**PALOMAR 2012 Observation Log**

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DECEMBER 5, 2012

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Object: PG0029

20121205 - 02:43:00 UTC
Focusing on pg0029 (Landolt Standard). Focused at 02:43:00, nominal focus at 21.1 mm.
Declared FIRST LIGHT! and Jean congratulated us with a gift of kettle corn.

Now centering up on array. Centered at 02:49:15 UTC. Moving object 30 arcseconds right, marking as our drop target. Our array is 30 arcseconds left of Pixel 837,342.

Moved 10 arcseconds more to the right. Object now at pixel 909,350. Making the array about Pixel 621, 318

Testing “Move to Bullseye” on guider. Works pretty well, even with plate scale not calibrated on guider.

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First laser cal at 03:01:00 UTC, seems a bit misaligned.
Realigned at 03:48:00 UTC. Not perfect in the corners, but good enough for tonight.

04:12:17 UTC, guider parameters have been calculated with DS9 images of a star before and after a known offset.

Reloaded new beammap, tuned array back up.
Taking long sky data while tuning up guider.

**Starting around UTC 04:40:00, TCS FAILED on ARCONS. All following obs files have wrong header info!**
**TCS RESTORED AT UTC 04:57:08**

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Object: Crab Pulsar

Moving at UTC 04:58:30 to Crab.
Crab on the array at 05:03:00 UTC! Guiding for a 5 minute observation.
Offsetting down to a better part of the array at 05:10:03. Restarting guiding.

Laser Cal at UTC 05:13:00.
Around UTC 05:15:00, Crab moved on to Roach 4, the best part of the array.
Finished with crab at UTC 05:31:00

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Paul is now finding the center of the array so we can set the center of rotation to our sweet spot on Roach 4.

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Object: NLTT11748

Moving to Justin's object, NLTT11748 at UTC 05:34:00
Doesn't have a guide star, skipping it for tonight.

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Object: SDSS J0651

Moving to SDSSJ0651 instead. Acquiring on guider around UTC 05:54:00
White dwarf binary. Ref:**arXiv:1211.0624**

Offset by 20.8 W and 6.6 N to a nearby star. Got there around 60s into obs file around UTC 07:00. Came back to object around 150s. Data in obs_20121206-065816.h5

blind offsets are working.

**NTP SERVERS WERE NOT SYNCED PROPERLY. TIMING DATA WILL BE SUSPECT BEFORE NOW**

Fixed now....at UTC?

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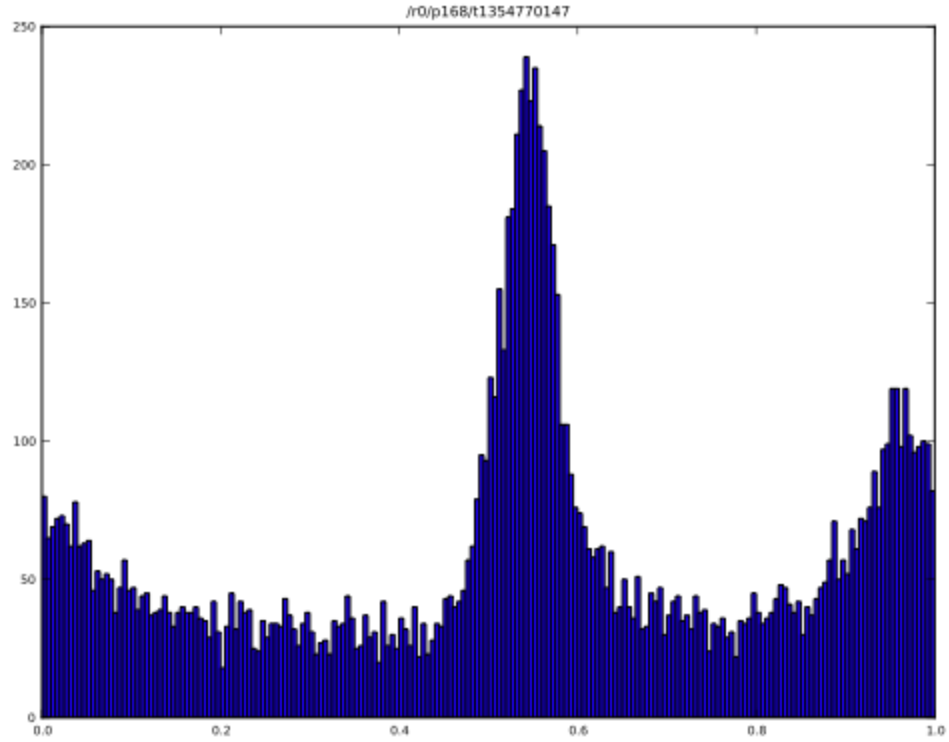
Object: Crab

Some clouds moving in, moving back to Crab.

Laser cal at UTC 09:20:00

Taking several minutes of Crab data to confirm if we see pulses...which we do.




Laser cal at UTC 09:55:00

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Object: SDSSJ0651

Back to SDSSJ0651...for hours and hours...

UTC 11:06:00, still on SDSSJ0651. 5 minute observations with continuous observing and guiding turned on.

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Object: HR3454

Eta Hydrae, Type B3V standard from ESO spectrophotometric list. V=4.3
Spectrophotometric standard, used for flux cal by spreading over whole array. Starting move to object around 12:00:00 UTC exactly.

Blasted the array. A few files around UTC 12:10:00. Can't defocus it enough, so moving to a new

object.

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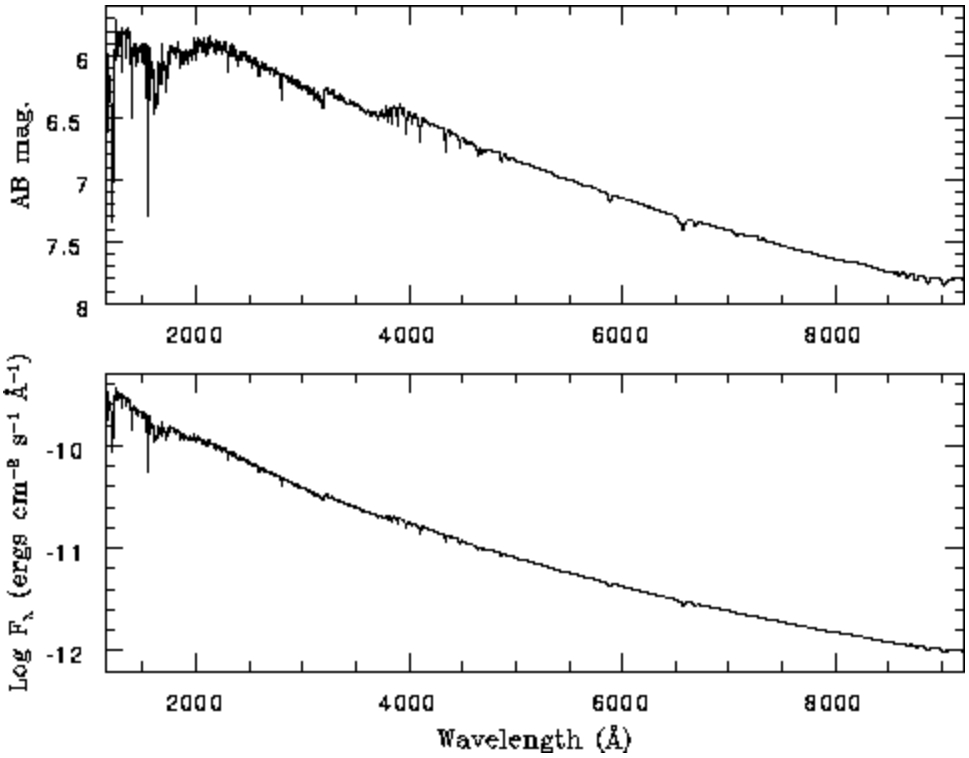
Object: HD93521

Type 09Vp standard from ESO spectrophotometric list, V=7.03
Spectrophotometric standard, used for flux cal by spreading over whole array. Starting move to object around 12:15:00 UTC




Acquiring at UTC 12:16:50.
Data at obs_20121216-121649.h5. Chopped to sky during 100-200s in file. Cloudy.
obs_20121216-122209.h5. 5 mins, no chopping. Take sky after.
obs_201216-122747.h5, offset 200" for sky. Appears to be same counts as last file, meaning both are all clouds.

Magnet is running out, and clouds are going to obscure our twilights. Data taking is done for the night at UTC 12:32:00.

Laser Cal around 12:35:00 UTC

12:39:00 UTC, swapped frequency files for roaches 6 and 7 in attempt to fix roach 6's small loops. Seems to have had an effect...

Taking another laser cal at 12:40:00 UTC. Doesn't look any better. Could be scrambling in the beammap with the switched frequency lists.

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DECEMBER 6, 2012

Started observing around UTC 02:00:00.
Cal arm came loose and needed to be reattached.  Realignment pending.

UTC 02:30:00, locating target.

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Object: OSA 34841

z=3.7 galaxy from the Subaru field.

Laser cal at 02:32:00.  Laser is aligned on the first try!

This object is fainter than the sky.  We want to do some dithering for the imaging. Plan for 3 10-minute dithered exposures while Ben calculated what our total integration time needs to be.
obs_20121206-023816.h5

Moving up 5”
obs_20121206-024401.h5

Moving right 7,” down 6”
obs_20121206-025604.h5
Moving to guide star 1
Moving right 9.5”, up 6”

Got about an hour of good data!

Taking laser cal at 03:20:00.

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Object: OSA 42377

Another Subaru field galaxy.  z=3.154
Locating in guider at UTC 03:23:30
Offset star on array at 03:27:10 UTC. (guide star 1)

UTC 03:32:34, think we have our object on the array. Guiding.

Taking 5 minute observation.

UTC 04:05:00, Started making some offsets.
Moved 70.4 N and 70 W to try to offset to guide star.
Seeing is about 1.4" Sky is still clear

Can't find good guide stars, moving to new object.

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Object: OSA 80475

moving to 2:17:42 -4:31:30.3
laser cal at UTC 04:16:00

UTC 04:20:19, guide star moved onto the array.
Attempted offset to a new guider, did not find it.
Moving back to the first object, putting it on the array, and rechecking focus.
UTC 04:36:00 Starting by moving focus down to 20.6 mm.
Now moving back up. Focus nominal around 21, not far from last night. Seeing is ~1.5"

Offsetting 113.2 W, 190 N
Don't see object. Guide charts might be wrong.
Back to first guider
Moving 13.8 E, 63.3 N
Second guide star is now on the array.

**Determined that finding charts were wrong. Calculating new offsets**
**Previous OSA objects may not have been offset to correctly (but we only took data on 1 anyways).**

UTC 04:44:10, believe we have object on the array! Trying to find a good guide smudge.

Still unable to find good guide star. Moving to new one.

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Object: OSA 49497

AGN with "honking" Lyman alpha
Guide star on array at UTC 05:05:19

Object should be on the array at 05:09:00. Guiding! Let's sit on this...

Laser call at UTC 6:15
Continuing on this object UTC 07:00:00
Gone through roughly ⅓ of the magnet.
Finished on object, UTC 06:29:00

Laser Cal.

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Object: Landolt 95 42
Moving to standard star

Object on array around UTC 06:35:00
Took 5 minute observation.

REROTATING AND RETHRESHOLDING

Laser Cal at UTC 06:47:00

Back on Landolt star.

UTC 06:55:00, 5 min observation on V filter
UTC 07:01:00, 5 min observation on R filter

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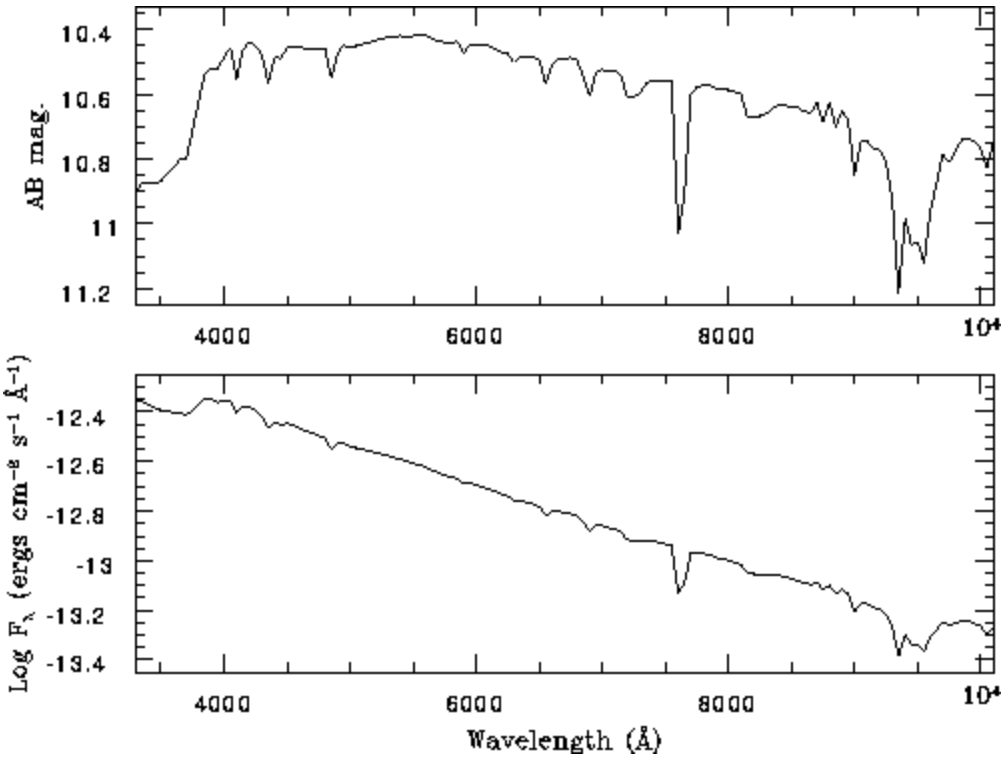
Object: Hiltner 600
UTC 7:13, starting to defocus to 41 mm
Trying to put object on array.

On the array at UTC 07:15:00.
Count rates are low (v=10 is a bit faint for this). Taking 10 minutes of data.

Then a sky for subtraction at UTC 07:37:00.




Moving focus back and moving to next object.

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Object: HM CNC
short period compact binary.
Object on guider at UTC 07:45:00.

Laser Cal.

Moving guide object in.
Centered on good part of the array, now offsetting to our target.
16.8” East, 15.1” North.
Trying to locate on our array. Should be visible.
Seeing down to 1.2”.
Back to guide star to try a better part of the array.
Putting it up in top right “good spot”

UTC 08:04 Stayed on object for 30 mins.
Offsetting to object. Can’t see it in real time, but we believe the offset should be good. Integrating here for a while.

UTC 08:34

Moving back to guide star, putting it on other “good spot”, then offsetting back to target for 30 mins.

UTC 08:40, starting another 30 mins on this object.
Seeing at 1.3-1.4”

GOING TO Z-COSMOS FIELD FOR A WHILE

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Object: Z-Cosmos 813548

Object on array at UTC 09:18:19
Taking 30 minutes of data

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Object: Z-Cosmos 819124

Moving to object at UTC 09:56:00
On the object at UTC 10:02:00
Taking 30 mins of data.

Moving object on array, lost it. Relocated around UTC 10:30:00.
Taking 30 mins of data.

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Object: Z-Cosmos 820105

Moving to ZC 820105 at UTC 10:48:00
Called ZX_02 in FITS headers from guider due to a typo

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Object: Z-Cosmos 841948

UTC 11:32:00 Moving to a new target

Laser Cal at UTC 11:35:00
Guide star on array at UTC 11:37:00
Moving 33.1” W and 37.1” S to offset to object

UTC 12:03:00 popping object off array, going back to offset star to move object onto better part of array.
UTC 12:06:00, moving target back on to array, now should be in top right quadrant.
Taking 20 mins of data.

Laser cal, then on to new objects.

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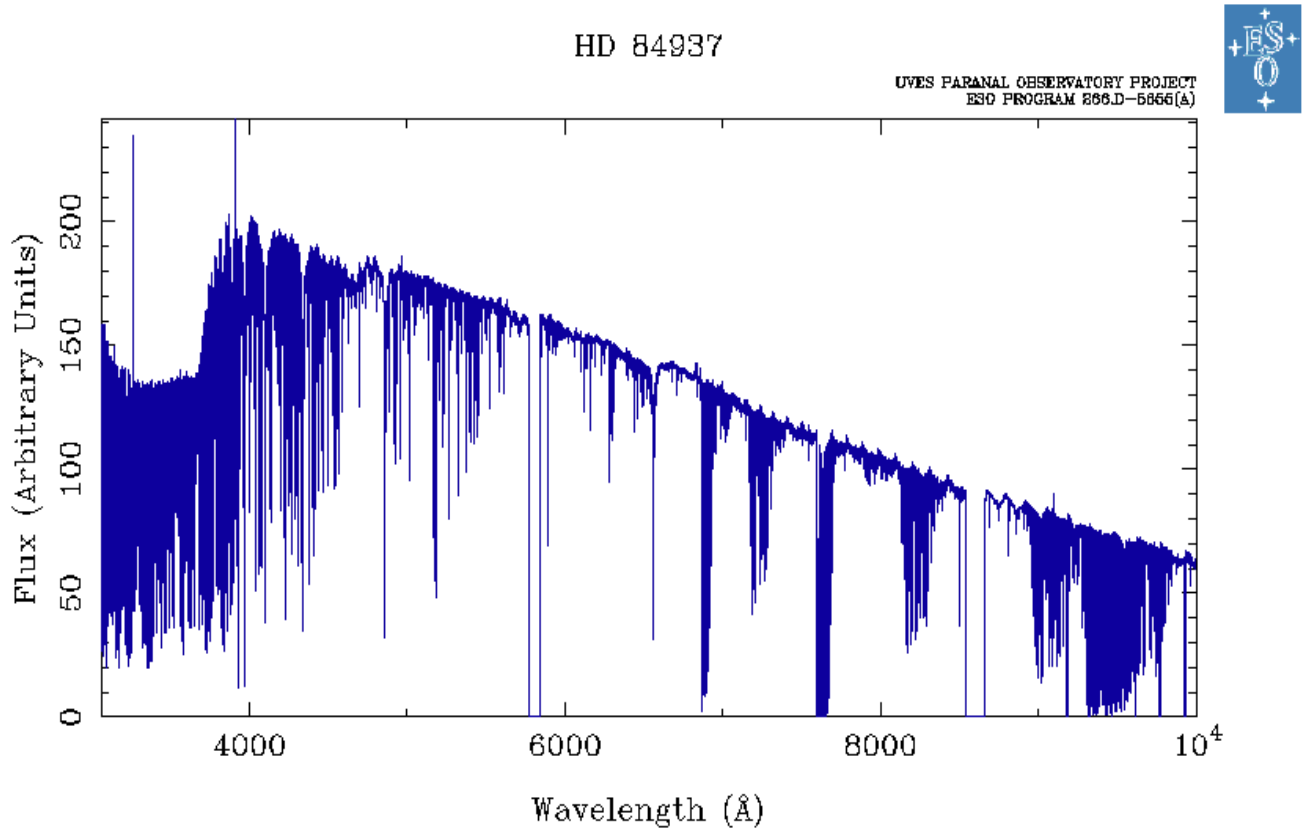
Object: HD 84937

Moving to spectrophotometric standards from UVES survey.

List can be found here:
http://www.eso.org/sci/observing/tools/uvespop/interface.html

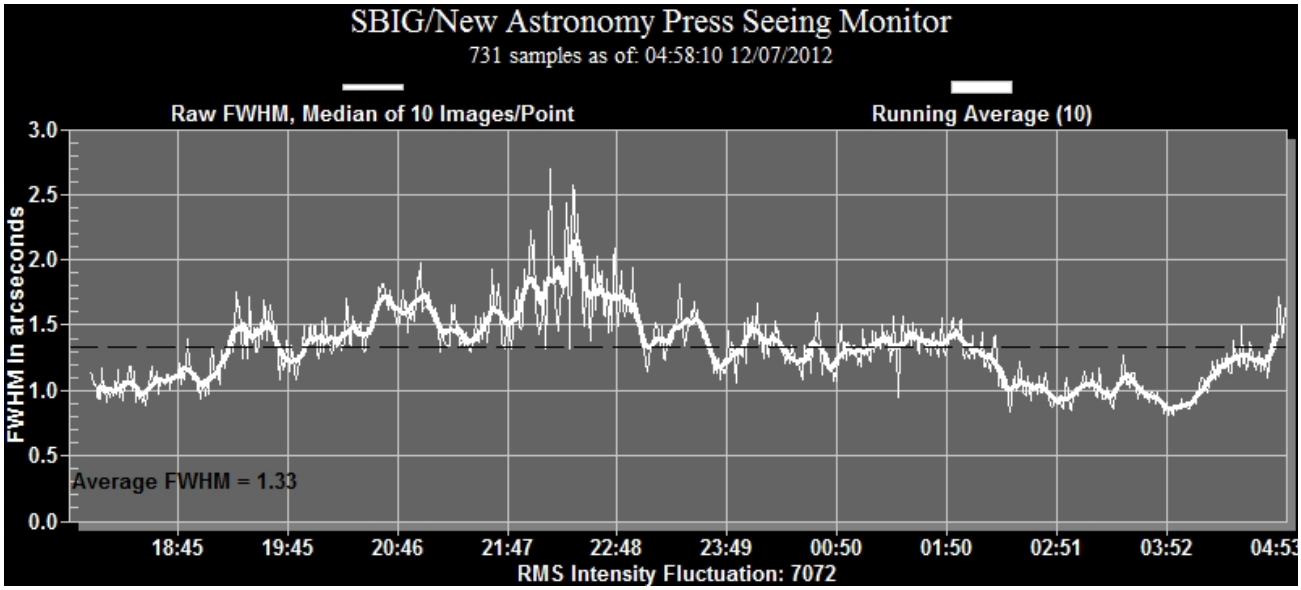
HD 84937, V=8.28 sdFS star




UTC 12:40:00, object is on the array.
Full file is UTC 12:40:41, and the one after (2 5-minute files).

Moved 120” away, went back into focus. Taking a couple 5 minute sky exposures.

Seeing has been <1” between 10 and 01 UTC.

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UTC 12:56:00
Continuing sky exposures until they become twilight flats.

Magnet ran out at UTC 01:37:00
Sky still pretty dark. Will need new wavelength cal for twilight flats as fridge slowly warms.

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DECEMBER 7, 2012

Started magnet ramping up around 2:30 PM.
Magnet ramped down and temperature stable at 110mK at UTC 01:51:00
769 kG left in magnet for temperature control

UTC 02:20:00
Starting with laser cals. Testing Matt’s optimal filters.

021853 - Used Matt’s sampled 26 pt filter
022035 - Used old custom matched filters
022718 - Used Matt’s custom sampled matched filters
023127 - Used Ben’s custom 26pt matched filters

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Object: Einstein Cross

UTC 02:45 Taking data on Einstein Cross with original optimal filters (Same as last two nights)
Dithering between 4 different sections of array

Seeing up to ~1.7 at UTC 03:10

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Object: OSA 34841

Switching to the template FIR filter  at UTC 03:14
On object at UTC 03:22
Guiding for around ~30 minutes

Move to new part of array and started guiding again, UTC 4:00

UTC 4:10, seeing became very good

Finished on object at UTC 4:36

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Object: OSA 45244

Started with guide star 2, moved to guide star 1

Moved to object at UTC 4:43

Problems with guiding, very faint or inside the slit

Had to re-center our location due to guiding problems.

Moved to another area of array, restarted guiding, doing around 45 minutes observation.

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Object: Corot-18b

Laser Cal
REROTATING AND RETHRESHOLDING

Seeing at 1.5”

UTC 06:45:00, target is on array, with companion star for relative photometry reference.
Centered on best location around UTC 06:50:00

Integrating for ~5 hours...

Re-rotating and re-thresholding  at UTC 06:56:00
UTC 07:00:00, bad laser Cal.  Network power switch having problems staying on...maybe be due to power strip.  Try plugging in somewhere new later.

UTC 07:05:00, good laser Cal.

Back on Corot 18.

Ingress should be at UTC 07:24:00
Egress should be at UTC 09:48:00

Stopped observing and took laser call at UTC 10:16

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Object: PSR 0656+14

Seeing is less than 1” so we are going to try a pulsar.
guide star is on array at UTC 10:22:00
Guiding on target started at UTC 10:25:00

Moved center of array 5 arcseconds to the right and 5 arcseconds down on the guider.
Laser cal at UTC 11:25

Moved guide star to good part of array, then move back to pulsar at UTC 11:27

Center should actually be on r0/p30. Pixel is given wrong name in description.

UTC 12:22, still integrating. Seeing about 0.8”

UTC 12:30:00 Moving 10.5E, 8.5N to move object out momentarily
Put object back to the top right of array, started guiding again.

Moved at UTC 12:39 to fix guiding, brought new star into array on bottom right corner.
Moving back to a finder star to make sure we get back on target.

UTC 12:44:00, back to the target and taking observations.

UTC 13:00, needed to manually fix guide star location.
Guide star seems to be moving around a lot.
Moved to a guide star on the right
Stopping observation, guider made some big moves, UTC 13:25

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Object: HR 3454

Spectrophotometric Standard, V=4.3
Laser cal at UTC 13:26
UTC 13:30, near the object, moving it closer to get its counts high enough
UTC 13:33, object is as close as we can get it.  Not the most uniform illumination, but we will see.
Sky subtraction may be hard since we are so close to twilight.

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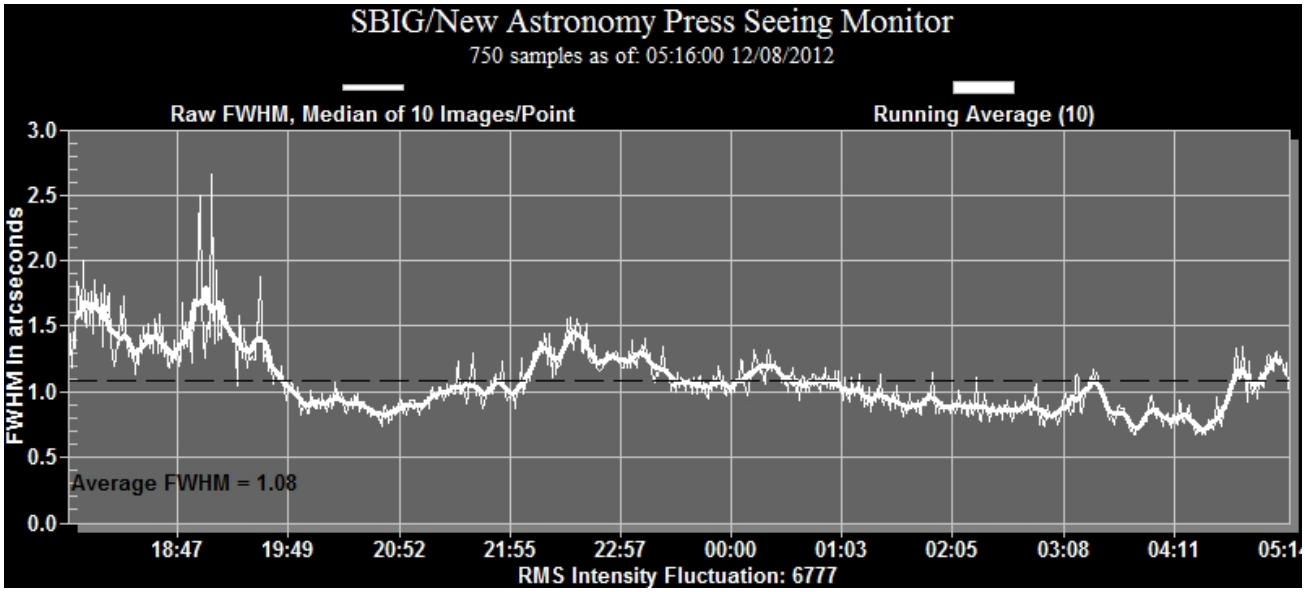
Finishing with twilight flats.
Stayed cold through the twilight flats tonight.

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DECEMBER 8, 2012

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Object: HD223075 Carbon star standard, V=5.1

Starting with Spectrophotometric standards.
UTC 01:45, started move to target
Too bright for array!

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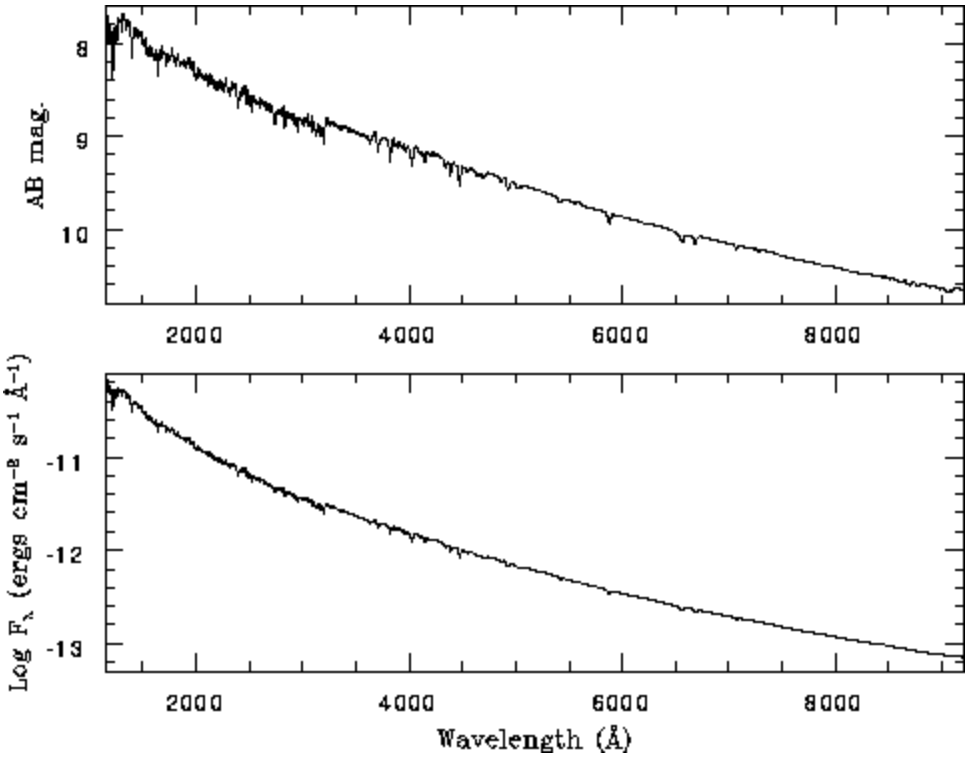
Object: BD+25 4655




Another standard, from ESO's site.
Used before in the Lick data.
V = 9.68

UTC 01:56:00, object is on array and defocused

UTC 01:59, taking 5 minute flux cal file
Seeing < 1" all night so far

Focus at 45 mm, about the right out-of focus to cover the array with these standards.

UTC 02:05, taking second 5 minute flux cal file

Offsetting to sky, taking 5-minute out-of-focus Sky exposure for subtraction

Moving back to good focus at 21 mm
Taking Laser Cal

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Object: NLTT11748 (aka. Justin's Object)

Moving to object at UTC 02:20
Adjusting focus, found best focus at 21.65 mm.

UTC 02:30 starting 5 minute observations, found final focus.
Adjusting guide camera focus.

UTC 02:40, everything focused up and taking data.

Laser cal at UTC 04:21

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Object: PG 0220+132

moving to Landolt standard star at UTC 04:27
A bit bright, saturating in center, V~14

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Object: PG 0220+132a

Moving to its fainter neighbor at UTC 04:35
V=15.77

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Object: Arp 147

Moving at UTC 04:39
Laser Cal

On target at UTC 04:50, centered on array

Matt is working on a dithering script using the TCS move commands and code provided by Paul and Seth

Started dithering pattern around UTC 05:28
**Started saving guide camera images at UTC 05:29**
Matt is also saving the offsets of the dithering pattern to a log
PAL2012/20121208/raster_20121209-052620-060135.log

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Object: PSR 0656

Moving to Matt's Pulsar at UTC 06:10
**REROTATING AND RETHRESHOLDING**

Guide star on the array at UTC 6:27
Object on array at UTC 6:32

Popping out to guide star and repositioning object at UTC 7:19
Guide star on array at UTC 7:20

Back to target at UTC 7:22
Guiding back on

Setting timer to pop out and relocate object every 30 minutes.

Reverse move 10.5E and 8.5N, at UTC 8:38

Popping out again at UTC 9:16

Clouds have rolled in, so we can't find our guide star at the moment. Waiting for them to roll through before trying again. Stopped taking data for now....

UTC 9:30 Clouds have moved out. Getting guide star back on array, then offsetting to target. Different than usual, 20.6 W and 18.0 N. Should now be on our pulsar. Moving to other guider by offsetting 10.5 E, 8.5 N. Still cloudy...

UTC 9:38, moved back to target location. Clouds coming and going. Taking data and guiding again.

UTC 9:56, clouds have mostly cleared. Popping out again, now that sky has cleared a bit.
UTC 10:30, still on it.  Seeing is good and clouds have left.
UTC 10:38, moving to finder star and adjusting slightly.
UTC 10:40, back to target. Should be on pixel r0/p82

UTC 11:17 Laser Cal
UTC 11:21:15, taking data again after popping off and back.
UTC 11:50:00, finishing on this target.

UTC 11:52 Laser Cal
Moving at UTC 11:53 to new target

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Target: SDSS J0926

UTC 12:05, target is on good part of array and guiding.
At UTC 12:07, dome move seems to fix some bright reflection from moon or nearby star that was putting glare on guide cam.

UTC 12:45, moved target 1” SE to get it off some dead pixels.

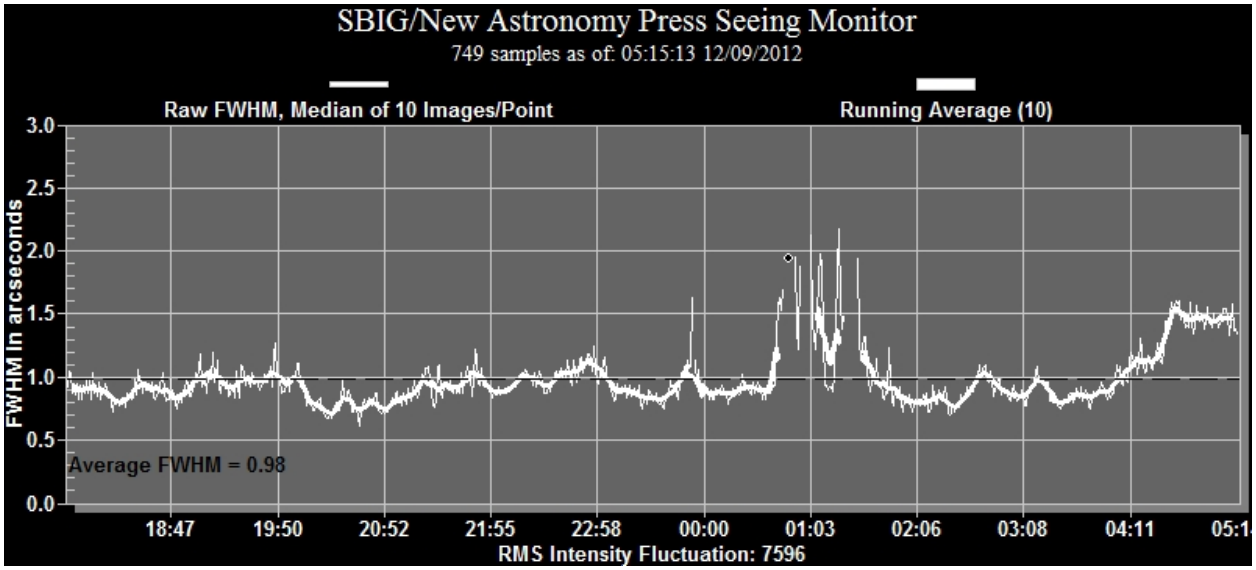
Magnet ran out at UTC 13:10

Laser Cal at UTC 13:11

Continuing data on SDSS J0926 while we warm up.

UTC 13:33 Taking another laser cal. Interesting to see how it looks different since we are now at 115 mK.

Seeing for the night:




DONE!

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DECEMBER 9, 2012
Gambling and movie night.

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DECEMBER 10, 2012

Rechecked laser alignment around UTC 11:00:00 because they needed to take out the coude flat last night. Seems ok, we'll see when we get cold.

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Object: NLTT11748

starting with NLTT11748 at UTC 01:28 to check out alignment. On the guider, but array is not cold yet.

Laser Cal at UTC 02:05

Focusing up on PG 0029+0245
Focus at 21.7 mm for now. Seeing is crap, so we may need to fix this later more.

Back to NLTT at UTC 02:18

DATA DIR WAS NOT UPDATED YET. ALL FILES UP TO NOW FROM TODAY ARE IN YESTERDAY'S FOLDER.

Guiding and taking data continuously at UTC 02:25

UTC 04:16, losing guide star in slit. Moving to manual Seth-guiding.

UTC 04:46 Stopping NLTT to do a standard.

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Object: HR9087

V=5.11, currently at airmass 1.6. May be faint enough with the bad seeing right now.

Laser Cal.

Current focus 21.7 mm. Defocusing to 55 mm. Still too bright...no data.
Back to focus

UTC 05:09, just moved object close enough for scattered light to fill array.
UTC 05:16, taking sky exposure

Laser Cal

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Object: SDSS J0651

UTC 05:33, object is on guider. Dropping it onto array. Too faint to see, so we are moving to a finder star and doing a precise offset instead.

Taking data at UTC 05:40

UTC 06:14 STARTED SAVING GUIDER IMAGES (to wrong directory: 20121208)
COPIED OLD 20121208 IMAGES TO 20121208_real

UTC 07:25
Laser Cal
REROTATED AND RETHRESHOLDED

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Object: SDSS J0926

AM CVN, ultra compact white dwarf binary, V~19. QPO signature in light curve
Moving to object at UTC 07:31

UTC 07:41 Laser Cal

UTC 07:43 On target and guiding.  Target on r0/p171.

Seeing improved to 1.1 at UTC 08:34, so we adjusted focus: went to 21.5.

UTC 08:37, back on target and guiding.

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Object: Geminga

UTC 09:05, seeing is almost down to 1".  Going to try Geminga.

Laser Cal.

UTC 09:10 On target and guiding

UTC 11:36, popping off target to recenter on finder star and blind offset back to target.

UTC 11:38, back on target

Got 2.5 hours on Geminga
Seeing back up to 1.5. so going back to SDSS J0926

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Object: SDSS J0926

UTC 12:00 on target and guiding

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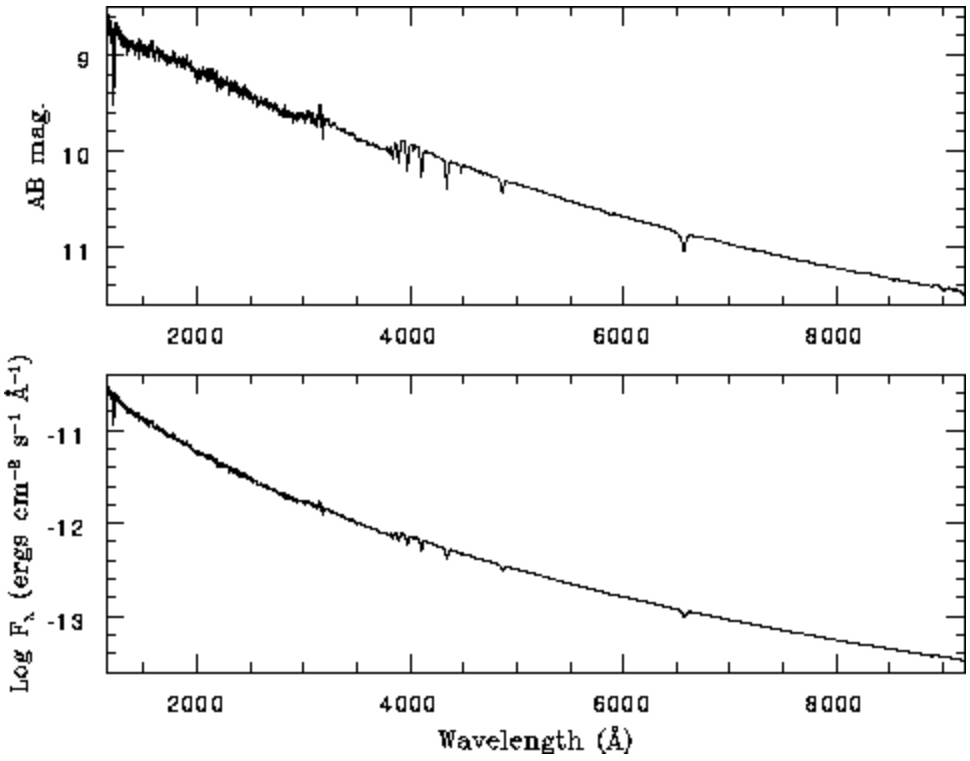
Object: Feige 66

Laser Cal

UTC 13:20: On to spectrophotometric standard, Feige 66, V=10.59.

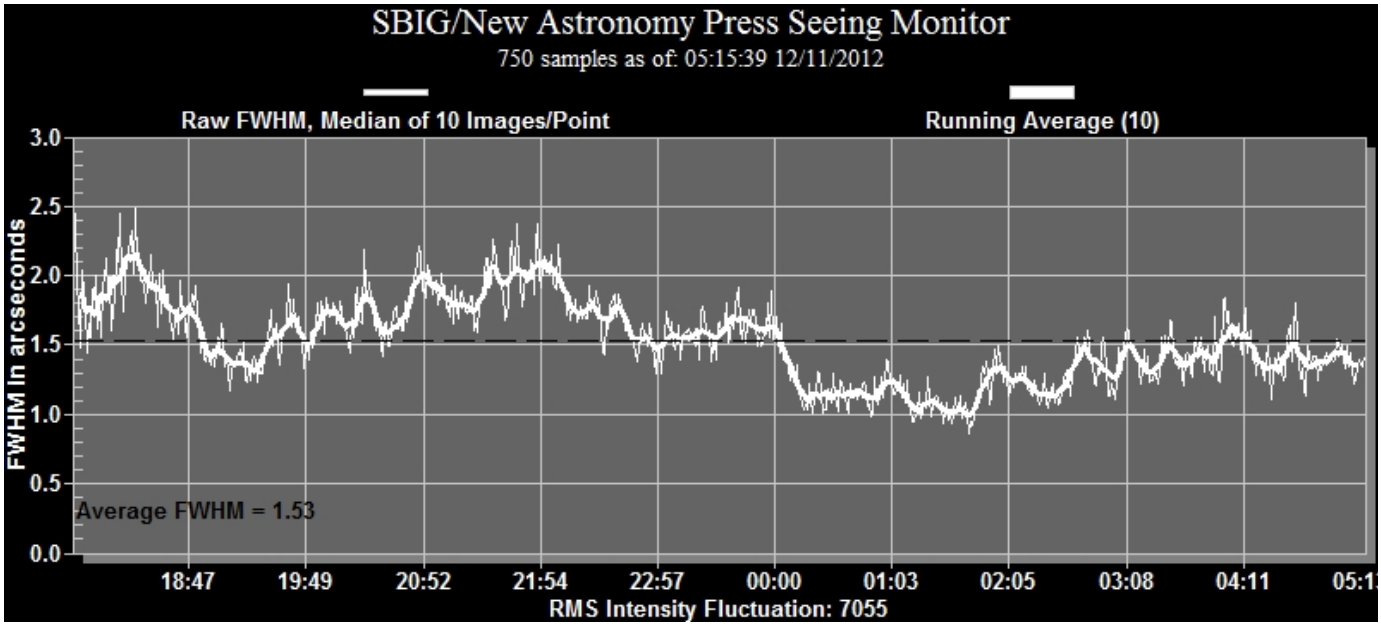



Defocusing to 42mm. Count rates about 250/s/pixel

UTC 13:40, taking a couple 5 minute exposures. Cut second one short because sky counts were coming up. Probably too far into twilight on this standard...

Taking sky exposure at UTC 13:48. Count rate rising quickly...

UTC 13:50, taking twilight flats

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DECEMBER 11, 2012

starting with spectrophotometric standard

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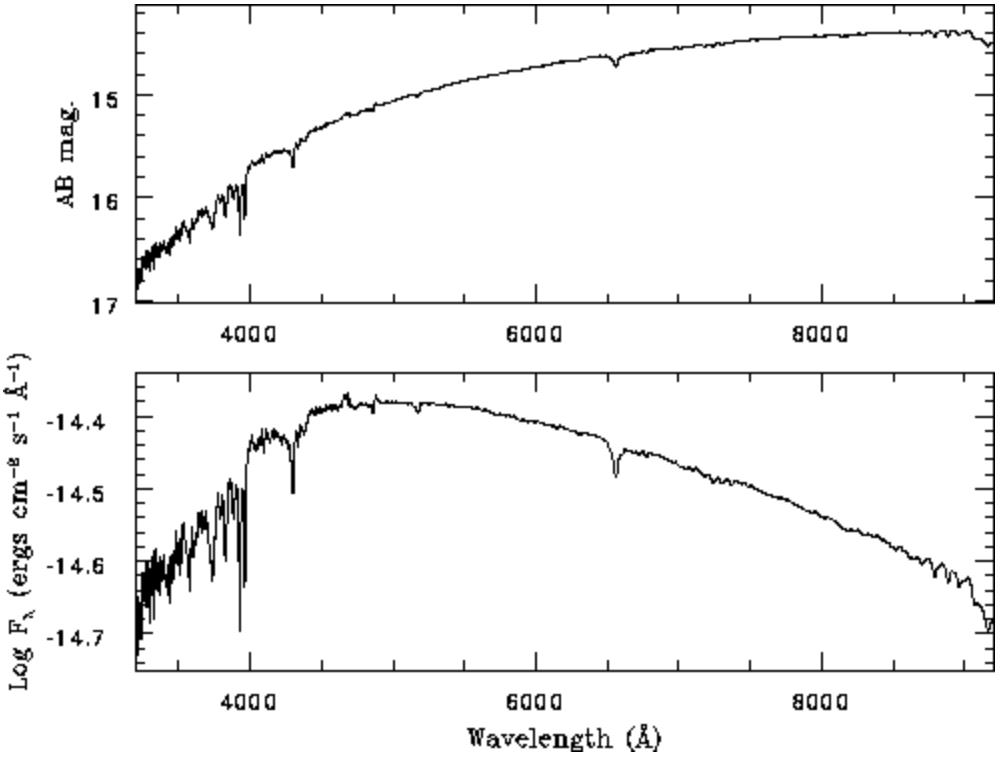
Object: G158-100

UTC 02:10, on target, V=14.891 standard.  We aren't spreading this one out.  Since flat field should take care of pixel-to-pixel variation, we really only need a good object spectrum on a few pixels to do the flux calibration to the object's spectral shape.

Focusing up, 21.5mm




UTC 02:16, taking a few 5-min exposures on different parts of the array.

GUIDER IMAGES FROM TONIGHT GOING INTO 20121210 (still off by a night)

Laser Cal right after.

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Object: NLTT11748

UTC 02:35 to 03:30

**NLTT Total: ~5 hours**

Laser Cal

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Object: Crab

UTC  03:30 Started taking data on Crab

UTC 05:47 moved target to lower left “good portion” of array

Simultaneous GBT observations stopped at 06:13 UTC

UTC 06:37, Laser Cal, and moving to new object

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Object: HM CNC

UTC 06:46 REROTATE AND RETHRESHOLD
Laser Cal

Taking data at UTC 06:55:00
Done at UTC 07:36

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Object: Geminga

UTC: 07:36, going to Geminga

Finding and focusing first. Best focus at 21.0 mm
Finder star on good part of array. Setting “Z” here and offsetting 19.6” E, 0.5” S

UTC 07:41, taking data on target.

UTC 08:12 popping out to make sure we’re in the right place

UTC 08:14 back on and guiding

Popped off and back on to recenter object.
UTC 08:48 taking data again
UTC 09:20 finished on Geminga

Laser Cal

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Object: PTF O8-8695

Going to try an eclipsing planet, from PTF Orion survey.
Have target on top right and reference on bottom left.

Taking data at UTC 09:25
UTC 10:27: Moving back to geminga

Laser Cal
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Object: Geminga

Started observing around UTC 10:30
Guiding has been a bit wonky (UTC 10:38)
This whole observation on Geminga has had some suspect guiding, lots of popping around.

UTC 10:55, moved to different guide star, still not working great, but better.
UTC 11:26, moving on

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Object: SDSS J0926

UTC 11:27 starting data taking

Thin high clouds around 12:50 utc

UTC 13:55, moving to sky flats.

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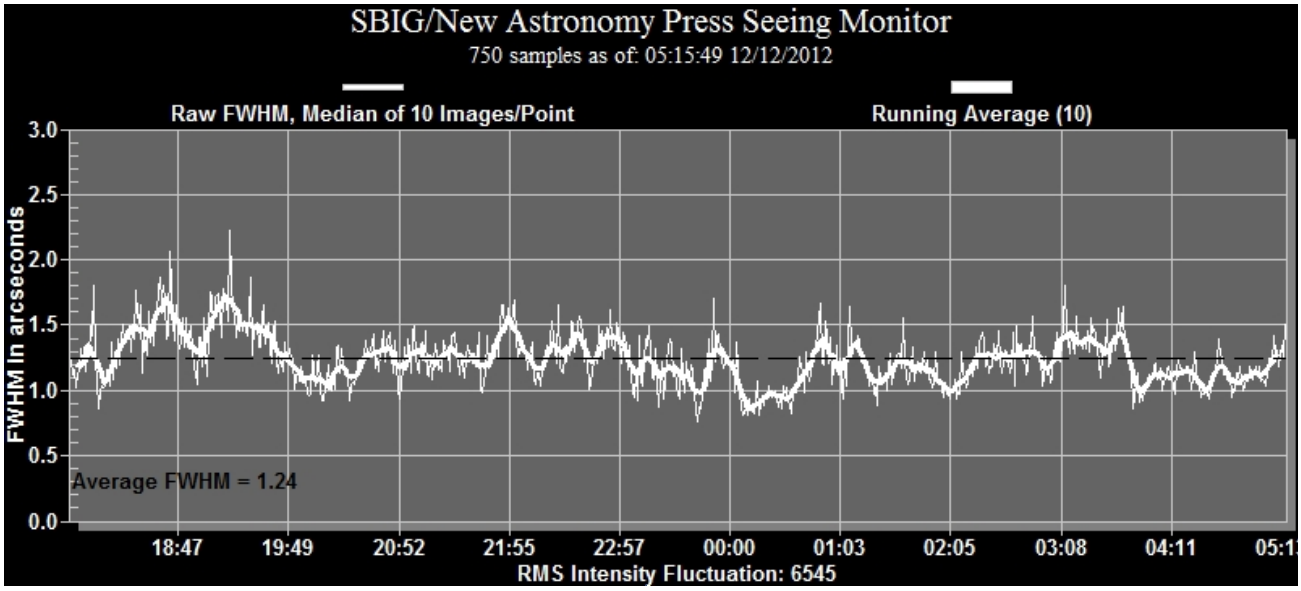
Done at UTC 14:02
Seeing chart:



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DECEMBER 11, 2012

UTC all night: Clouds.....