



$h(t)$: are you experienced?



Michael Landry
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on behalf of the CW search group

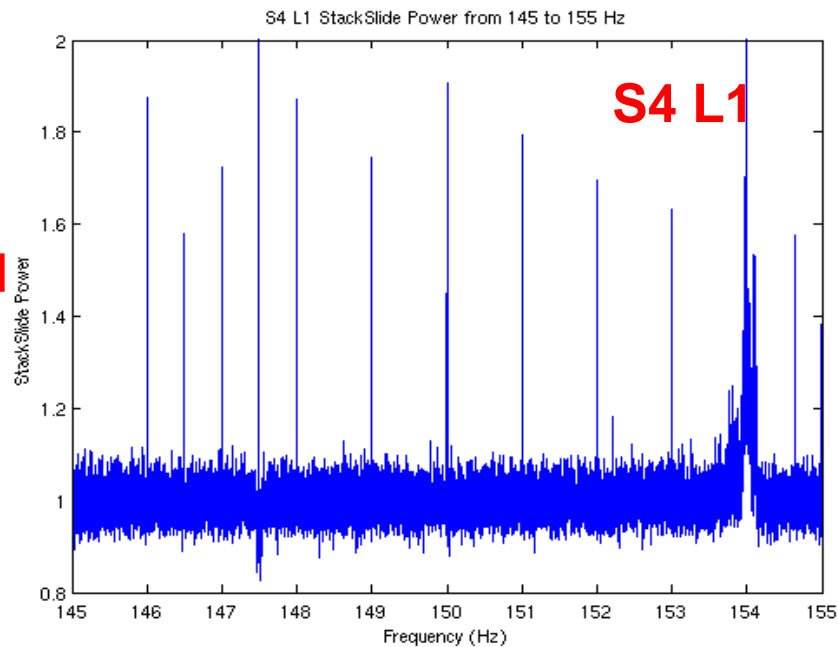
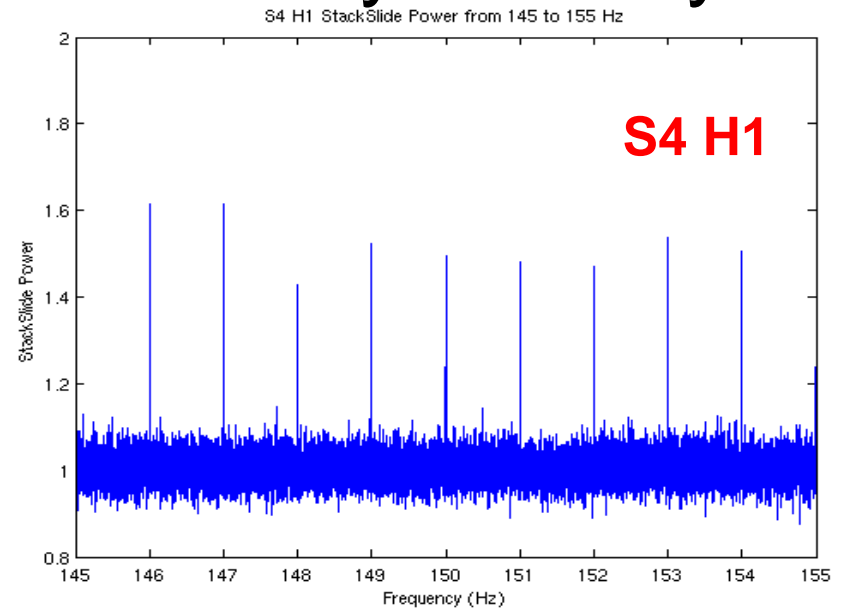
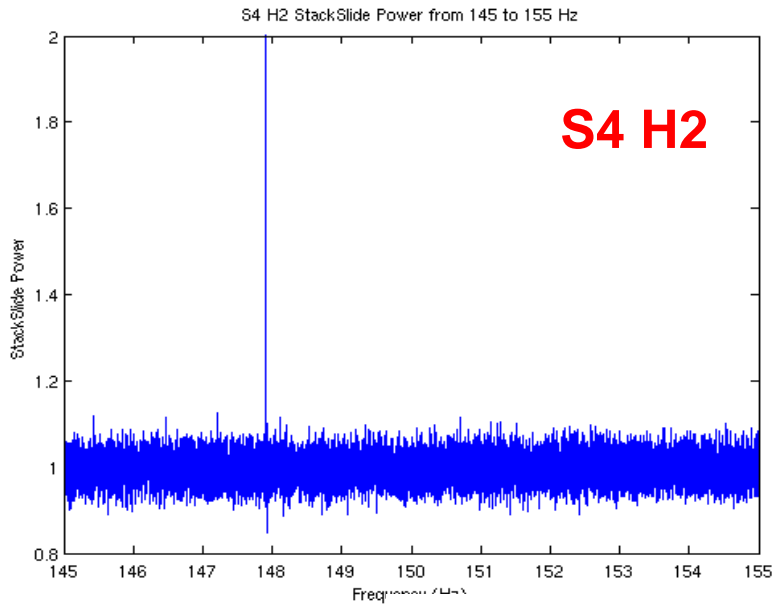


$h(t)$ and the CW group

- $h(t)$ for S4: Xavier Siemens created one version of $h(t)$ using V1 calibration and V4 DQ flags
- Minimum lock stretch is 256s
- Takes a couple of days on Medusa to produce $h(t)$ dataset
- For more information on S4 $h(t)$ production, see <http://www.lsc-group.phys.uwm.edu/~siemens/ht.html>
- From these data, CW group forms 0.5h short Fourier transforms (SFTs)
- These SFTs used in incoherent studies and Einstein@home



From Greg Mendell's talk yesterday



**Stackslide power
no sliding
all S4 SFTs stacked
Shown: 145-155Hz**

**Lines observed by
Vladimir, Xavi,
Greg, others**

**1Hz lines cleaned
in E@h data**

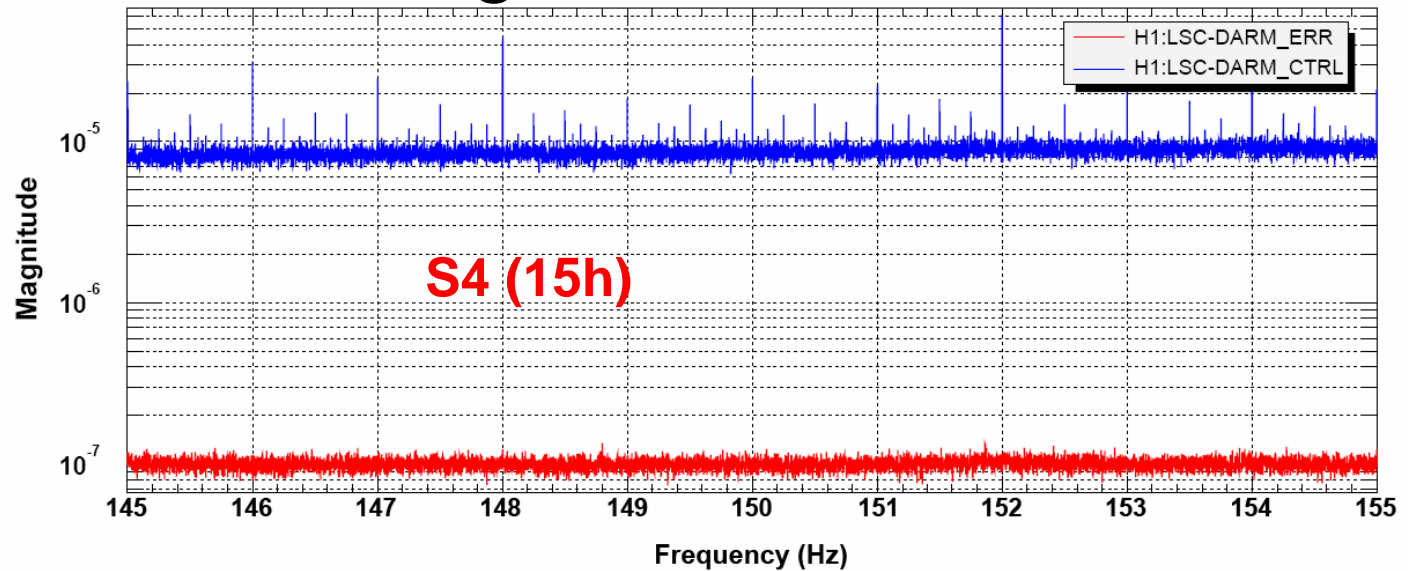


H1 lines in control signal but not error signal

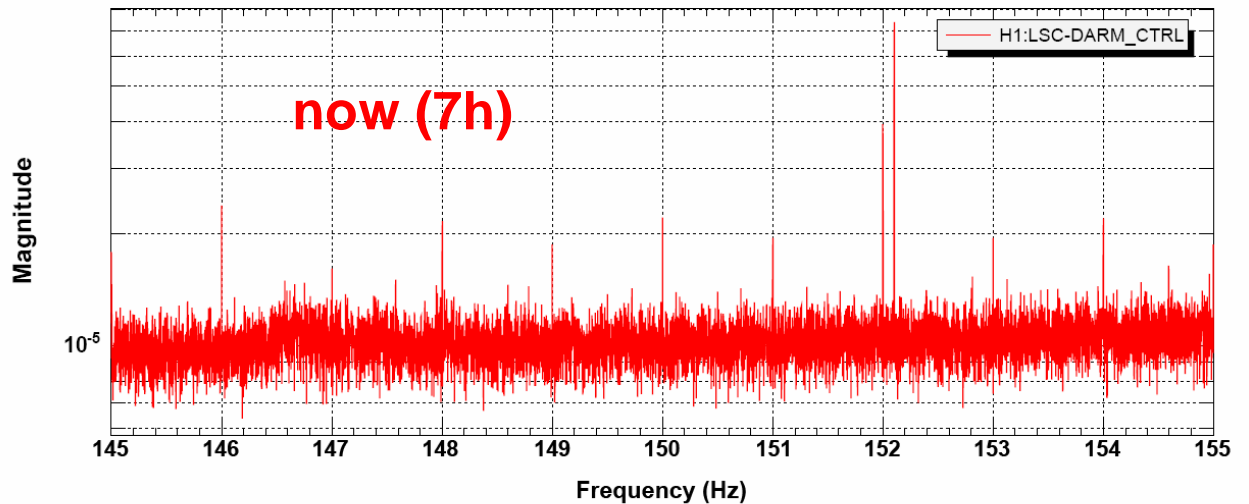
1Hz, 1/4Hz and 1/8Hz lines observed in S4 H1 DARM_CTRL, with decreasing amplitude

(one mystery: Shourov Does not see these lines in the same data using his FFT code)

1Hz still in H1 : data taken last week



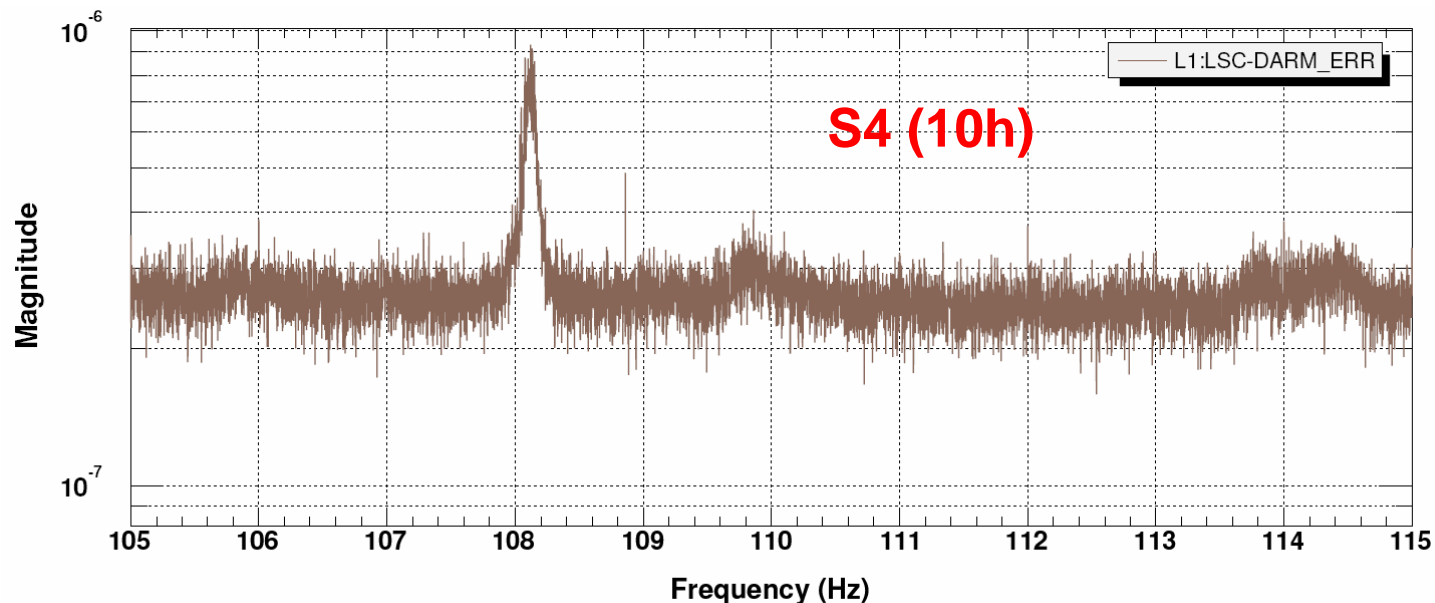
Power spectrum





Lines in L1 SFTs, but have not yet found offensive channel or time

- Despite seeing these lines in L1 CW SFTs, can't find them in $h(t)$ ingredients (control, error or excitation channels) over multiple epochs during S4
- Hints in DARM_ERR?
- The CW group will make uncalibrated SFTs of L1 control, error and excitation channels to determine how the lines are propagated into $h(t)$



T0=21/03/2005 20:31:27

Avg=20/Bin=2

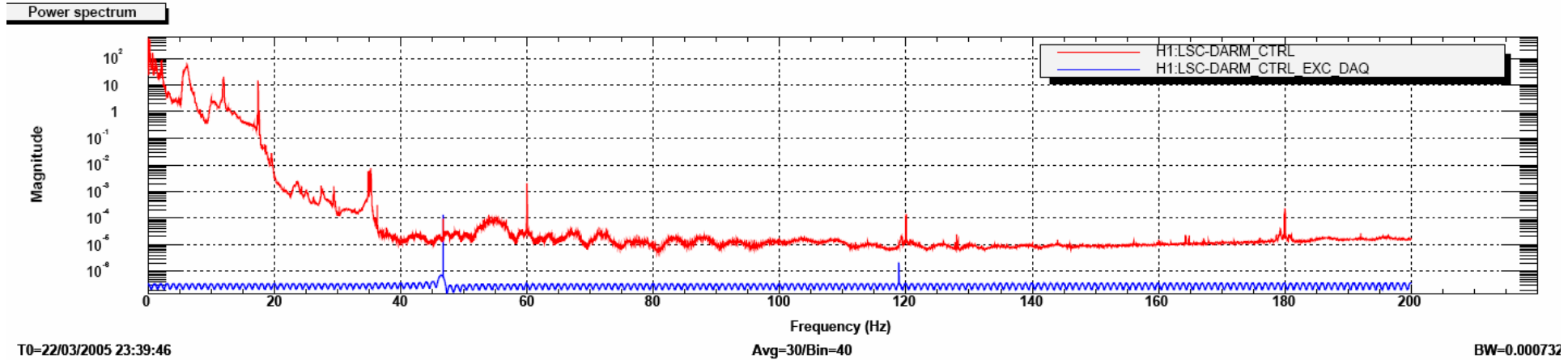
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LIGO-G050404-00-Z

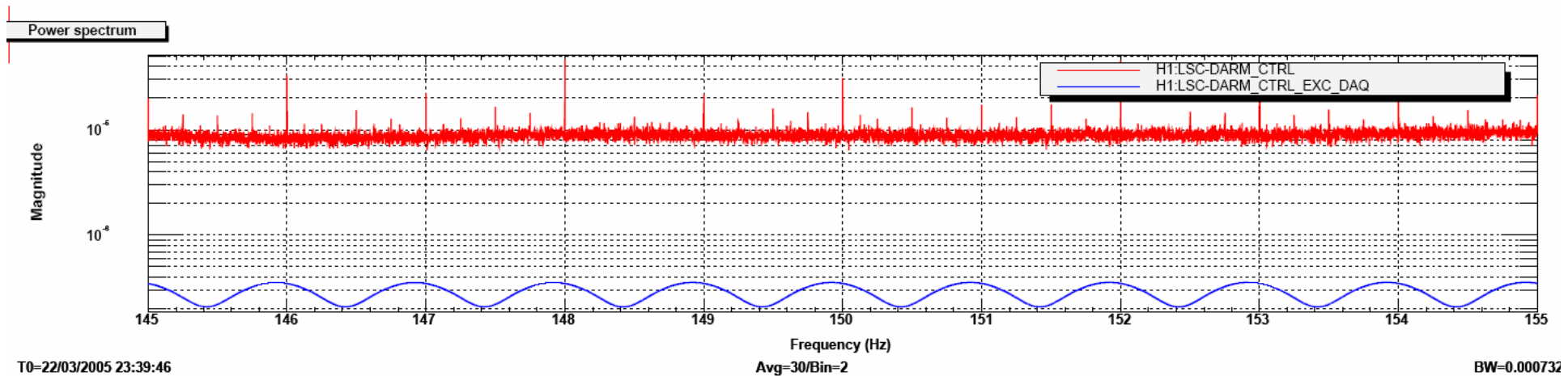
Landry - Aug LSC, 15 Aug 2005



H1 cal line excitation channel at LHO does not contain the lines



S4 (15h): don't see narrow 1Hz and sub-1Hz lines in the excitation channel (do see a spurious contribution at 119Hz however)





Data corruption?

Dave Barker
Rolf Bork

- This problem feels like our S2/S3 16Hz noise: expect corruption in acquisition hardware/software, and not noise injected in IFO. However...
- Testing what happens if we change the channel order in the reflective memory and gw frame
- H1 test indicated noise stays with DARM_CTRL when this channel swapped with DARM_ERR in i) the reflective memory (RFM) and ii) where it is written to the gw frame. !@#%
- Need to confirm and test further



LIGO Summary of what we know about 1Hz, 1/4Hz, 1/8Hz... lines

- They're observed in H1 (CW SFTs and DARM_CTRL), in L1 (CW SFTs but not yet in LSC channels), and not yet seen in H2
- they're in the H1 pulsar analysis because $h(t)$ employs DARM_CTRL, but not sure why in L1 : some noisy epochs?
- they're in the S4 raw frames as well as the level 1 RDS
- they're not in H1 DARM_ERR, so the beta ("mobile input matrix code") does not introduce them
- they don't appear to have been injected with the DARM_CTRL_EXC excitation
- They are still evident in H1
- As they are not observed in the H1 error signal, we expect that they are corruption in hardware as the data are propagated/stored to disk, and **not as a result of the $h(t)$ calibration**. However, studies of swapping the channel in the RFM are not yet complete
- Prudent to expect this type of corruption exists in other channels
- **$h(t)$ will employ DARM_ERR instead of DARM_CTRL: final version of S4 $h(t)$ will thus be free of these lines in H1 at very least**
- **For S5: eliminate from machine!**