

A photograph of a laboratory or industrial setting. In the foreground, a person wearing a dark blue jacket is partially visible, holding a metal chain. The background shows white equipment, possibly a large container or tank, with various pipes and components. The text is overlaid on the image.

# Lasti Plan Update

*Excomm Call  
April 7, 2008*

*Rich Mittleman  
On behalf of the Lasti team*




# *Current Status*

 The control work on the BSC-ISI is proceeding

 It looks like we know what it is that produces the hysteresis in the Quad and we have a plan to get around it

 The welding/fiber pulling lab is mostly constructed and Alastair has pulled test fibers for the new pondermotive suspension

 We have installed a septum plate into Lasti and are in the process of installing the second pumping system



# Other Work

## INITIAL LIGO SUSPENSION , BREAK OFF AND WIRE CLAMPS

*Matt Evens, Rai Weiss, Lucienne Merrill*

## BAFFLE SCATTERING MEASUREMENTS

*Cassi Hunt*

## HAM HEPI ISOLATION

*Sharon Rapoport*

## BOLT FRICTION MEASUREMENTS

*Sharon Rapoport*

## LASTI INFRASTRUCTURE WORK

*Myron Marinis, Bob LaLiberte*

## PONDERMOTIVE EXPERIMENT

*Thomas Corbitt, Tim Bodiya, Chris Willf, Sarah Ackley,  
Shelia Dwyer, Nergis Mavalvala*

## CONSTRUCTION AND CHARACTERIZATION OF A UNIVERSALLY TUNABLE MODULATOR

*Sarah Ackley*



**IN THE PAST YEAR**

• **-BSC-ISI**

Finished “Dirty testing”

Went to Italy for Cleaning

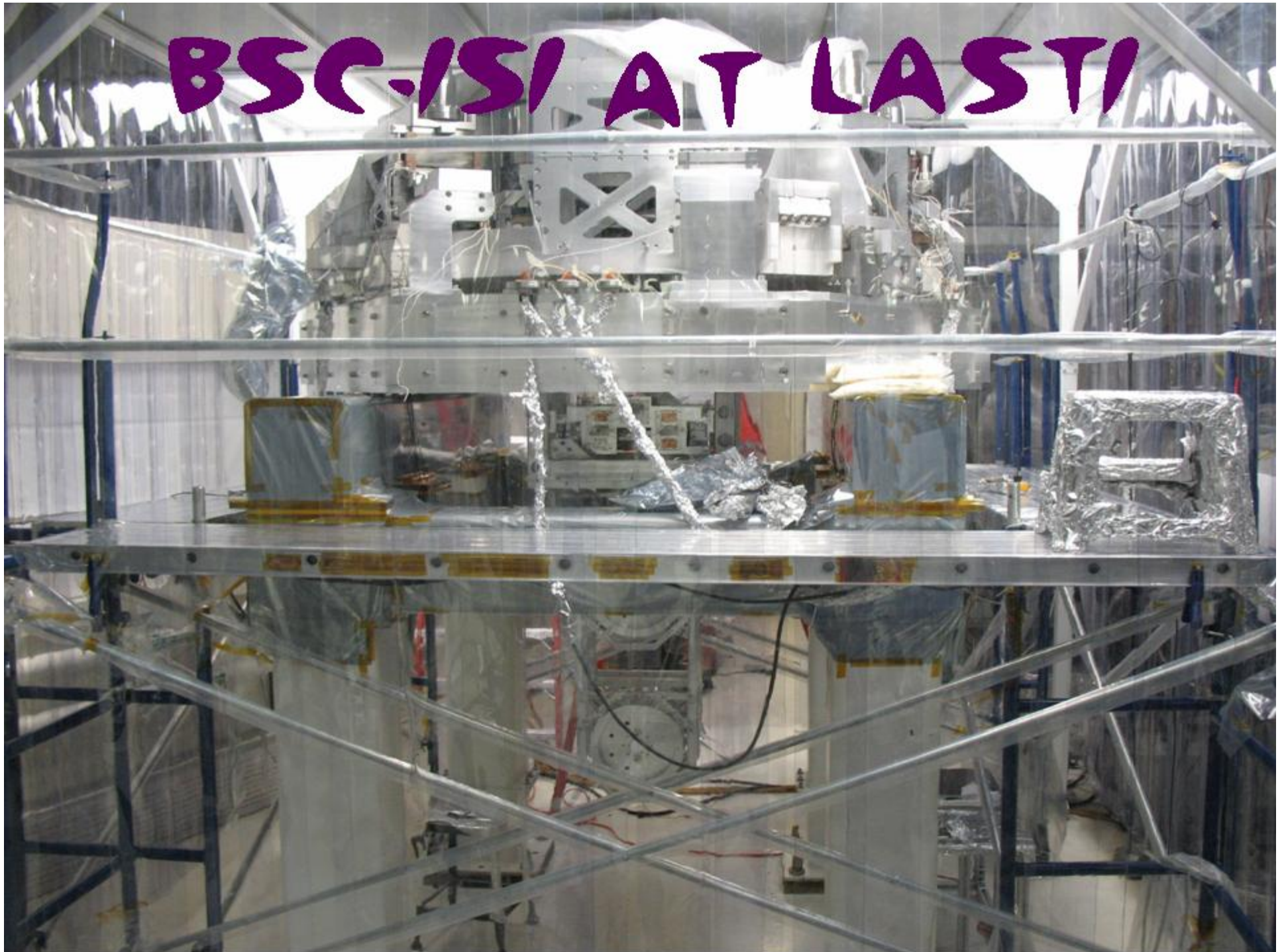
Some Redesign

Reassembled Clean

Mated with the Quad Prototype

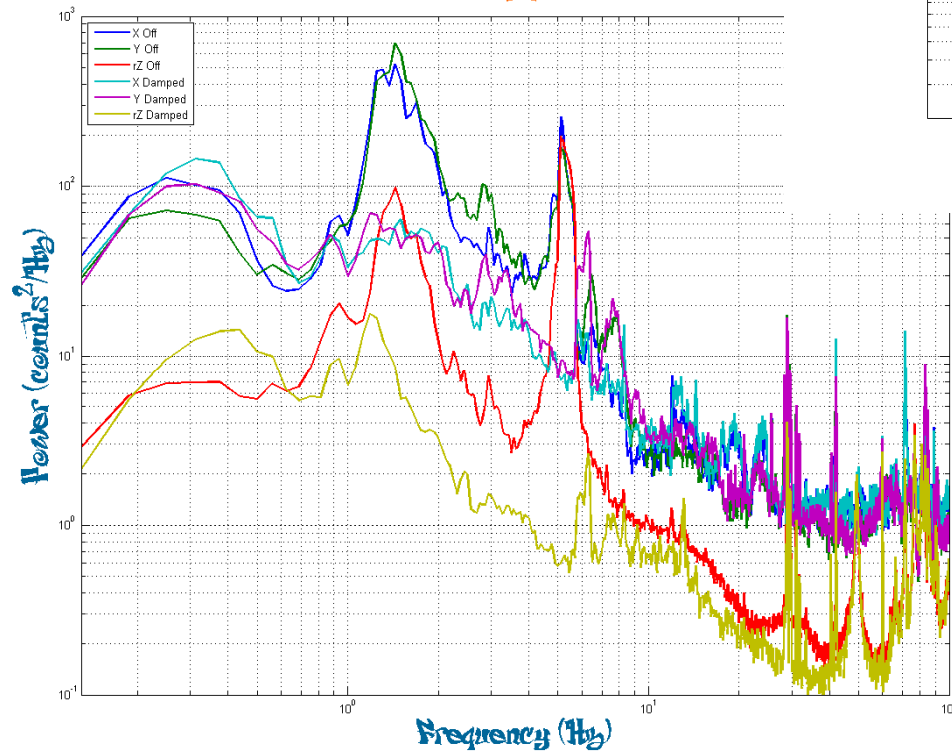
Started Commissioning

# BSC-151 AT LAST!

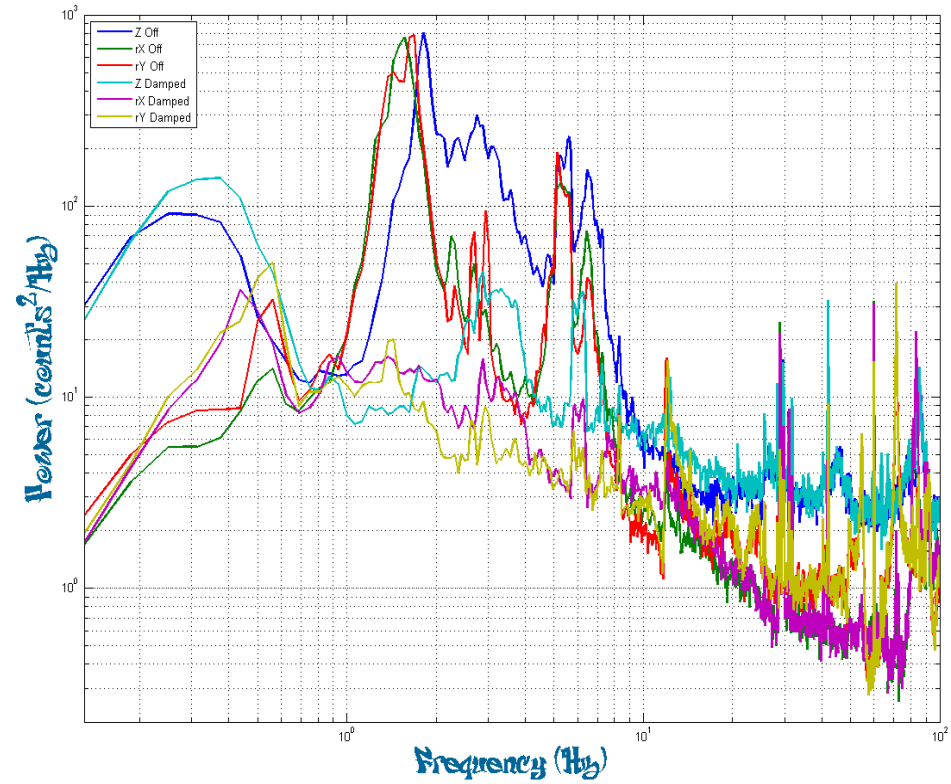


# First Isolation Results

Horizontal GS13s



Vertical GS13s



*Motion of stage 2 with  
2 stages of damping  
loops on*

# Quad Noise Prototype Pendulum



I. Assembled the suspension and mounted onto the ISI.

II. Installed the sleeve.

III. Sorted various bugs along the way.

Some of the more major ones:

1. Upper structure not machined properly (holes in the wrong places or not tapped).

2. Al baked at wrong temperature causing all magnet interfaces to be too soft.

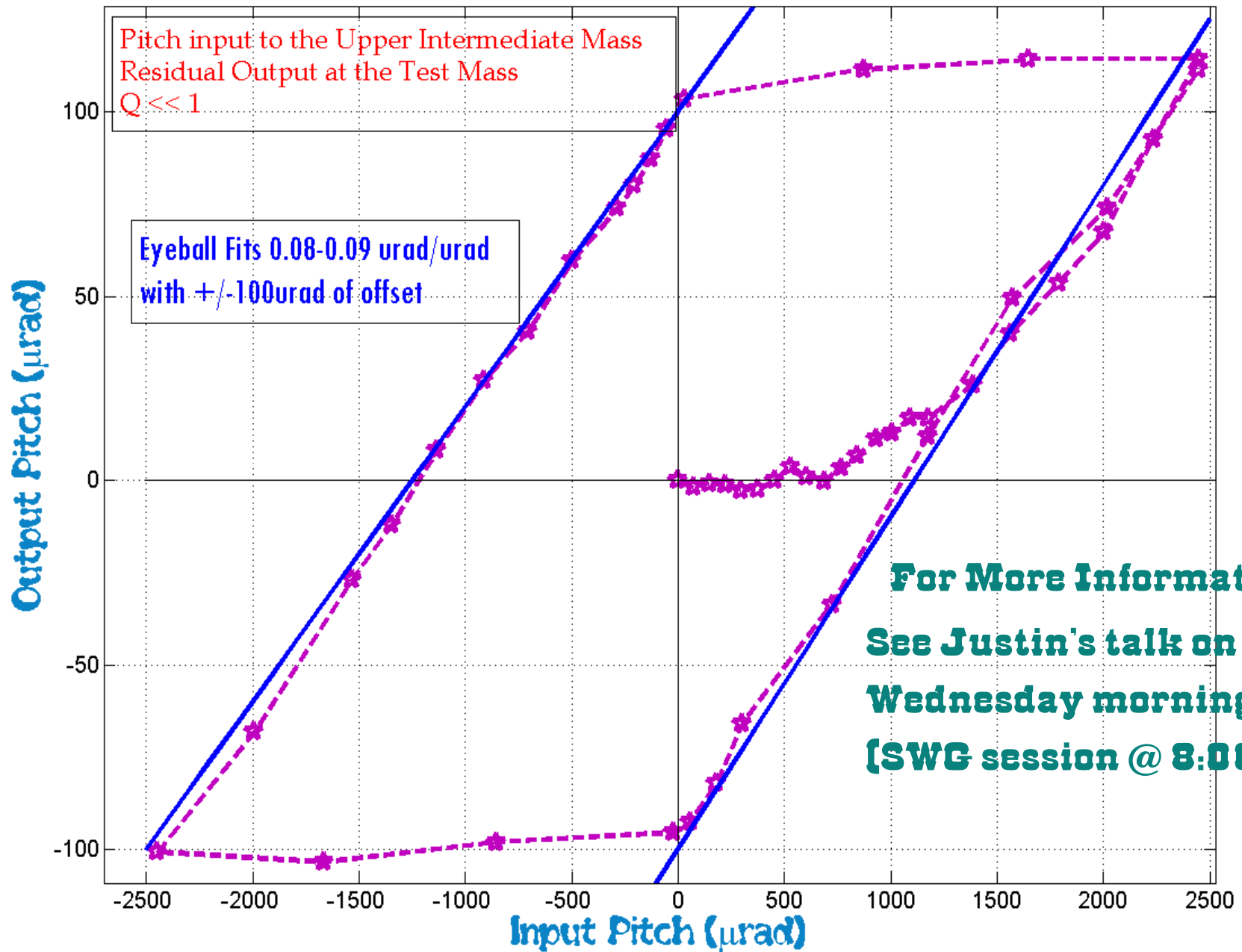
3. Some parts didn't fit or caused interferences with the suspension.

4. Too much blade sag.

IV. OSEMs and damping loops were installed and the final alignments began.

V Pitch Hysteresis

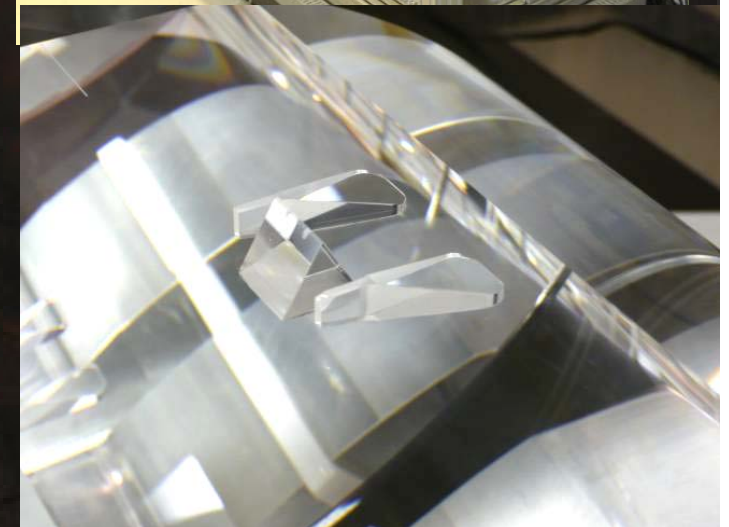
# QUAD PITCH HYSTERESIS





# Monolithic suspensions at LASTI

- Installation of the fibre pulling machine began in December 2007
- First fibres produced in February 2008
- Work is continuing on improving recipe
- Three of four fibre characterisation machines are installed and the profiler will be completed over the next month
- CAD studies of the suspension thermal noise are being used to look for potential design improvements
- Ear and prism bonding work has essentially been completed at LASTI
  - 4 ears bonded and 2 prisms glued to both penultimate masses
  - 4 ears bonded to the test mass
  - 4 prisms glued to reaction mass



**PLANNING AHEAD**



# LAST! TASK LIST

## SEI

### **FULLY COMMISSION BSC-ISI**

- *Implement Control Loops and Test performance*
- *Test Installation and in vacuum performance*

### **REDUCED SENSOR CONTROL**

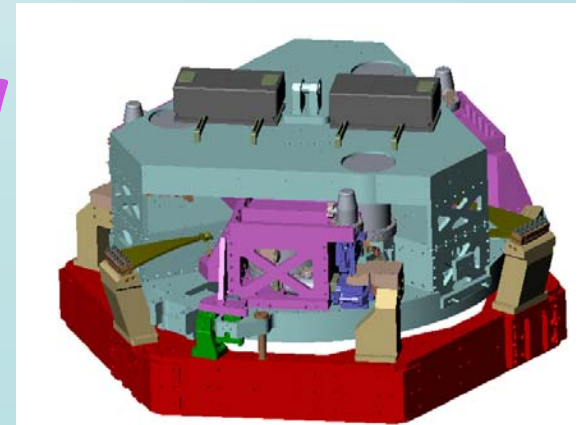
### **TEST LOAD SCENARIOS**

- *Currently the Quad is centered on the optics table; we should test off center loading*
- *Balance and performance*

### **INSTALL AND TEST A SPI SYSTEM**

### **INSTALL AND COMMISSION HAM-ISI**

*Will require some infrastructure work*



# LAST! TASK LIST

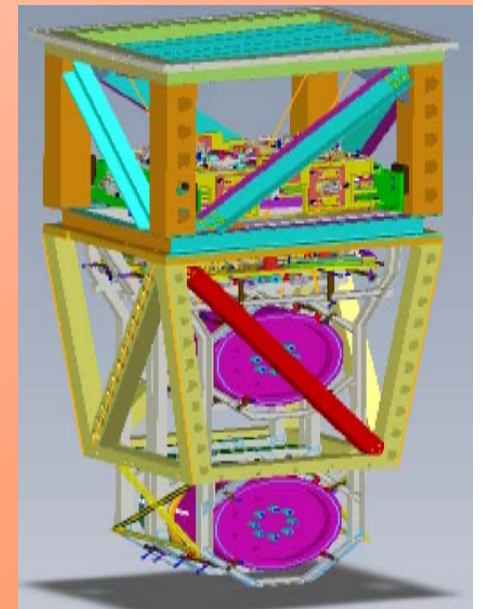
## SUS

### GET NOISE PROTOTYPE WORKING

- *Fix current hysteresis problem*
- *Verify damping, modal frequencies and couplings on metal version*
- *Convert to glass monolithic version*
- *Test assembly alignment and installation procedures and tooling*

### TEST ELECTRO STATIC DRIVE (ESD)

*Optic Modes and Damping (Parametric excitation) is included here*

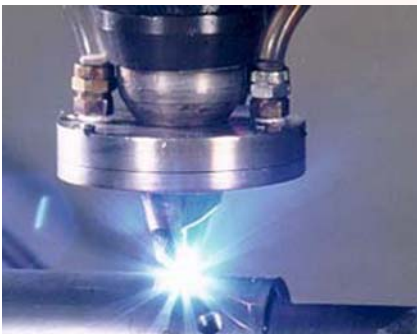


# LAST! TASK LIST

## SUS

### **FIBER PULLING AND WELDING**

- ***Finish Installation***
- ***Develop and refine fiber pulling and welding methods***
  - There is still a lot of development work to be done*
  - Clearly this is with a lot of help from Glasgow.*
- ***Test Ring Heater (thermal and optical)***
- ***Violin Mode Damping***
- ***Non -Gaussian noise in violin mode studies***
- ***Charging/discharging of the test mass studies***
- ***RM Suspension in HAM***
  - Reconfigure to ITM suspension***
    - rotate suspension*
  - First article modecleaner,***



# LAST! TASK LIST

## Other

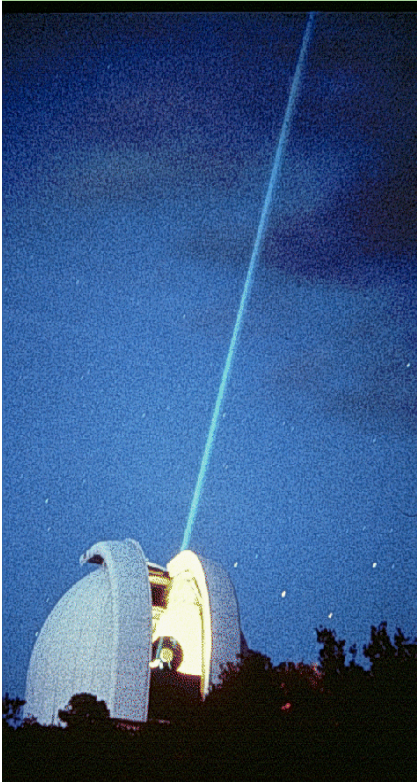
***BAFFLE INSTALLATION AND FIT CHECK***

***ADVLIGO TCS TEST***

***TESTING OF CDS CONTROLS***

***AND HARDWARE***

***LOCKING AND CONTROL***



# Time Line

- ☀ **End of April '08 -ISI/Quad into the BSC**
  - ☀ **Commissioning ISI**
  - ☀ **Testing Quad with metal masses**
- ☀ **June '08 Monolithic Construction**
- ☀ **Summer '08**
  - ☀ **Cavity Experiments**
  - ☀ **ISI Commissioning**
- ☀ **HAM ISI Summer '09**
- ☀ **Followed by TCS build**



# CONCERNS

- 👤 Storage space
- 👤 Fork Lift (outside)
- 👤 Chilled Water
- 👤 Graduate students
- 👤 External Support
- 👤 Computing Issues
- 👤 Enhanced Ligo Laser