this 11.00 star. (got one extra CD6 spectrum because of a script error I made - stopped it after 8:47 and readout)

SNR CD1 146, CD6 462
SNR CD2 145, CD4 230
SNR CD3 148,CD5 191

OSU_PASTA/K2352

07:46 Slewing
07:48 Starting

SNR CD 3 161, CD5 204
SNR CD 2 154, CD4 242
SNR CD 1 142, CD 6 459 (<~2000 counts max)

OSU_BHBinaries/7130810549457492 48

(2MJ08495568+3305299)
08:37 Starting
SNR CD 3 61, CD 5 96

OSU_BHBinaries/6949267092219714 56

(2MJ09194909+2719371)
08:46 Starting
SNR CD3 67, CD5 78

OSU_BHBinaries/5749580600696679680

(2MJ08563980-0945453)
Pointing check needed - missed on both sides.
09:00 Slewing
09:04 Starting
SNR CD3 65 CD5 71

OSU_BHBinaries/57276219490389772 80

(2MJ08120279-1213014)
09:16 Starting
SNR CD3 64 , CD5 76 (desired 50)

OSU_BHBinaries/57268167972888048 64

(2MJ08160501-1227385)
09:28 starting
SNR CD3 68, CD5 84 (desired 50)

OSU_BHBinaries/57266865051625271 04

(2MJ08103927-1320427)

SNR CD3 67, CD5 61

OSU_BHBinaries/57273186212678720 00

(2MJ08201568-1148453)
09:38 start
SNR CD3 71 CD5 76

09:43 — FWHM on the guiders has been consistently ~0.5". Currently 0.41/0.44" on DX/SX

OSU_BHBinaries/83238462926857958 4

(2MJ10474905+4815166)
Pointing check needed - missed the star on the right.
09:53 Slewing
09:57 Starting
SNR CD3 105, CD5 137

OSU_MWAbundDisp/2MJ1013+0135

10:06 starting
SNR CD2 224, CD4 419

OSU_MWAbundDisp/2MJ1120+0645

10:11 slewing
10:15 starting
SNR CD2 235 , CD4 428

OSU_BHBinaries/8632926226802133 76

(2MJ09570138-0121316)
10:23 starting
SNR CD3 110, CD5 136

OSU_BHBinaries/39731690403064999 68

(2MJ11435197+1709292)
10:26 FWHM on guiders 0.4/0.5"
SNR CD3 69, CD5 79

OSU_BHBinaries/39928967141544501 76

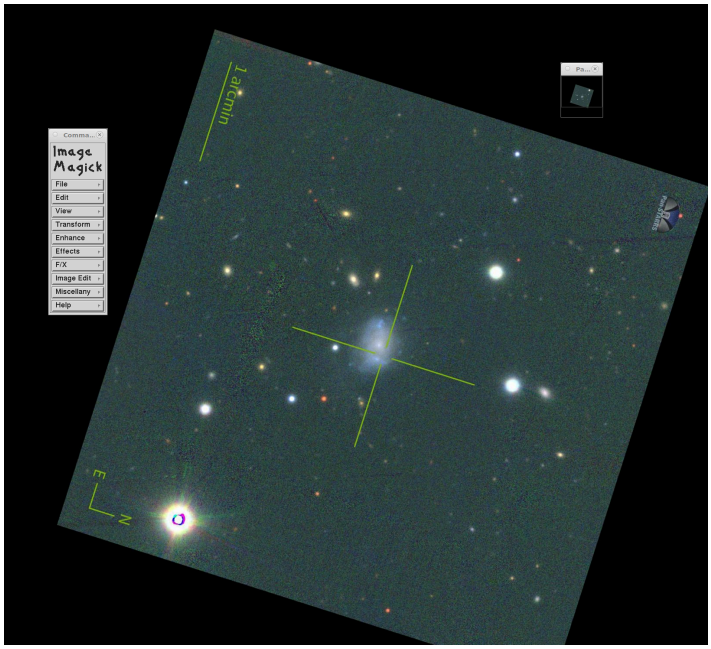
(2MJ11261825+2351553)
10:36 slewing - seems to be taking a long time. A hung preset, like IT9418
10:45 starting integrations
SNR CD3 106, CD5 151

11:00 Starting PEPSI calibrations -
11:00 OSU_PASTA

10:58 Switching back to LUCI

OSU_SCAT-LUCI/2025adje

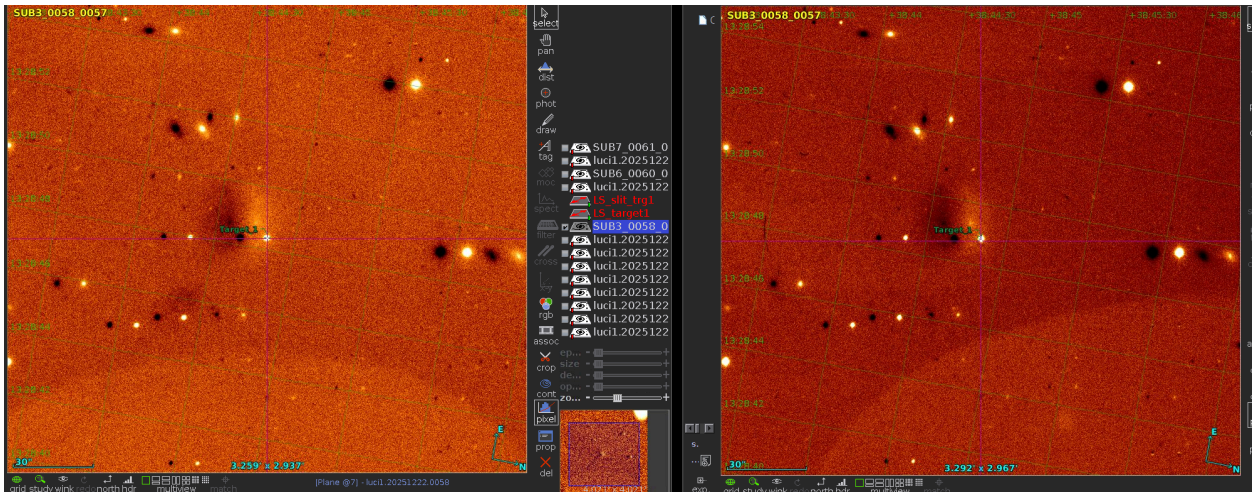
11:05 Josh is pointing/collimating



11:15 Acquiring:

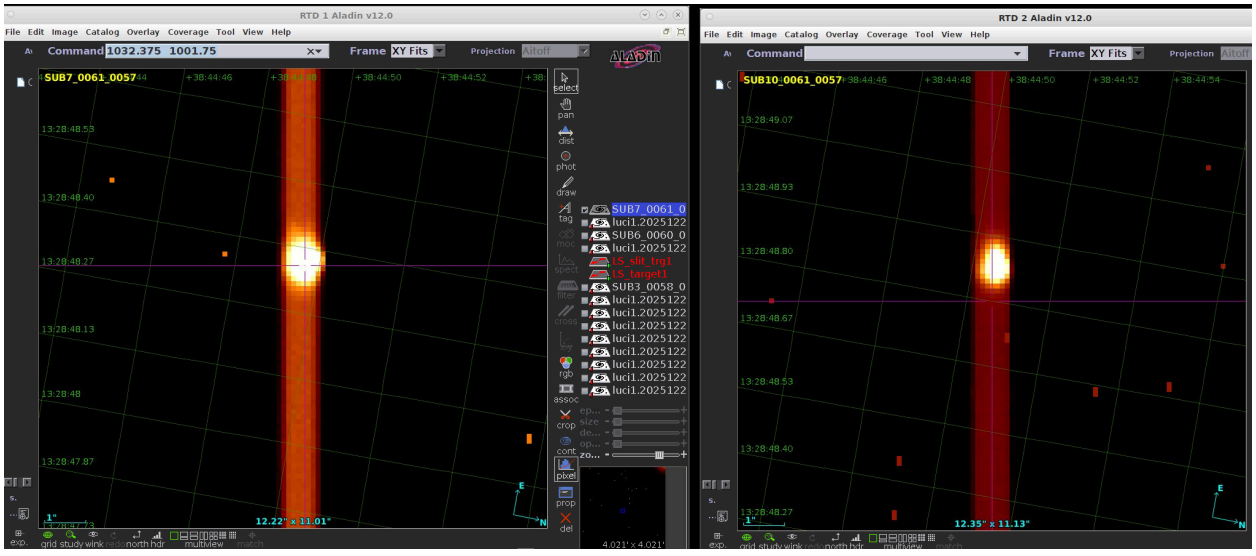
L1 and L2: 57 (bkgd), 58 (obj), 59 (slit)

This was easy to find! Offsets needed (dx,dy) to put the target on the slit: L1 (0.0412", -0.0895") and L2: (-1.3899", -0.0809")



tweaking centering based on thru-slit images 60: L1 60 dx = +0.06" and L2 60 dx = +0.12"

61: looks well centered



Starting the spectroscopy:
L1 & L2 G210+J 62-73
L1 & L2 G210+H 74-85
L1 & L2 G210+K 86-97

Spectra on L1 still look a bit softer than L2, but much better than before.
FWHM on SX/DX now 0.77/0.65"
Telluric star = HD116405:
Spectroscopic obs of telluric:
L1 & L2 G210+J 101-104
L1 & L2 G210+H 105-108
L1 & L2 G210+K 109-112

13:01 Switching back to PEPSI!

OSU_MWAbundDisp/2mJ1231+3353

13:19 Slewing
13:21 Starting
SNR CD2 262, CD4 481

13:35 Switching back to LUCI

Calibrations

Twilight K band sky flats for OSU_SCAT

LUCI2 MOS error putting the 1" slit back to storage. Dave came online to help us recover, and we just managed to get 1-2 K flats on each side with ~20K counts.

14:00 5 K-band twilight flats per side with count levels 20-32K.
L1 : 115-119
L2 : 114-118

14:05 Closing up

Calibrations

LUCI G200 zJ+HK spectroscopic cals for OSU_SCAT

Needed to create fraternal 1" zJ and HK flats (just dropped them in from the library)

14:24 G200 zJ 1" slit
L1: 120-137, L2: 119-136

14:43 G200 HK 1" slit
L1: 138-155, L2: 137-154