



Advanced LIGO Team Monthly Update

29 May 08

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Funding Status

- First year funds (~\$32M) now 'in the bank'
- Now supporting staff
- Starting on some long-lead procurements
- Procurement plan presented earlier today to the NSF to pre-pave the path for future large procurements
- Eager (for lots of reasons) to get through these \$&%#@^! reviews – want to get people on the Project payroll, and equipment ordered!



Other-than-subsystem stuff

- Interviewing for dedicated Safety and Quality Assurance people
 - » Safety to be stationed at LLO, but traveling
 - » QA to be stationed at LHO, but traveling
 - » Objective: relieve technical folk of some of the current burden in these areas, and give us vendor oversight, a helping hand, etc.
- Risk Management Team (mostly subsystem leaders) getting together to review where we think things could go wrong – updating the ‘Risk Register’. Ask me if curious, please help me out when I ask.
- First Monthly report submitted to NSF – they appear to be happy
- Pictures: there are more and more. Would like to centralize.
 - » Most obvious is the Wiki --- practical?
 - » Need also for experts to pull out the ~1% best of photos for future documentation
 - » Other ideas from those aware of web developments?
 - I think we want to keep the repository in LIGO machines...
- New software for the DCC is in ‘alpha test’ – hope to say much more about this next month.



Virgo – Vacuum accident

- On 9 May 2008, a glass viewport on the NE end station vacuum system broke (imploded) during pumpdown
- Mirror, suspension, and other components in the tank were contaminated (and the mirror is probably ruined)
- BeamTube gate valves were closed, happily
- Many sensors were active at the time, allowing many causes to be excluded
- To my knowledge, no clear explanation known quite yet
- LIGO looking at its viewports, thinking about procedures to limit risks and consequences if there is a similar event
- Advanced LIGO looking at designs and tracking the Virgo investigations to ensure we all learn as many lessons as possible.
- That said....



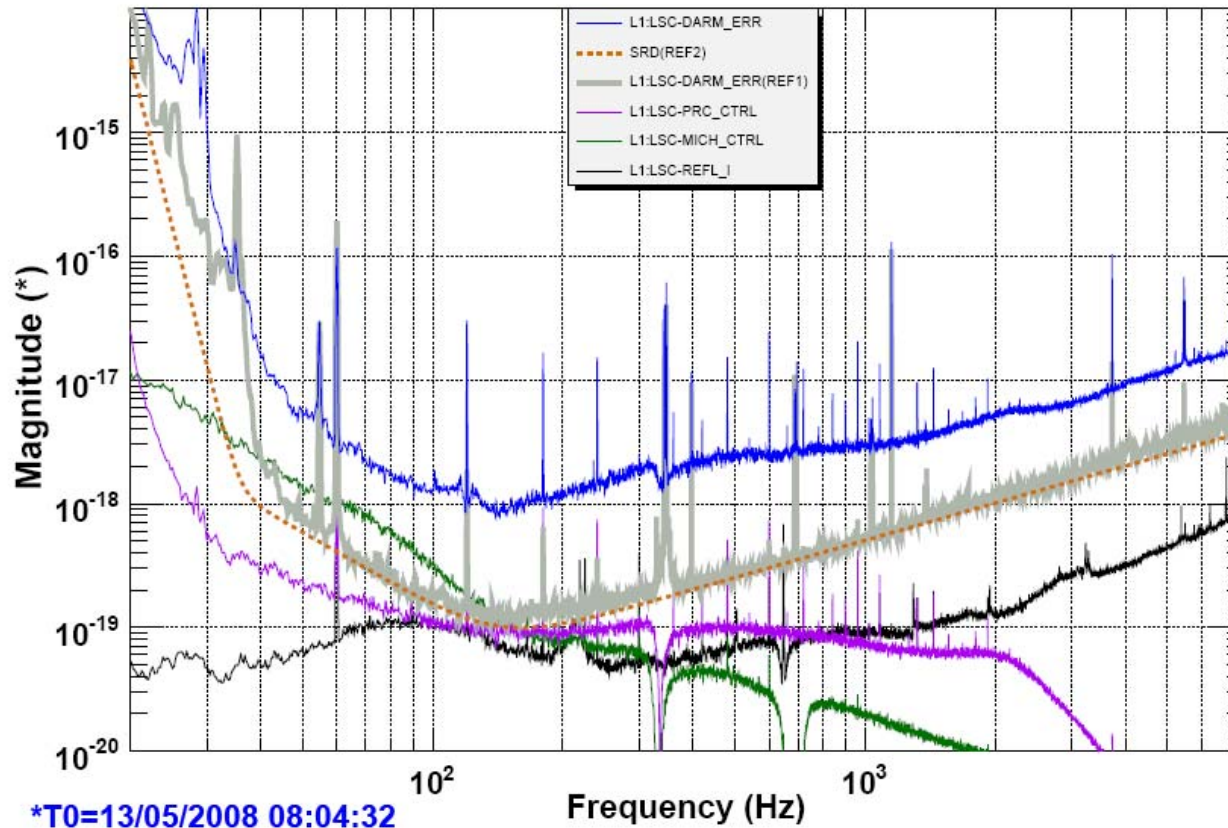
Companion projects

- Virgo+ and Advanced Virgo still planned on same time scales as eLIGO and AdL
- LCGT, in Japan, in another round of proposals
- A detector in Australia, probably using many Advanced LIGO designs as a way to reduce cost and duration, is in study
- We wish them luck!
- Now, a bit of a technical update



eLIGO – DC Readout

- It locked – 1.7 Mpc Binary Inspiral range
- A very big step forward (with a little way to go yet)



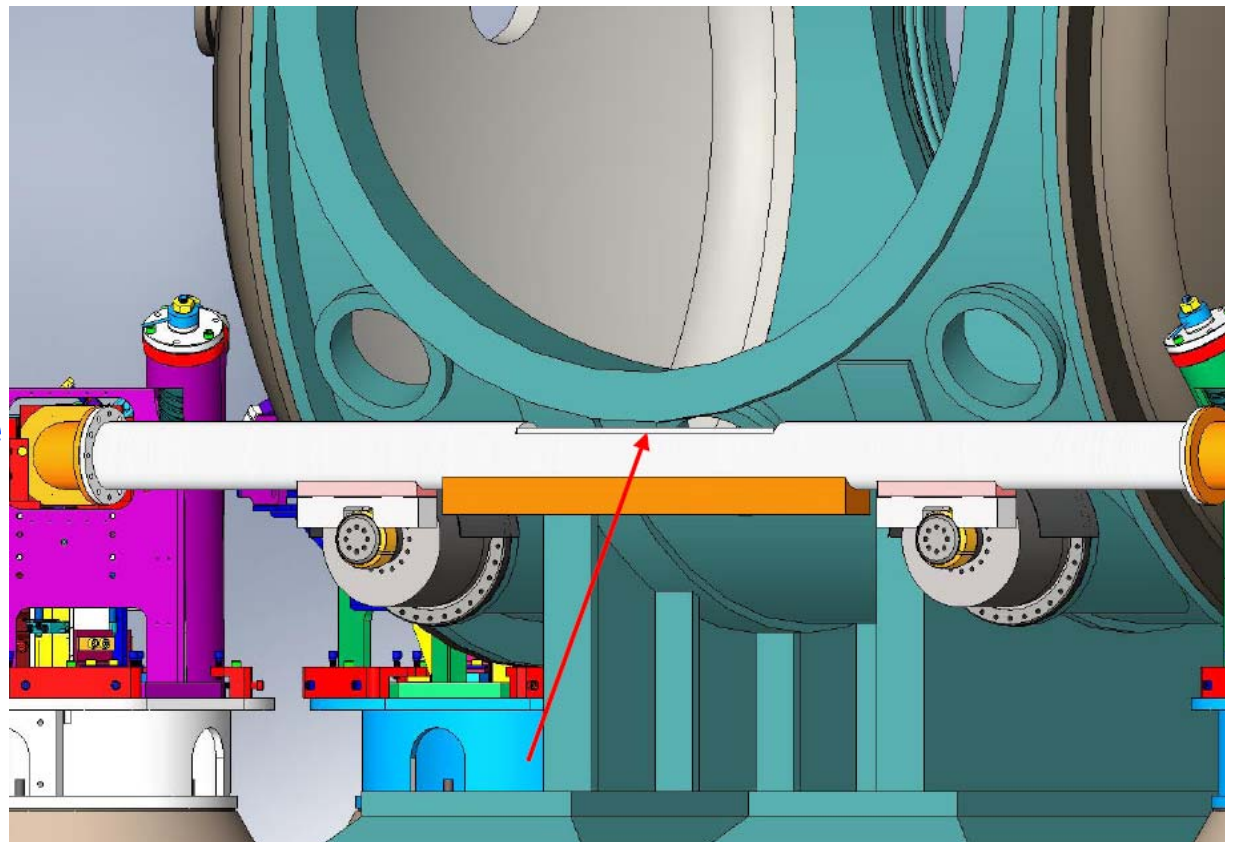


HAM Seismic Isolation

- LLO Ham Seismic Isolation has been unlocked and prepared for use with simple damping loops to reduce the motion of optics in the DC detection chain
 - » Change in plans – had thought to keep it locked
 - » Target of opportunity to reduce noise in ifo, see system work in use
 - » Next: get the software going
- LHO Ham Seismic Isolation just about finished, exquisitely documented in 700 photographs...
 - » Will now pursue real commissioning of that setup
 - » And install the DC readout mechanics and optics as possible and timely

Seismic: HEPI

- HEPI (Hydraulic External Pre-Isolator) has been looked over for any changes in preparation for installation at LHO (and the last chambers at LLO)
- Procurement Readiness Review underway – changes in cross-beam ('gull-wing') likely to make stiffer; might move the HAMs apart a little





Seismic and Quad Suspension

- On LASTI BSC Seismic, have been battling symptoms that resembled rubbing in the electromagnetic motor on the second stage
- May have been problematic position sensors instead...
- Last news is that it is all working, ready for servo tuning
- The production readiness review for the glass masses (penultimate mass and ERM) is underway
- Working on the welding setup for the fibers in preparation for the LASTI monolithic assembly
- 'BOSEM' review complete, units for the LASTI quad prototype being shipped
- LHO eLIGO OMC SUS waiting on blades – should be in 27 May



Assembled BOSEMS at testing station



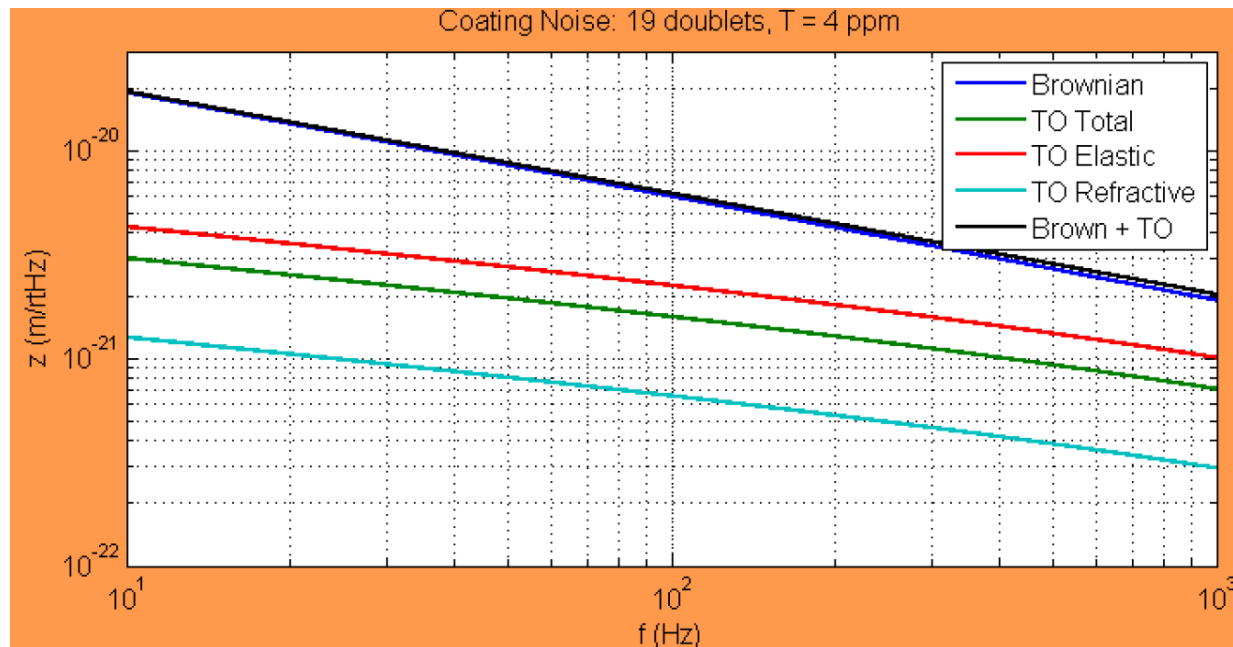
Pre-Stabilized Laser

- Getting DAQ system for 180 W laser installed in Germany
- LHO 35W laser in characterization, completion of PSL installation



Core Optics – Test Masses

- Progress on the procurement action for the AdL test mass blanks – hope to announce a choice of vendor very soon
- Matt Evans found a nice sign error in the coating noise calculation; it appears that thermo-optic noise will be much lower than anticipated
 - » Maybe no advantage in the optimized coating, as a consequence
 - » May bring AdL NS-NS beyond 200 Mpc





Auxiliary Optics

- Thermal Compensation for eLIGO in integration, test
- Lots of work on Layouts –
 - » Found a nice small-wedge-angle layout to solve a conflict with Quad Suspension design
 - » Looks like it may be basically a better layout!

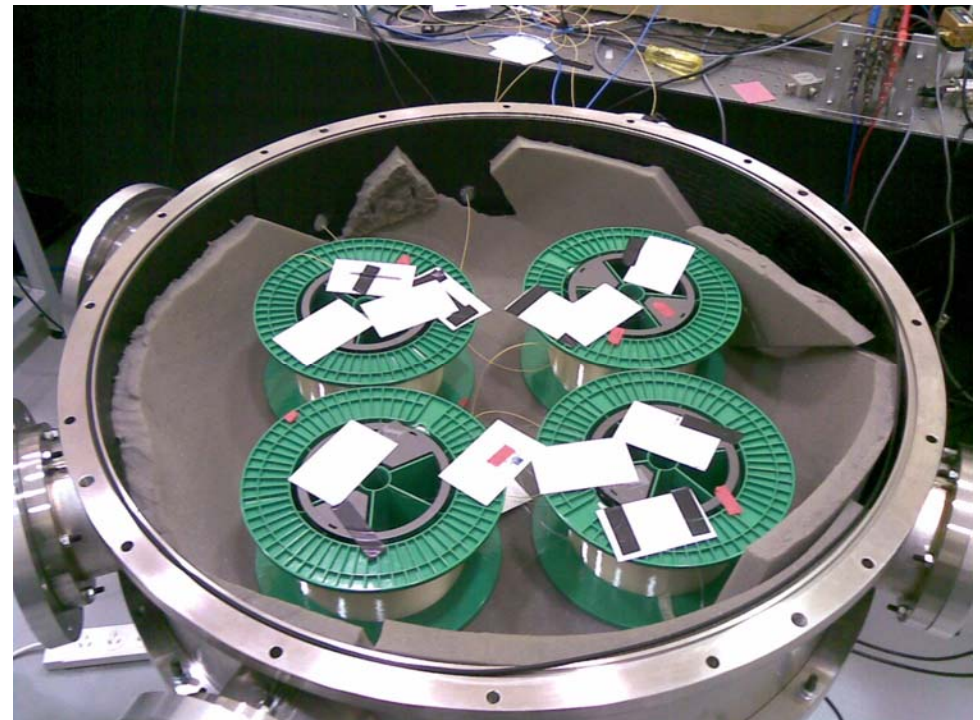
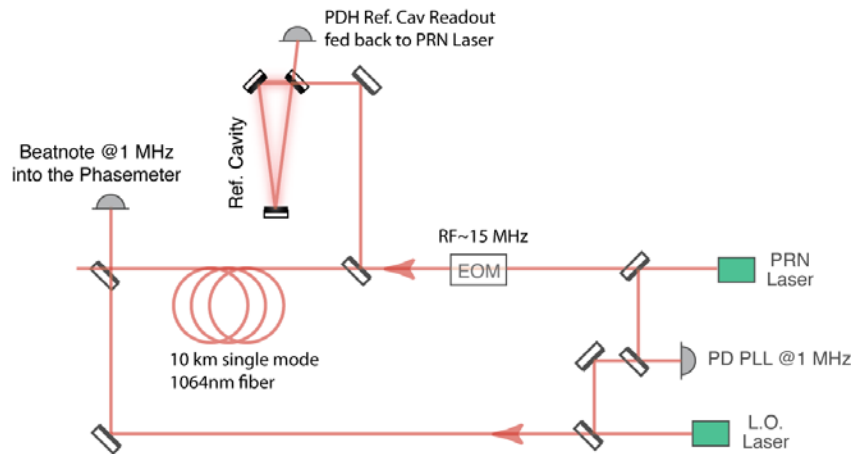


Input Optics

- Continued work on using segmented ring heaters on DKDP (electro-optic material) as a way of doing remote-control matching with some correction of aberrations – looks promising
- Installing 35-W ready modulators at LHO
- Studying impact of high absorption in eLIGO MC mirrors
- Still searching (I think) for cause of matching difficulties into LLO core optics

Interferometer Sensing and Control

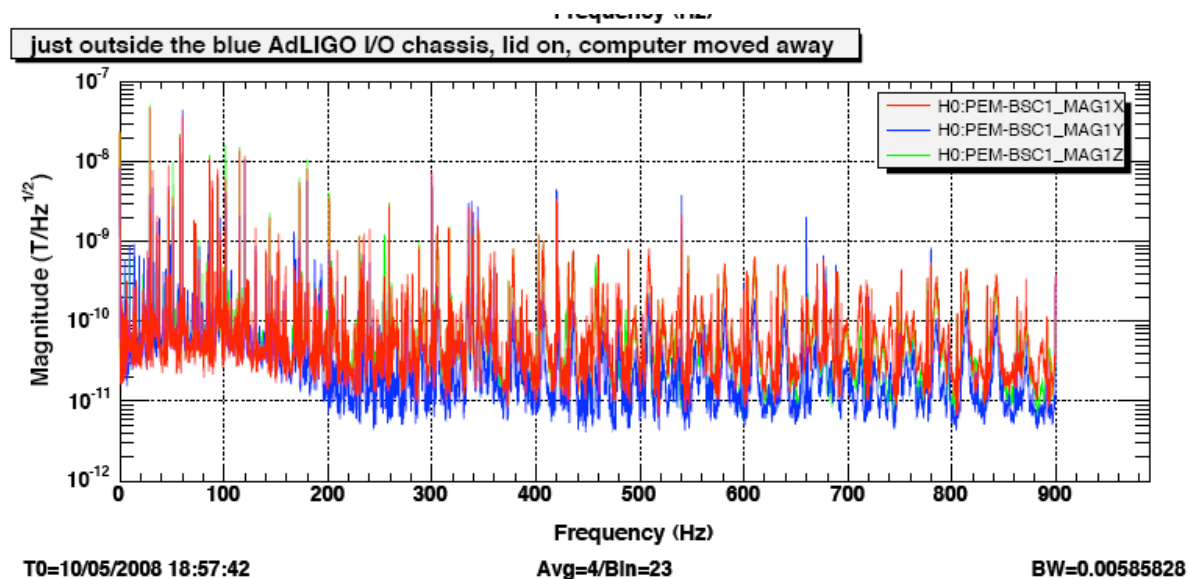
- Working through issues raised at the successful CDR
- Exploring means to stabilize lengths in anticipation of locking (aka 'SPI')
 - » Measuring phase noise due to long paths in optical fibers





Control and Data systems

- Supporting many of the on-going reviews
- Getting definition of the suspension test stands
- Working through protection systems for the new higher-power laser levels in eLIGO/AdL
- Looking critically at the current prototype DAQ systems in the field – e.g., generation of magnetic fields





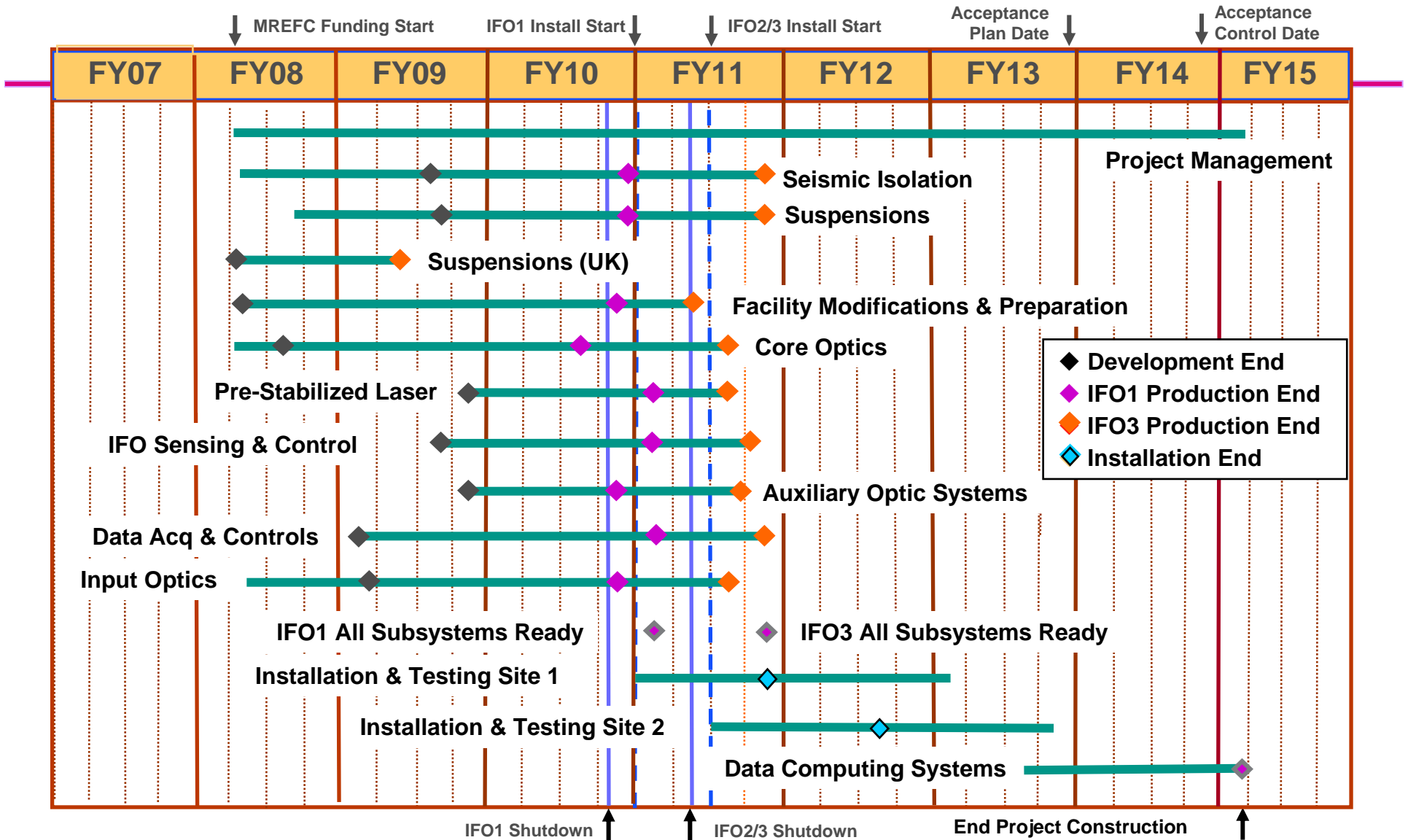
Systems

- Discovered and resolved the conflict due to large wedge angles in the layout
- Responded to, hopefully to the committee's satisfaction, the SYS PDR questions
- Working through a number of Technical Review Board actions –
 - » Parametric Instability Planned modeling and measurements are proceeding. TRB action ~fall 2008
 - » Au Barrel Coating Phil Willems presented a case for gold coated CP and TM barrels. Many analyses completed/underway Implications on COC production are to be determined. TRB action ~June 2008.
 - » Arm Length Stabilization The three proposed schemes for pre-lock acquisition stabilization of the arm lengths described in L080051-01. TRB ~end of June 2008



Advanced LIGO Subsystem Summary

(Showing Development and Project Production Early Milestones)





Closing notes

- Summer vacations are important
- Maintaining momentum is important
- Please coordinate in advance with your colleagues to make the best set of compromises, get long-lead things out the door, etc.
- Please do post progress to the AdL Wiki (and durable documents to the DCC as well)

- Please let me know if you see ways that we can make the Project, or your participation, more successful and more fun!