

# An Early Glimpse at the S3 Run

Stan Whitcomb (LIGO–Caltech)

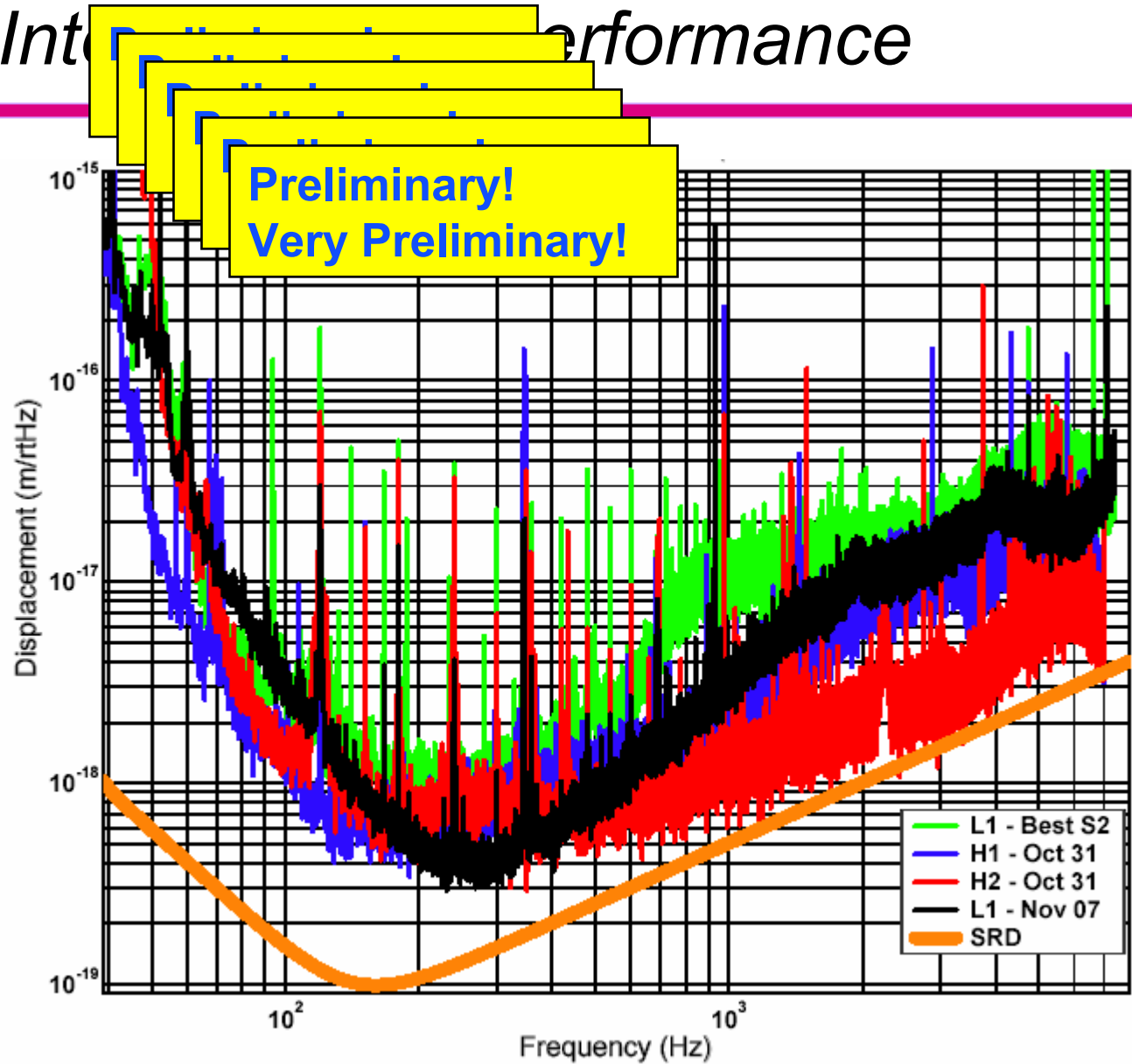
*LIGO Scientific Collaboration Meeting*

*LIGO Hanford Observatory*

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# Interferometer Performance

“Current”  
Sensitivities



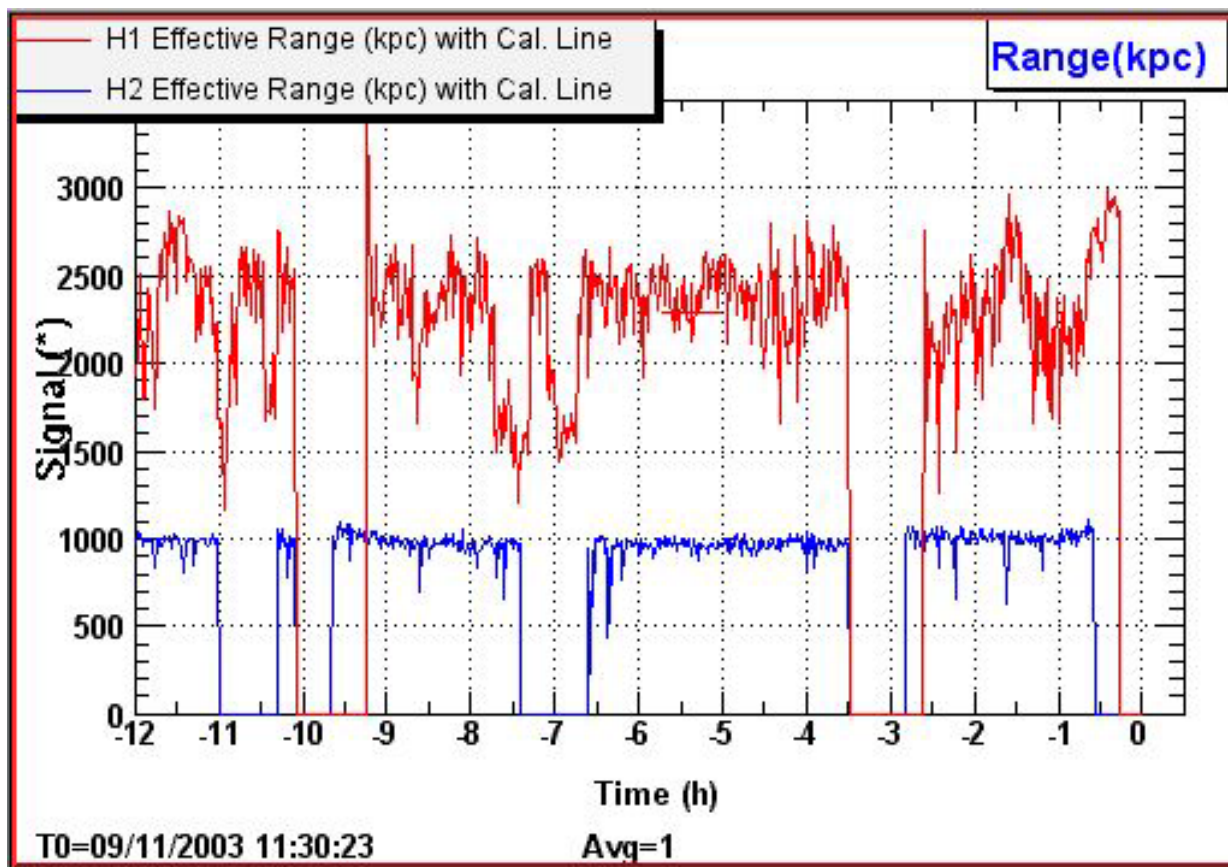
Thanks,  
Rana!

- Reduced correlated noise in H1, H2

# “Inspirational Range”

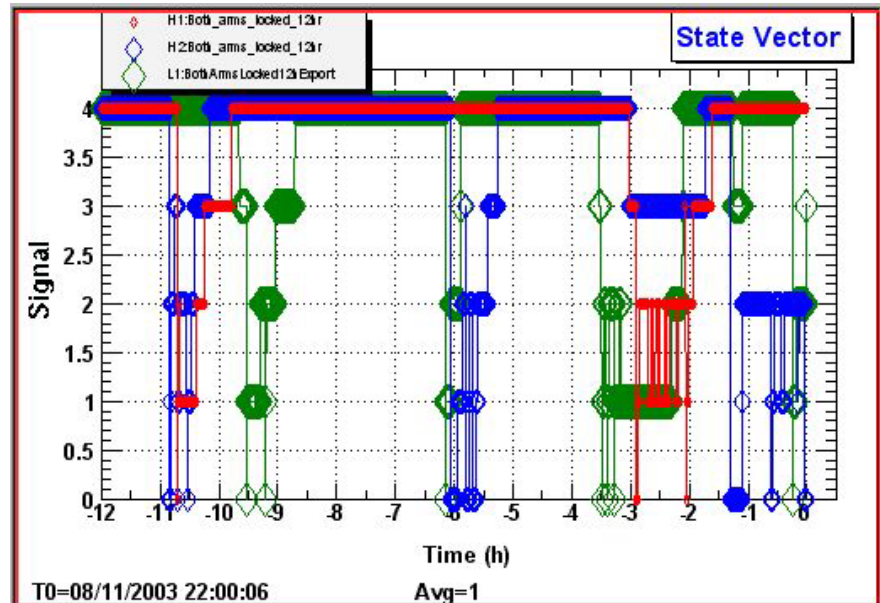
1.4M<sub>☉</sub>-1.4M<sub>☉</sub> NS-NS with SNR=8, average over direction/polarization

“Typical” 12 hour variation of inspiral range



# Interferometer Liveletimes

- Science mode duty cycle to date (Sunday)
  - » H1            66%
  - » H2            63%
  - » L1            40% (last three days only)
- Duty cycle reduced significantly because of early run tuning/commissioning
  - » Hope for 75+% from LHO interferometers
  - » Hope for 40+% from LLO interferometer



## Anecdotal remarks about interferometer stability

- H1
  - » Inspiral range varies quite a bit (2x) – real variation in noise
  - » Cal lines stable
- H2
  - » Inspiral range fairly constant (20%)
  - » Cal lines stable
- L1 (less operating experience)
  - » Inspiral range variation similar to H2 ?
  - » Cal line drift up to 2x ?

- DMT is recognized by operators and scimons as “mission-critical”
- Most monitors operating in production mode
  - » Maturity of system improving
- Reliability good
  - » Occasional monitor needs restarting, but most run without intervention

- Data acquisition and archiving working relatively reliably
  - » Nothing much to talk about
  - » Good!
- Reduced datasets
  - » Level 1 through level 3 being created at the sites in near real time
  - » Level 3 frames being transferred to CIT and tier 2 centers, typically within 2 hours
- On-line analysis
  - » None to date



- Calibration runs originally scheduled for beginning of S3
  - » Performed as scheduled on H1, H2
  - » Performed ~1 week into S3 at LLO
- Preliminary calibrations produced and in place at both observatories
- Expect refined calibrations (equivalent to end of S2 level) within a week or so
  - » Continue prototype testing at LASTI, including migrating from dSpace to VME based controls

- Inspiral and burst injections similar to S2
  - » A couple of long injection sessions, somewhat different set of waveforms
  - » ~10 shorter (1 hour) injection sessions through the run
- Periodic
  - » Continuous injection throughout the S3 run
  - » Calculated on the fly, automatic restart when program dies
- Stochastic
  - » Multi-hour injection completed at  $\Omega \sim 1$  (approximately SRD level)

# *Challenges for the future: S4*

- What do we want from S4? When should it be?
  - » Two month run with 2 x S3 sensitivity (Aug 2004), to gain experience with long term operation of HEPI?
  - » Wait until reach SRD sensitivity (Dec 32, 2004) for six month run?
  - » Possibility of unmatched detector sensitivities?
  - » Other options?
- What will we do differently?
  - » Will the analysis groups be ready for real on-line analysis?
  - » Should we shake up the analysis group structure in a major way?
  - » How should we perform the scimon function?

# Challenges for the Future: Supernova Watch

Supernova in Milky Way is a once in a lifetime opportunity

- Stan's New York Times nightmare
  - » “You really missed seeing SN2004x just because no one bothered to turn on the interferometer?”
- Proposal: Commissioning should take highest priority until S4, but attempt to operate interferometers whenever active commissioning is not underway
  - » Greatest burden will fall on site and LDAS staff
  - » Active cooperation of commissioning staff
- What is the **minimum** that we would need in order to detect and observe GWs from a neutrino SN trigger?
  - » 2 detectors? Which Auxiliary channels? Scimons?
  - » What can LSC do to make the job easier for the site and LDAS staff?

# *The answers you all want*

*and one you might not...*

- How is S3 going?
  - » Got off to a rocky start – troubles with L1 -- hard work by LLO and commissioning staff to get us operating (Thanks!)
  - » Had to use the first part of the run to tune L1 for stable running
  - » Chose to use corresponding time at LHO for some final tweaks
  - » I expect it to be better in nearly every measure than S2
- Are we going to extend the run?
  - » Put forward as a possibility if there is a substantial delay in preparations for HEPI installation at LLO
  - » So far the HEPI team is holding to their schedule, by their fingernails
- We are planning to analyze the S2 and S3 data together because they are so similar
  - » Maybe
  - » Maybe not...