

S5: The Show So Far

Mike Zucker, LLO

LSC Summer Meeting @ LSU

15 August 2006

LIGO-G060393-00-Z

QuickTime™ and a
TIFF (LZW) decompressor
are needed to see this picture.

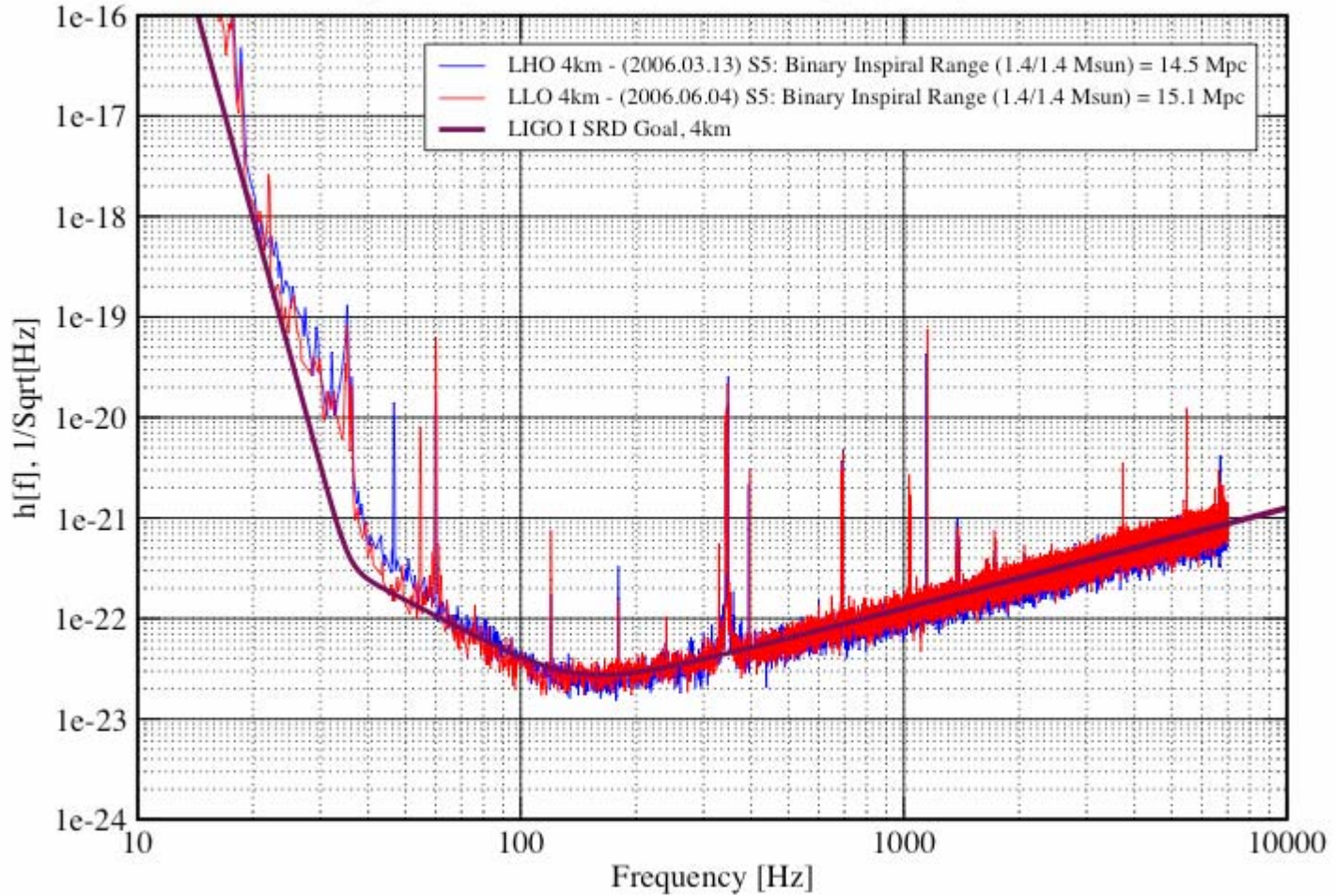


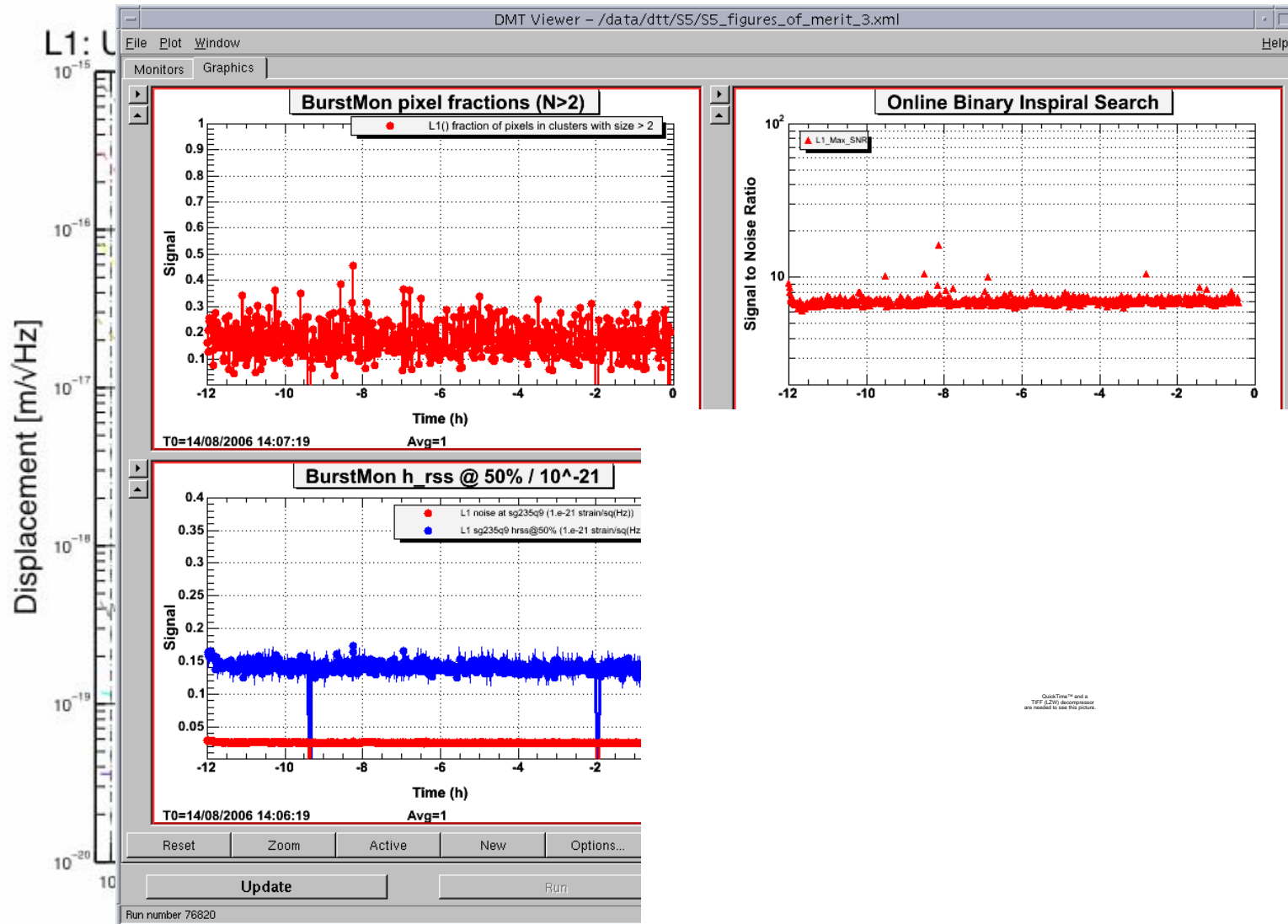
Sensitivity Prograss

Strain Sensitivity for the LIGO 4km Interferometers

S5 Performance - June 2006

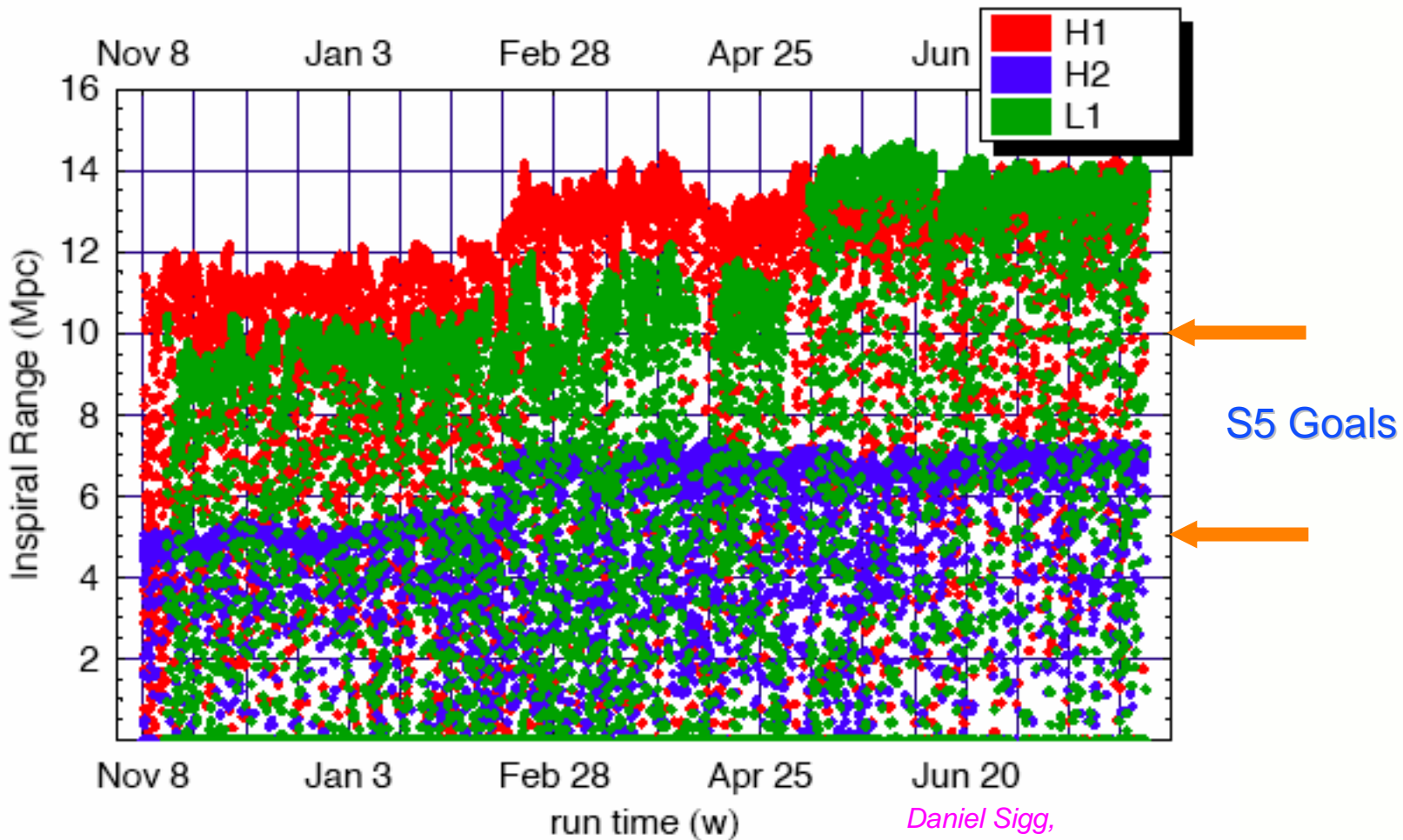
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The Show So Far...

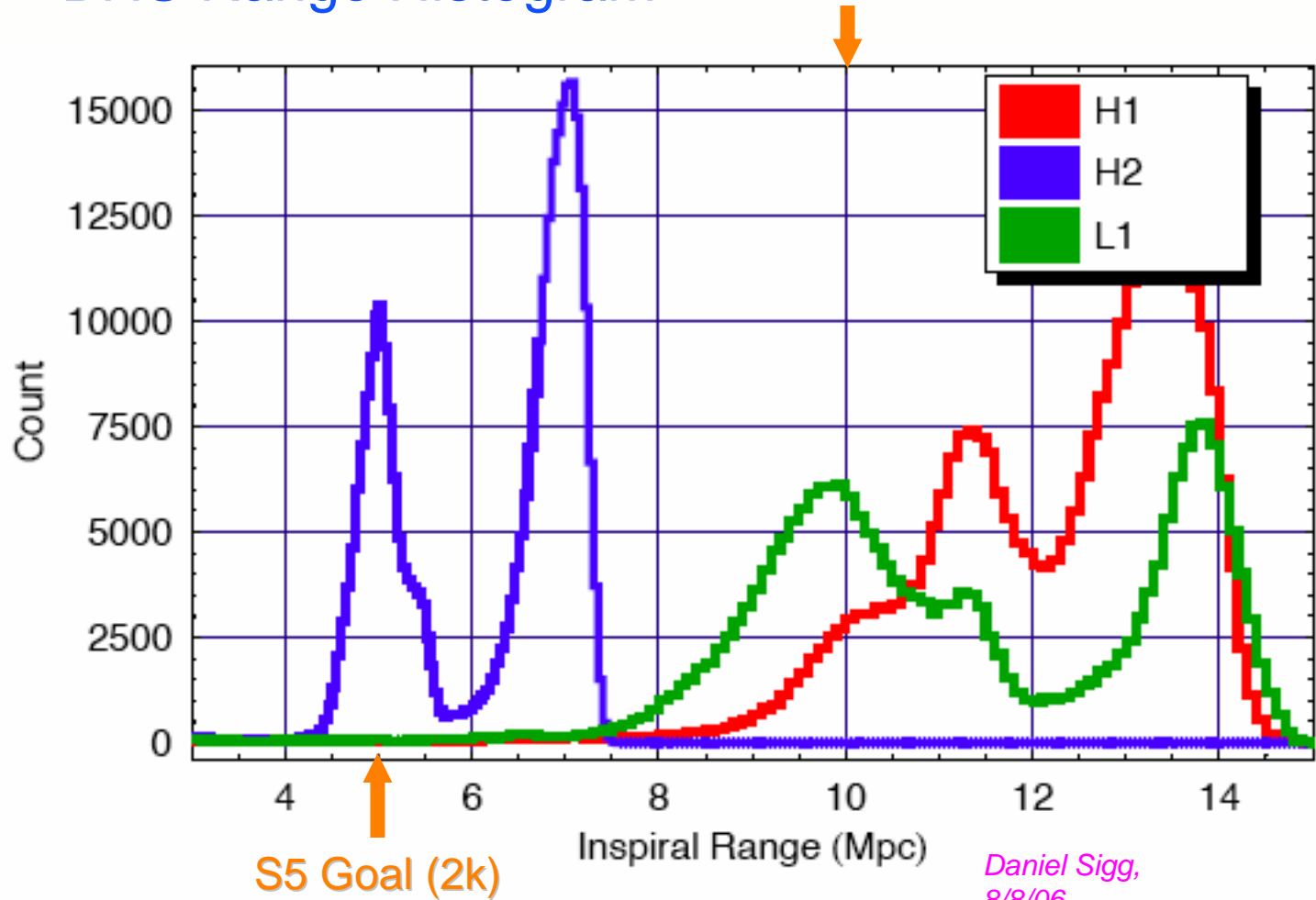
BNS range by week



The Show So Far...

BNS Range Histogram

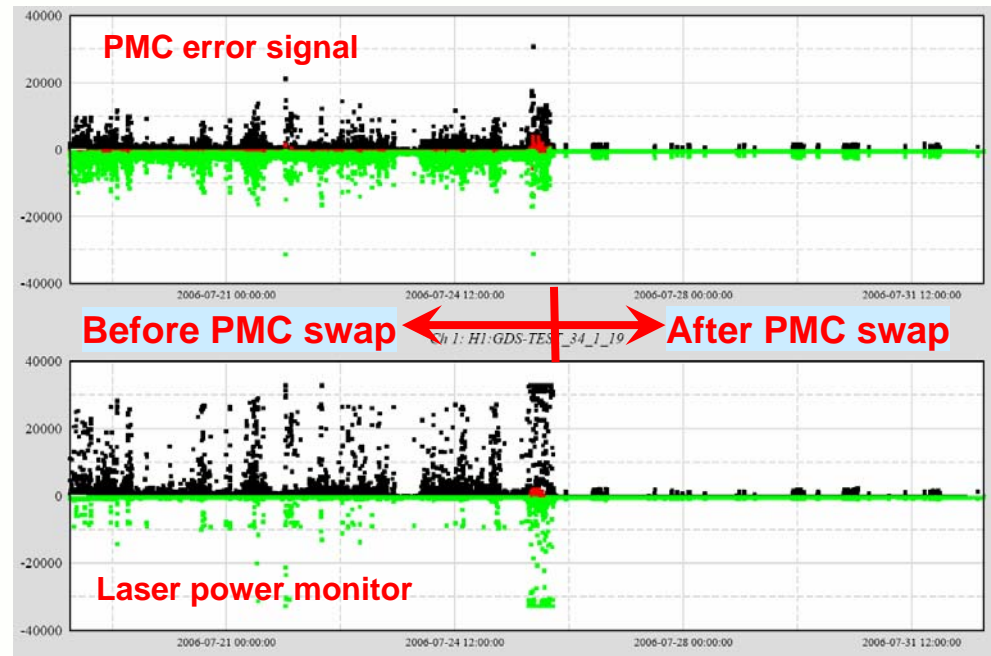
S5 Goal (4k)



*Daniel Sigg,
8/8/06*

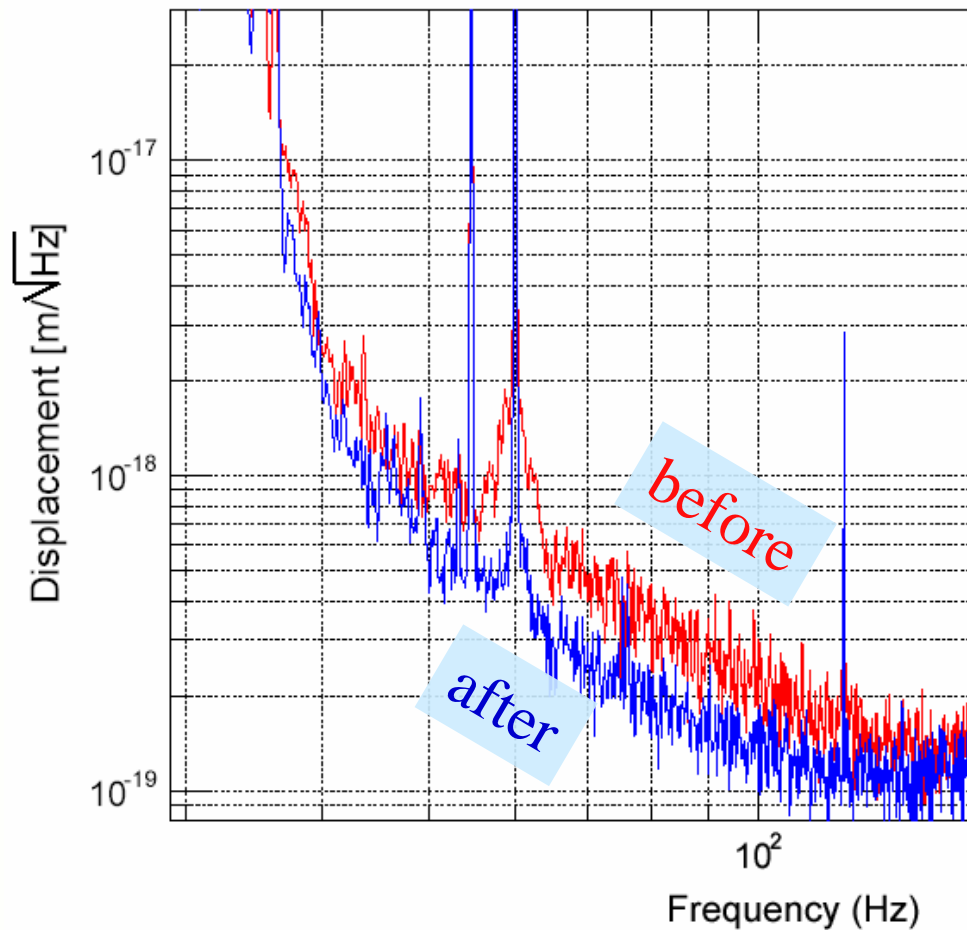
S5 highlights: some recent interventions

- LHO
 - PMC swap (GLITCHES)
 - Upconversion studies
- LLO
 - Isolated ISCT4
 - Improved WFS loops
 - HEPI improvements
 - Electronics rework
- All
 - Calibration, loud injections, PEM injections, IFO tuning, ...

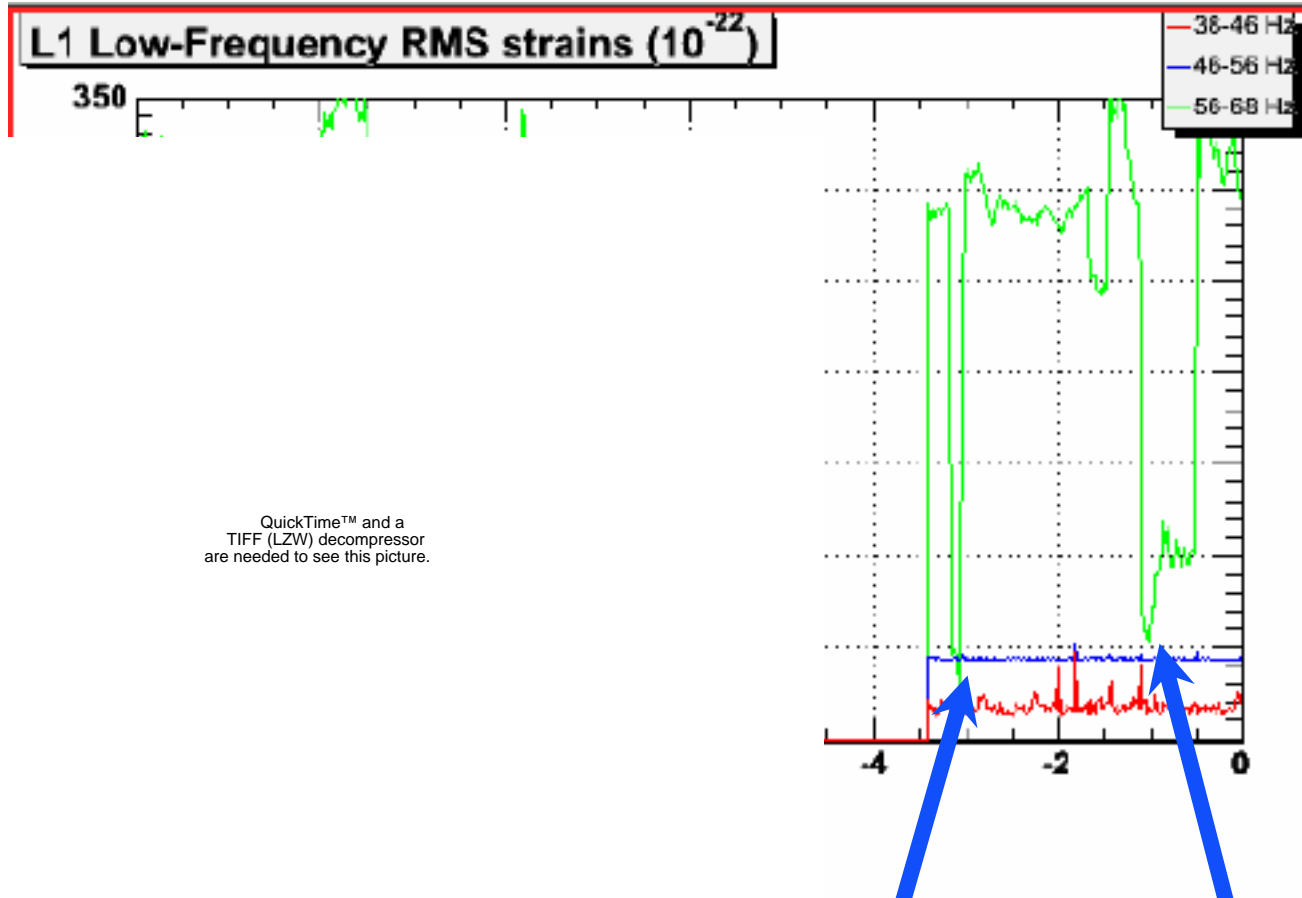


Stranger than fiction...

- ❑ Near disaster: L1 ITMy got stuck-
- ❑ Vented and fixed it: Noise got better!!!



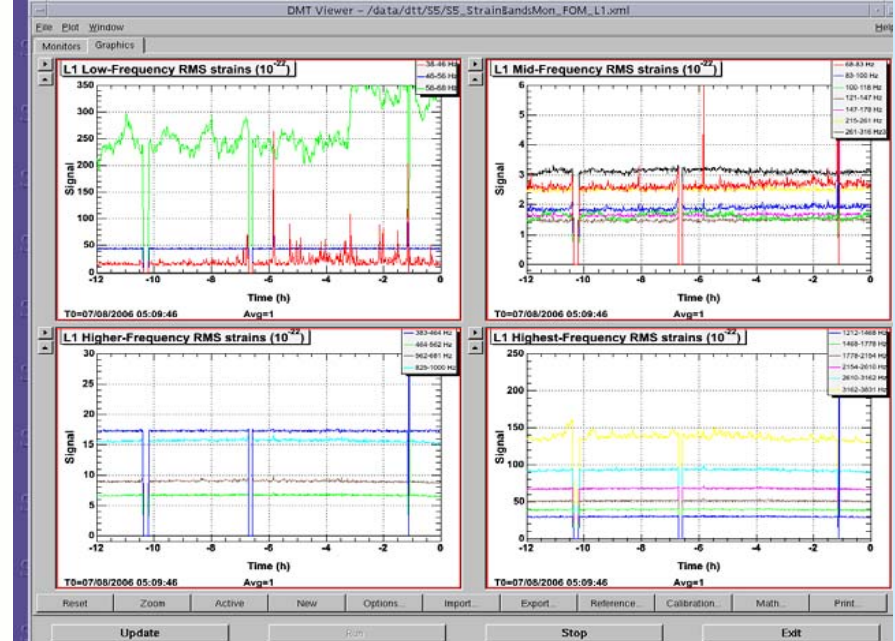
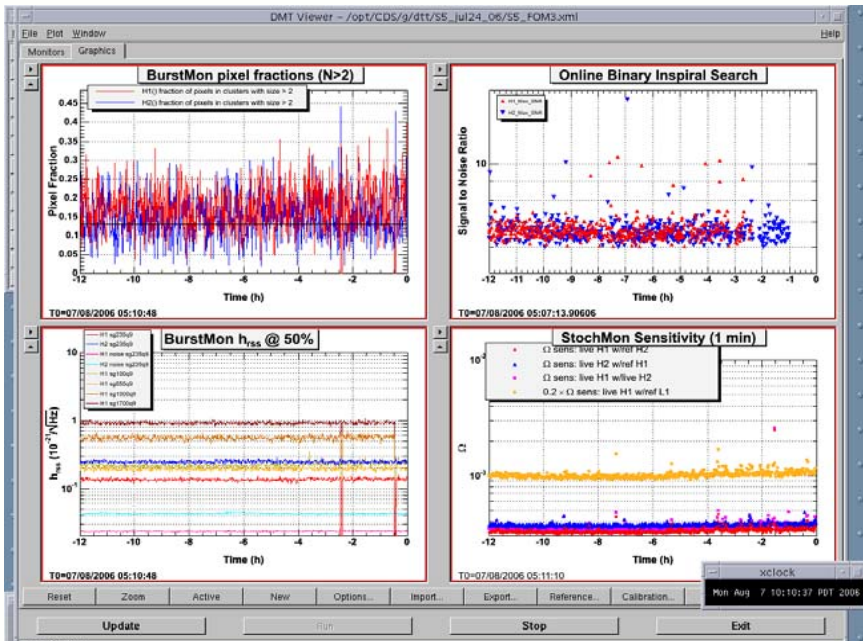
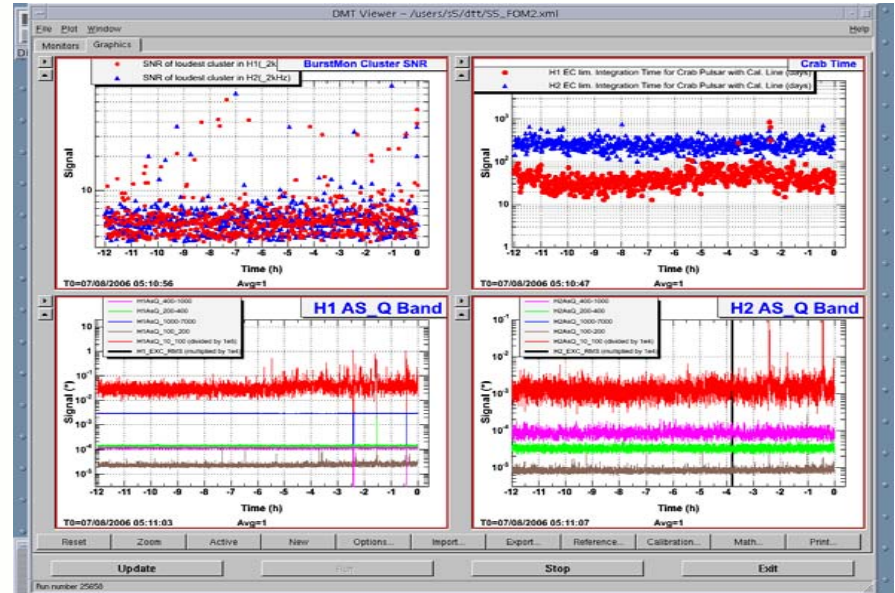
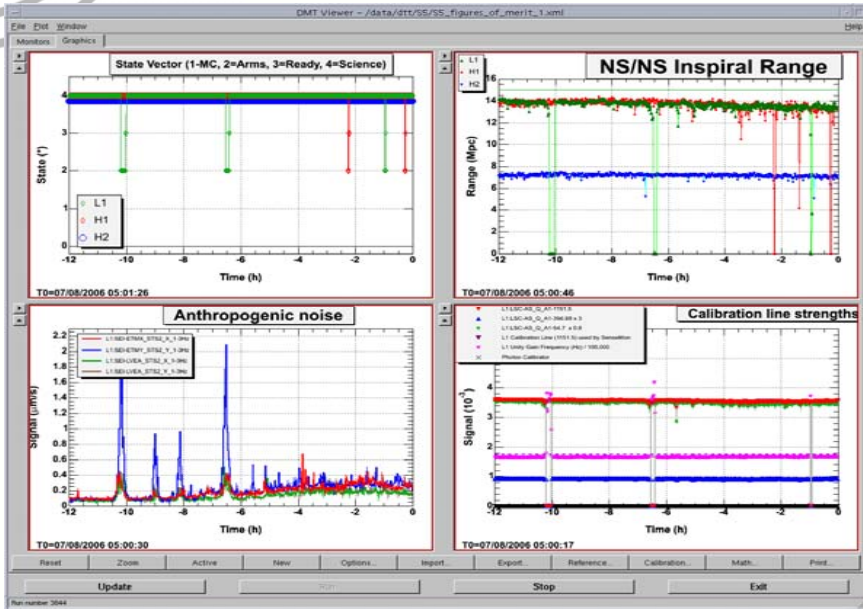
60 Hz Line in L1: A break in the case?



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Outage(?)

DEMCO
intervention



Online DMT Monitoring & Rapid Analysis

DMT monitors expanded for S5: Now >90 instantiations of nearly 30 programs!

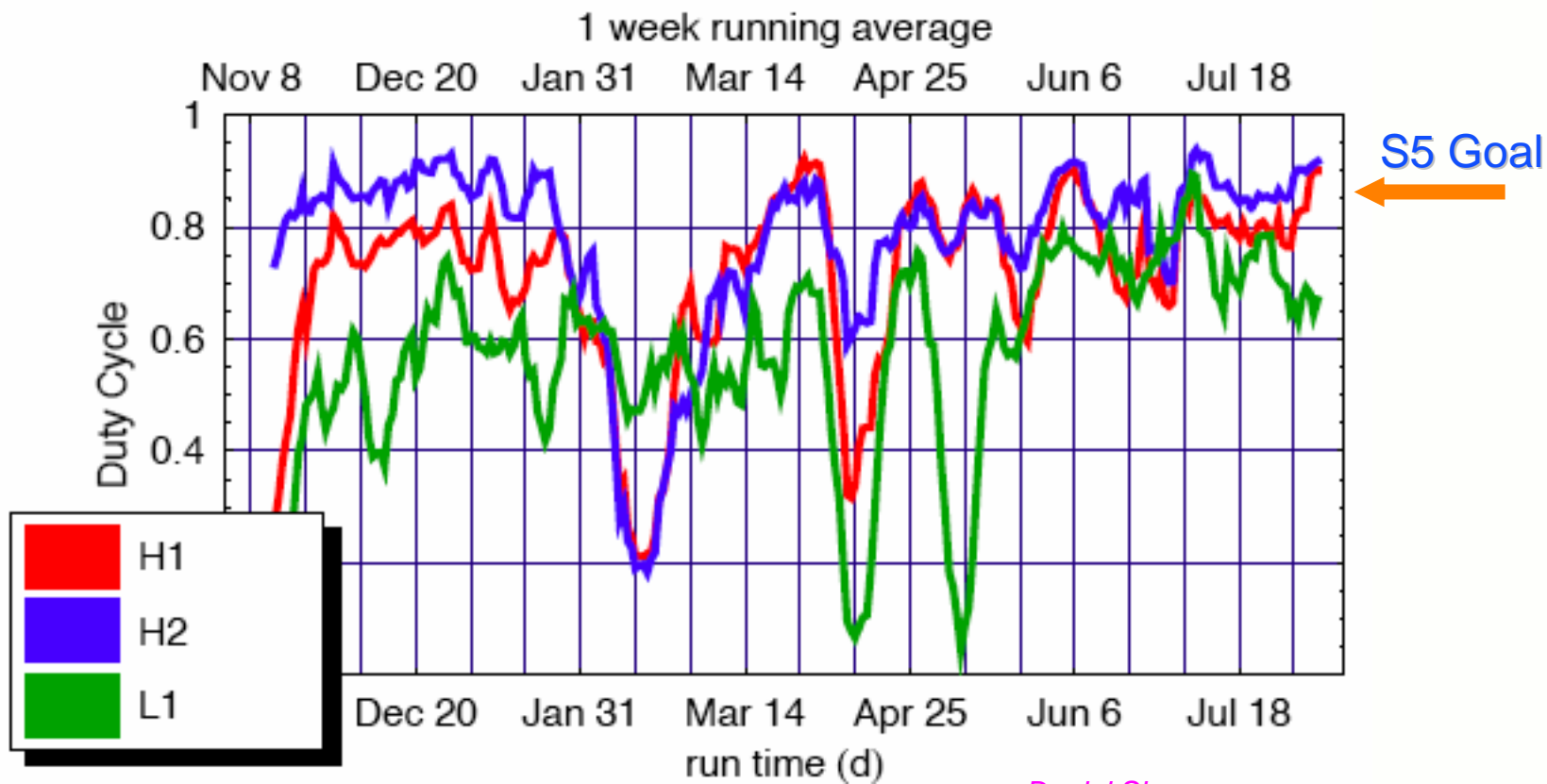
- Figures of merit for control room walls
- Real-time data quality flags
- Trends/triggers for offline flag creation
- Improved protocol for introducing new / improved monitors

Fast data analysis results inform commissioning & run strategy !

- Weekly feedback from the Glitch Working Group & Spectral Lines Working Group
- Elogged high-SNR inspiral triggers
- Web links to loud KleineWelle and BlockNormal triggers
- Q scan tool for glitch investigations
- Near real-time GRB analysis output
- Near real-time validation of hardware signal injections

The good, the bad and the...

Duty factor vs. Time



Daniel Sigg,
8/8/06



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A Dan Hoak
Production

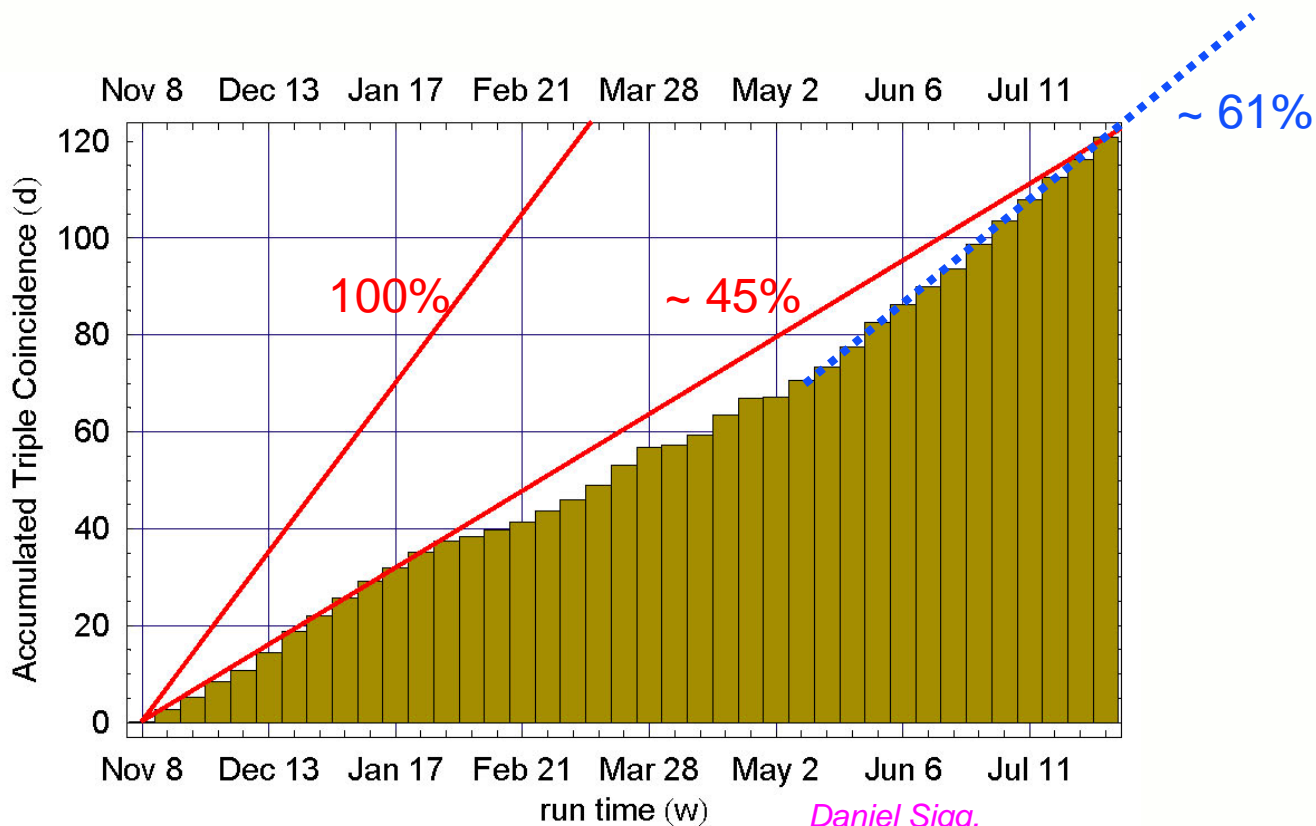
LIGO Science Education Center at Livingston Observatory

- 8000 ft² facility with ~50 hands-on exhibits illustrating LIGO science themes
- School group, family, club visits
- K-12 teacher professional development
- **OPENING IN NOVEMBER!!**



The Show So Far...

Triple coincidence accumulation

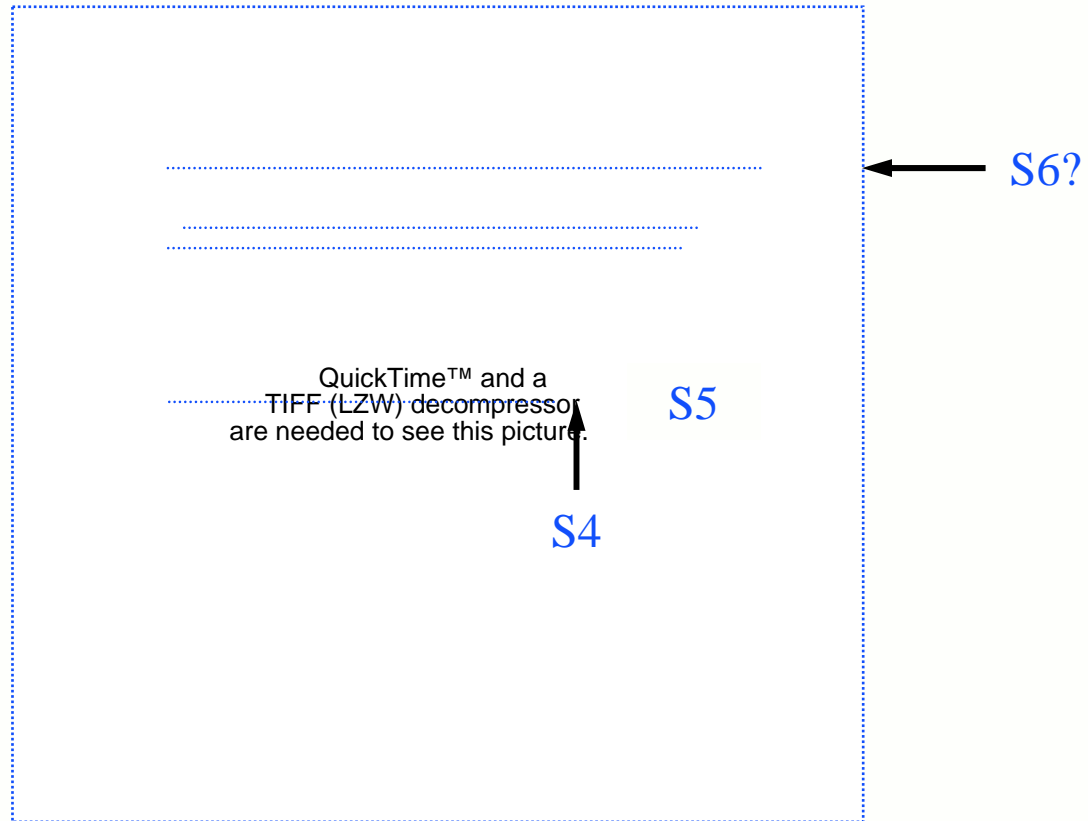


*Daniel Sigg,
8/8/06*

⇒ Project bagging 1y triple coincidence @ **September 2007 (±)**

Perspective: When to quit?

A function of **readiness for a sensitivity upgrade**



Nutzman et al., arXiv:astro-ph/0402091 v2, 28 Jun 2004

- ❑ DMT, online analysis tools have really matured; playing a critical role
- ❑ Interferometers have come a long way baby!
 - As advertised, you need a long run to engineer for a long run
 - Regular maintenance downtime + coordinated commissioning breaks a winning strategy (though stressful)
- ❑ Team is functioning superbly
 - Good communications & sharing of information
 - Increasing pool of experts letting us spread the “joy,” but....
 - Battle fatigue a constant enemy
- ❑ Duty factor (especially L1) is still a struggle

- ❑ **INITIAL S5 ANALYSIS RESULTS REALLY ENCOURAGING-- KEEP ‘EM COMING!**

The “O” in LIGO is singular: one observatory

We have only one detector, comprising three interferometers

It's duty *factor* guys, not duty *cycle*

THANK YOU STAN!

LIGO Livingston rocks! Thanks !