

status

- 8/18-8/24のaLog
- 8/9 7.5hロックのdata quality shift
- Violin modeに関する記述

laura.nuttall@LIGO.ORG - posted 17:14, Thursday 21 August 2014 (14259)

Detchar Data Quality Shift - 9th August 7.5hr lock

Laura Nuttall, Peter Saulson, TJ Massinger, Detchar

Detchar has been conducting DQ shifts of recent LLO lock stretches to look at the performance of the detector from the data quality point of view (links to all DQ shifts can be found on the [detchar lock pages](#) - some pages are more complete than others). In these pages we use a variety of tools to try and identify the majority of glitches in DARM, compare the trigger rate now with s6 rates, and look at how event trigger generators deal with the current data.

The main page for the 9th August DQ shift can be found [here](#)

Highlights from 9th August DQ Shift:

- There is a dramatic 4 Hz comb seen across the spectrum. See the [fscan results](#) on the wiki page and an [alog](#) from Keith
- Glitches occur in a variety of flavors:
 - There was one [massive glitch](#), occurring at ~11:40 UTC. It appears to have come from the ISS or related parts of the PSL. **Question for commissioners, were you performing any injections at this time?**
 - Both [Excess Power](#) and [Omicron](#) report steady glitching in the vicinity of 3 kHz. Study of zoomed [spectrograms](#) reveals this to be glitchy sidebands on the 3.3 kHz dither line of the OMC.
 - There is also a [population of low frequency glitches](#). They were quite noticeable at a rate of ~ 5 - 10/hr early in the lock, increasing in rate toward the very end of the lock. Most (~all?) of these were shown to be caused by DAC "major carry transition" glitches in the drive of ETMX.
 - [hveto](#) found several "storms" of glitches linked to glitches in SRCL. These only account for a few percent of DARM glitches, but a veto based on them would have a hefty use percentage, ~26 percent.
- The rate of low SNR triggers seems to be comparable now to S6. The rate of high SNR (i.e. $SNR > 8$) triggers is about an order of magnitude worse now than in s6. However, the majority of these triggers will be due to the DAC and OMC glitches. So the rate of high SNR triggers, once these glitches have been mitigated, is probably closer to s6 rates. Plots can be found [here](#)

shiftのページはロックされていて見れなかった。

glitch trigger rateはオーダーでS6より悪いが、メインはDACとOMCだと思われるため取り除けば、S6に近づけるとと思われる。

keith.riles@LIGO.ORG - posted 16:06, Wednesday 20 August 2014 (14231)

Violin mode frequencies redux

(In an e-mail Angus pointed out a typo in the table in [this entry](#) and clarified that I should cite only the December 2013 EY in-air measurements, which supersede those of November 2013, but I was too slow to make the fixes and exceeded the 24-hour editing window. So below is the revised table.)

In-air freq	Test mass	Fiber	DARM freq(s)	DARM split
499.2 Hz	EY	BL	499.6002 Hz, 499.6711 Hz	0.0709 Hz
502.7 Hz	EY	BR	503.1044 Hz, ?	
508.75 Hz	IX	FL	508.9755 Hz, 509.0648 Hz	0.0893 Hz
508.9 Hz	IY	BL	508.4244 Hz, 508.5167 Hz	0.0923 Hz
509.6 Hz	IY	BR	509.4556 Hz, 509.5409 Hz	0.0853 Hz
510.5 Hz	IX	BL	510.2139 Hz, 510.2878 Hz	0.0739 Hz
511.6 Hz	IY	FL/FR	510.9467 Hz, 511.0208 Hz	0.0741 Hz
511.6 Hz	IY	FL/FR	511.5171 Hz, 511.5669 Hz (?)	0.0398 Hz (?)
513 Hz	EX	BL/FL	513.1267 Hz, 513.2194 Hz (?)	0.0927 Hz (?)
513 Hz	EX	BL/FL	513.2300 Hz, 513.3278 Hz (?)	0.0978 Hz (?)
514.8 Hz	EY	FL/FR	515.3431 Hz, 515.4184 Hz (?)	0.0771 Hz (?)
514.8 Hz	EY	FL/FR	515.3695 Hz, 515.4373 Hz (?)	0.0678 Hz (?)
515 Hz	EX	BR	515.5439 Hz, 515.6205 Hz (?)	0.0766 Hz (?)
515.5 Hz	IX	BR/FR	515.8611 Hz, ?	
515.5 Hz	IX	BR/FR	515.9453 Hz ?	

denis.martynov@LIGO.ORG - posted 00:12, Wednesday 20 August 2014 - last comment - 12:08, Wednesday 20 August 2014(14214)

quad violin mode damping

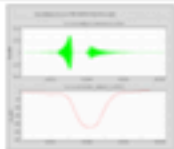
Tonight I worked on damping of quad violin modes. PRCL was used as an error signal while L2 stage of ITMX was an actuator. Broadband noise of PRCL error in PRM configuration is $\sim 10^{-16}$ m/Hz^{1/2} and gives reasonable SNR for ITM violin modes.

First I determined that violin modes seen in the DARM spectrum at 509Hz and 511Hz come from ITMX. Then L2 stage was excited broadband in length from 508Hz to 512Hz. Measured transfer function from excitation signal to PRCL error is attached as "VIOLIN_TF". I put fitted TF into ITMX L2_LOCK_L filter bank. I used 4th order bandpass butterworth filter with cut-off frequencies located at 1 Hz from the mode. Simulated OLTF is attached as "VIOLIN_OL"

It was surprising how fast violin modes can be excited -- wrong sing of the servo increases violin mode coupling to length from 10^{-15} m up to 10^{-13} m in ~ 1 minute. Damping takes approximately same amount of time. Plot "VIOLIN_ERR" shows control signal to ITMX and PRCL error demodulated at violin mode frequency. First part of the plot shows excitation, while second part -- damping. Plot "DAMPED_509" shows the same process in frequency domain.

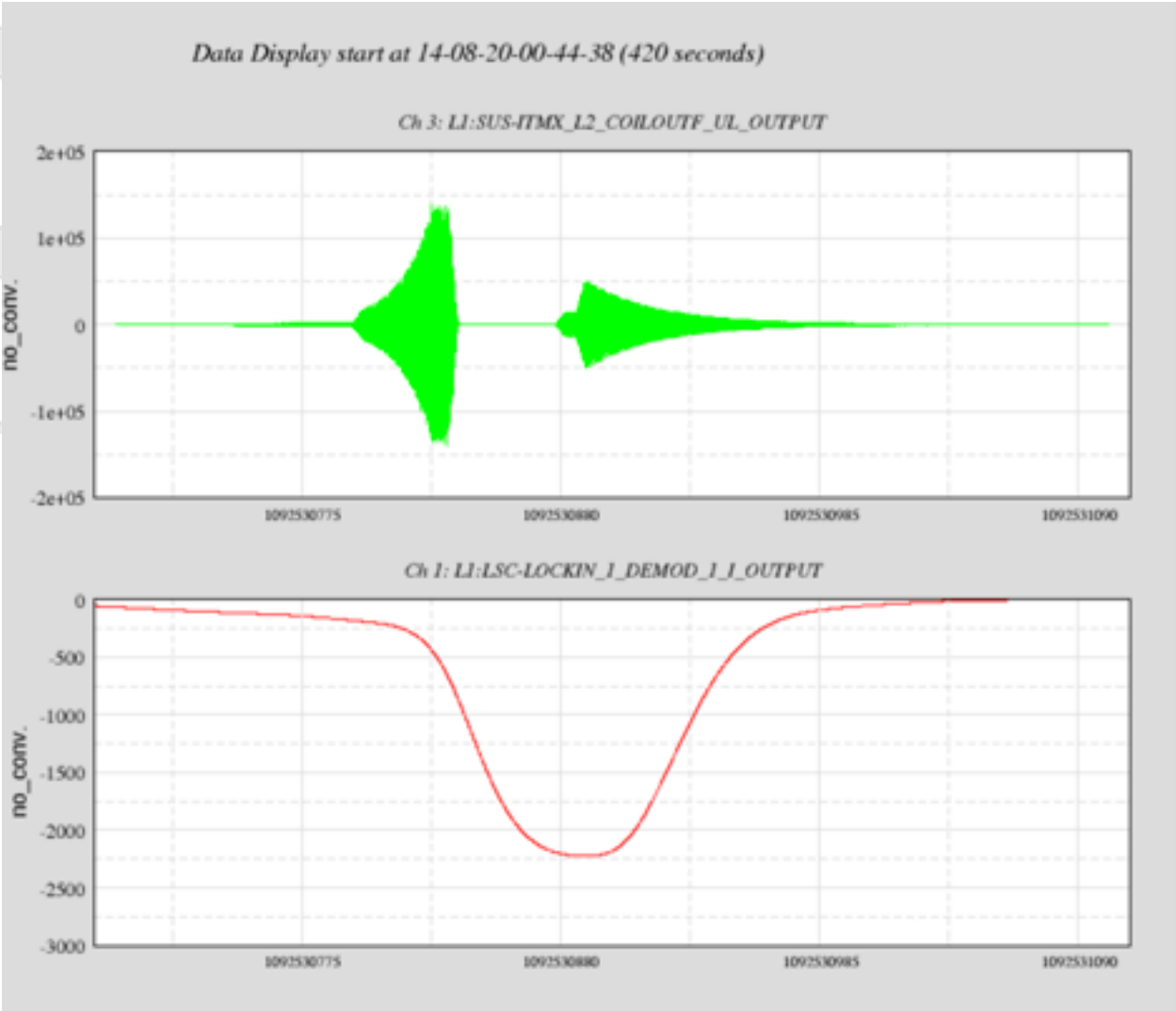
ITMX 509Hz violin mode was dumped, however, it seems that modes are getting excited very fast, for example, when L2 actuator saturates when other violin modes are damped.

Images attached to this report



Non-image files attached to this report

-  [VIOLIN_TF.pdf](#)
-  [VIOLIN_OL.pdf](#)
-  [DAMPED_509.pdf](#)



LLO General (Detchar)

[Link](#) 

nathaniel.strauss@LIGO.ORG - posted 14:51, Friday 22 August 2014 (14280)

DARM Coherence at 905-935 Hz

I took a look at the lines in the DARM spectrum on 905-935 Hz ([aLog](#)) and compared them to the output of the coherence tool on a bandwidth of 1mHz from the August 9 lock. I only found one channel that had a similar structure on this frequency band and one line that matched up exactly, but the general structure on this band looks very similar.

Non-image files attached to this report

 [DARMCoherenceat905-935Hz.pdf](#)

[https://alog.ligo-la.caltech.edu/aLOG/uploads/
14280_20140822144723_DARMCoherenceat905-935Hz.pdf](https://alog.ligo-la.caltech.edu/aLOG/uploads/14280_20140822144723_DARMCoherenceat905-935Hz.pdf)

stuart.aston@LIGO.ORG - posted 18:24, Friday 22 August 2014 (14285)

ETMX BSC-ISI Power Spectra (in-air, dome on, doors off) show some improvement

[Ryan D, Stuart A]

Reference power spectra were previously taken following the vent, but still with doors on the chamber (see LLO aLOG entry [14079](#)). Note that these measurements were carried out with both ST1 and ST2 isolated using Guardian (i.e. by requesting the FULLY_ISOLATED state).

After removing BSC4 chamber doors and dome, I was not able to isolate the ISI, due to purge air turbulence. Even after the dome had been refitted, attempting to isolate ST1 of the ISI with Guardian, tripped the T240s. Since at present Guardian only supports the highest isolation level (3), we switched to using command scripts and were able to isolate ST1 one DOF at a time, manually ramp in filters. This approach was successful for ST1, but ST2 tripped on every attempt to isolate it.

The first plot shows ST1 and ST2 motion with no isolation (see below ETMX_X_No_Isolation.png). The second plot shows the same, but with ST1 isolation loops running (see below ETMX_X_ST1_Isolation.png).

There appears to be some improvement at around 0.3 Hz compared to the original reference measurement (reproduced in third plot below ETMX_X_ST1andST2_Isolation.png), but we really need to be able to isolate ST2 to be sure. So it may not be possible to measure until chamber doors are on, and purge air is off.

Images attached to this report

