LLO aLog

2015/01/13

General (Detchar) Link

patrick.meyers@LIGO.ORG - posted 14:39, Tuesday 06 January 2015 - last comment - 17:48, Friday 09 January 2015(16282)

STAMP-PEM ER6 Lines

STAMP-PEM Report on ER6
Below is a list of lines seen in STAMP-PEM during ER6. These lines were consistent across the run. This can be compared to Keith's post on lines on December 19th (16218), specifically a set of lines ~930Hz that show up strongly in several channels.

A good sample of representative data (and interactive plots with zoom tools in the upper right corner) can be seen on the December 16th summary pages:
https://ldas-jobs.ligo-la.caltech.edu/~detchar/summary/day/20141216/detchar/stamp_pem/

STAMP
Stochastic Transient Analysis Multi Detector Pipeline

https://alog.ligo-la.caltech.edu/aLOG/index.php?callRep=16282

L1 ISC (Detchar, PEM, TCS) Link

anamaria.effler@LIGO.ORG - posted 21:00, Tuesday 06 January 2015 (16291)

74 Hz line in DARM from Ring Heater Box at EY

Josh S, Will P, Anamaria

Today we set out to connect a few more magnetometers (since we got back the repaired PS boxes) and check on the 74 Hz peak in DARM which is coherent with the EY EBAY magnetometer.

In the end stations only the EY EBAY magnetometer had been running; we connected the EX EBAY magnetometer, so that can now be trusted as well. The VEA ones had some issues to be further investigated - they continue to not be running.

At EY we moved the EBAY magnetometer around and found that it was the ring heater (RH) box which was causing it. Turning it off made the line go away, and it does not change amplitude with the amount of current requested. See plot for 74 Hz line amplitude in different locations. The racks are in the following order (left to right) SUS -- ISC-- TCS.

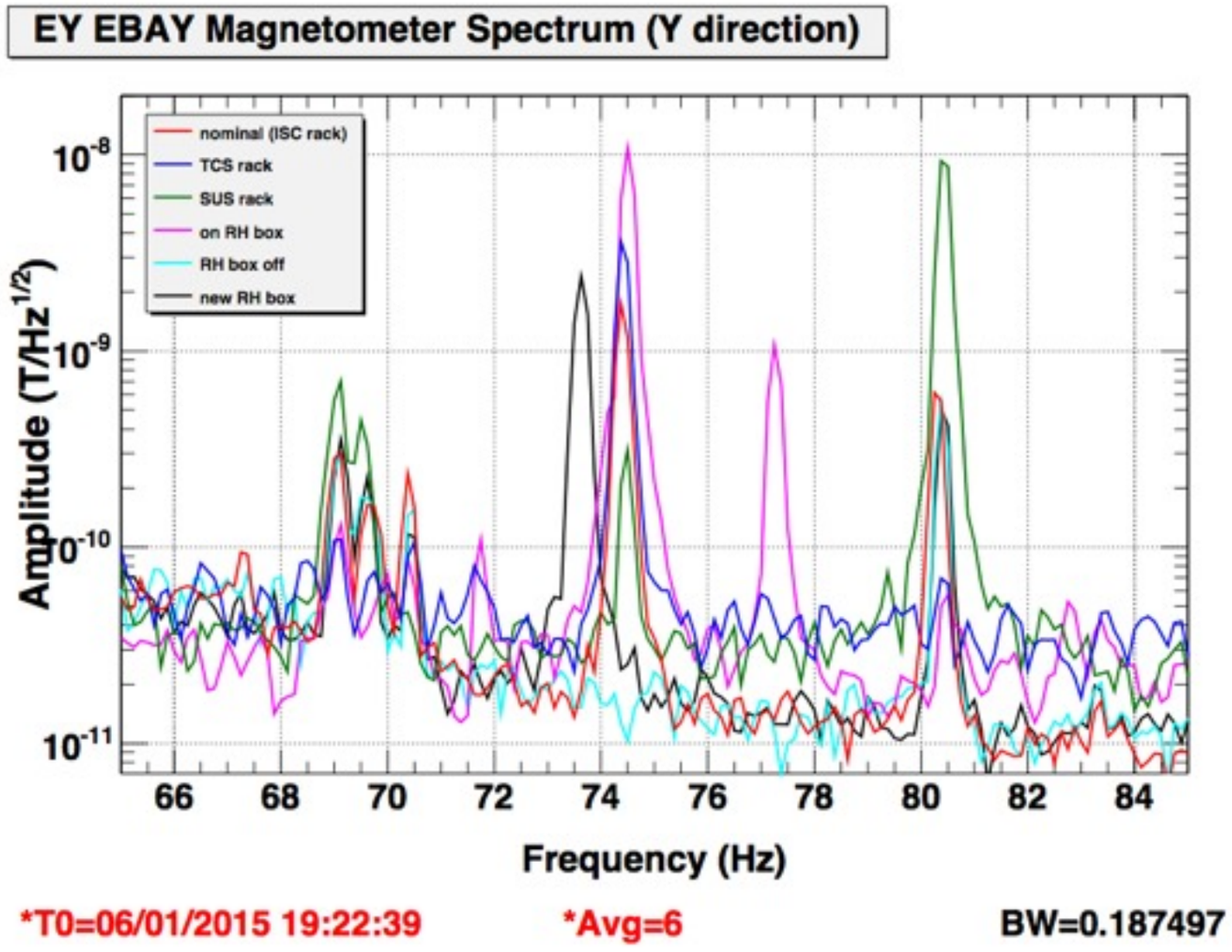
As Carl mentions in the alog below, we then swapped the RH box with the spare, but the spare shows a similar amplitude peak, just offset a bit in frequency. I put back the 0.4 value, hopefully they're close in calibration.

Once we relock, we can check if this line is similarly coherent with DARM. There is a similar peak present at EX and other peaks in the spectrum, but since they're not coherent with DARM, we don't care to first order. That alone is interesting, saying that the coupling mechanisms are different.

For the record, I also power cycled the Hartmann Sensor box.

Non-image files attached to this report

150106-MagSpec_RHbox74Hz.pdf



General (Detchar) Link

joshua.smith@LIGO.ORG - posted 16:00, Wednesday 07 January 2015 (16298)

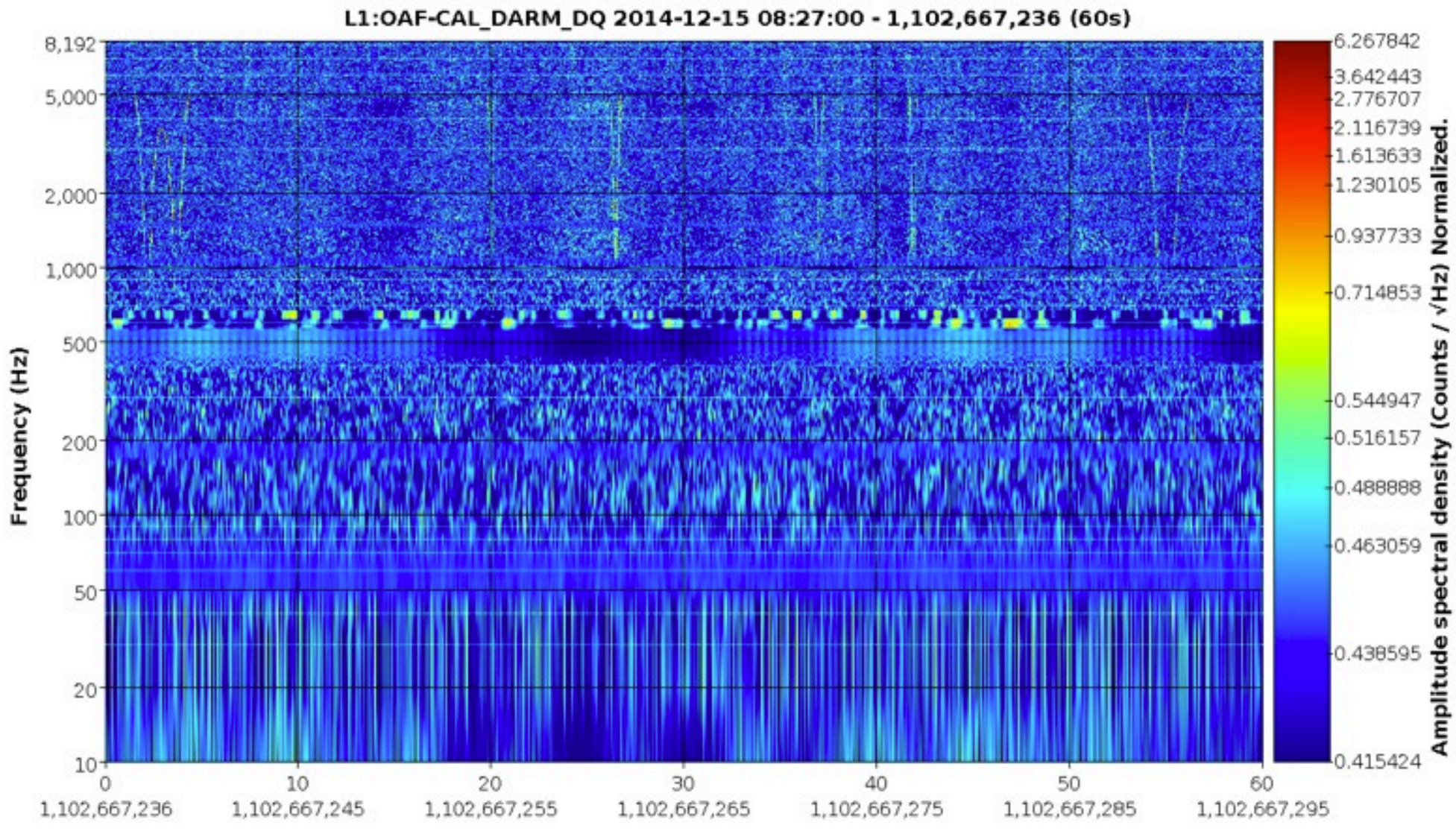
Shape of whistles in DARM in ER6 comes from IMC F

Josh, Andy

Here's a summary of what is known (at least to us) about the RF beat notes in DARM that happen when IMC_F crosses a given values.

- In 16132, whistles (RF beat notes) in DARM were mentioned and, for that particular lock stretch, the glitches happened when IMC-F crossed a value around -812 kHz. This is the same sort of thing that folks have been seeing for a while, and Valera and crew know all about it and have thought of ways to fix it.
- In 14840, there was a mechanism proposed, "the arches appear to correspond pretty well to the absolute frequency difference between MC-F and a fixed oscillator at whatever the IMC VCO makes when MC-F is -812."
- In 16015, we saw that IMC_F itself glitches whenever it crosses a value around -125kHz.
- These glitches were the largest contributions to background in the binary black hole searches performed in ER6.

Attached below is i) a spectrogram of the whistles seen in DARM in ER6, in one minute of data, ii) top: IMC F with a threshold line drawn in at -817kHz (note: in this study I found 817 to be closer than 812) and bottom: the beat signal (the absolute difference between IMC F and -817kHz) zoomed in to show only 0-8kHz, and iii) the beat signal (transparent) overlaid with the spectrogram so that their axes match. The shape of the whistles is very well predicted by the variations in IMC F.

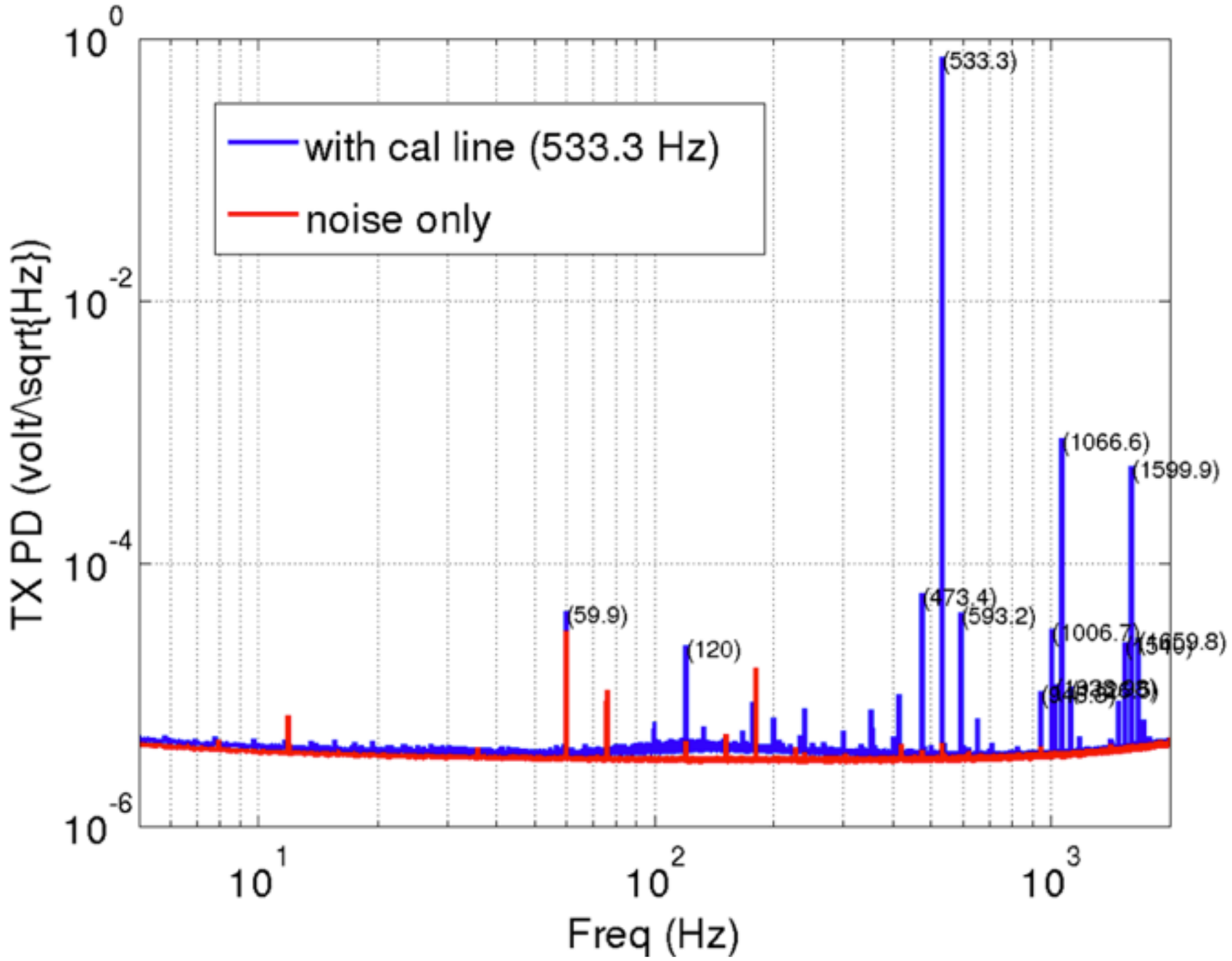


L1 CAL (CAL) Link

shivaraj.kandhasamy@LIGO.ORG - posted 21:28, Thursday 08 January 2015 (16313)

Pcal channels and summary

In the a-log entry, it was noted that a few glitches (~per week) were seen in the Pcal laser. Rick and Valera suggested that reducing the requested laser power might reduce these glitches. After reducing the requested power, the system has been running without any glitches for the past couple of weeks (Today there were some problems with Pcal laser which we are still investigating). We looked at the stability of Pcal line (only one line was running at 533.3 Hz) duing these two weeks by looking at the read back channel used for pcal line calbration. A plot showing the variation of the amplitude of the line is attached here with. In the plot, we see trends (inversly) following temperautre of the transmitter module (where the readback PD is housed) with variation of ~1.5%. In the worst case scenario, this would correspond to systematic error of readback PD and need to be added to existing error of the calibrtion line coming from other factors such error in end test mass, angle of incidence, absolute power calibration etc. Those other factors contribute ~1% error. We have also attached another plot comparing the spectrum of read back channel with and without 533.3 Hz line (dark noise). We see the noise levels are very similar and higher harmonics of cal lines are suppressed by ~3 orders of magnitude (there will be an additional suppression of 1/f^2 when this translates into DARM). Two cal lines were running during part of ER6 and during that period pcal line calibration and OAF calibration agreed within ~15% (@33.7 Hz ~ 3%, @533.3 ~15%; plot attached).



L1 ISC Link

ryan.derosa@LIGO.ORG - posted 03:02, Saturday 10 January 2015 - last comment - 12:26, Monday 12 January 2015(16331)

250 Hz noise

Adam, Josh, Valera, Ryan

After our discussion during the ISC meeting, tonight we decided to move the piezo actuated mirror from the top of the PSL periscope to the tabletop (we moved it to where the M4 mirror is in the layout). At the top of the periscope we placed a REO 45 deg HR mirror. This mirror is marked as s-pol but there is no measurable power loss. We preserved the input alignment with a combination of irises and a jig, raised up to the top periscope height, which either reflected the beam to the other side of the PSL room or injected it into the IMC, depending on the position of a flipper mirror. This technique allowed us to replace the top mirror, realign, replace M4 with the piezo mirror, and then finally realign in less than 1.5 hours. Unfortunately we twisted the piezo in its mirror mount relative to its previous orientation, we will fix this soon but left this DOF disabled tonight since the alignment does not drift quickly and manually touching it up was sufficient.

We saw an immediate improvement between 100 and 300 Hz in the MC WFS spectra, and once we had DARM locked in a low noise state (13 W injected) there was a clear improvement, with the 250 Hz bump removed (see attached spectra). Both the WFS and PRCL spectra show that the peak is now smaller, narrower, and higher in frequency (around 300 Hz). Also different in the attached graph from previous DARM spectra is a better calibration in around the 300 to 500 Hz transfer function feature, created by a little extra filtering of the L2 drive around these frequencies.

We have been locked in the undisturbed state since around 0700 UTC, with the range varying from 40-45 Mpc, with what looks a 1 hour periodicity.

Piezoelectric Transducer - Controls the position of one mirror in the OMC (works with HTR to obtain a single mode)

https://alog.ligo-la.caltech.edu/aLOG/index.php?callRep=16331