# aLOG@LHO Review

2015. 6. 3 - 6. 10

John OH (NIMS)

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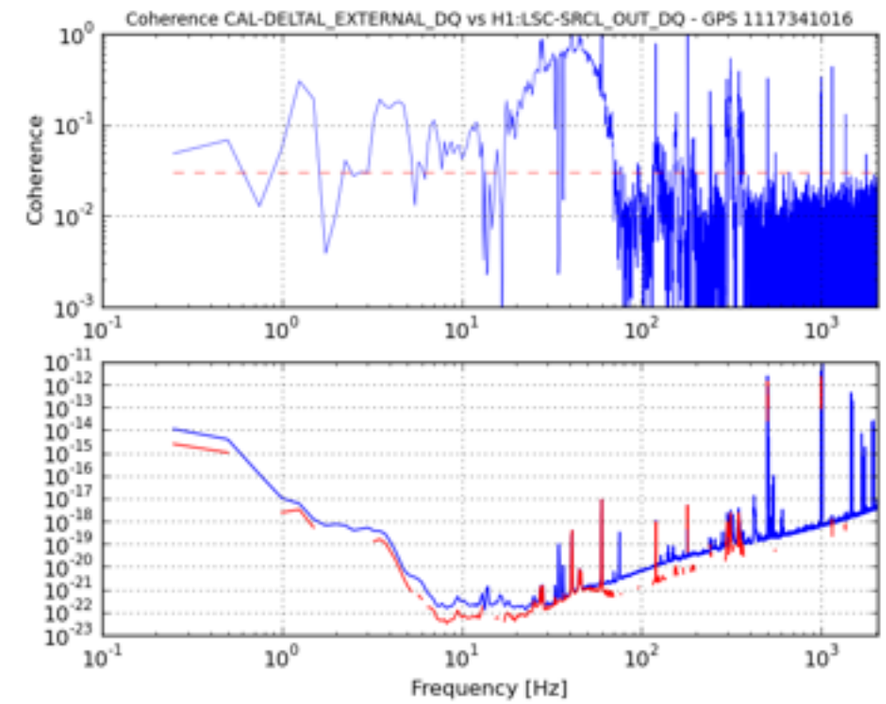
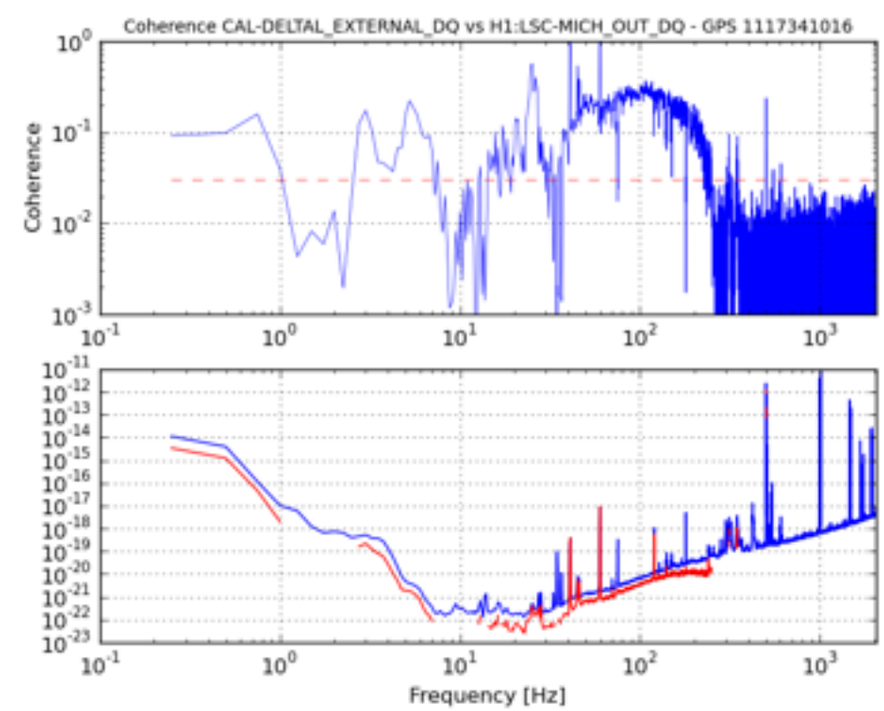
1. Coherence - BRUCO
2. Glitches in PRCL, SRCL
3. 25.4Hz Peaks

# Coherences

H1 ISC(DetChar, ISC) : Reported 11:44, 03 June, 2015

- Brute Force Coherences (Bruco)
- https://ldas-jobs.ligo.caltech.edu/~gabriele.vajente/bruco_1117341016/

# Bruco

## Brute Force Coherence Tool by Gabriele Vajente

https://alog.ligo-la.caltech.edu/aLOG/index.php?callRep=13415

- Brute Force Coherences (Bruco)

- The main **output is a table: for each frequency the 20 channels with the largest coherence are shown**, in order of decreasing coherence. For each channel, the computed coherence is saved in a PDF plot, similar to the one attached. **The top panel shows the coherence in log scale, the dashed red line being the 95% confidence level. The bottom panel shows the DARM spectrum with a coherence-based projection of the contribution of the channel.**

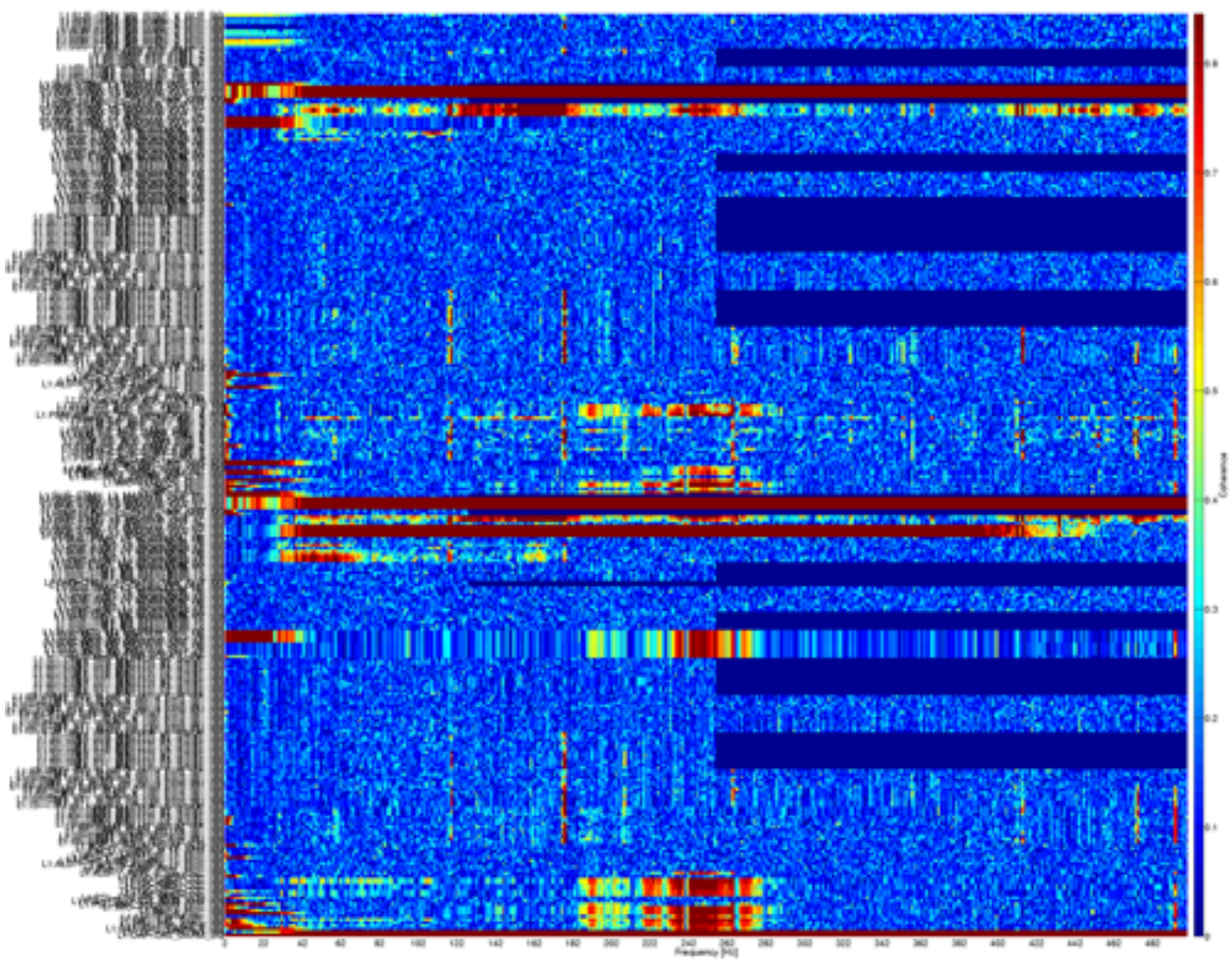
| Frequency [Hz] | Top channels | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 0.00 | SUS-ETMY_R0_DAMP_Y_IN1_DQ (0.55) | SUS-ETMY_R0_DAMP_L_IN1_DQ (0.55) | SUS-ETMY_M0_DAMP_L_IN1_DQ (0.54) | SUS-ETMY_L1_WIT_L_DQ (0.53) | SUS-ETMY_L1_WIT_Y_DQ (0.53) | SUS-ETMY_M0_DAMP_R_IN1_DQ (0.52) | SUS-ETMY_M0_DAMP_Y_IN1_DQ (0.50) | SUS-ETMY_L2_WIT_Y_DQ (0.50) | SUS-ETMY_L2_WIT_L_DQ (0.50) |
| 0.25 | SUS-ETMY_R0_DAMP_L_IN1_DQ (0.48) | SUS-ETMY_M0_DAMP_L_IN1_DQ (0.47) | SUS-ETMY_L1_WIT_L_DQ (0.47) | SUS-ETMY_L1_WIT_Y_DQ (0.46) | SUS-ETMY_R0_DAMP_Y_IN1_DQ (0.46) | SUS-ETMY_L2_WIT_Y_DQ (0.43) | SUS-ETMY_L2_WIT_L_DQ (0.43) | SUS-ETMY_M0_DAMP_Y_IN1_DQ (0.42) | SUS-ETMY_M0_DAMP_Y_IN1_DQ (0.42) |
| 0.50 | SUS-ETMY_L1_WIT_P_DQ (0.61) | SUS-ETMY_R0_DAMP_P_IN1_DQ (0.48) | SUS-ETMY_M0_DAMP_L_IN1_DQ (0.38) | SUS-ETMY_R0_DAMP_L_IN1_DQ (0.37) | SUS-ETMY_L1_WIT_Y_DQ (0.36) | SUS-ETMY_L1_WIT_L_DQ (0.36) | SUS-ETMY_L2_WIT_Y_DQ (0.34) | SUS-ETMY_L2_WIT_L_DQ (0.33) | SUS-ETMY_L2_WIT_P_DQ (0.32) |
| 0.75 | SUS-ETMY_L1_WIT_P_DQ (0.55) | SUS-ETMY_R0_DAMP_P_IN1_DQ (0.39) | SUS-BS_M1_MASTER_OUT_F3_DQ (0.32) | SUS-ETMY_M0_DAMP_P_IN1_DQ (0.31) | SUS-BS_M1_MASTER_OUT_F2_DQ (0.30) | SUS-ITMX_M0_DAMP_L_IN1_DQ (0.30) | IMC-F_OUT_DQ (0.28) | IMC-L_OUT_DQ (0.27) | IMC-MCL_IN1_DQ (0.27) |
| 1.00 | SUS-ETMY_L3_ESDAMON_LR_DQ (0.53) | SUS-ETMY_M0_DAMP_P_IN1_DQ (0.16) | ASC-REFL_B_RF9_I_YAW_OUT_DQ (0.15) | SUS-SRM_M3_WIT_Y_DQ (0.15) | SUS-IM4_M1_LOCK_Y_IN1_DQ (0.15) | ASC-INP1_Y_OUT_DQ (0.15) | ASC-REFL_B_RF9_Q_YAW_OUT_DQ (0.15) | LSC-ASAIR_B_RF18_Q_ERR_DQ (0.14) | ASC-REFL_A_RF9_I_YAW_OUT_DQ (0.14) |
| 1.25 | SUS-ETMY_L3_ESDAMON_LR_DQ (0.76) | ASC-REFL_B_RF9_I_YAW_OUT_DQ (0.51) | ASC-REFL_B_RF9_Q_YAW_OUT_DQ (0.51) | ASC-REFL_B_RF45_I_YAW_OUT_DQ (0.50) | LSC-REFL_A_RF9_I_ERR_DQ (0.50) | ASC-REFL_B_RF45_Q_YAW_OUT_DQ (0.49) | LSC-ASAIR_B_RF18_Q_ERR_DQ (0.49) | ASC-REFL_A_RF9_I_YAW_OUT_DQ (0.49) | ASC-REFL_A_RF45_I_YAW_OUT_DQ (0.48) |
| 1.50 | SUS-ETMY_L3_ESDAMON_LR_DQ (0.71) | LSC-REFLAIR_A_RF45_I_ERR_DQ (0.63) | LSC-REFL_A_RF9_I_ERR_DQ (0.63) | ASC-REFL_B_RF9_I_YAW_OUT_DQ (0.58) | ASC-REFL_B_RF45_Q_YAW_OUT_DQ (0.57) | ASC-REFL_B_RF9_Q_YAW_OUT_DQ (0.57) | SUS-PR3_M3_OPLEV_YAW_OUT_DQ (0.57) | LSC-ASAIR_B_RF18_Q_ERR_DQ (0.57) | LSC-REFLAIR_A_RF45_Q_ERR_DQ (0.54) |
| 1.75 | SUS-ETMY_L3_ESDAMON_LR_DQ (0.70) | SUS-ETMY_L1_WIT_L_DQ (0.44) | SUS-ETMY_M0_DAMP_L_IN1_DQ (0.42) | SUS-ETMY_R0_DAMP_L_IN1_DQ (0.38) | LSC-REFL_A_RF9_I_ERR_DQ (0.34) | ASC-X_TR_B_NSUM_OUT_DQ (0.29) | ASC-X_TR_A_NSUM_OUT_DQ (0.28) | ASC-REFL_B_RF45_I_PIT_OUT_DQ (0.24) | ASC-REFL_B_RF45_Q_PIT_OUT_DQ (0.23) |
| 2.00 | SUS-ETMY_L3_ESDAMON_LR_DQ (0.65) | SUS-ETMY_L2_WIT_L_DQ (0.27) | SUS-ETMY_M0_DAMP_L_IN1_DQ (0.21) | SUS-ETMY_L1_WIT_L_DQ (0.18) | SUS-ETMY_M0_DAMP_P_IN1_DQ (0.17) | SUS-ETMY_L2_WIT_P_DQ (0.16) | SUS-ETMX_M0_DAMP_P_IN1_DQ (0.16) | SUS-ETMY_L1_WIT_P_DQ (0.13) | LSC-REFL_A_RF45_Q_ERR_DQ (0.11) |
| 2.25 | SUS-ETMY_L3_ESDAMON_LR_DQ (0.95) | SUS-ETMY_L2_WIT_L_DQ (0.31) | SUS-ETMX_M0_DAMP_L_IN1_DQ (0.24) | SUS-ETMX_M0_DAMP_P_IN1_DQ (0.18) | SUS-ITMY_M0_DAMP_L_IN1_DQ (0.13) | SUS-ITMY_M0_MASTER_OUT_F3_DQ (0.12) | SUS-ETMX_L1_WIT_L_DQ (0.12) | SUS-ITMX_M0_DAMP_L_IN1_DQ (0.12) | ASC-REFL_B_RF9_I_YAW_OUT_DQ (0.11) |

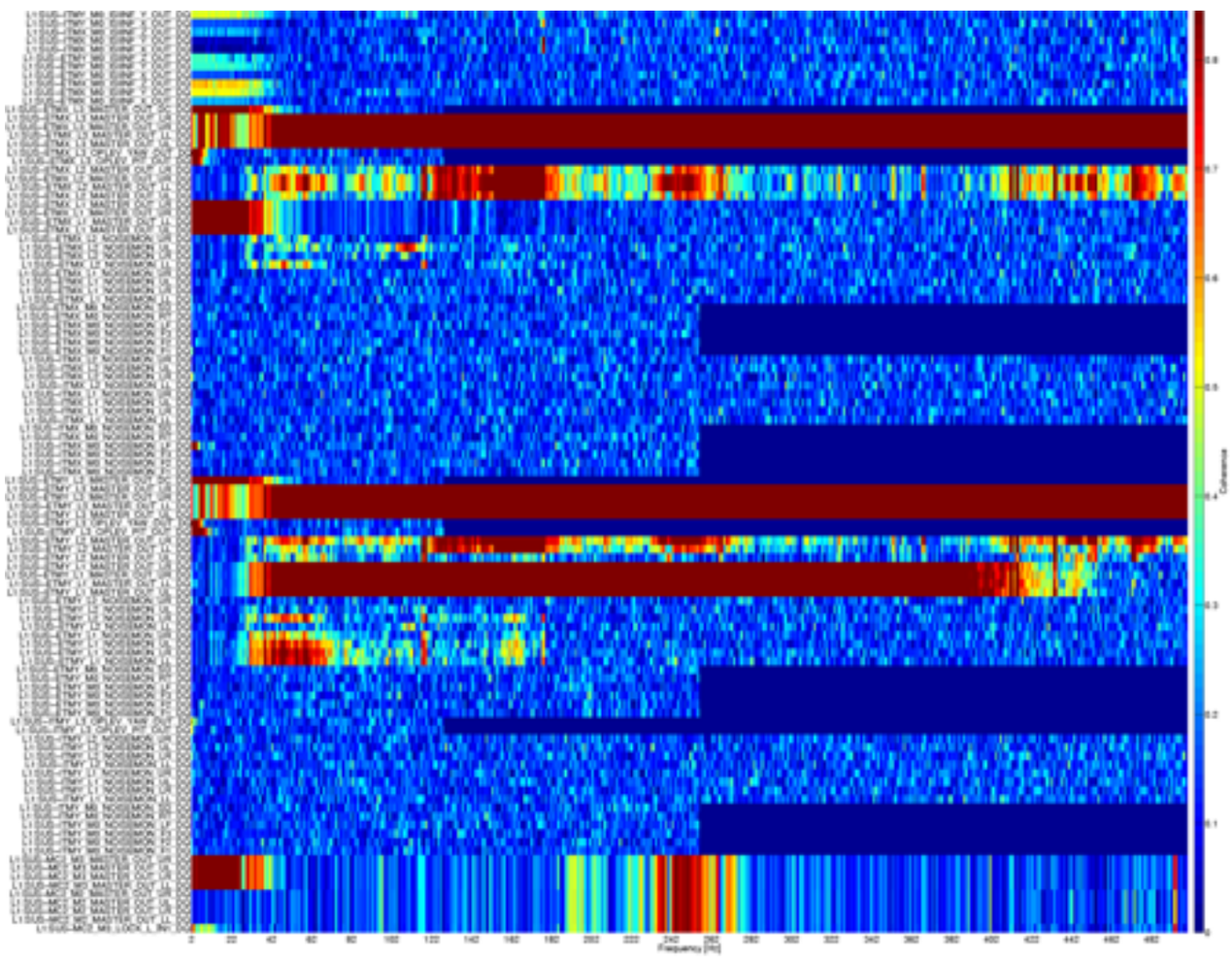
# Similar Approach

## STAMP-PEM (by Shivaraj Kandhasamy)

https://alog.ligo-la.caltech.edu/aLOG/index.php?callRep=13384

- Coherence matrix between DARM and AuxChannels with all frequency range.
- Planned to be added in DetChar Summary page
- Very similar approach with my analysis approach using Correlation Methods

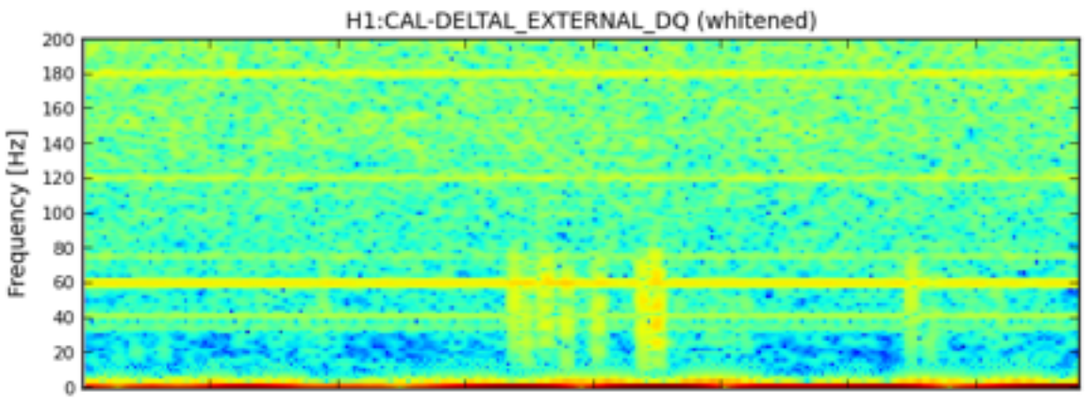




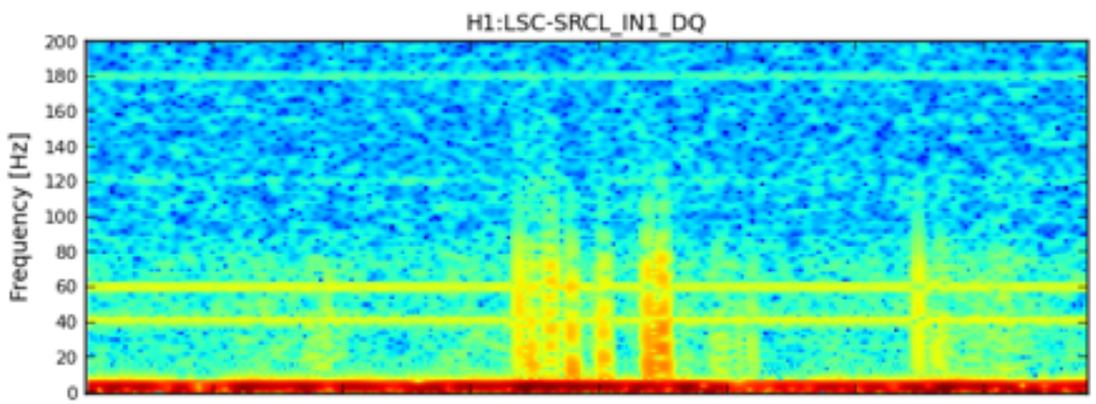
# Glitches in PRCL, SRCL

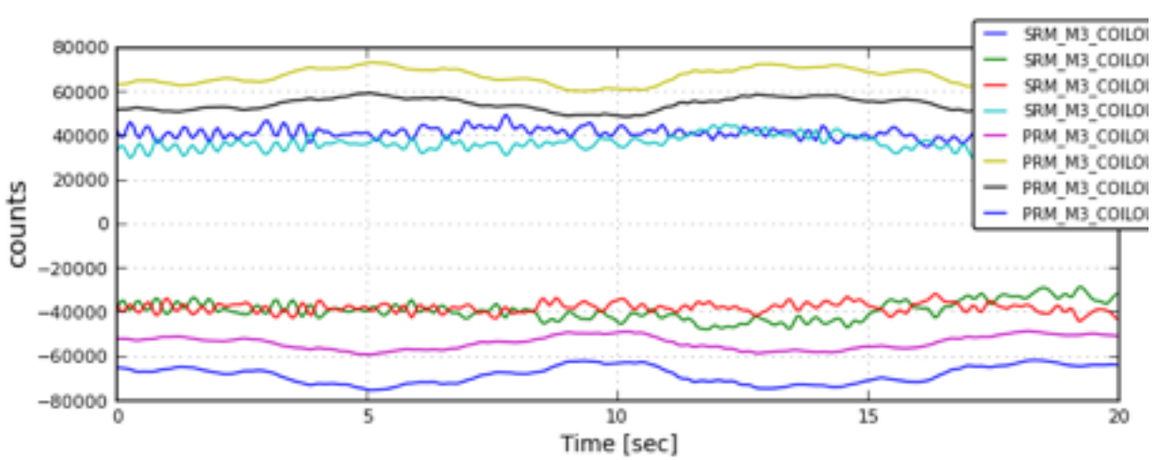
(Reported by Daniel Hoak, June 03 2015, 02:44)

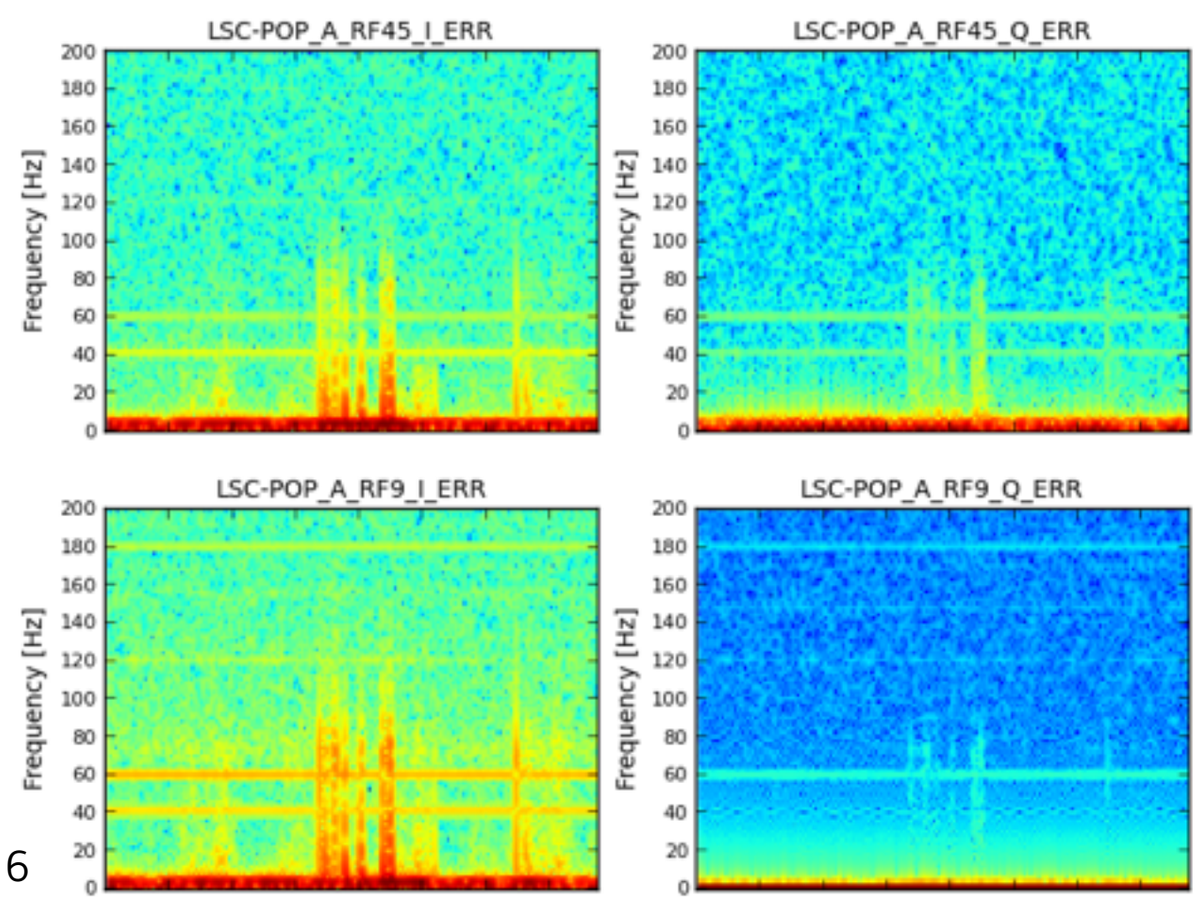
https://alog.ligo-wa.caltech.edu/aLOG/index.php?callRep=18815




- 06:50 UTC, frequent glitches in PRCL and SRCL (non-stationary noises) in DARM btw 20 - 100Hz



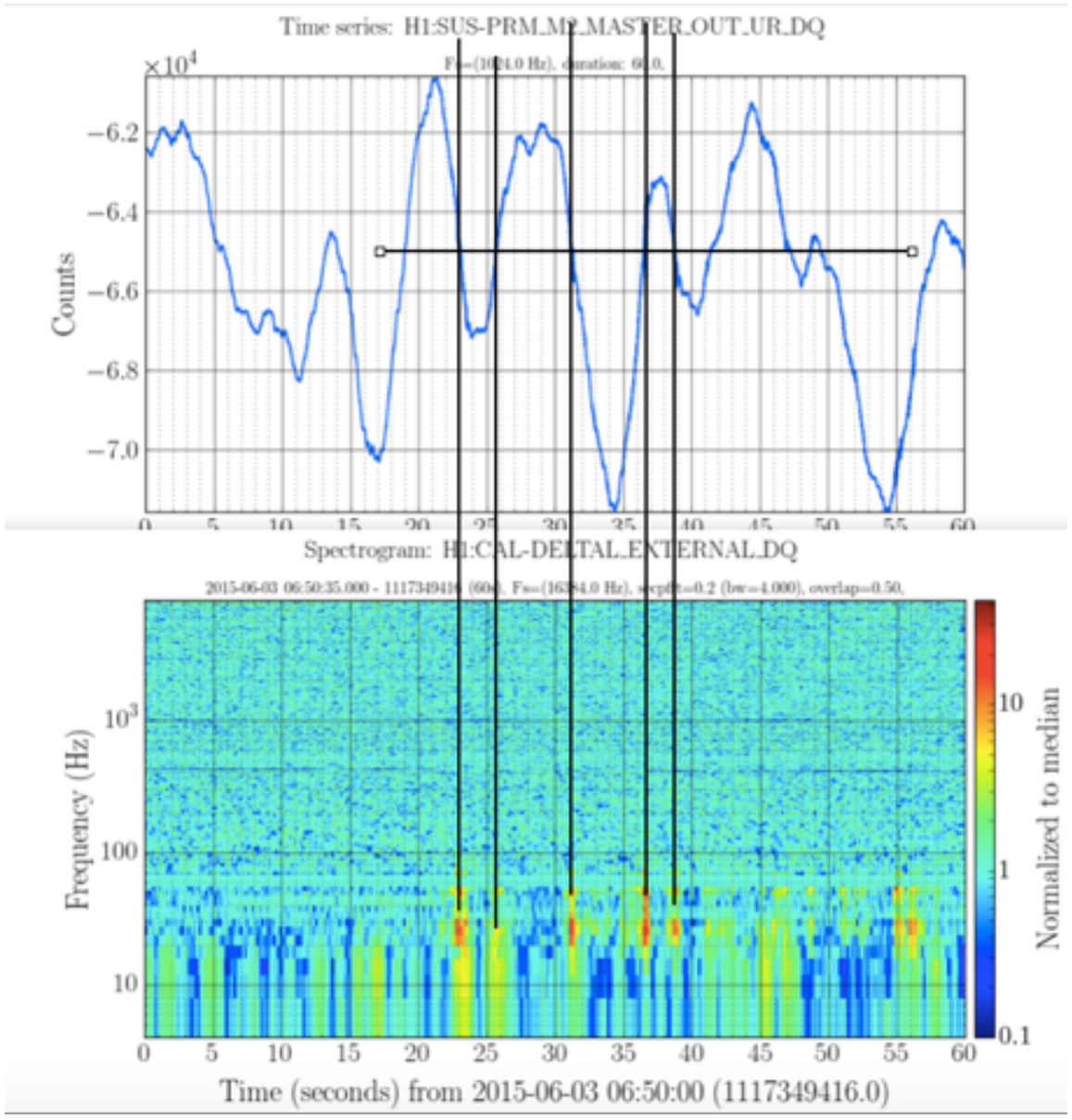
# Glitches in PRCL, SRCL

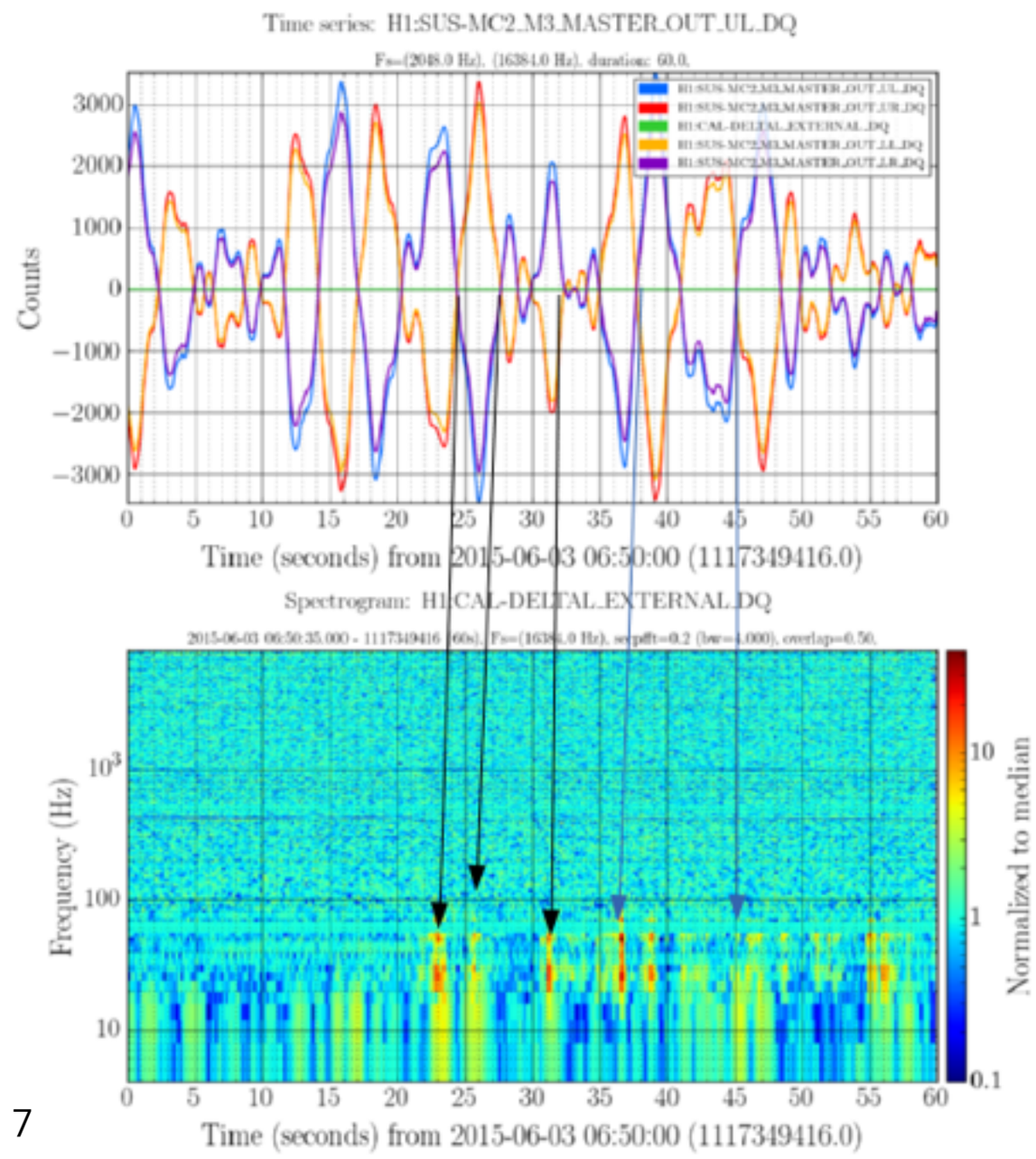
(Reported by Daniel Hoak, June 03 2015, 02:44)

https://alog.ligo-wa.caltech.edu/aLOG/index.php?callRep=18815

- Checking MC2 coils originated by PRM
- They occur when three different crossing: 0 and $\pm 2^{16}$ (=65536 counts)

by Joseph Areeda



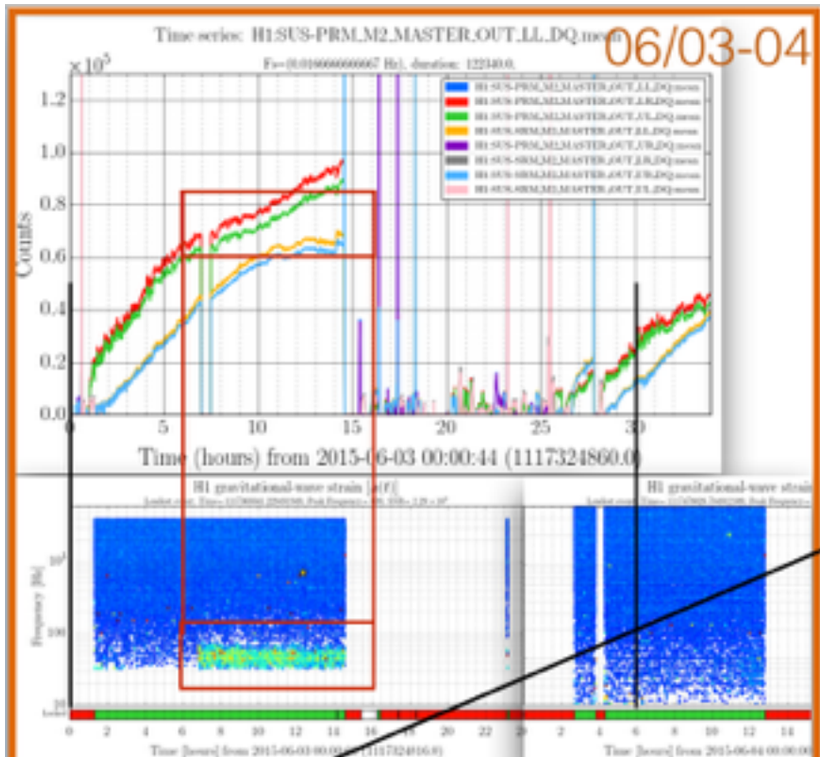




by Josh Smith

# Glitches in PRCL, SRCL

(Reported by Daniel Hoak, June 03 2015, 02:44)

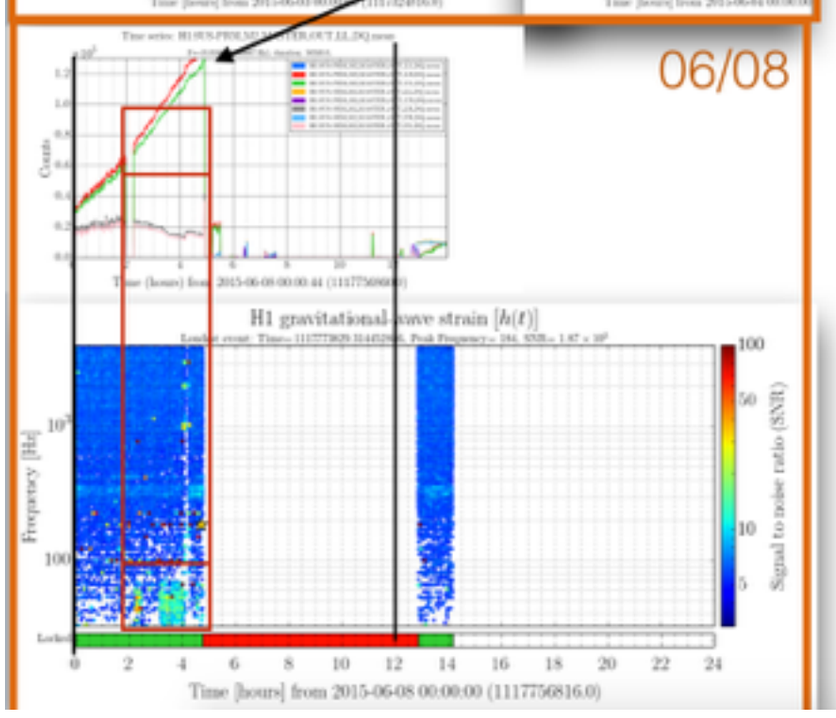
https://alog.ligo-wa.caltech.edu/aLOG/index.php?callRep=18815

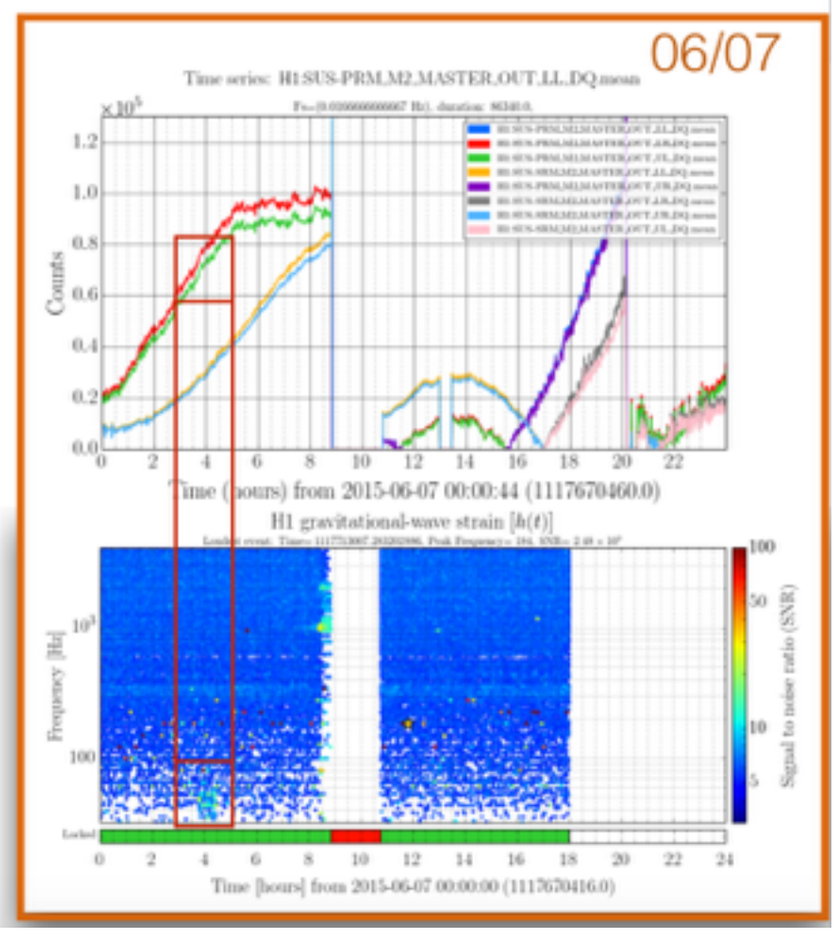



Are PRCL SRCL glitches correlated with PRM/SRM M2 getting near 2^16 and DAC glitches?

Conclusion by Josh Smith – When PRM M2 coils get a mean value close to $2^{16}$, we see glitches in DARM.

Bonus find: 2^17 DAC saturation and lockloss!

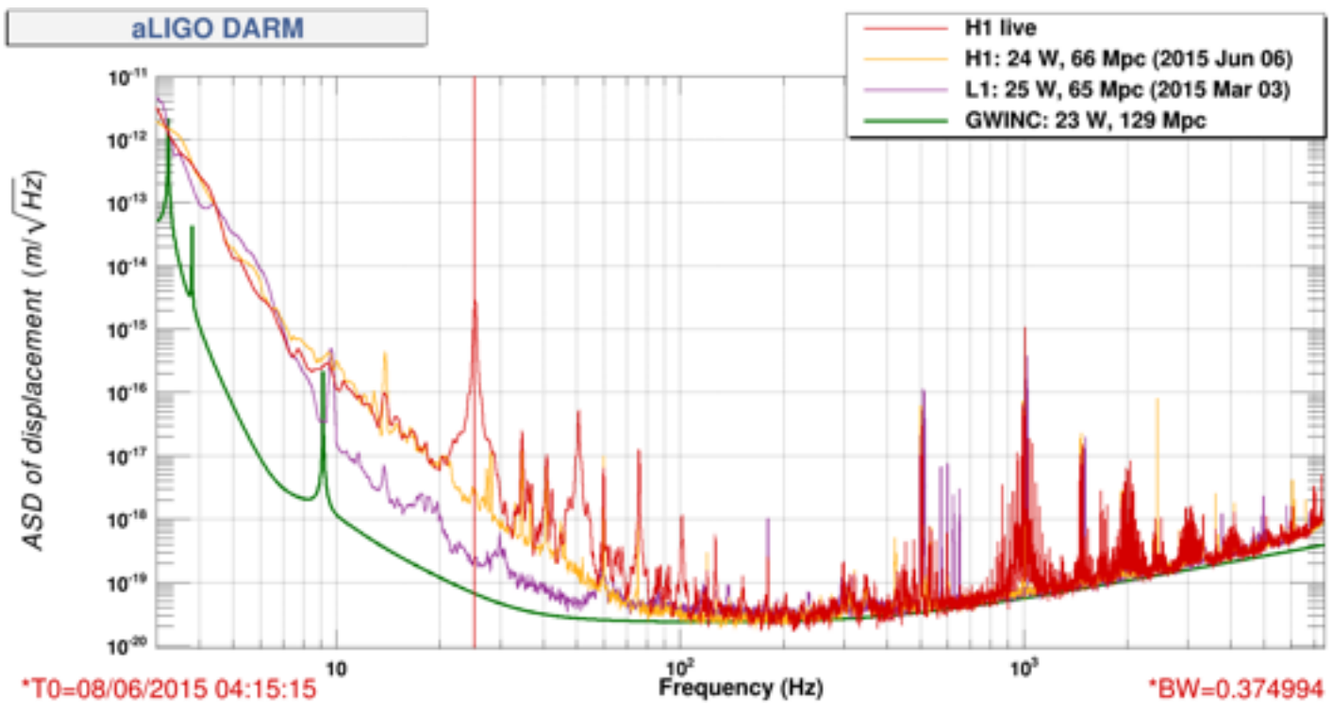


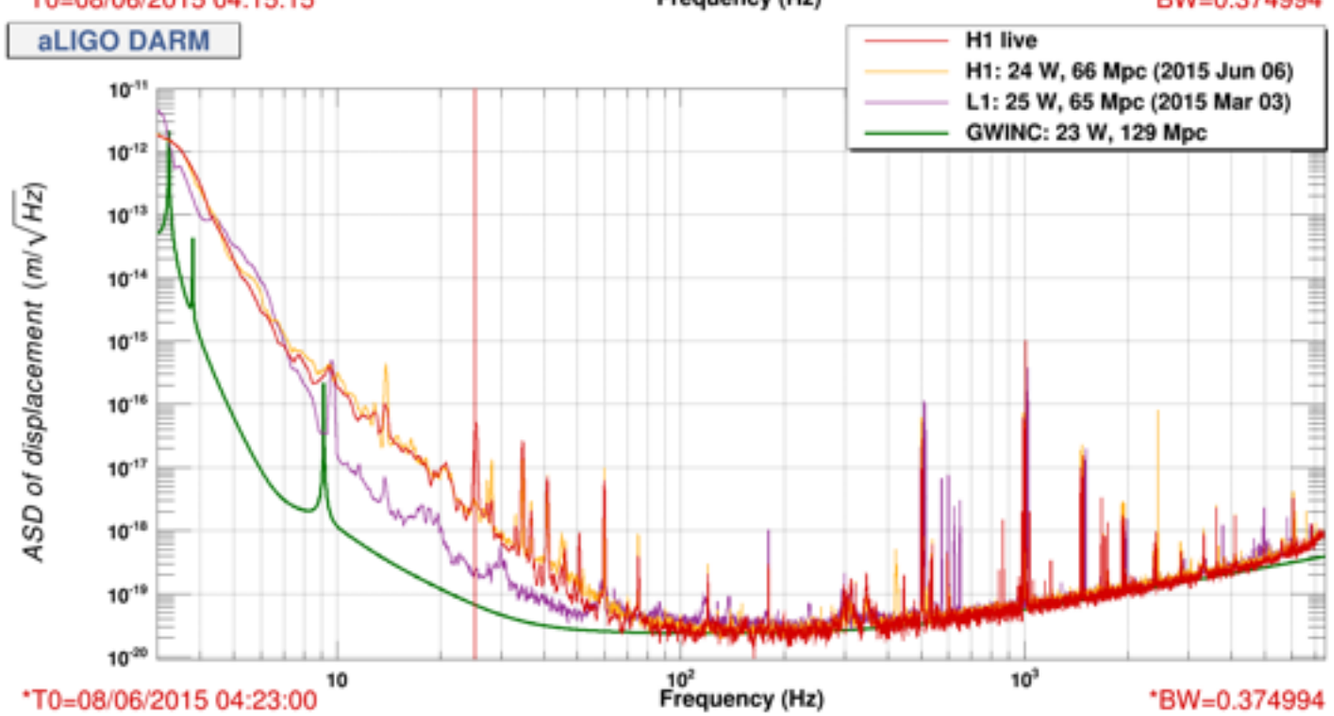



# 25.4Hz peaks

(Reported by Jim Warner, June 07 2015,21:24)

https://alog.ligo-wa.caltech.edu/aLOG/index.php?callRep=18965




- Starting 21:00 (local), the 25.4hz peak showed (above)
- turned off the power down to 16watts - peak subsided (below)