
Calibration Review

Keita KAWABE, LIGO Hanford Observatory
on behalf of the Calibration Review Committee

Topics

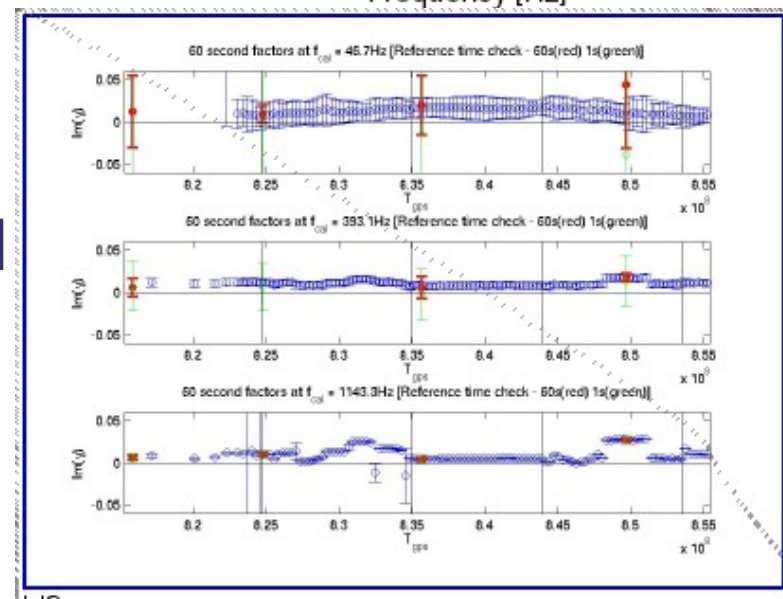
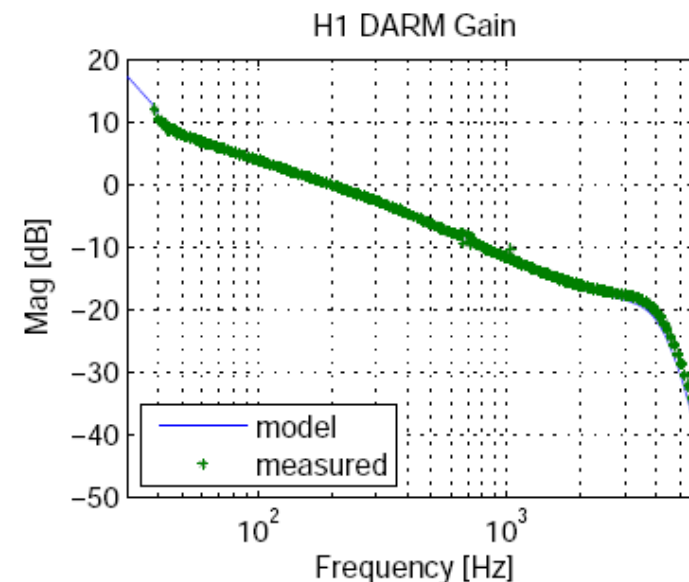
(Follow up of Dec/2008 LV)

- $h(f)$ V3 review close to the finalization
- $h(f)$ V4 review on the way (but not yet there)
- $h(t)$ V3 review

- Everything that needs to be said was said in Brian's talk.
- 3.5 Reviewers: VukM, JohnZ, (SteveF), KeitaK
- 9 Reviewees: BrianO, GabyG, MichaelL, MyungkeeS, JeffK, EvanG, RickS, JustinG, EiichiH
- Very close to finalizing

Awful lot of things we reviewed

- IFO Model, code, etc.
- Digital filters and their history
- Open loop gain measurements
- Actuation function
- Sensing function
- Calibration coefficients
- Recommendation made
 - and they seem to be addressed



LSC, ETMX filters used

Epoch #	Param file	LSC gain	LSC filters	ETMX,Y filters
L1-1	L1DARMparams_816851952.m	-1.5	[0,1,2,3,4,8]	[1,3,4]
L1-2	L1DARMparams_824599365.m	-1.5	[0,1,2,3,4,8]	[1,3,4]
L1-3	L1DARMparams_841930071.m	-1.5	[0,1,2,3,4,8]	[1,3,4]
H1-1	H1DARMparams_815844976.m	-5.0	[0,1,2,3,4,7,8,9]	[0,3,6]
H1-2	H1DARMparams_824791240.m	-5.0	[0,1,2,3,4,7,8,9]	[0,1,3,7]
H1-3	H1DARMparams_835664459.m	-5.85	[0,1,2,3,4,7,8,9]	[0,1,3,7]
H1-4	H1DARMparams_849677446.m	-6.2	[0,1,2,3,4,7,8,9]	[0,1,3,7]
H2-1	H2DARMparams_816068773.m	-1.4	[0,1,2,4,5,6,7,8]	[0,1,2]
H2-2	H2DARMparams_826542380.m	-1.4	[0,1,2,4,5,6,7,8]	[0,1,2]
H2-3	H2DARMparams_849678155.m	-1.4	[0,1,2,4,5,6,7,8]	[0,1,2]

- Everything that needs to be said was said in Brian's talk.
- Calibrators make a case for the readiness/maturity of calibration. ← We're approaching here
 - Then reviewers review.

- Requested support for DAC
 - **New guys/gals!** $h(t)$ calibration committee chaired by XaviS
 - We really appreciate the understanding and support from the analysis groups.
- It's still at “calibrators preparing to make a case” stage. Patience. Please.
- Somewhat wishful release schedule: End of May
- Likely to be able to OK Crab paper result earlier

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 - **BECAUSE OF** the hard work the authors JoeB and MattP are putting in for vetting

- 4 Reviewers: VukM, SamW, MyungkeeS, KeitaK.
- 2 Reviewees: XaviS, EiichiH
 - FYI, 9 reviewees for h(f).
- Everybody more or less worked as a reviewee.
- AAS approaching
 - We realized that h(t) was going to be the main product for all practical purpose for all search groups.

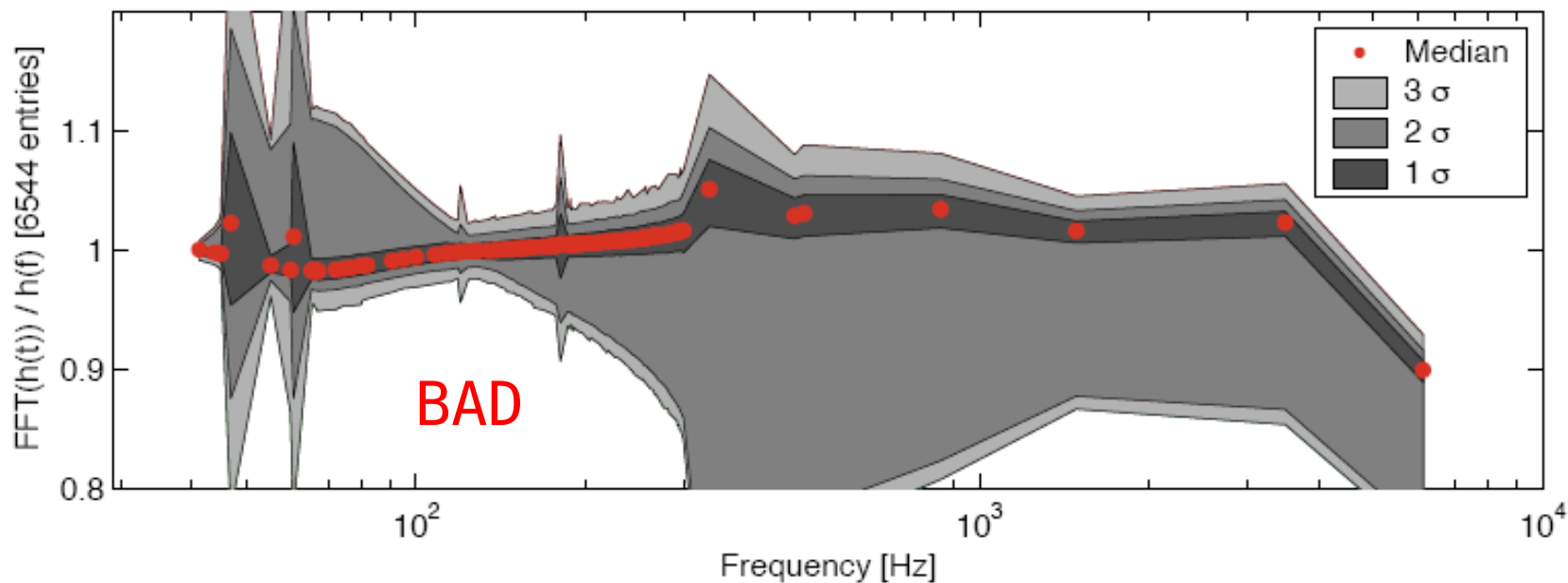


What was done/known at this stage?

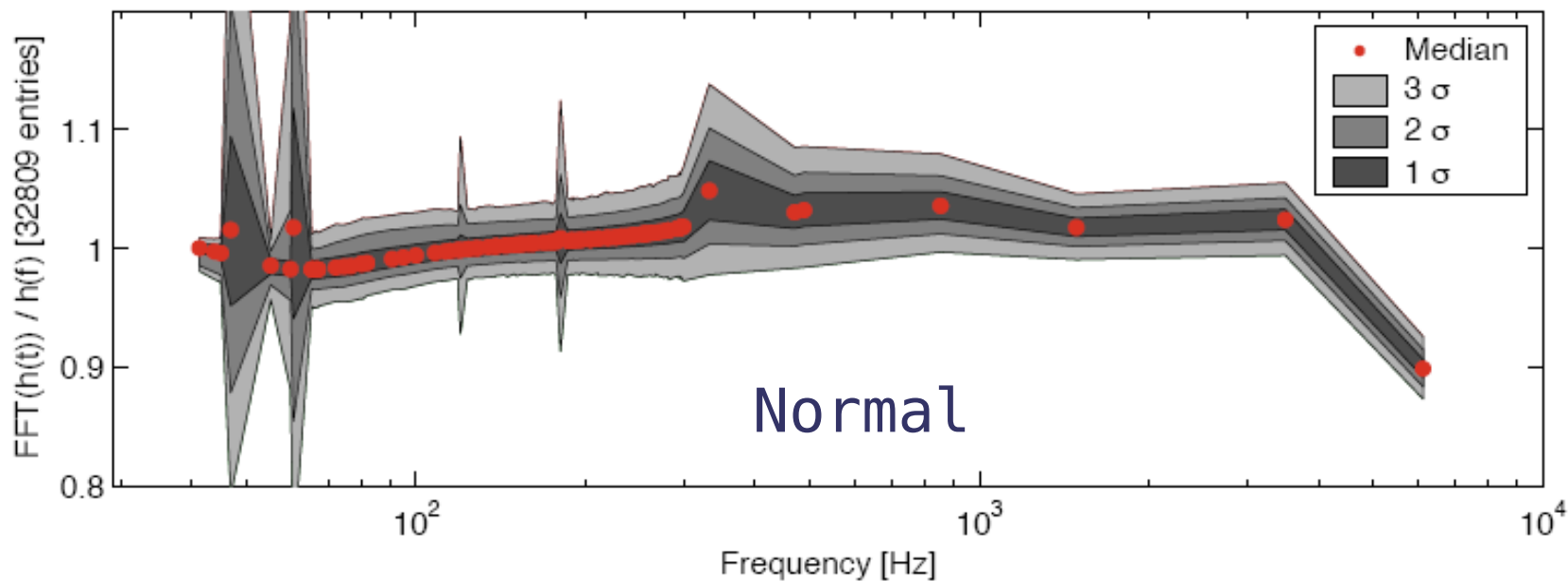
- Limited test and sanity check.
 - Code review.
 - Calibration factor study.
 - Injection study (burst) by Eiichi/Xavi
 - $h(t)$ - $h(f)$ comparison (SamW)
 - 10% of S5 3-coincidence.
 - 100 randomly chosen frequency bins
- Two problems found despite the limited scope of the noise comparison.
 - Bad $h(t)$ production period, H1 and L1.
 - $h(t)/h(f)$ noise difference at around lines.

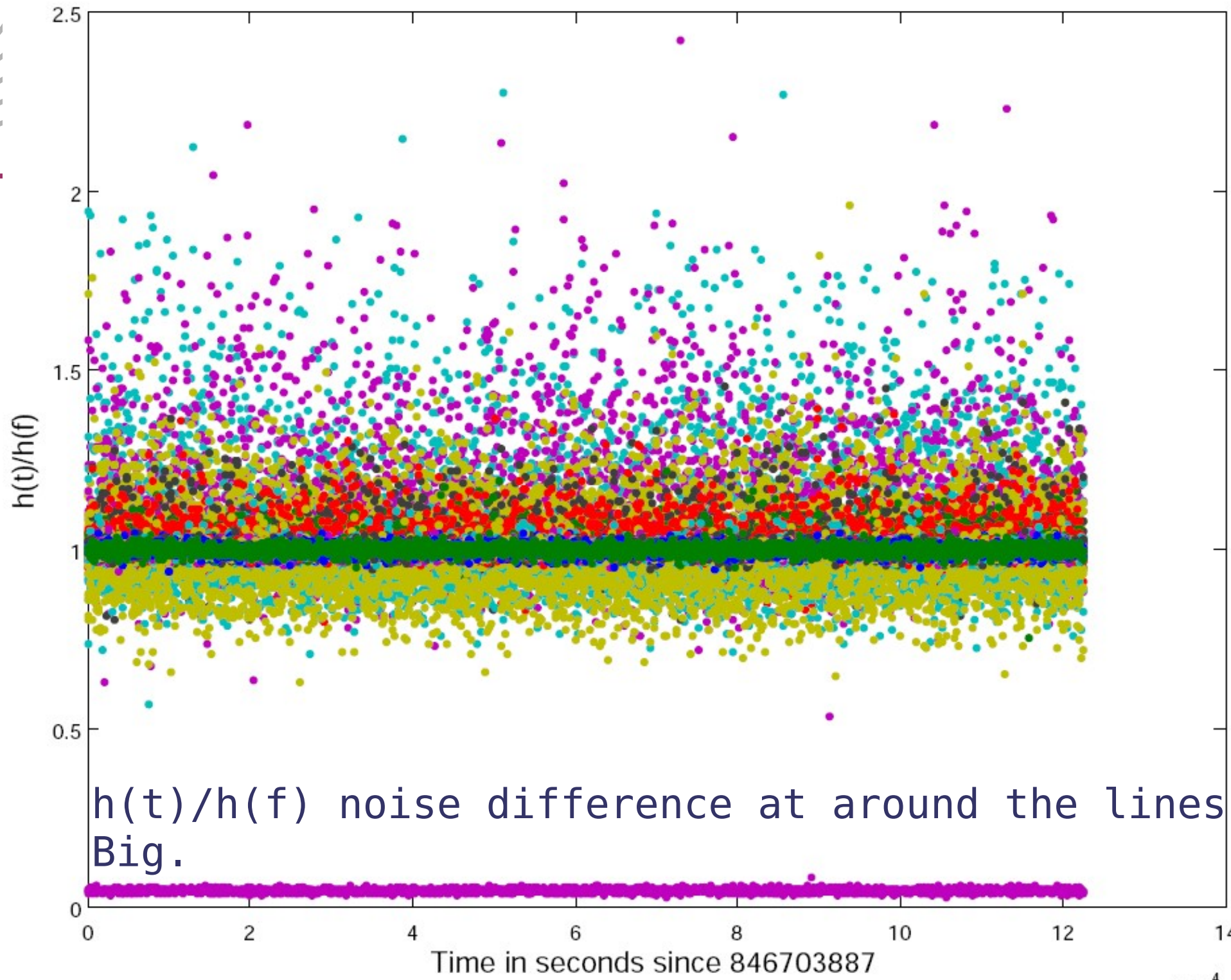
Example of Bad period

H1 GPS 835 to 840 comparison



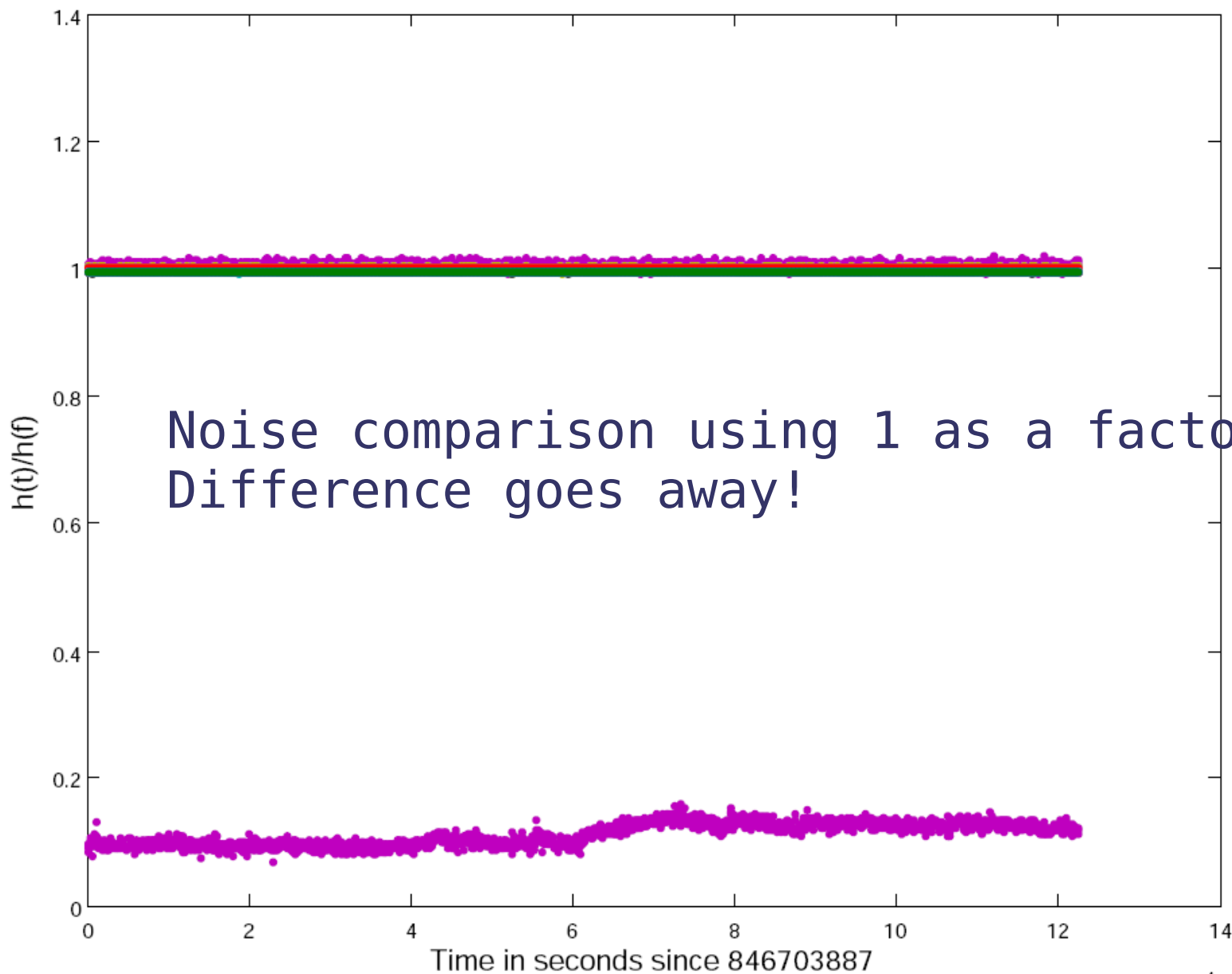
H1 !(GPS 835 to 840) comparison





$h(t)/h(f)$ noise difference at around the lines:
Big.

It's the calibration factor difference:
(60s for $h(f)$, 1s for $h(t)$)



- Sent you a heads-up in Dec/2007 L-V
- Got support from search groups WRT injections (thank you very much!).
- Ridiculous amount of work after L-V until Jan/4 (unhappy spouse and/or kids etc.)
- Released V3 h(t) only for AAS based on our limited test on Jan/4/2008.

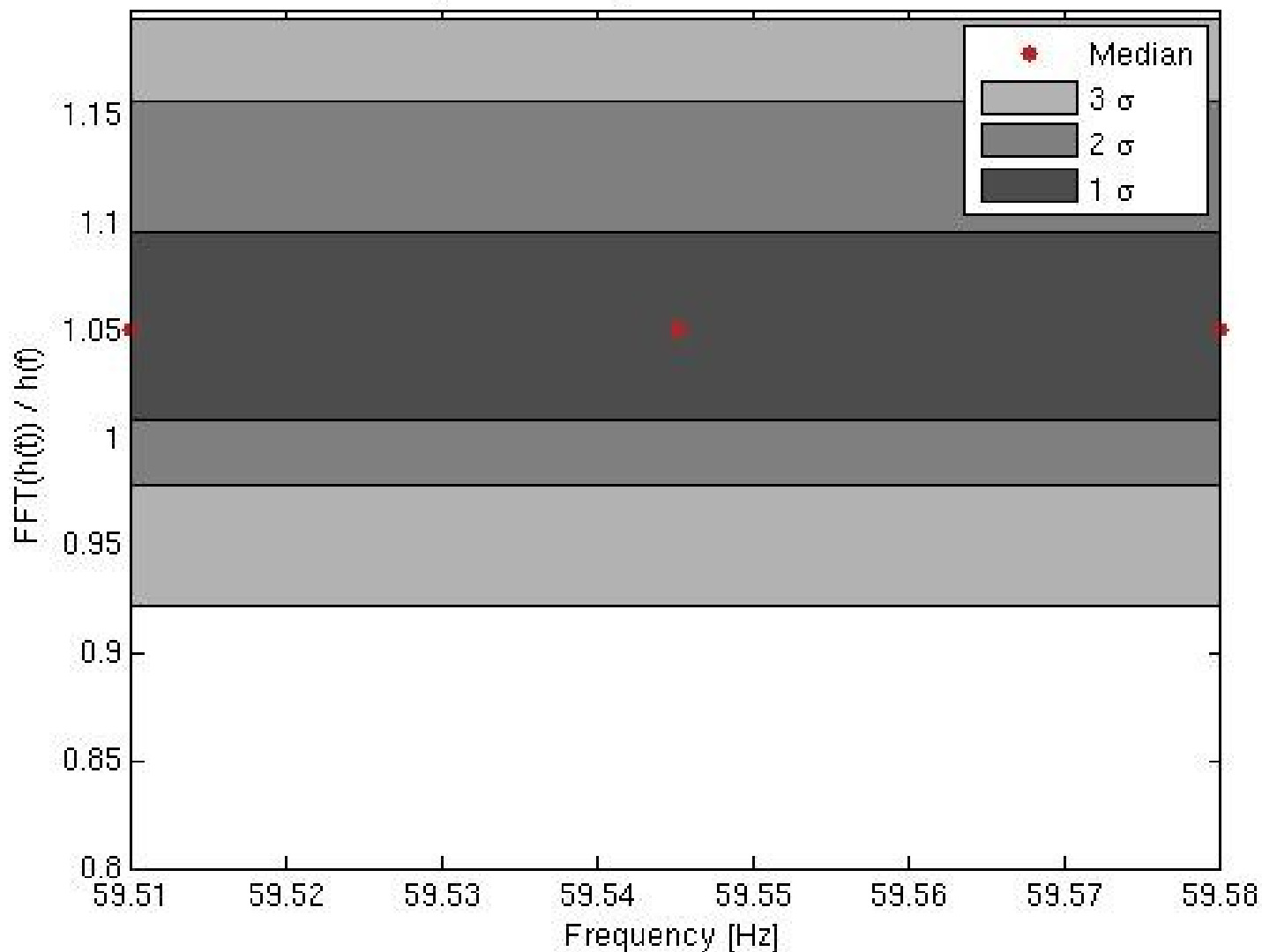
- Smart guess \neq good.
 - Go to data before believing.
- We need more people on calibrators' side
 - Too much work for basically one man.
 - Reviewers can't keep wearing reviewee hats.
- Search groups are willing to help.
 - Man power plus different tools (e.g. injection).

- Still needed a full review.
- Request for support to Calibration committee and DAC.
- New h(t) calibration committee: XaviS, AmberS, JoeB (CW), MattP (CW), AnnandS (CBC), BrennanH (Burst), PhilipC (Stoch)
- Now it's a 7 men operation (and they're already doing good stuff!).
- We really appreciate search groups' support and understanding.



- Go to Xavi's talk for details.
 - 17:50 today, 201 E. Bridge
- Noise difference not yet fully understood.
- Characterizing and understanding noise difference (aka does it matter and why)
 - Calibration factors study (AmberS)
 - Noise comparison (JoeB, MattP, PhilipC)
- Sanity check
 - Injection analyses (pretty much everybody from the search groups)

H1 comparison using 1800 second data chunks



- Same segments and frequency, same 1800 sec FFT length, as their analysis
- Eventually do this for the entire analysis period
- We're likely to be able to OK Crab early because of this.

- It's taking time. Every bit of man power is being used as I understand. Patience please.
- Understanding of V3 important not only for V3 $h(t)$, but also for V4 and S6.
 - No big change in the underlying thing despite the shift from RF to DC.
- We understand the needs (as far as you tell us).
 - Communication, guys. The earlier, the better.
 - We can discuss things with you and/or DAC.
 - We might have to ask you to work for Xavi.

- Are the Calibrators doing it the right way? Yes.
- Recovering the GW wave form? Tell us. Please.
- Discrepancy/noise?
 - We do basic things, e.g. bad times, bad freqs during good times etc.
 - We cannot satisfy your specific needs
 - (e.g. background stat of $h(t)$ VS. that of DARM_ERR or $h(f)$ or who knows what)
 - Pay special attention to the DAQ configuration change after the first 3 months of S5.
 - Got some experience? Tell us.