

# LBT Observing Log: 2025 Dec 21 UT

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

## Plan:

Daytime troubleshooting resolved the issue with the DX AO WFS (IT 9460: OCAM Cooling State Error)

Conditions at sunset - clouds coming from the NW - are not suitable for LBC sky flats. The LUCI AO will be attempted, but if clouds are too variable or thick, then PEPSI.

## Summary:

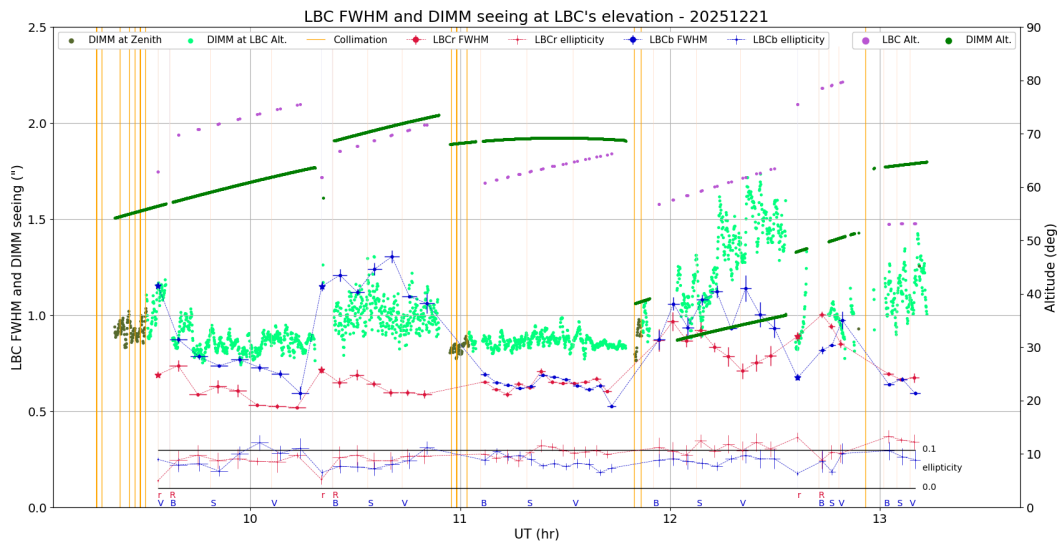
Clouds at sunset held up opening until 1:10 hr after sunset, but then it was clear enough to attempt the UVa\_nirjets program AFGL437\_AO, though seeing was  $>1''$  (sometimes varying up to 1.5-1.8"), but trending down during the observation (included LBTplot of guide FWHM for that observation). The AO ref star magnitude, as seen by the AO WFS, was lower than the Gaia Rp, but still in Bin 3 and FWHM  $\sim 0.2''$ .

After that, we switched to PEPSI. A combination of few targets and questions on OSU\_PASTA led to some downtime, but after that went through a number of targets until seeing seemed to be good and stable enough to observe OSU\_monitor targets. Seeing and LBC IQ was very good for these (see below plot). OSU\_monitor targets: NGC2093, NGC3344, NGC3627, NGC4826, NGC4214 and NGC4236 were observed.

We ended with LBC twilight sky flats in LBCB/V-BESSEL and LBCR/R-BESSEL (at 2 PAs) and V-BESSEL (one PA).

PEPSI log: [OSURC PEPSI Log20251221.txt](#)

LBC IQ plot (below): [http://people.lbto.org/~cveillet/dms/lbcIQ\\_raw\\_20251221.png](http://people.lbto.org/~cveillet/dms/lbcIQ_raw_20251221.png)



## Issues:

[IT 9460](#) Cooling State Error for the DX WFS OCAM resolved.

\* Some questions about the OSU\_PASTA program - mismatched blue/red exptimes - that need to be resolved.

\* [IT 9461](#) Unfortunately, there was some debris/drop that appeared tonight on LBCR. It was not there yesterday and is in flats taken with two different filters. Flats were obtained for the data taken and the ISP will have a look this morning.

\* Attempted LBCR/V-Bessel flats for INAF, but because of this debris, these will need to be repeated.

## Weather:

Clouds coming from the NNW at sunset. NWS predicts cloud coverage up to 48/49% from ~9pm-midnight, then dropping to 12% at sunrise.

Contrary to the forecast, cloud cover did not increase towards midnight, and seeing in the 2nd half was very good.

## Overview:

### UVa\_nirjets\_AO AFGL437 (01:42-02:58)

00:22 Deciding to try the LUCI AO program on AFGL437. Reconfiguring to LUCI (we were at the LBCs to get sky flats, but cirrus is passing through). Configuring for N30 and N30 FS.

LUCI 1 failed to move to the N30 camera. +20 steps from MCU succeeded in activating the switches, init from IMGUI - all set.

00:41 Clouds are starting to come in - holding off on opening. The LUCI AO target transits at 04:30UT so we'll hold with LUCI.

00:52 Aligned the N30 FS on both LUCIs and put blind filters back in.

01:32 Open, Josh sending a pointing preset.



01:38 Collimation preset... seeing about 1.0-1.1" on the guiders.

01:42 Sending the script - UVa\_nirjets\_AO/AFGL437\_AO\_image.xml

Doug sees the AO ref star... WFS sees 15.7/16.2 — arrived at the AO system as 12.65 (catalog mag + offset), but WFS sees 15.7/16.2 magnitude. Doug asked me to edit the script to send AO ref magnitude 15.5.

cp AFGL437\_AO\_image.xml AFGL437\_AO\_image\_edit.xml  
and edit AFGL437\_AO\_image\_edit.xml to change 12.65 to 15.5 on both sides.

01:50 Resent - WFS sees 15.5 on DX and 16.2 on SX  
Bin3 358Hz on DX and Bin3 272Hz on SX.

Turning on optimize gain. OK on both sides.

01:56 LUCI taking images!

UT	seeingDIMM	L1	filter	L2	L2
01:56	1.65"(zen)	16-26	Ks	8-18	Ks
02:22	1.55"	27-48	BrG	19-40	H2

L1 19 13x18 pixels 0.015"/pix -> 0.195" x 0.27"

During L1 20 (start at 02:03:15UT) the SX loop opened. Paused both sides while we recover (next item is offset).

Doug notes tip-tilt gains were low - there may be some residual tip-tilt (elongation) in initial images, up to L1 20 and L2 12.

02:07 Resuming script at L1 21 and L2 13.

L1 22: 12.55 x 15.07 pixels

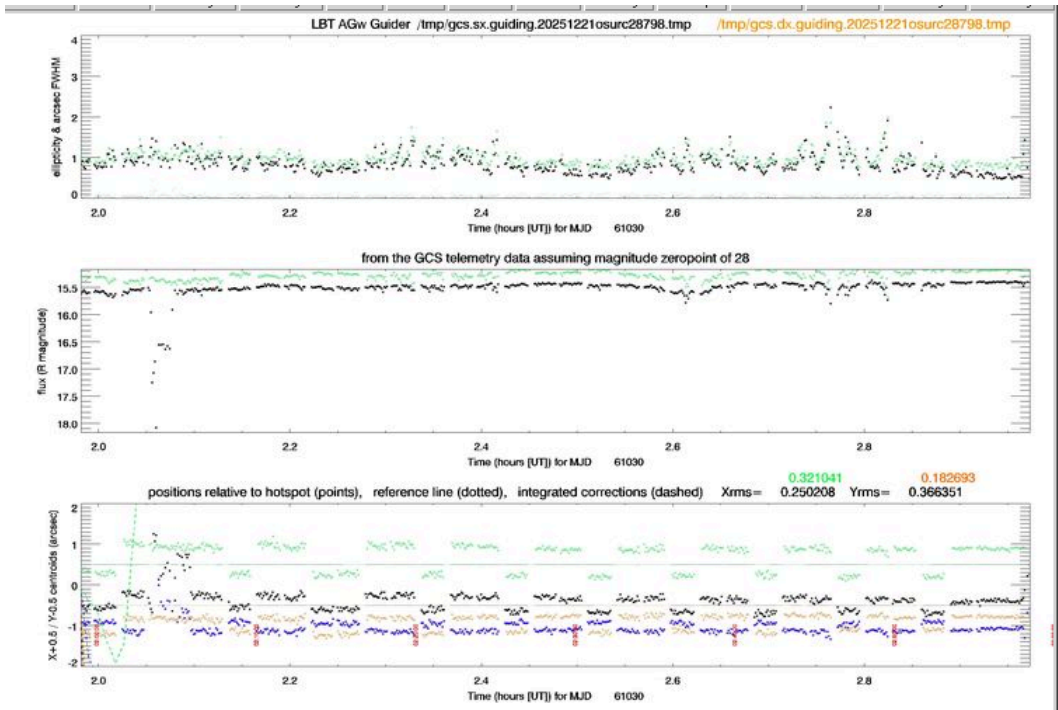
L2 15: 14.55 x 11.89 pixels

02:14UT DIMM seeing (zen) 1.44"

L1 33 BrG: 13.87 x 14.25 and 15.11 x 13.57 pix

L2 25 H2: 10.78 x 14.14 and 10.59 x 12.96 pix

02:30UT WFS now sees 15.2/15.8 on DX/SX - less clouds and DIMM seeing now 0.86"



SX - black, DX - green. SX signal drop corresponds to the period during which the loop opened, and Doug had to reacquire/reclose SX loop.

02:42 DIMM seeing 1.45"

02:58 Done. DIMM seeing 1.16"

## Reconfiguring to PEPSI

OSU\_PASTA/TOI963

(check to see if it is too early to start this one - the OB needs to be created. Blue channel req 1400s while Red just 200 sec)

03:15 Pointing preset.

SX PFU - Displacement, Cartesian FWHM, Flux plots are not populating. SX CrossProfile and all 4 DX PFU plots are fine. Clicked "Clean", now it seems to be OK.

OSU\_BHBinaries/ 2758093311612997248

2MASS J23404656+0827063

03:25UT Preset to target.

03:28UT start

SNR: CD3 99, CD5 129

UVa\_Multistar/ TIC 470710327

03:40UT preset

03:42UT start

SNR: CD3 126, CD6 140

OSU\_BHBinaries/2847197557833077504

J00011343+2156114

03:48UT preset

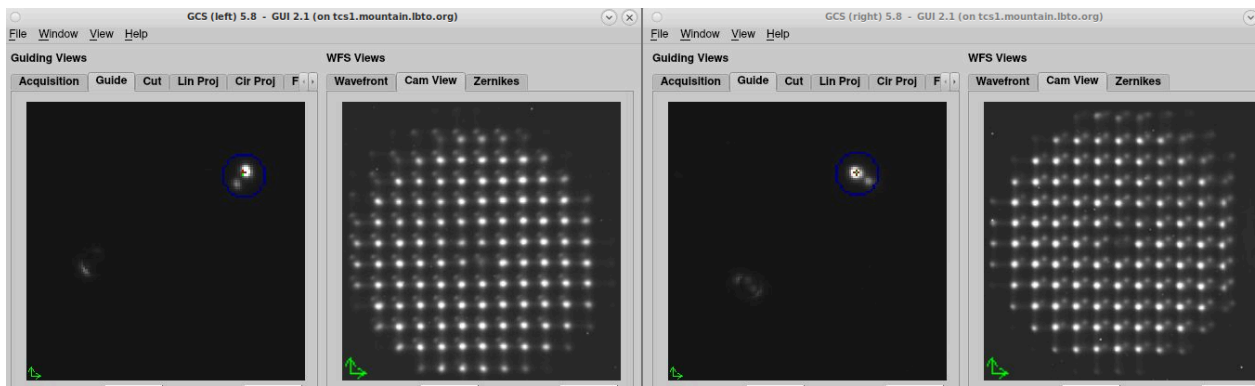
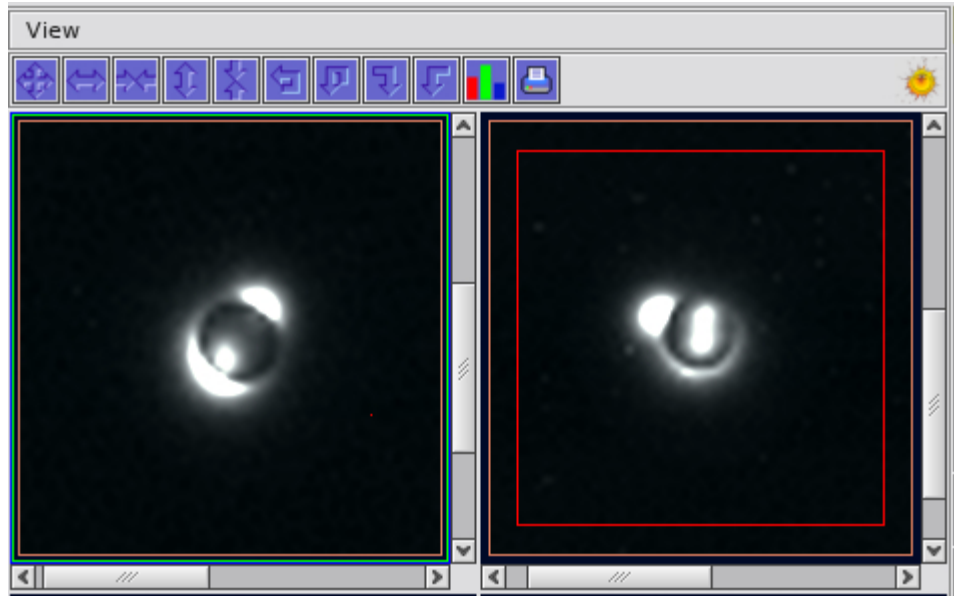
03:52 Start

SNR CD3 92, CD 5 121

UVa\_Multistar/TIC286470992EB

04:03UT preset

Looks like this star has a companion:



SNR: CD3 131, CD6 193

UVa\_Multistar/TIC454140642EB

04:16UT Start

SNR CD3 155, CD6 189

OSU\_BHBinaries/300726119643476992

Missed the object on the right side. Josh is checking pointing

04:30 UT starting

SNR CD3 113, CD5 150

OSU\_BHBinaries/4881898083356692480

too low right now

Scheduling tool showed it 1 hour into the green observable band,

but it was, in fact, too low.

### UVa\_Multistar/HIP 20910RV

05:10 Preset - pointing check needed

05:19 Started

SNR CD3 394, CD6 480

### OSU\_BHBinaries/4881898083356692480

2MASS J04520744-2448231

05:22 Slewing - DX star not found

05:30 Presetting again.

Desired SNR 50

SNR CD3 61 CD5 77 (note: PEPSI SW now auto-computes SNR... human measurement is a bit less optimistic - this log entry was overwritten with my measurement, some previous were not)

### OSU\_BHBinaries/31355441772809839936

2MASS J07362055+0254421

05:47 starting

SNR CD3 50, CD5 47 - goal was 50

### OSU\_BHBinaries/3088519473708379264

2MASS J07510507+0207231

05:56 Starting

SNR CD3 53, CD5 62

### OSU\_MWAbundDisp/2MJ0716-0448

06:03 Slewing

06:05 Starting

SNR CD2 216, CD4 440 (goal 100)

### OSU\_MWAbundDisp/2MJ0808+4605

06:12 Presetting -

06:15 Starting

SNR CD2 184, CD4 376

### OSU\_BHBinaries/1098324086498919552

2MASS J08073604+6945544

06:27 Presetting

06:29 Starting

~~OSU\_BHBinaries/2991347071288585472~~

=2MASS 206024026-1646042 — SKIPPED: the readme notes that this target should only be observed on 2025-12-19 (it is a long period binary and they aim to fill in phases that have not been observed yet).

OSU\_MWAbundDisp/2MJ0806+1838

06:45 Starting

SNR CD2 263, CD4 507

OSU\_PASTA

The csv file has a different target name for each CD pair, TIC...156, 157 and 158, but all have the same coordinates. This is different from the other targets in the csv, where the same target name appears for all CDs. We'll observe all pairs with the same target name, TIC7152156.

The blue/red exptimes were not matched. I increased Nexpt to 7 1-min exposures for CD6, to match the 7-min exptime for CD1, but the others were so short I left the mismatch.

OSU\_PASTA/TIC71582156

06:55 starting

SNR CD1 150 , CD6 180

OSU\_PASTA/TIC71582157

SNR CD2 160, CD4 196

OSU\_PASTA/TIC71582158

SNR CD3 163 , CD5 206

OSU\_MWAbundDisp/2MJ0838+2253

07:15 Starting

SNR CD2 212, CD4 404

OSU\_MWAbundDisp/2MJ0826+2007

07:23 Starting

SNR CD2 206, CD4 400

### OSU\_MWAbundDisp/2MJ0840+5542

07:29 Slewing — seeing 0.8-0.6". Seeing has been subarc much of the time while on PEPSI, but some excursions to 1.2-1.4"

07:32 Starting

SNR CD2 139 , CD4 337

### OSU\_MWAbundDisp/2MJ0852+2531

07:44 Slewing

07:48 Starting

Seeing now 1.3, 1.24" on guiders and DIMM 1.68"

SNR CD2 182, CD4 335

### ~~OSU\_MWAbundDisp/2MJ0854+5547~~

SKIPPING - lower priority and considering switch to LBC (if seeing is not going downhill)

### OSU\_MWAbundDisp/2MJ0920+0536

08:03 Slewing

SNR CD2 161, CD4 324

### OSU\_MWAbundDisp/2MJ0854+5547

Seeing varying and trending up ~1.5 (1.2-1.8" on the guider) - sticking with PEPSI a while longer

08:17 Starting

SNR CD2 197, CD4 376

### OSU\_BHBinaries/5721905003970002688

2MASS J08255161-1622474

08:24 Slewing

08:27 Starting

SNR CD3 113, CD5 237

### OSU\_BHBinaries/2921191705389412480

2MASS J07035867-2523253

Seeing here is ~0.9" on the guiders

SNR CD3 68 ,CD5 90 (desired 50)

### OSU\_BHBinaries/3135544177280983936

2MASS J07362055+0254421

SNR CD3 64, CD5 63

Seeing on guiders is now ~0.6" and DIMM, cyclope indicate it is trending down. Skipping the next two queued-up targets to switch to the LBCs.

~~OSU\_BHBinaries/713081054945749248~~  
~~2MASS J08495568+3305299~~

~~OSU\_BHBinaries/832384629268579584~~  
~~2MASS J10474905+4815166~~

## Reconfiguring to LBCs

09:01 Starting PEPSI calibrations (for BHBin config)

10:26 For OSU\_PASTA configurations (all CDs)

12:06 For UVa\_Multistar configurations (overlapping, I think with the ones previously taken).

12:45 For MWAbund (CDs 2 & 4)

09:00 Turned on TMS lasers

Hung at "Registration failed" when running "tms\_loop". Needed to reset the TMS sync service.  
OK now, but didn't

Running dohybrid... no, not yet - we were sitting at zenith because I forgot to connect.  
Connected, now we slewed to target.

## OSU\_monitor/NGC2093

09:20 dohybrid - the initial pupil images were in-focus. Lots of z4 needed, -17000 nm on, on both sides.

Set TMS reference.

09:32 Starting tms\_loop and taking copointing images

09:35 Starting science OB

[http://people.lbto.org/~cveillet/dms/lbcIQ\\_raw\\_20251221.png](http://people.lbto.org/~cveillet/dms/lbcIQ_raw_20251221.png)

First pair have IQ ~ 0.8/0.7" . There may be a dust donut on the lower right of LBCR Chip 2.  
R-Bessell flats were in the plan for morning twilight.

(B 100557 - some field-dep aberration?)

## OSU\_monitor/NGC3344

10:19 Slewing

Copointed

1st pair: LBCB ~ 4.5-5 pix FWHM, but LBCR ~2.7 pix. Looks like LBCB collimation may be going soft.

## OSU\_monitor/NGC3627

Ran dofpa - needed 2 iterations. Largest net change on blue was z8

11:01 Copointing - IQ looks improved.

11:05 Starting science

FWHM  $\sim$  3 pix in LBCB, LBCR

## OSU\_monitor/NGC4826

Copointed

11:54 Starting science

The first LBCR image 115503 has a small jump.

IQ remains very good, though not quite like before - stars have FWHM 3.5-3.8 pix.

*DMS plot of ALTA+cyclope stopped plotting cyclope around 8UT, though datastream in telemetry is complete.*

B 121544 & 121953 have satellite trail

## OSU\_monitor/NGC 4214

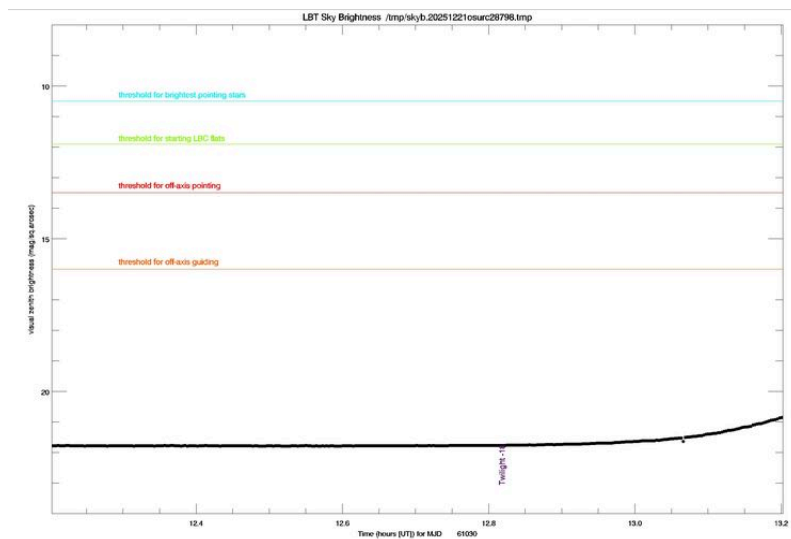
12:39 Starting science. IQ  $\sim$  4.2 pix on the images - lots of extended objects.

12:50 astronomical twilight

## OSU\_monitor/NGC4236

Try to squeeze it in before the sky gets bright -

13:12UT The integrations ended. IQ looks good.



# LBC Calibrations

## twilight sky flats

Blank field 10:42 +58

V-Bessel/R-Bessel

13:28 starting with 6-sec: 6000 cnts - 10K

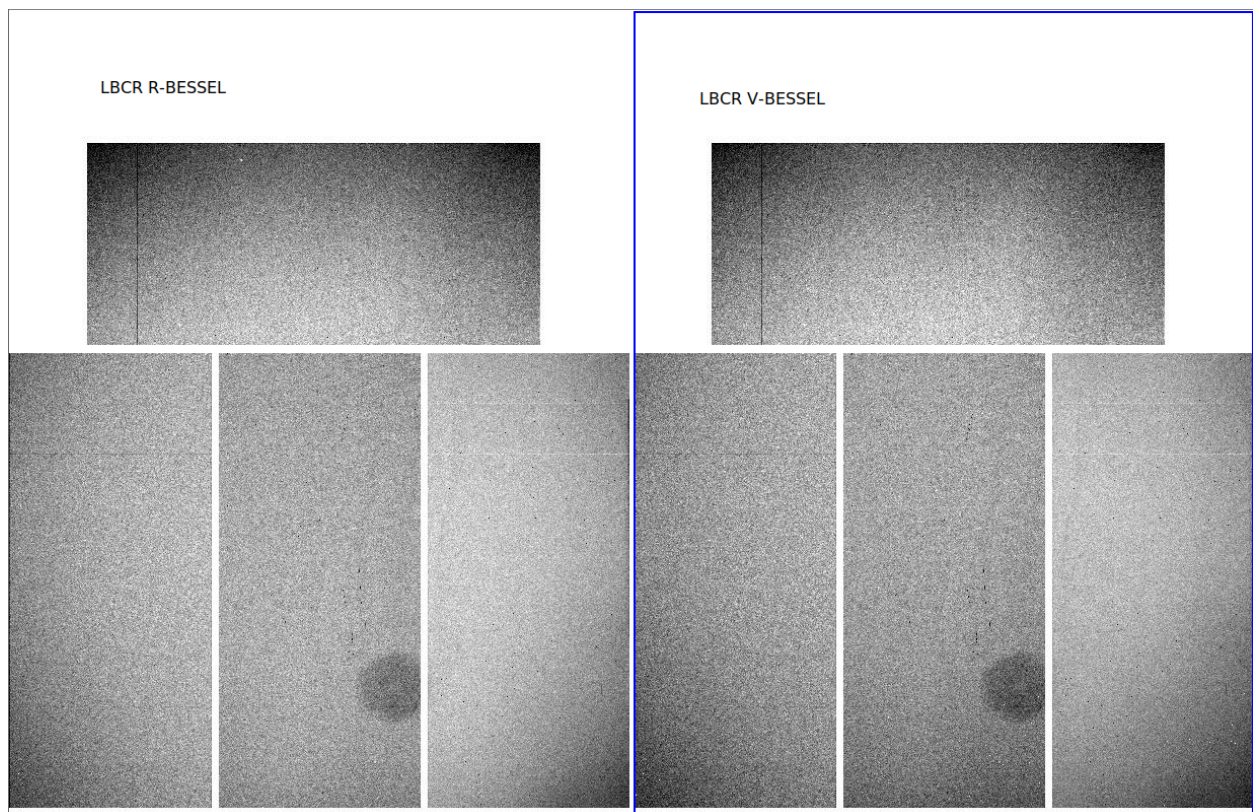
13:34 Repeat with 4-sec: B ~ 8-15K, R ~10-17K

13:38 Rotate to PA180, test 1sec -> 6-7K

13:40 PA180, 1.5-sec: 14K-27K

13:45 Now V+V (Red/V for INAF) @ PA180 – the dark spot on chip2 is in both R and V flats - maybe it is on the dewar window.

13:50 - Try V+V at PA0 and 0.5-sec, but ... I think we've run out of twilight - got a few LBCR/V-BESSEL, but LBCB/V-BESSEL were too high (B/V and R/V throughputs are pretty different).



13:59 Josh is closing up.

## LBC Biases

14:27 A series of 50 LBCB/LBCR biases started.