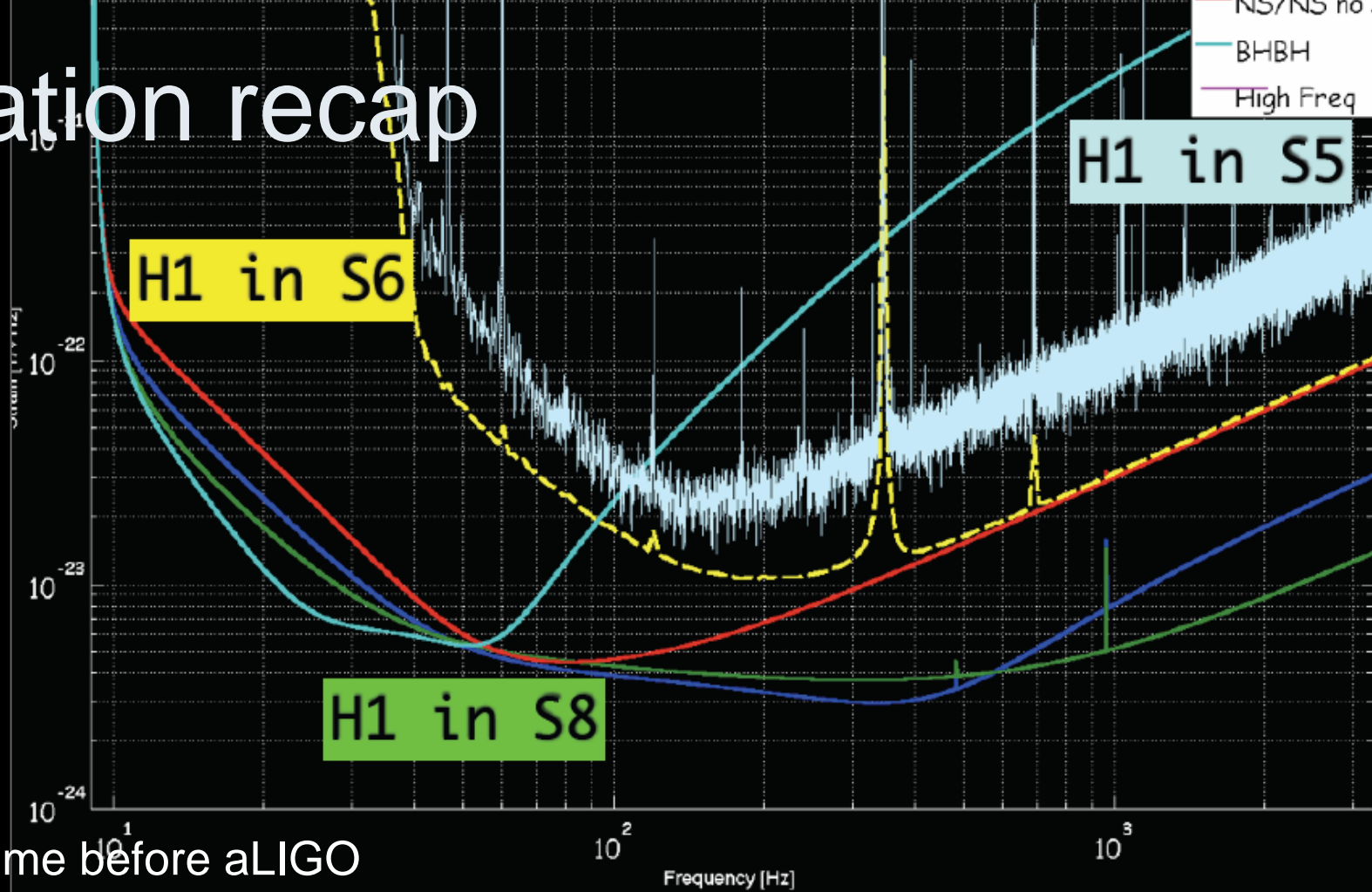




# LIGO commissioning update

Nicolas Smith  
LIGO MIT/LHO  
LVC Amsterdam Sep. '08  
LIGO-G080460-00-D

# motivation recap



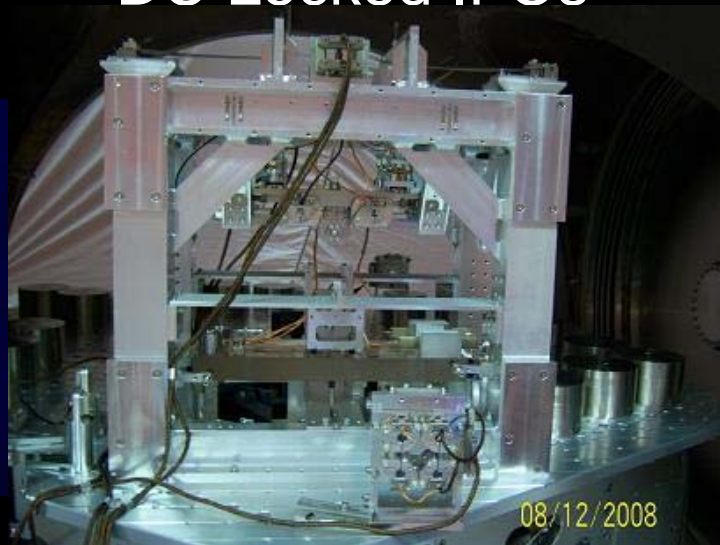
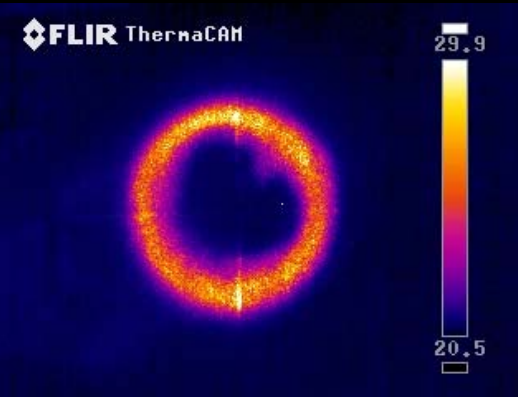
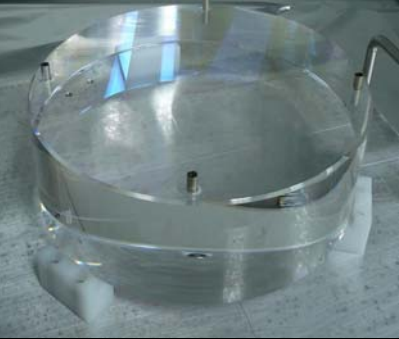
- S5 done, time before aLIGO
  - incremental increase of sensitivity
  - factor of 2 range would give factor  $\sim 8$  in detected volume
- prototype new systems
- increase power, DC readout, fix some known noises





# milestones

- magnets and EQ stops swapped
- baffles installed
- faradays upgraded
- 35W PSLs installed
- new TCS ongoing
- HAM-ISIs installed
- OMCs installed
- DC Locked IFOs



08/12/2008

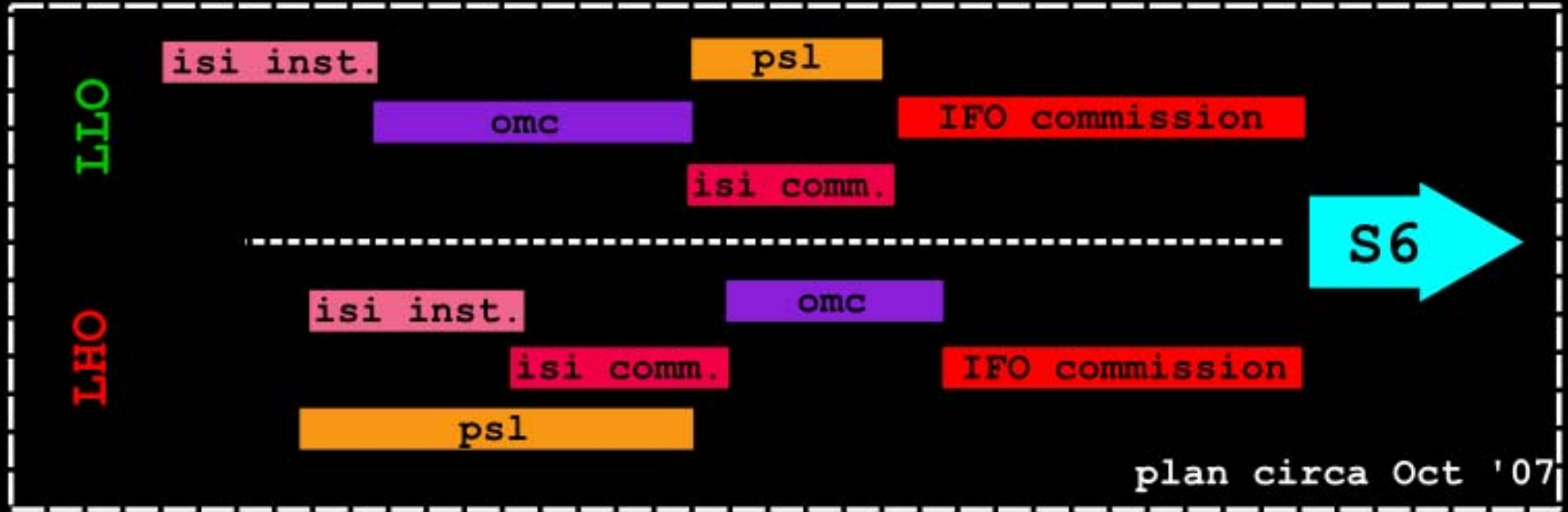


2007

2008

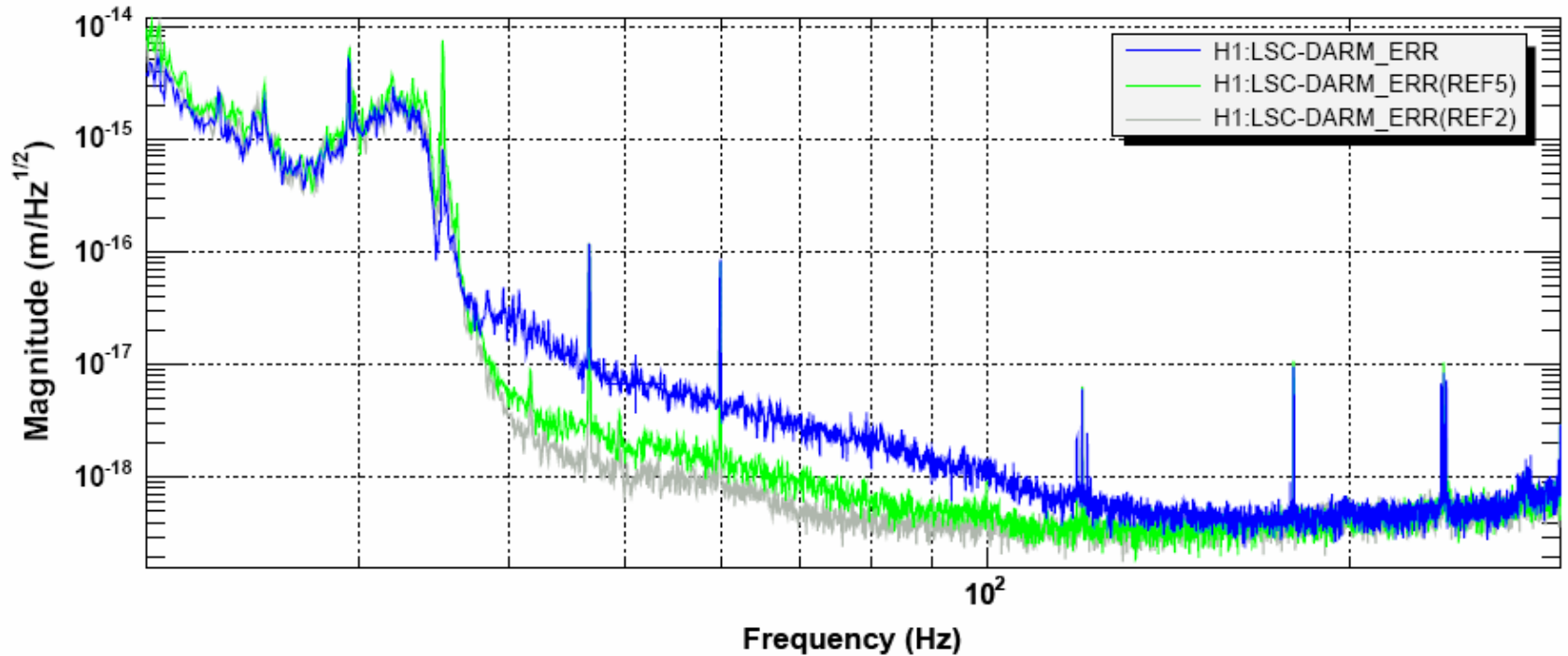
2009

O N D J F M A M J J A S O N D J



# upconversion

Roughly Calibrated DARM\_ERR



- $1/f^4$  model, scales with  $i^{(3/2)}$ .

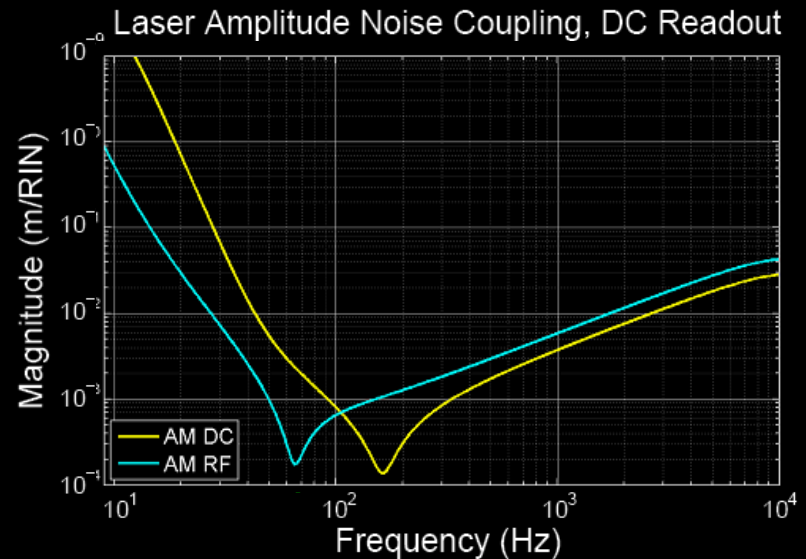
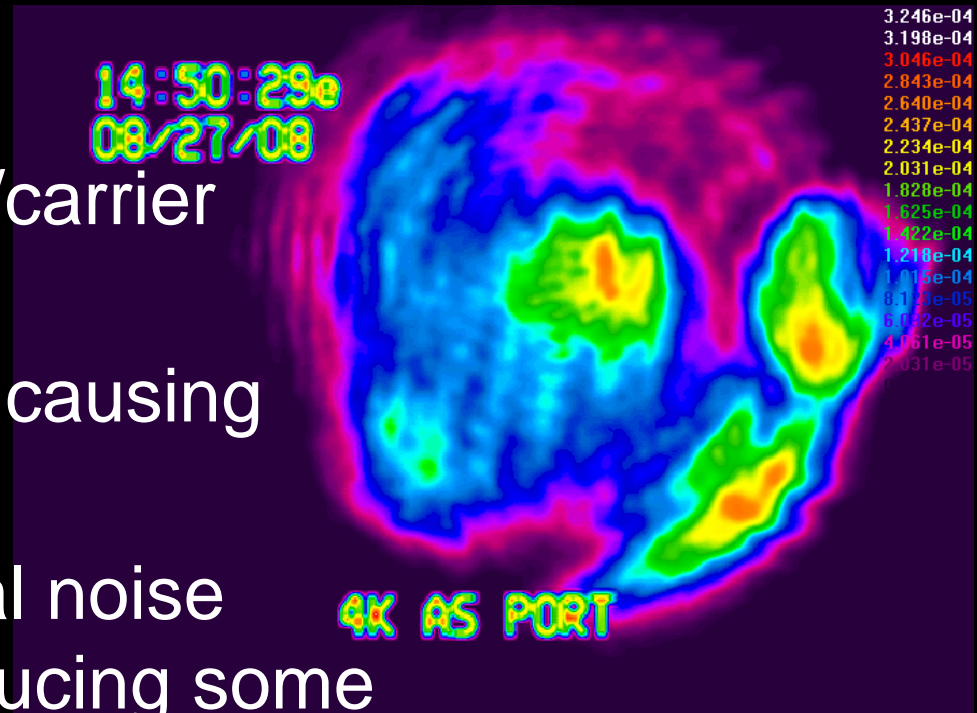
current (mA)	predicted coefficient	measured	ratio
pre-swap 1.1	3.8	3.8	1
<span style="color: green;">●</span> 5.1	38	3.1	1/12
<span style="color: blue;">●</span> 18.3	260	18	1/14

- see July 17 LHO elog



# dc readout

- immunity to sideband/carrier overlap
- reduction of junk light causing additional shot noise
- reduce some technical noise couplings while introducing some new ones
- see July 8 LLO elog for preliminary results

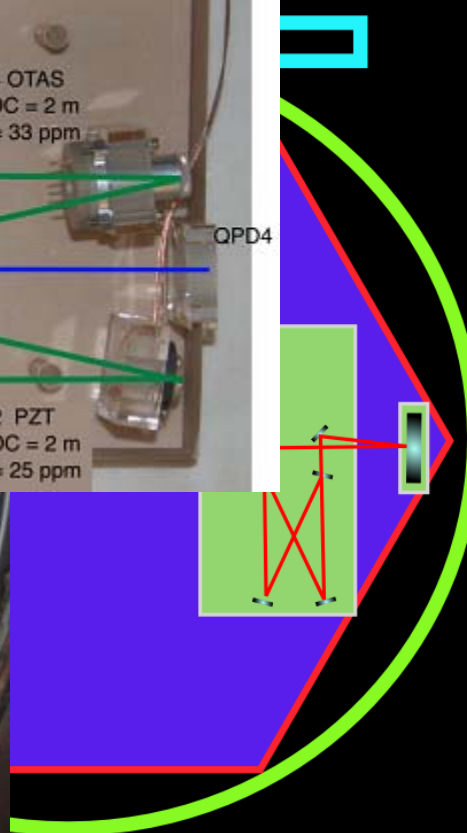
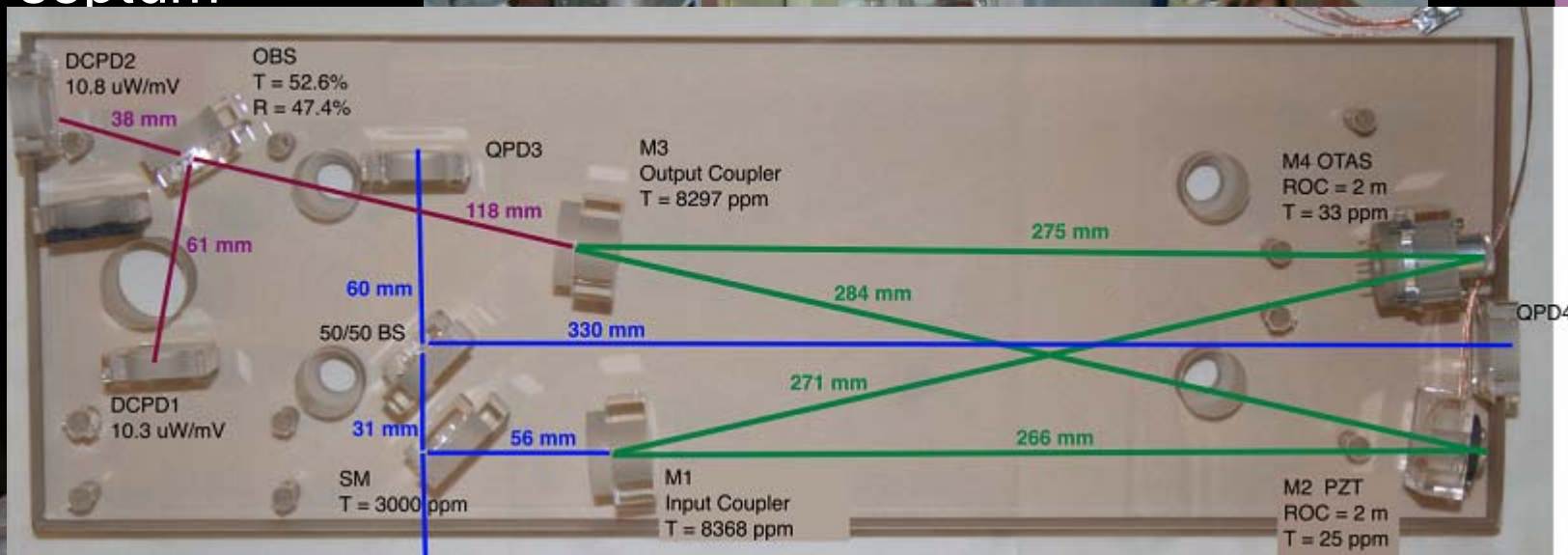


# DC readout



blitter

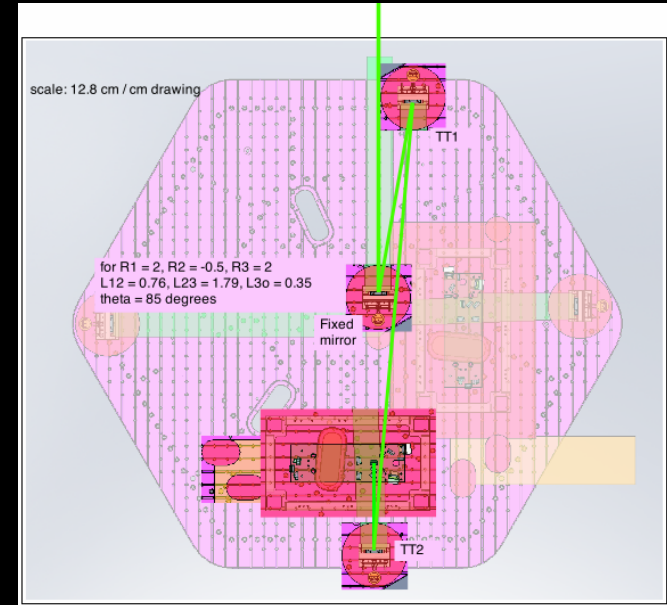
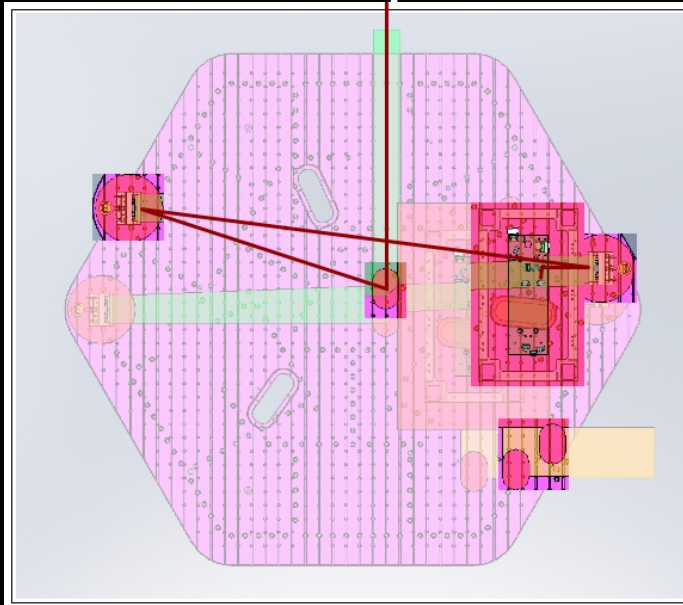
septum



HAM 6 Chamber  
/software

# issues

- OMC alignment control
  - using TTs simultaneously as steering mirrors and telescope



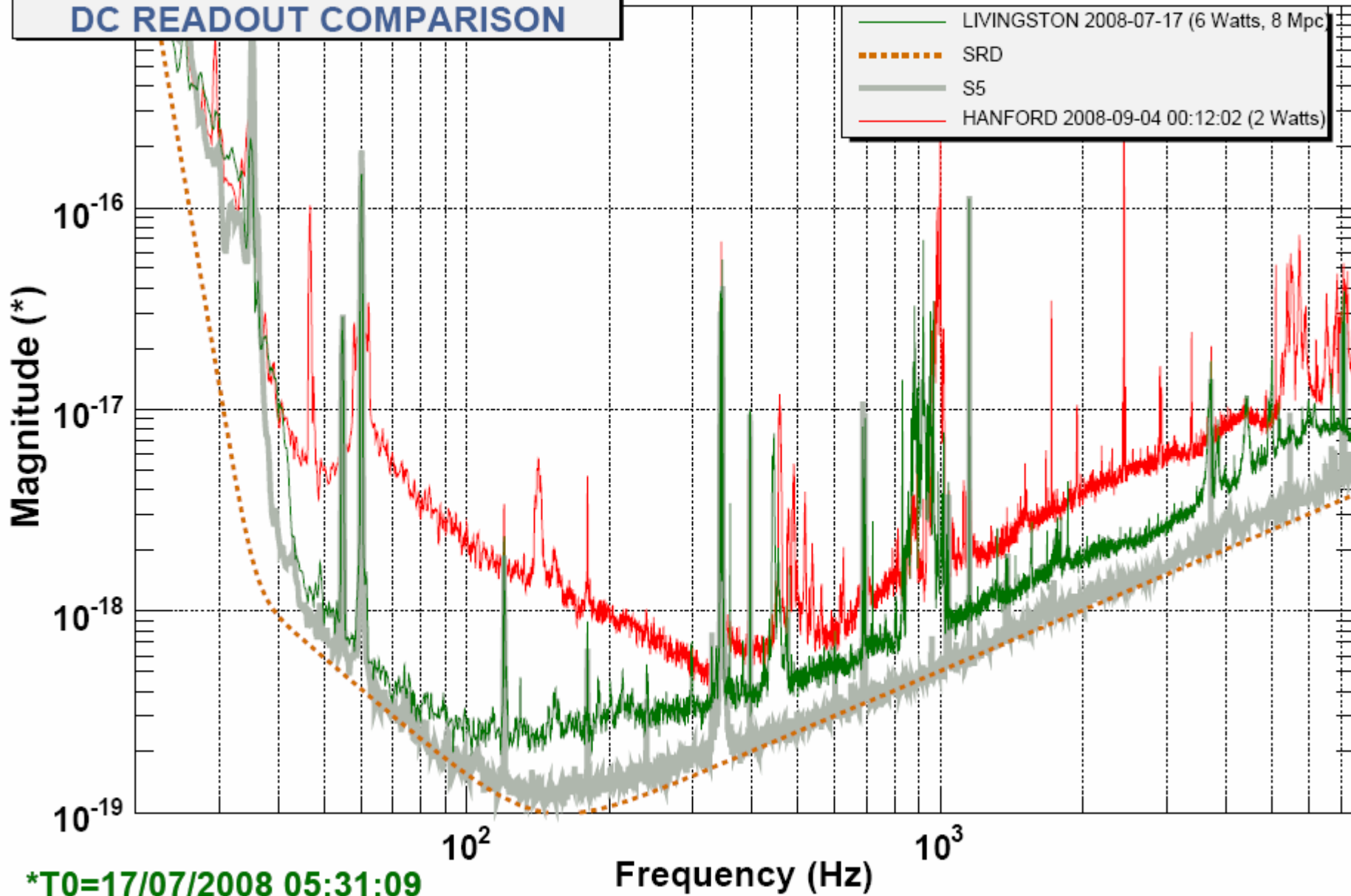
- input optic jitter
  - how much is tolerable?



# still to do

- noise hunting/budgeting
- high power largely unexplored
  - may cause problems in IFO alignment servos
  - tune TCS heating
- make permanent switch to DC
- beat S5

# DC READOUT COMPARISON



\*T0=17/07/2008 05:31:09