

LBT Observing Log: 2026 May 09 UT

Observers: Jenny Power
Partner Observer: Chick Woodward
Telescope Operator: Steve Allanson
Special Guests: Ilya Ilyin

Plan:

Io (PEPSI) and a few other Pepsi programs if the seeing is ok try some LBC

Summary:

PEPSI

UM_IoEclipse - Woodward

LBCs

OSU-MONITOR

NGC 3489

I2574

NGC6503

NGC5194

NGC4395

NGC4605

NGC4449

PEPSI

OSU-PANTERA 140743666658919296

OSU-PANTERA 1349677912103573888

OSU-PANTERA 1817438775924874496

UVa_metalpoor

First RV HIP91659

Science 4493353965706833152

Science 4459578964095181440

Science 1317627491751206016

Science 1767214390437753600

Science 4595163592775849088

Science 4531964557774517248

PEPSI log:

https://drive.google.com/file/d/1GYxtyORbRXlelBdQ3u-NvFA7gcbVVgk_/view?usp=sharing

LBC skyflats:

<https://scienceops.lbtto.org/lbc/calibrations/twilight-sky-flats/>

Skyflats in all filters have been taken recently.

LBCB Flats:

- [B-Bessel](#) - 20260418
- [USpec](#) - 20260416
- [V-Bessel](#) - 20260416

LBCR Flats

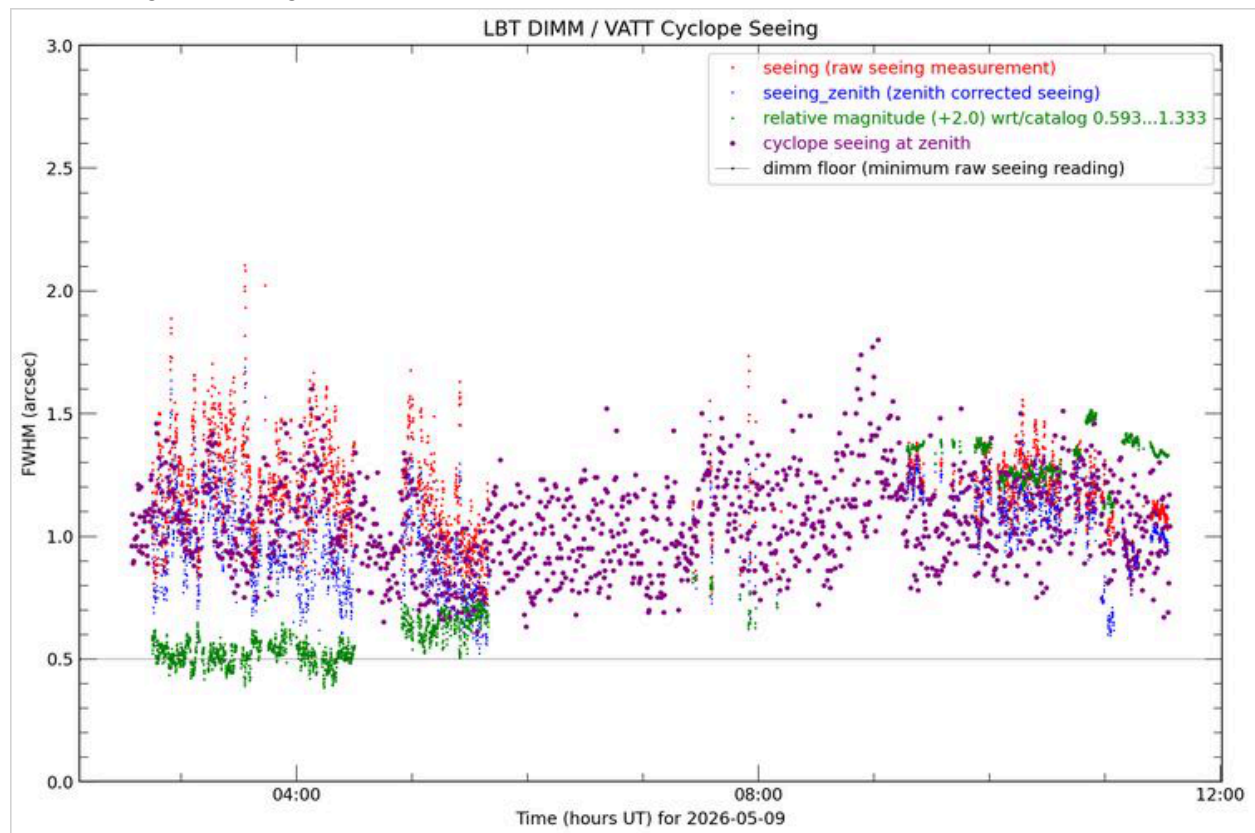
- [R-Bessel](#) -20260418

Issues:

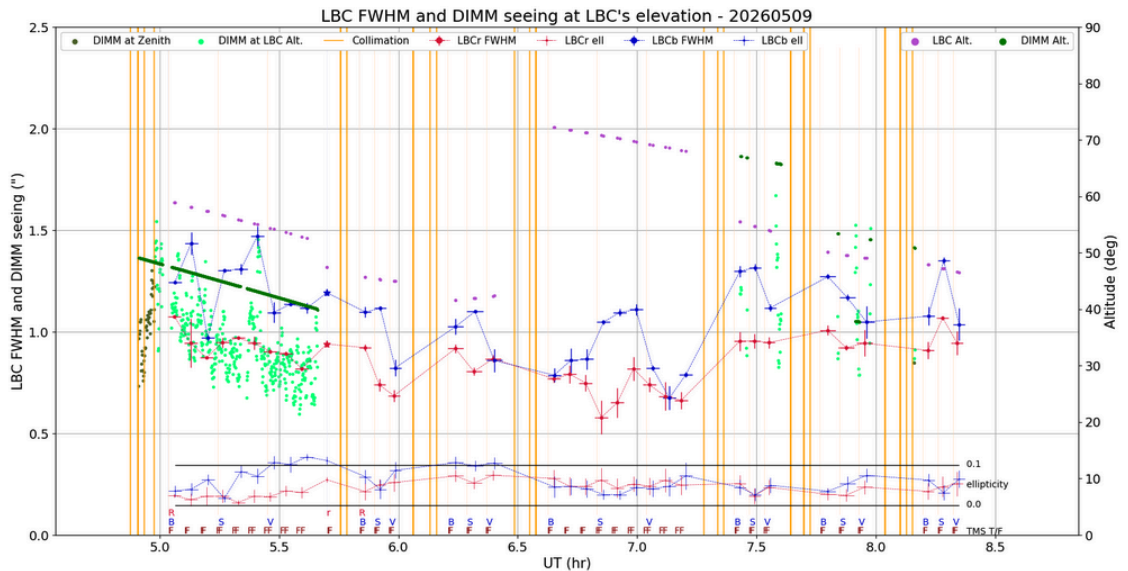
- TMS remains unavailable

Weather:

Clear all night. Seeing 0.75-1.5"



LBC IQ Plot:



Overview:

00:50 UT We are configured for PEPSI. Tim started mirror ventilation so we could get a head start. It's quite warm today.

00:51 UT Powering up LBC's and checking out.

00:54 UT of Issue: Initialization of LUCI2 failed with mask in unknown position. Confirmed both strain gauges just on, mask safely in FPU with grabber in neg lim and clamps hold, closed MCR. Zeroing strain gauges. Init success.

00:58 UT Checking LUCI field stops, although luci was not in the plan for tonight.

01:03 UT Steve is executing a test preset.

01:13 UT Take some LBC bias, telescope at zenith inclosure dark, warm out 12C, ventilation fans have been running for several hours.

01:55 UT sky conditions at start of night look encouraging



02:00 UT opening chamber

02:12 UT sunset

02:14 UT heading to delta Gem $m_v=3$ to get setup with ND3 Pepsi

02:24 UT Steve is doing come by eye active optics to clean things up a bit.

02:28 UT Sending collimation preset since we have time, but we are pretty close to collimated already. Seeing 1.3" on the WFS

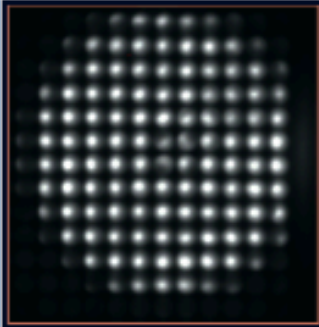
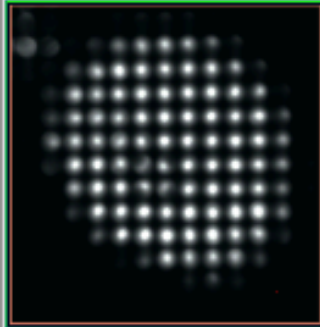
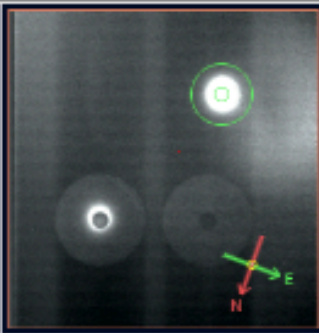
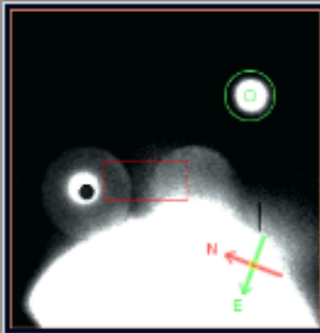
PEPSI

UM_IoEclipse - Woodward

02:31 UT Preset to Europa, NSIGUI override set for 502. Jupiter is visible on the left..

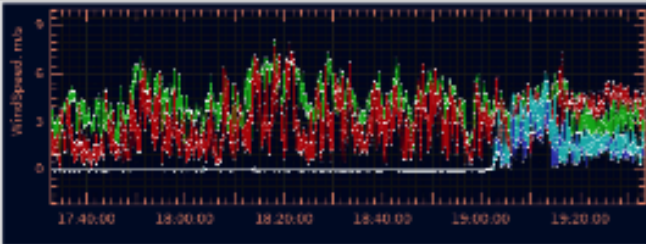
Collimating on Europa. Seeing is 1.3-1.4" in the guiders. Conditions clear.

View



X range: -59.2 -95.2 (0)

Y range: -236.7 -236.7 (0)



PEPSI LBT Control Interface

Maintenance

Seeing Flux Humidity Wind

Clean

Target

Object: Jupiter Europa
 JulianDay: 2461169.60615
 Date: Sat May 9, 2026
 UTC: 02:32:51.7
 LST: 10:22:10.9
 RA: 07:27:13.60
 Dec: +22:19:29.0
 Hour angle: 02:54:57.3
 Parallax: +085:28:20.3
 Azimuth: +086:17:36.0
 Altitude: 50:08:38.3
 Zenith dist: 39:51:29.7
 Airmass: 1.303
 SSB time: -203.675
 SSB vel: 29210.337
 Phase: 0.9928
 Diameter: 0.761

Preset

Active Guide POS BINO

Guide star: 0

Acquire Track PAR MONO

Left SX Right DX Sync SX/DX

Large Binocular Telescope

Temperature: 8.5 Sky: 13.2
 Humidity: 32.4 WindSpeed: 4.5

RA: 07:25:39.25 Parallax: +065:15:51.4
 Dec: +22:22:35.2 UTC: 02:32:49.5
 Azimuth: +085:59:50.4 LST: 10:20:59.3
 Altitude: 50:24:08.4 Local Time: 19:32:50.0

Left: PEPSIFU

Right: PEPSIFU

Rotator: 210:00:02.0 Rotator: 209:59:54.1
 Hotspot X: 391.00 Hotspot X: 355.00
 Hotspot Y: 377.00 Hotspot Y: 375.00
 Focus: 30000 Focus: 30500
 Secing: 1.32 Secing: 1.40
 GCS + WFS: OK GCS + WFS: OK

Offset: 0.2

Offset: 0.2

Bin: 3

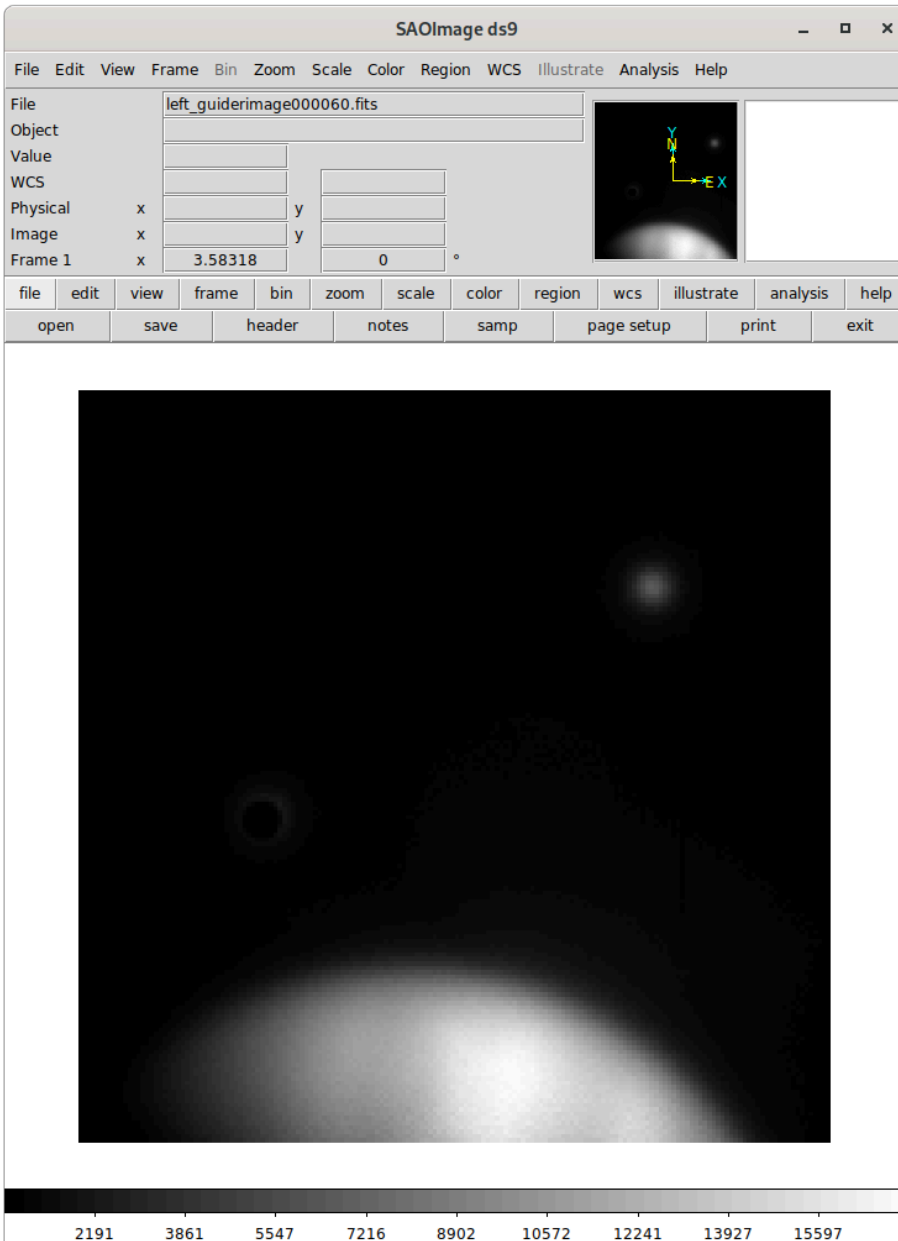
Bin: 3

Filter

ND0 ND2 ND3 ND0 ND2 ND3

Guider Engage

Guider Engage



02:34 UT Taking 10min x all cross disperser

02:44 SNR 570 blue 1200 in red CD2 CD4 pair

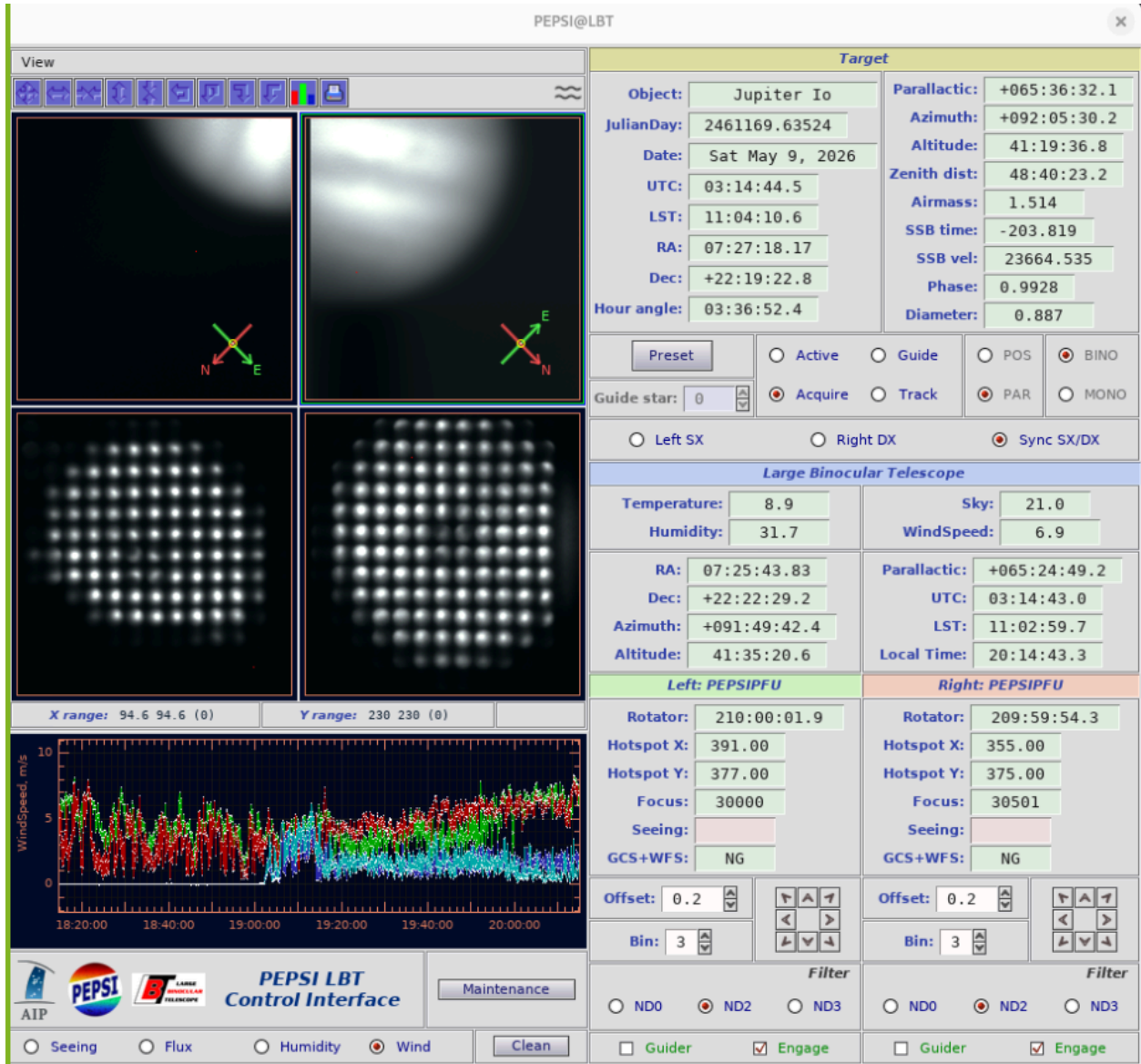
02:45 UT Seeing is 1.0" on the guiders, 0.73-1" on the DIMM, 1.02" on Cyclope

03:01 UT Seeing is 1.3" on the guiders, 0.94" on the DIMM, 0.98" on Cyclope.

03:05 UT 12 degree evening twilight

03:09 UT Sending a preset to a pointing check star nearby (less than 0.8 degree away). We have had a large temperature change and the peps pointing model has not been perfect lately.

03:12 UT Preset to Io, with non-sidereal override set to 501. Io is still behind Jupiter.



03:17 UT Starting Io exposure. Its not visible because its in the shadow of Jupiter so we are tracking

03:28 UT Suspect pointing is drifting. Doing another pointing check.

- Leftside was bang on the hotspot, rightside was ~3" from hotspot in elevation

03:29 UT Resending preset to Io. and integrating 5s exposures and exposures 5s CD2 / CD4 1.09 on Dimm and 0.9 on cyclopes

03:39 UT 18 degree evening twilight, LMST at evening twilight: 11 28

03:52 UT on read out nudge 1" on right side only

03:41 UT Sending pointing preset. Temperatures have stabilized around 9C. Only 1" off on both sides., in el on the right and az on the left. This was after Steve sent the pointing nudge of 1" on the right side only between exposures. We also seem to be doing well resending our pointing every 2 exposures (2, 5 min exposures).

03:45 UT Seeing is 1" on the DIMM and 0.77" on Cyclope.

03:48 UT 1" nudge on the right side only in readout between exposures.

03:56 UT Collimation preset

03:56 UT Pointing preset. Left side is off by about 2" in az and a touch of el, and right side off by about 1".

03:58 UT Presetting back to target. 1.1" on Cyclope.

04:04 UT Nudging between exposures, 1" in el on the right and 1" in az on the left. Seeing is 0.85" on the DIMM, 1.09" on Cyclope.

04:10 UT Pointing check. Right is bang on, maybe 1/2", left is about 1" in az and 1" in el.

04:11 UT Presetting back to lo. We are going to run all 3 exposures this time since we only have 17 minutes left, with Steve nudging between each.

04:17 UT Nudging +1" in el on the right, and on the left -1" in el and +2" in az. Seeing Na emission lines now (file 20260509.028); (10 min elevation just issued)

04:23 UT Nudging +1" in el on the right, and on the left -1" in el and +2" in az.

04:28UT Can see it now

The screenshot displays the PEPSI@LBT Control Interface. The main window is divided into several sections:

- View:** Four panels showing telescope views. The top-left shows two circular fields of view with red and green crosshairs. The top-right shows a similar view with a red box around the central object. The bottom-left and right panels show a grid of stars.
- Target Information:**
 - Object: Jupiter Io
 - JulianDay: 2461169.68592
 - Date: Sat May 9, 2026
 - UTC: 04:27:43.4
 - LST: 12:17:21.4
 - RA: 07:27:21.43
 - Dec: +22:19:15.4
 - Hour angle: 04:50:00.0
 - Parallactic: +063:29:20.4
 - Azimuth: +100:51:48.1
 - Altitude: 26:03:26.4
 - Zenith dist: 63:56:33.6
 - Airmass: 2.275
 - SSB time: -284.138
 - SSB vel: 17536.923
 - Phase: 0.9928
 - Diameter: 0.887
- Control Options:**
 - Buttons: Preset, Active, Guide, POS, DIMM, Acquire, Track, PAR, MONO
 - Radio buttons: Left SX, Right DX, Sync SX/DX
- Large Binocular Telescope Status:**
 - Temperature: 8.8, Sky: 21.7
 - Humidity: 32.2, WindSpeed: 6.4
 - RA: 07:25:47.10, Parallactic: +063:18:05.9
 - Dec: +22:22:21.9, UTC: 04:27:44.1
 - Azimuth: +100:37:30.9, LST: 12:16:12.8
 - Altitude: 26:19:09.2, Local Time: 21:27:44.4
- Left/Right Telescope Data:**
 - Left: PEPSIFU**
 - Rotator: 210:00:02.0
 - Hotspot X: 391.00
 - Hotspot Y: 377.00
 - Focus: 30000
 - Seeing: [blank]
 - GCS/WFS: NG
 - Right: PEPSIFU**
 - Rotator: 209:59:54.6
 - Hotspot X: 355.00
 - Hotspot Y: 375.00
 - Focus: 30501
 - Seeing: [blank]
 - GCS/WFS: NG
- Offset and Binoculars:**
 - Offset: 0.2
 - Bin: 3
- Filter and Maintenance:**
 - Filter: NDO, ND2, ND3 (selected NDO)
 - Maintenance: Clean
- Bottom Status Bar:**
 - Seeing: [blank], Flux: [blank], Humidity: [blank], Wind: [blank]
 - Buttons: Clean, Engage

LBCs

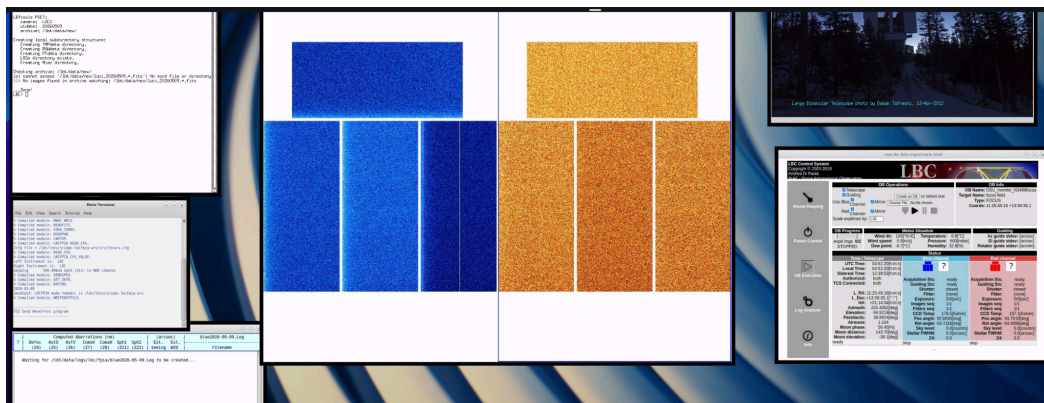
04:30 UT Done with Io and reconfiguring for the LBC's.

OSU-MONITOR

04:35 UT note that TMS is still off line. (about 20 mins reconfig time from Pepsi to LBCs)

NGC 3489

04:49 UT Sending preset for collimation to NGC 3489 focus field.



04:51 UT running dohybrid. Seeing 0.94" on Cyclope.

LBC FPIA LOG MONITOR @ LBTO - v4.1												
Computed Aberrations (nm)										(arcsec)		blue2026-05-09.Log
?	Defoc	Ast0	AstV	ComaV	ComaH	Sph1	Sph2	Est.	Est.	Filename		
	(Z4)	(Z5)	(Z6)	(Z7)	(Z8)	(Z11)	(Z22)	seeing	WIQ			
---	-1050	0	0	0	0	600	0	----	----	dofpia_sph3_adjustment		
●	917	0	0	-796	-698	0	0	0.50	0.60	lbc.20260509.045234.fits		
●	-464	-152	-180	-259	377	-24	27	1.21	0.29	lbc.20260509.045428.fits		
●	-21	-146	-128	-102	29	7	33	1.37	0.11	lbc.20260509.045604.fits		
---	1015	0	0	0	0	-580	0	----	----	dofpia_sph3_adjustment		

LBC FPIA LOG MONITOR @ LBTO - v4.1												
Computed Aberrations (nm)										(arcsec)		red2026-05-09.Log
?	Defoc	Ast0	AstV	ComaV	ComaH	Sph1	Sph2	Est.	Est.	Filename		
	(Z4)	(Z5)	(Z6)	(Z7)	(Z8)	(Z11)	(Z22)	seeing	WIQ			
---	-875	0	0	0	0	500	0	----	----	dofpia_sph3_adjustment		
●	8616	0	0	-1546	-129	0	0	0.50	3.47	lbc.20260509.045231.fits		
●	3517	190	-251	-1368	-317	110	3	0.84	1.53	lbc.20260509.045423.fits		
●	-78	-50	-83	-109	166	171	39	1.00	0.17	lbc.20260509.045558.fits		
---	740	0	0	0	0	-423	0	----	----	dofpia_sph3_adjustment		

04:56 UT Borderline particles.

04:57 UT Copointing.

Radial star offsets from rotator centers: BLUE 18.7" and RED 27.1"

lbcrangebal:

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COPOINTING: B=45833 R=45828
Pointing updates: delta_IE = -22.69", delta_CA = 4.24"
Mirror updates: dX(mm) dY(mm) dRX(") dRY(")
                SX: 0.20 0.28 6.03 -4.27
                DX: -0.15 -0.21 -4.44 3.15
-----

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05:01 UT Sending science for NGC 3489. 1.17" on Cyclope. Conditions clear.

05:05 UT Seeing is 0.87" on the DIMM and 0.99" on Cyclope.

05:12 UT Seeing 1.4" on the blue and 1.2" on the red.

05:16 UT Seeing down to 0.9" on both red and blue images. 0.66" on Cyclope, 0.87" on DIMM.

05:31 UT IQ a bit worse on blue, 1.35" on the blue

05:32 UT LBC image 52702 looks elongated, although the previous image didn't look bad. Losing collimation. Almost done and we will recollimate shortly.

l2574

05:39 UT Sending preset for copointing. Temp stable now about 8.6C RH 33%.

Radial star offsets from rotator centers: BLUE 6.0" and RED 8.6"

lbrangebal:

COPOINTING: B=54201 R=54158
Pointing updates: delta_IE = 5.74", delta_CA = 0.86"
Mirror updates: dX(mm) dY(mm) dRX(") dRY(")
SX: -0.12 0.00 0.08 2.49
DX: 0.15 0.09 1.94 -3.11

05:44 UT Running dofpia.

The screenshot shows a window titled "LBC FPIA LOG MONITOR @ LBTO - v4.1". It contains two tables of aberration data. The top table is for the blue channel (blue2026-05-09.Log) and the bottom table is for the red channel (red2026-05-09.Log). Both tables have columns for aberration types (Defoc, Ast0, AstV, ComaV, ComaH, Sph1, Sph2) in nm and arcsec, and estimated seeing and wavefront error (WFE) in arcsec. The blue channel table shows a red dot for the 963 nm defocus and a green dot for the 177 nm astigmatism. The red channel table shows a green dot for the 42 nm astigmatism and a yellow dot for the -404 nm defocus.

Computed Aberrations (nm)								(arcsec)		blue2026-05-09.Log
?	Defoc	Ast0	AstV	ComaV	ComaH	Sph1	Sph2	Est.	Est.	Filename
	(Z4)	(Z5)	(Z6)	(Z7)	(Z8)	(Z11)	(Z22)	seeing	WFE	
---	-1050	0	0	0	0	600	0	----	----	dofpia_sph3_adjustment
●	963	-32	-244	-113	184	-37	-31	1.21	0.41	lbc.20260509.054528.fits
●	177	-16	-127	53	77	5	5	1.25	0.12	lbc.20260509.054700.fits
---	942	0	0	0	0	-538	0	----	----	dofpia_sph3_adjustment

Computed Aberrations (nm)								(arcsec)		red2026-05-09.Log
?	Defoc	Ast0	AstV	ComaV	ComaH	Sph1	Sph2	Est.	Est.	Filename
	(Z4)	(Z5)	(Z6)	(Z7)	(Z8)	(Z11)	(Z22)	seeing	WFE	
---	-875	0	0	0	0	500	0	----	----	dofpia_sph3_adjustment
●	42	111	45	301	-354	68	0	0.92	0.23	lbc.20260509.054522.fits
●	-404	-86	64	9	13	165	12	0.88	0.21	lbc.20260509.054656.fits
---	671	0	0	0	0	-383	0	----	----	dofpia_sph3_adjustment

05:48 UT Starting science.

05:54 UT Satellite through images lbc.55009, lbc.55003

05:56 UT 1.1" on the blue and 0.95" on the blue, Airmass = 1.414, 0.87-1.1" on cyclope.

NGC6503

06:01 UT Sending preset for copointing

Radial star offsets from rotator centers: BLUE 5.8" and RED 13.8"

lbrangebal:

COPOINTING: B=60340 R=60335

Pointing updates: delta_IE = 5.80", delta_CA = -7.43"

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

SX: 0.18 -0.06 -1.29 -3.80

DX: -0.14 0.15 3.19 3.10

06:06 UT Starting dof pia

Blue:

---	-1050	0	0	0	0	600	0	----	----	dof pia_sph3_adjustment
●	973	0	-207	-90	214	-8	-20	1.18	0.41	lbc b.20260509.060754.fits
●	175	-96	41	-41	27	-49	-20	1.06	0.12	lbc b.20260509.060933.fits
---	821	0	0	0	0	-469	0	----	----	dof pia_sph3_adjustment

Red:

---	-875	0	0	0	0	500	0	----	----	dof pia_sph3_adjustment
●	2330	32	108	-148	-214	-11	-28	0.84	0.93	lbc r.20260509.060748.fits
●	185	94	59	44	-46	-44	-4	0.77	0.12	lbc r.20260509.060927.fits
---	600	0	0	0	0	-343	0	----	----	dof pia_sph3_adjustment

06:11 UT Starting science. Seeing is 1.04" on Cyclope.

06:18 UT Blue looks a touch elongated to start. 1.1 on the blue and 0.95" on the red images.

NGC5194

06:27 UT Sending preset for copointing.

lbrangebal:

COPOINTING: B=62910 R=62905

Pointing updates: delta_IE = -10.88", delta_CA = 1.27"

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

SX: 0.48 0.08 1.79 -10.29

DX: -0.45 -0.03 -0.56 9.56

06:31 UT Starting collimation, dof pia. Seeing is 1.08" on cyclope.

Blue:

---	-1050	0	0	0	0	600	0	----	----	dof pia_sph3_adjustment
●	1705	178	201	312	-531	-323	-32	0.98	0.76	lbc b.20260509.063258.fits
●	264	86	163	37	-18	-230	0	0.98	0.20	lbc b.20260509.063431.fits
---	774	0	0	0	0	-442	0	----	----	dof pia_sph3_adjustment

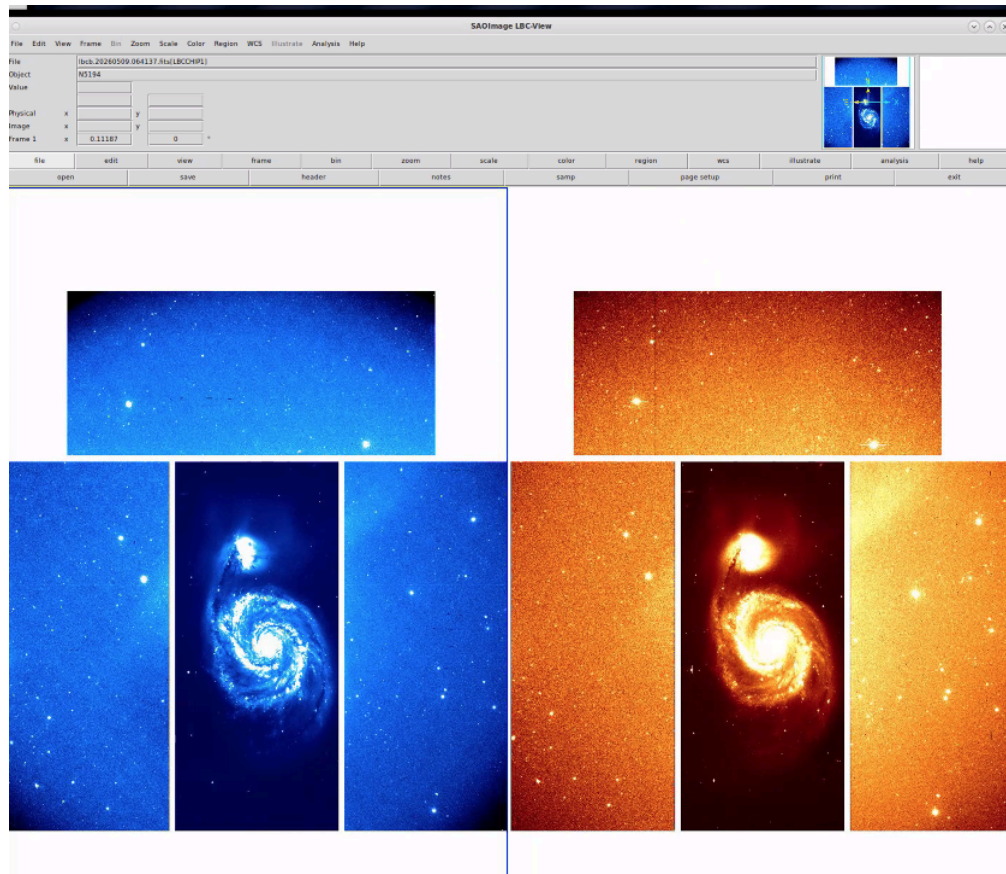
Red:

---	-875	0	0	0	0	500	0	----	----	dof pia_sph3_adjustment
●	352	-24	-23	124	288	-199	-19	0.56	0.25	lbc r.20260509.063254.fits
●	-122	-58	-9	-129	-21	-46	0	0.56	0.11	lbc r.20260509.063426.fits
---	475	0	0	0	0	-271	0	----	----	dof pia_sph3_adjustment



06:36 UT Starting science. Seeing is 0.77" on Cyclope.

06:44 UT 0.87" on both red and blue first image.



07:11 UT Seeing is 0.76" on Cyclope

NGC4395

07:15 UT Sending preset for copointing.

Radial star offsets from rotator centers: BLUE 18.1" and RED 1.1"

lbcrangebal:

COPOINTING: B=71642 R=71638
Pointing updates: delta_IE = 0.79", delta_CA = -9.77"
Mirror updates: dX(mm) dY(mm) dRX(") dRY(")
SX: -0.38 0.09 1.89 8.16
DX: 0.42 -0.01 -0.16 -8.92

07:19 UT Collimating

Blue:

---	-1050	0	0	0	0	600	0	----	----	dofpia_sph3_adjustment
●	-951	-203	-81	71	235	40	17	1.27	0.40	lbcb.20260509.072013.fits
●	-158	87	111	-48	56	34	20	1.35	0.12	lbcb.20260509.072146.fits
---	1000	0	0	0	0	-571	0	----	----	dofpia_sph3_adjustment

Red:

---	-875	0	0	0	0	500	0	----	----	dofpia_sph3_adjustment
●	282	-151	-151	399	-195	-118	8	0.89	0.26	lbcr.20260509.072008.fits
●	6	159	-64	70	44	-17	7	0.88	0.10	lbcr.20260509.072141.fits
---	669	0	0	0	0	-382	0	----	----	dofpia_sph3_adjustment

07:23 UT Starting science. 0.86" on Cyclope.

07:30 UT 1.3" on the first image and cyclope just blew up to 1.5", but variable

NGC4605

07:36 UT Sending preset for copointing.

Radial star offsets from rotator centers: BLUE 16.0" and RED 10.7"

lbcrangebal:

COPOINTING: B=73834 R=73830
Pointing updates: delta_IE = 3.14", delta_CA = 11.56"
Mirror updates: dX(mm) dY(mm) dRX(") dRY(")
SX: 0.21 -0.11 -2.38 -4.47
DX: -0.17 0.19 4.10 3.72

07:40 UT Starting collimation. Seeing 1.34" on cyclope.

Blue:

---	-1050	0	0	0	0	600	0	----	----	dofpia_sph3_adjustment
●	-998	53	-108	26	80	38	19	1.23	0.41	lbc.20260509.074155.fits
●	-197	-61	-103	52	-34	135	13	1.34	0.15	lbc.20260509.074327.fits
---	996	0	0	0	0	-569	0	----	----	dofpia_sph3_adjustment

Red:

---	-875	0	0	0	0	500	0	----	----	dofpia_sph3_adjustment
●	-439	-198	50	-94	22	-8	7	0.87	0.20	lbc.20260509.074151.fits
●	-181	64	-117	-152	51	-58	11	0.94	0.14	lbc.20260509.074327.fits
---	704	0	0	0	0	-402	0	----	----	dofpia_sph3_adjustment

07:44 UT Starting science. Seeing 1.05" on cyclope.

07:59 UT moonrise, illumination 0.553

NGC4449

08:00 UT Sending preset for copointing.

Radial star offsets from rotator centers: BLUE 4.8" and RED 1.9"

lbcrangebal:

COPOINTING: B=80216 R=80212

Pointing updates: delta_IE = 0.92", delta_CA = 1.29"

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

SX: 0.01 0.17 3.57 -0.29

DX: 0.02 -0.08 -1.80 -0.42

08:05 UT Collimating

Blue:

---	-1050	0	0	0	0	600	0	----	----	dofpia_sph3_adjustment
●	-250	-61	111	170	-106	-72	12	1.29	0.17	lbc.20260509.080609.fits
●	403	-113	-155	0	28	-23	-10	1.36	0.19	lbc.20260509.080740.fits
●	-394	-111	-43	-44	52	27	32	1.34	0.18	lbc.20260509.080910.fits
---	997	0	0	0	0	-570	0	----	----	dofpia_sph3_adjustment

Red:

---	-875	0	0	0	0	500	0	----	----	dofpia_sph3_adjustment
●	689	-28	124	185	31	-54	-11	0.98	0.30	lbc.20260509.080604.fits
●	395	-185	42	59	67	-94	13	0.97	0.20	lbc.20260509.080735.fits
●	14	-67	151	-45	28	-95	3	0.99	0.11	lbc.20260509.080906.fits
---	739	0	0	0	0	-422	0	----	----	dofpia_sph3_adjustment



08:10 UT Starting science on NGC4449. 1.0" on Cyclope.

08:14 UT Cyclope showing variable seeing, 1.23" at the moment with a blip up to 1.5"

PEPSI

08:23 UT Reconfig to PEPSI

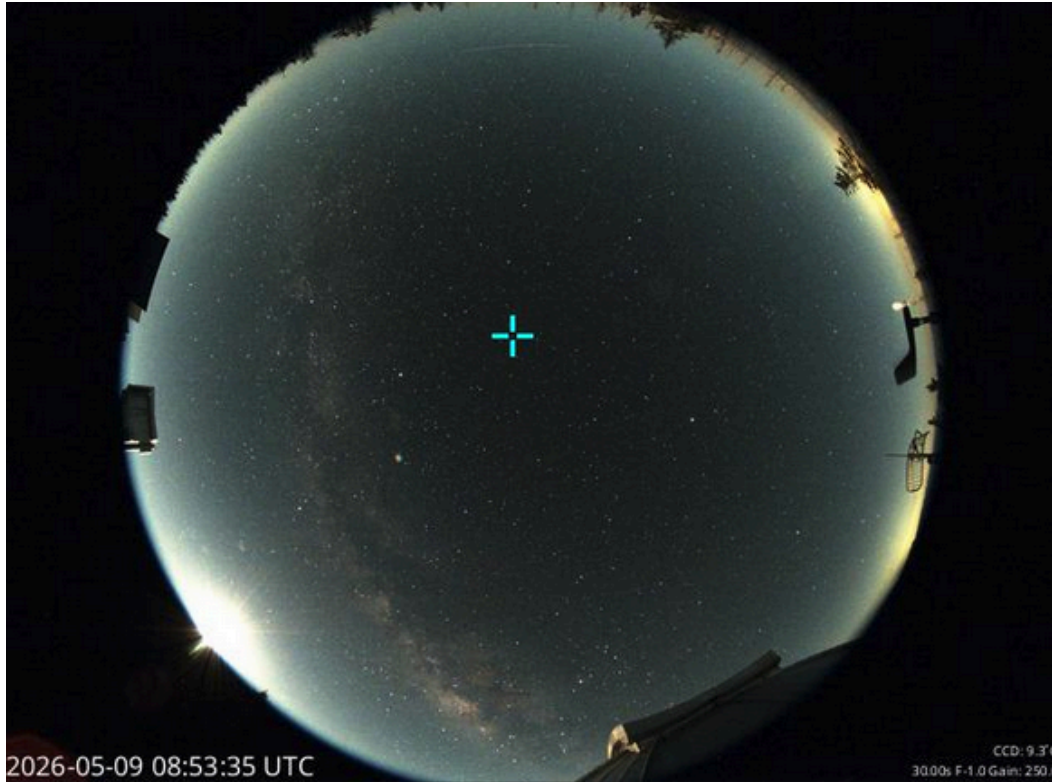
08:43 UT Sending pointing and collimation preset

OSU-PANTERA 140743666658919296

08:50 UT Sending preset to target. Oops sent as acquire

08:52 UT Resent as active preset to target. Seeing is 0.94" on the guiders.

08:52 UT Starting science. Seeing is 0.85" on the SX side and 0.97" on the DX side.
Conditions are clear. Temp =8.10C wind 7.3m/s



09:00 UT SNR CD3/CD5 55/104. Going to take an additional cycle to pull up the snr in the blue to achieve PI's requirement of 75

09:11 UT SNR CD2/CD6 54/135. Seeing 0.73" on the guiders.

SNR CD3/5 59/108

SNR CD2/6 58/136

OSU-PANTERA 1349677912103573888

09:26 UT Preset to next target

09:28 UT Starting science. Seeing 0.84" on Cyclope, 0.75" on the guiders.

09:35 UT SNR CD3/5 60/101. We are running a second cycle to reach the requested SNR in the blue.

09:44 UT SNR CD2/6 64/135, seeing 0.69" on the guiders

09:51 UT SNR CD3/5 67/115

SNR CD2/6 66/137

OSU-PANTERA 1817438775924874496

10:00 UT Sending preset

10:04 UT Starting science. Seeing is 0.79" on SX and 0.84" on DX. 0.82" on cyclope and 1.12" on the DIMM

10:09 UT SNR CD3/5 60/94. Second cycle to reach SNR requested by PI in blue.

10:21 UT SNR CD2/6 58/117

10:26 UT SNR CD3/5 54/85 , Seeing 0.98" on the guiders.



SNR CD2/6 59/115

UVa_metalpoor

First RV HIP91659

10:37 UT Presetting to RV standard.

10:39 UT Starting science. Seeing 0.81" on the left and 0.85" on the right, 1.2" on cyclope.

SNR CD2/CD4 345/606

Science 4493353965706833152

10:41 UT Preset to science target.

10:43 UT Starting science, seeing 0.84" on the left and 0.87" on the right, 1.24" on the DIMM and 0.3" on cyclope.

SNR CD2/CD4 84/139

Science 4459578964095181440

10:48 UT Preset to target

10:50 UT Starting science

SNR CD2/CD4 60/106

10:52 UT 18 degree morning twilight, LMST at morning twilight: 18 42

Science 1317627491751206016

10:55 UT Presetting to target

10:57 UT Starting science. Seeing 0.74" on the left and 0.8" on the right. 1.34" on cyclope.

SNR CD2/CD4 61/96

Science 1767214390437753600

11:04 UT Sending preset. Can't do, facing into the rising sun

Science 4595163592775849088

11:06 UT Sending preset.

11:08 UT Starting science. Seeing 0.8" on the guider.

11:11 UT Seeing is 0.95" on the DIMM and 0.98" on Cyclope.

SNR CD2/CD4 69/100

Science 4531964557774517248

11:17 UT Presetting to science

11:19 UT Pointing check needed.

11:21 UT Presetting back to science.

11:22 UT Starting science. Seeing 0.62" on the guider, 0.9" on cyclope.

Overall a very productive night of science under reasonably good sky conditions !

11:26 UT 12 degree evening twilight

11:33 UT Done and closing up. Starting PEPSI Cals.

11:44 UT Taking 25x LBC bias frames.

12:20 UT sunrise