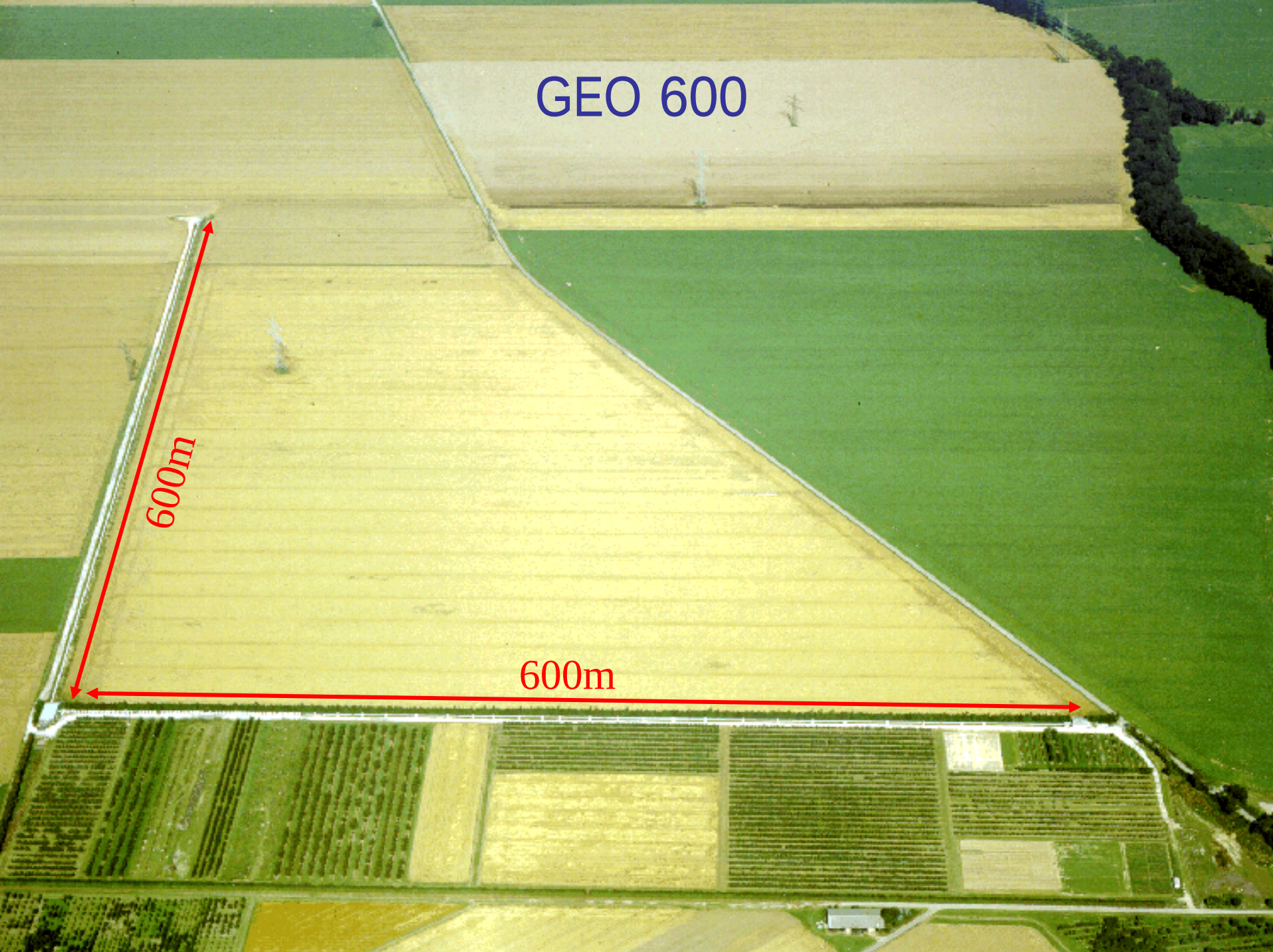
Status of GEO600

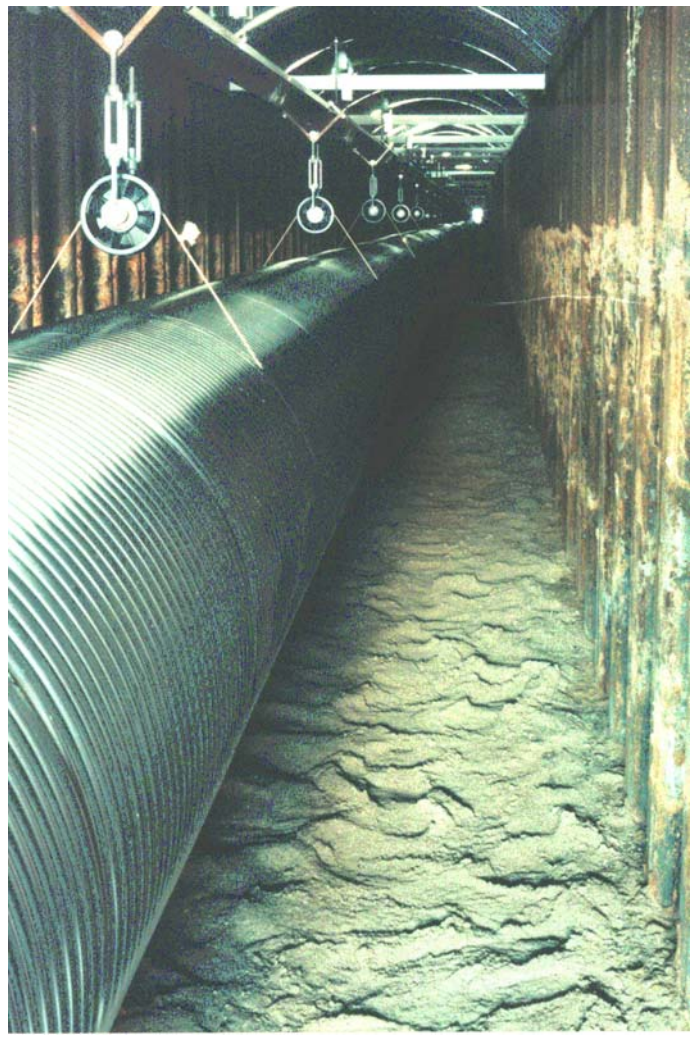
Benno Willke
for the GEO600 team

LSC meeting
Hanford WA, August 2004
LIGO-G040366-00-Z


GEO 600
600m
600m

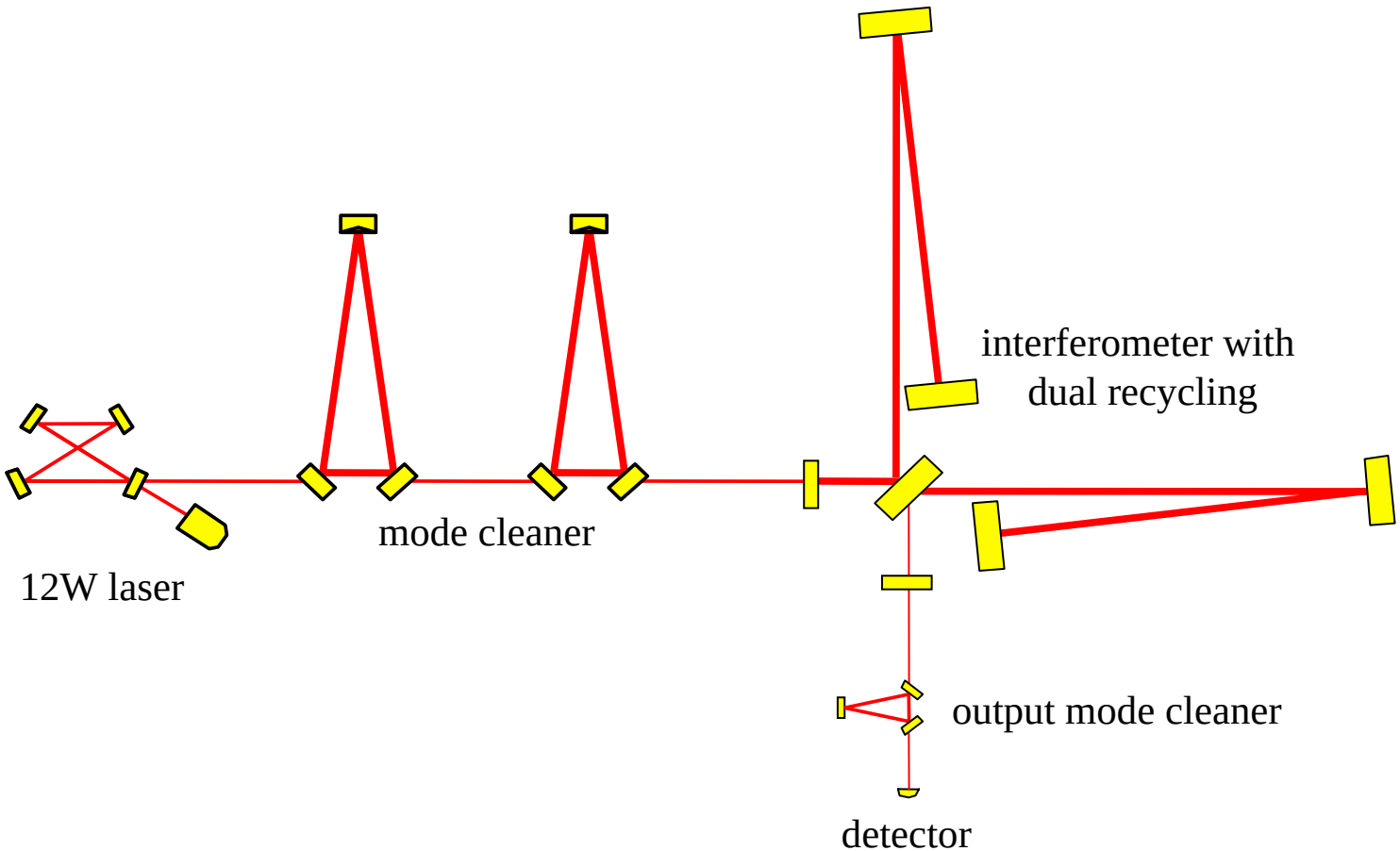
Central Building

Tube / Trench

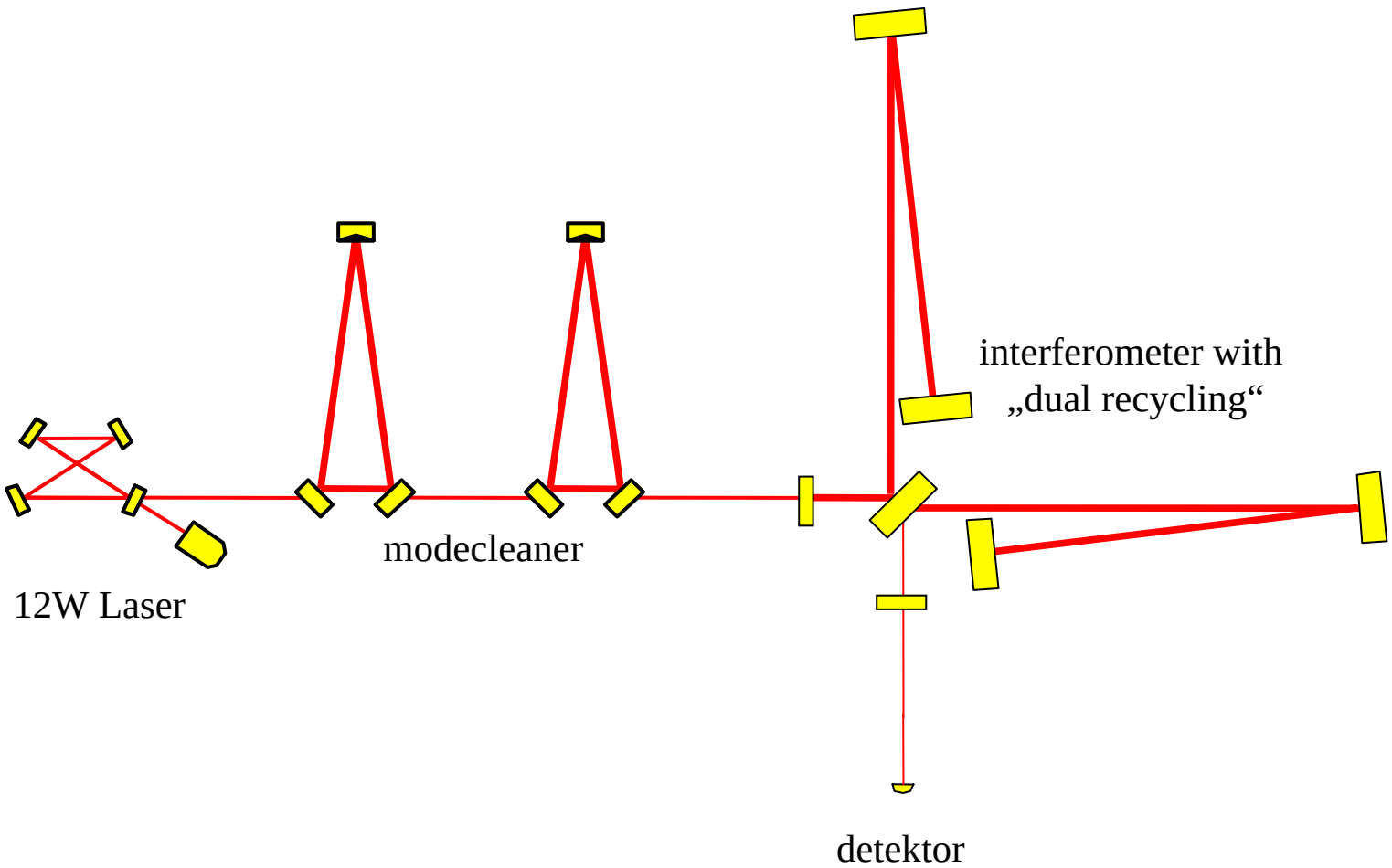


Clean Room / Control Room

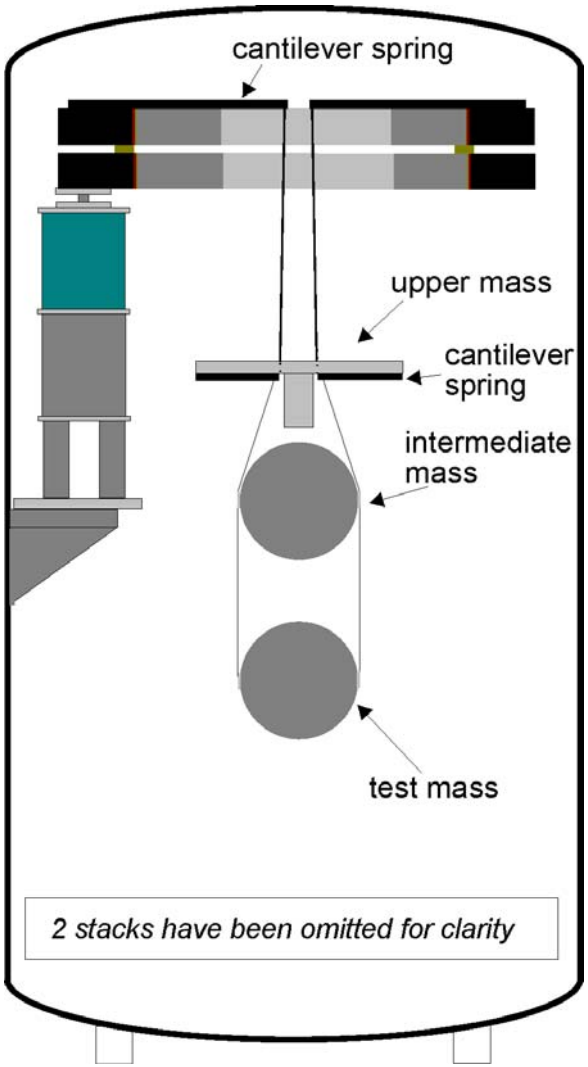
Optical Layout

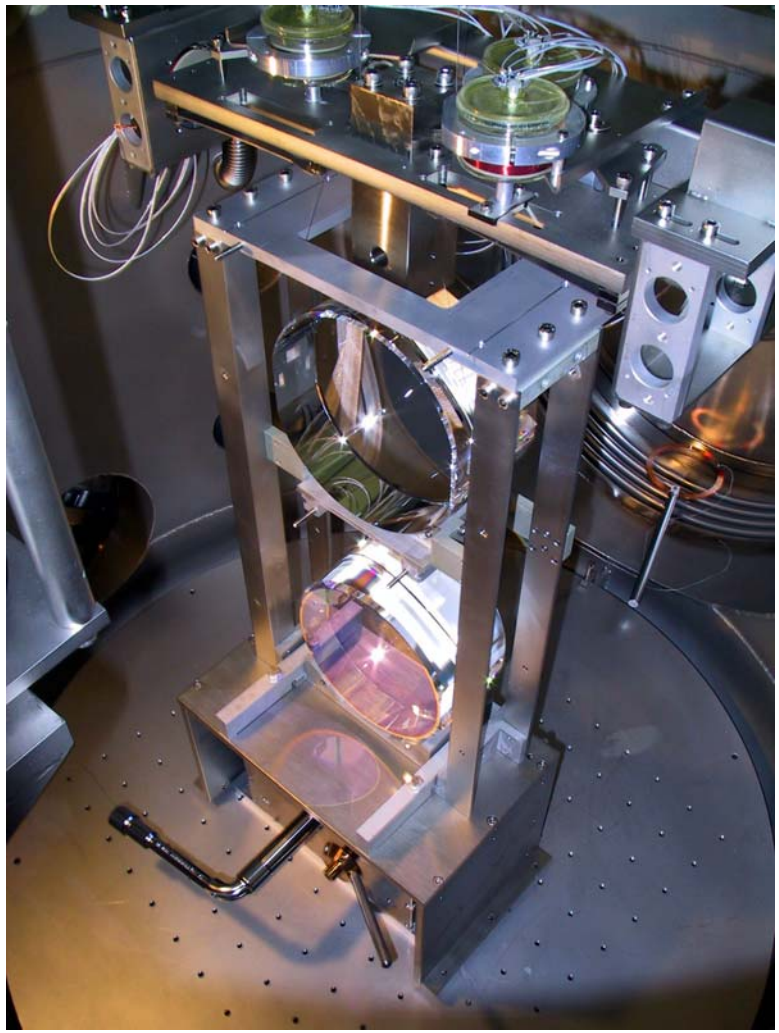


Optical Layout



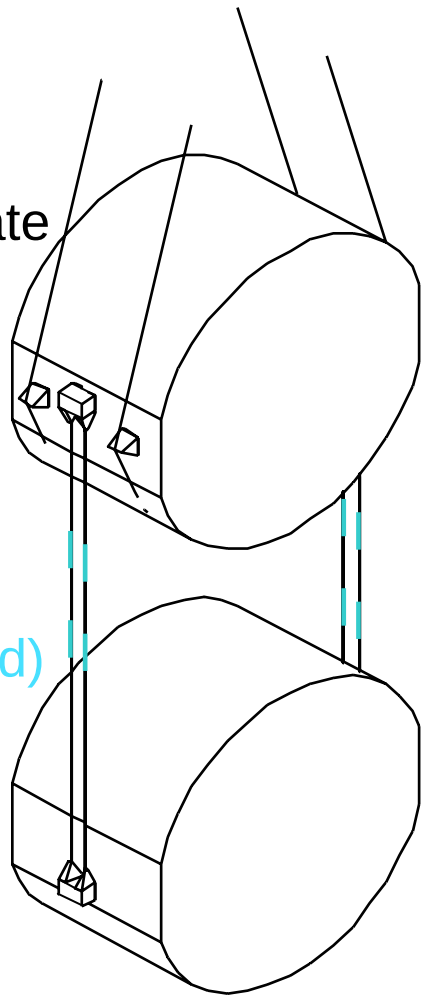
Triple Pendulum Suspension

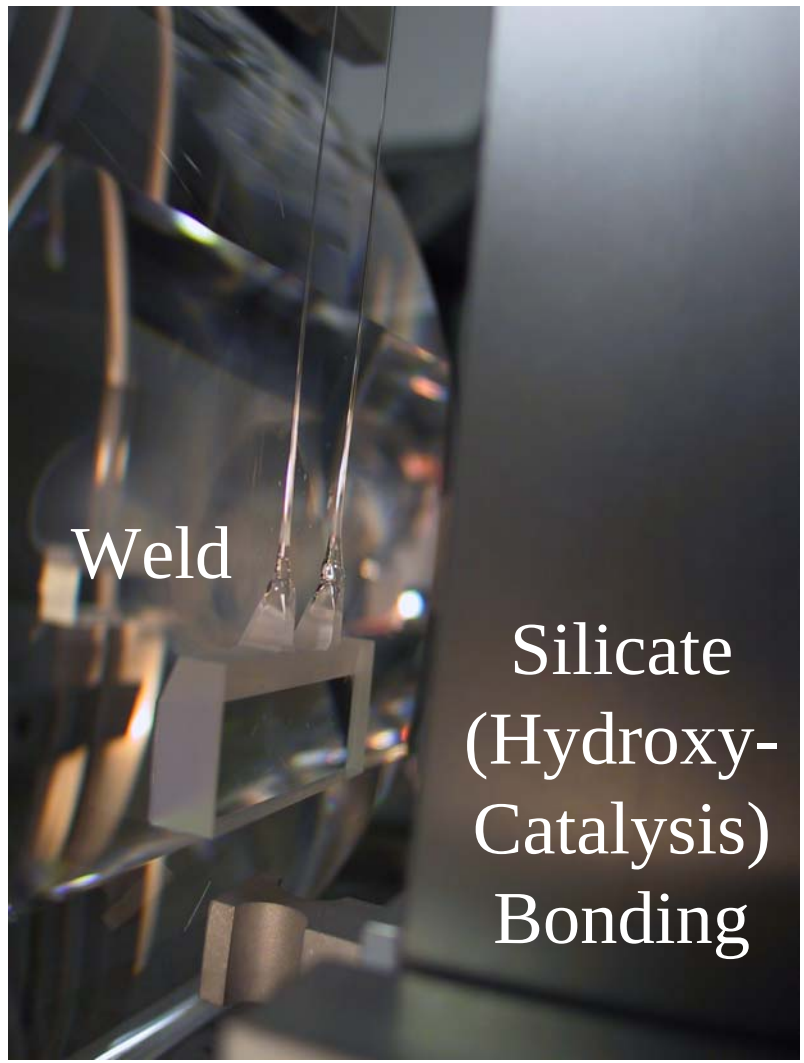




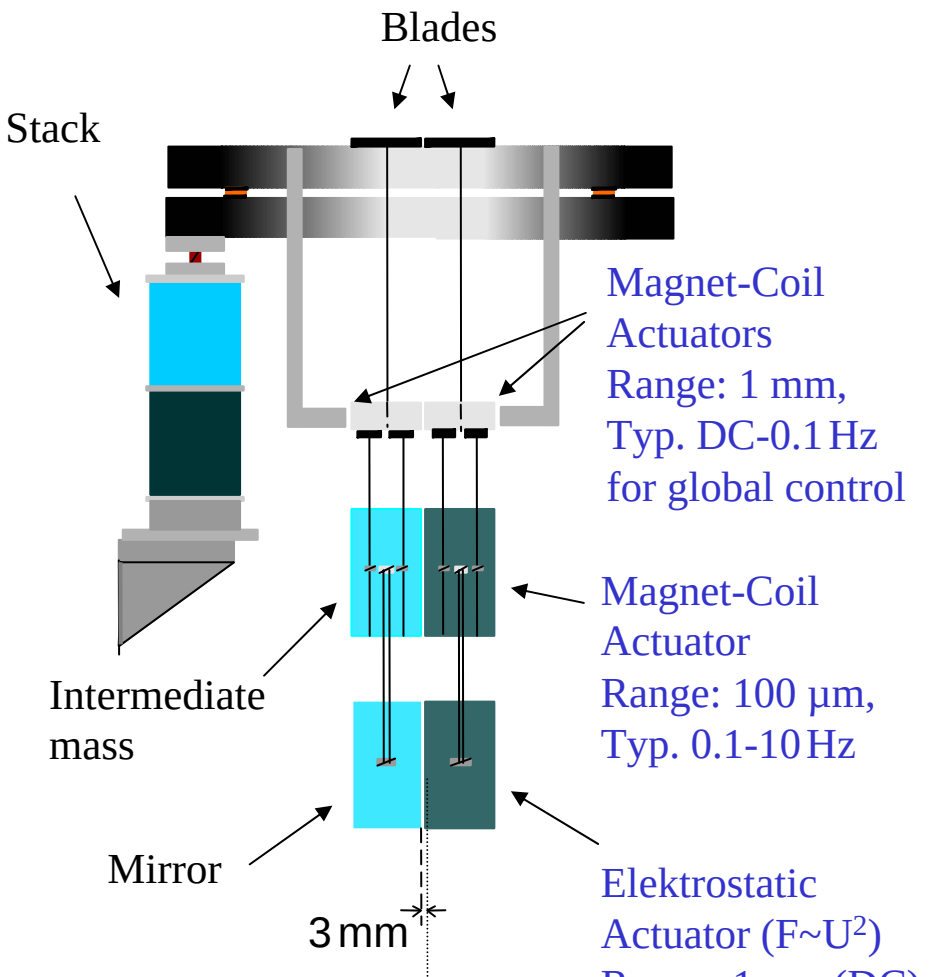
Thermal Noise Issues

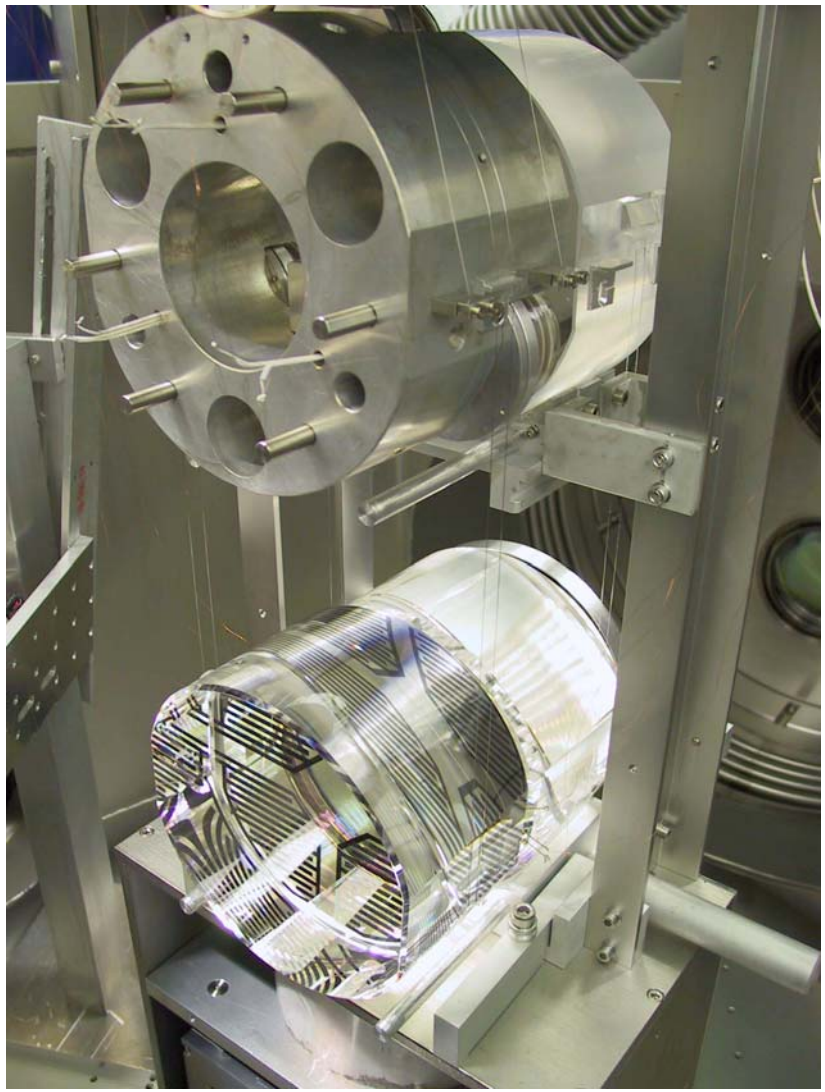
→ Monolithic Suspension



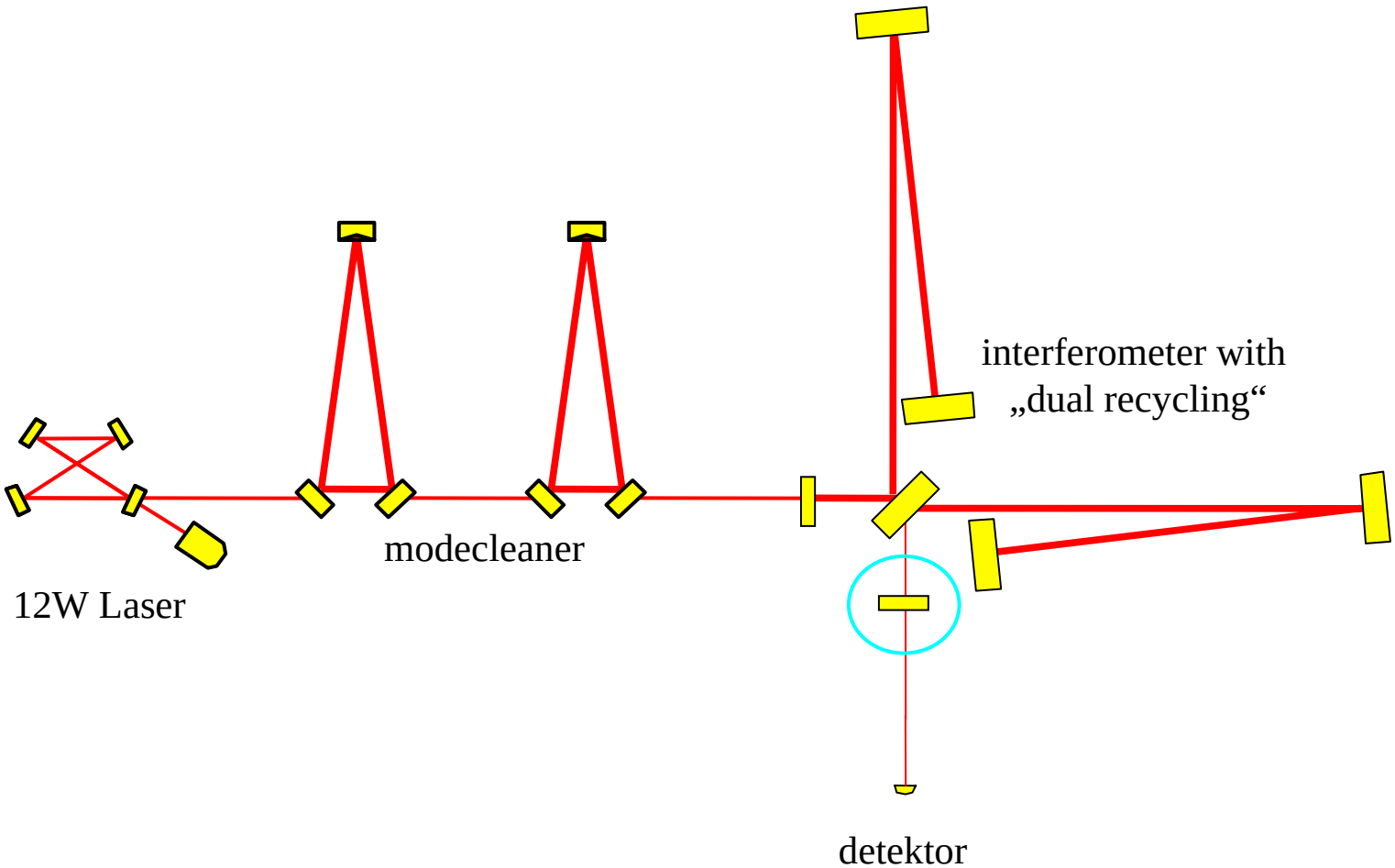


Main Suspension with Reaction Pendulm

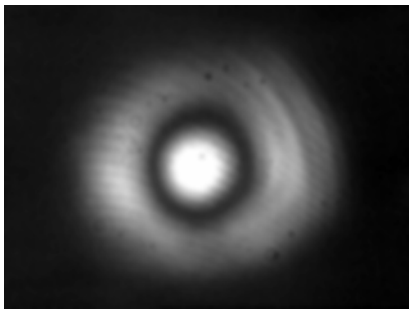


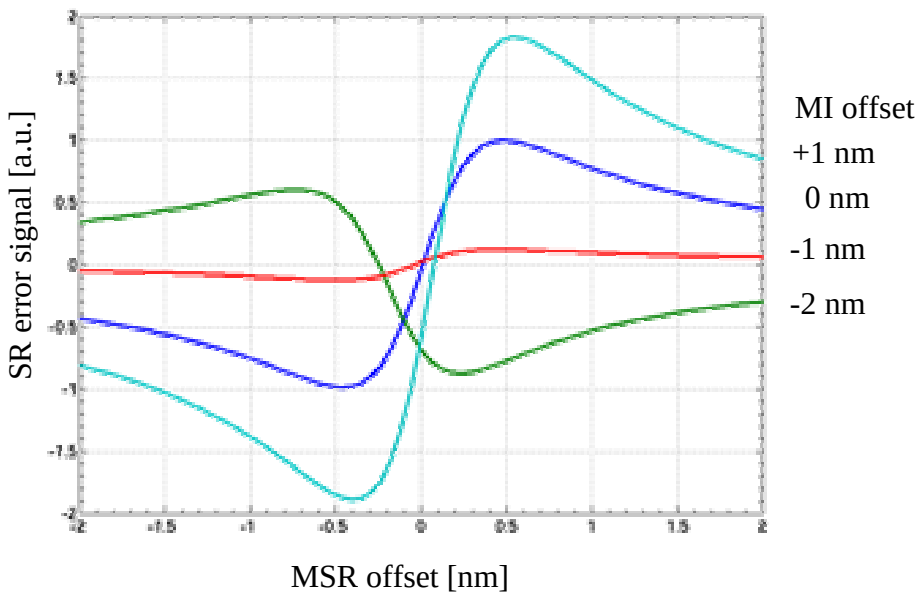


Mirror Installation Fall 2002



Commissioning in 2003

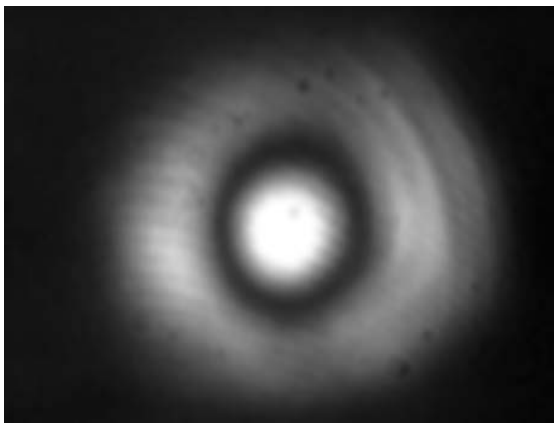




- Radius of Curvature mismatch of end mirrors required thermal compensation scheme
- new lock acquisition sequence had to be develop
- delay in commissioning by one year

Dark port contrast

~ 1 %

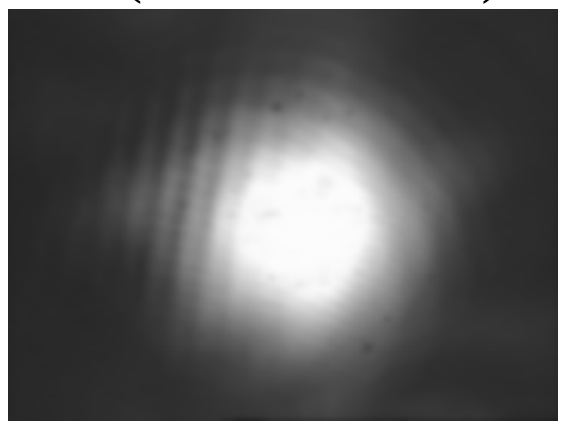


Power recycl. MI. without therm. compensation

~ 0.05%

Power recycl. MI with therm. compensation

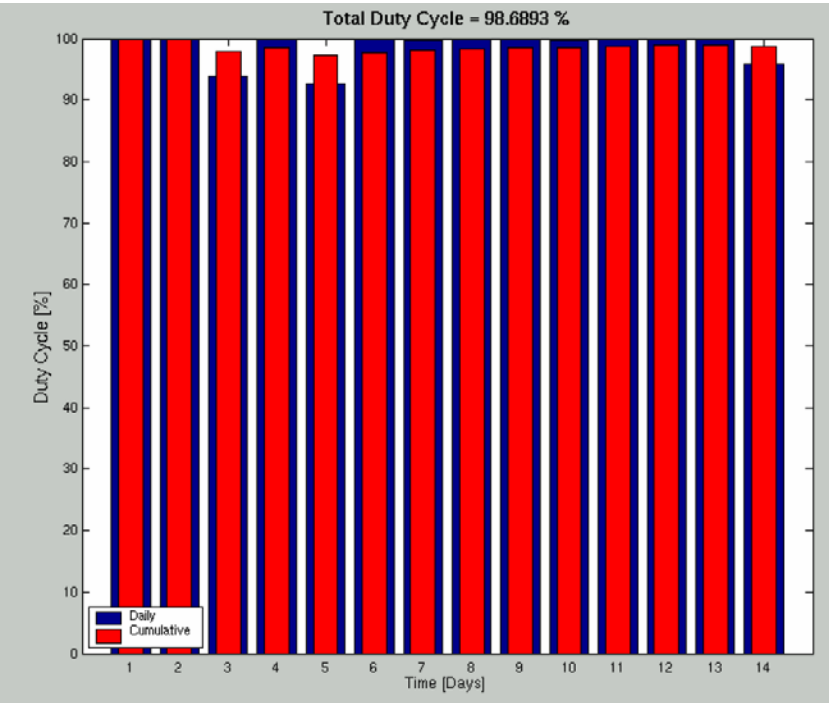
< 0.001 %
(SB-dominated)



Dual recycl. MI with therm. compensation

(Ratio of carrier light power at dark port / power incident on beamsplitter)

GEO600 - Participation in S3



S3 part I (7 days)
Nov 5th – Nov 12th

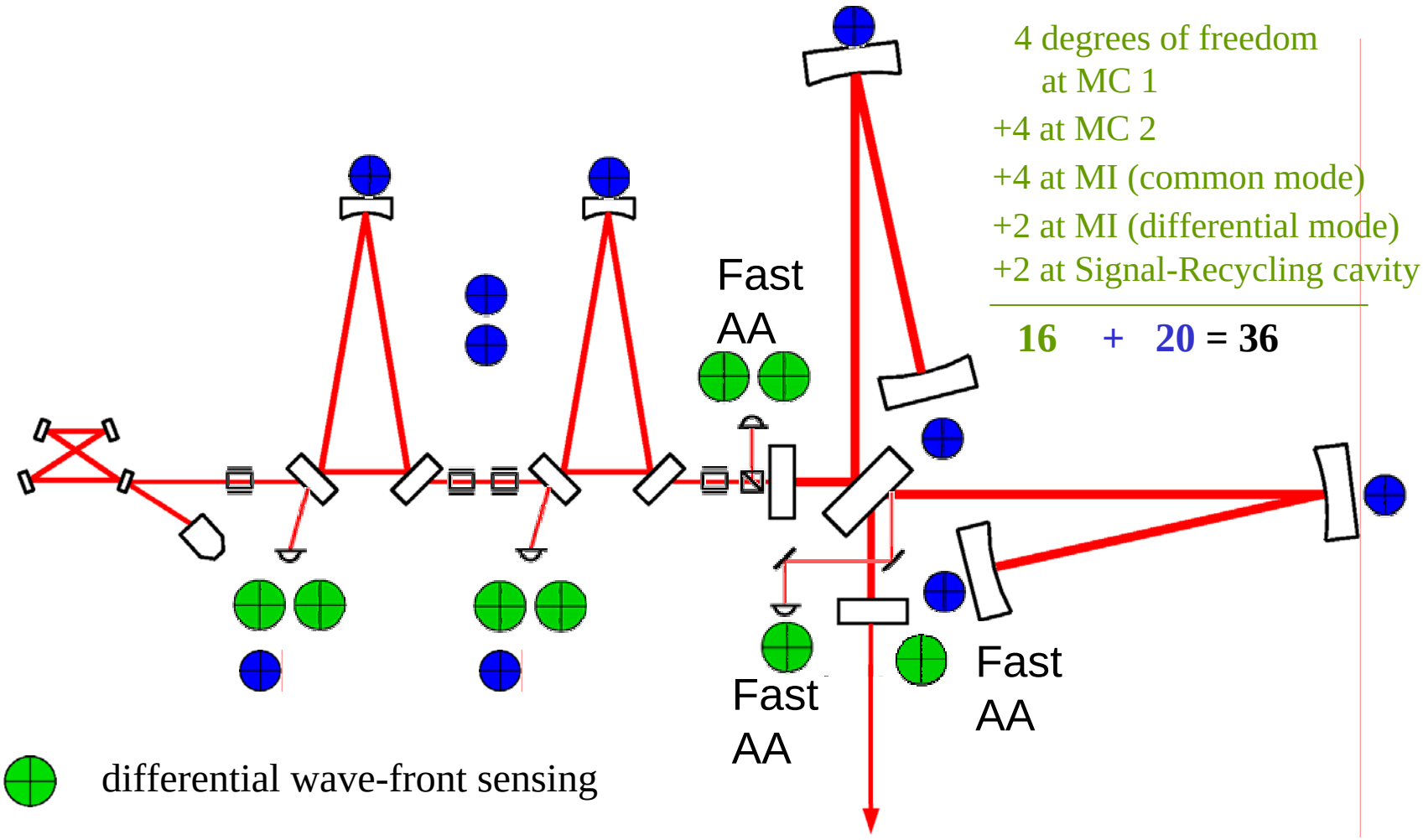
duty cycle > 95%
longest lock > 27h

S3 part II (14 days)
Dez 30th - Jan 13th

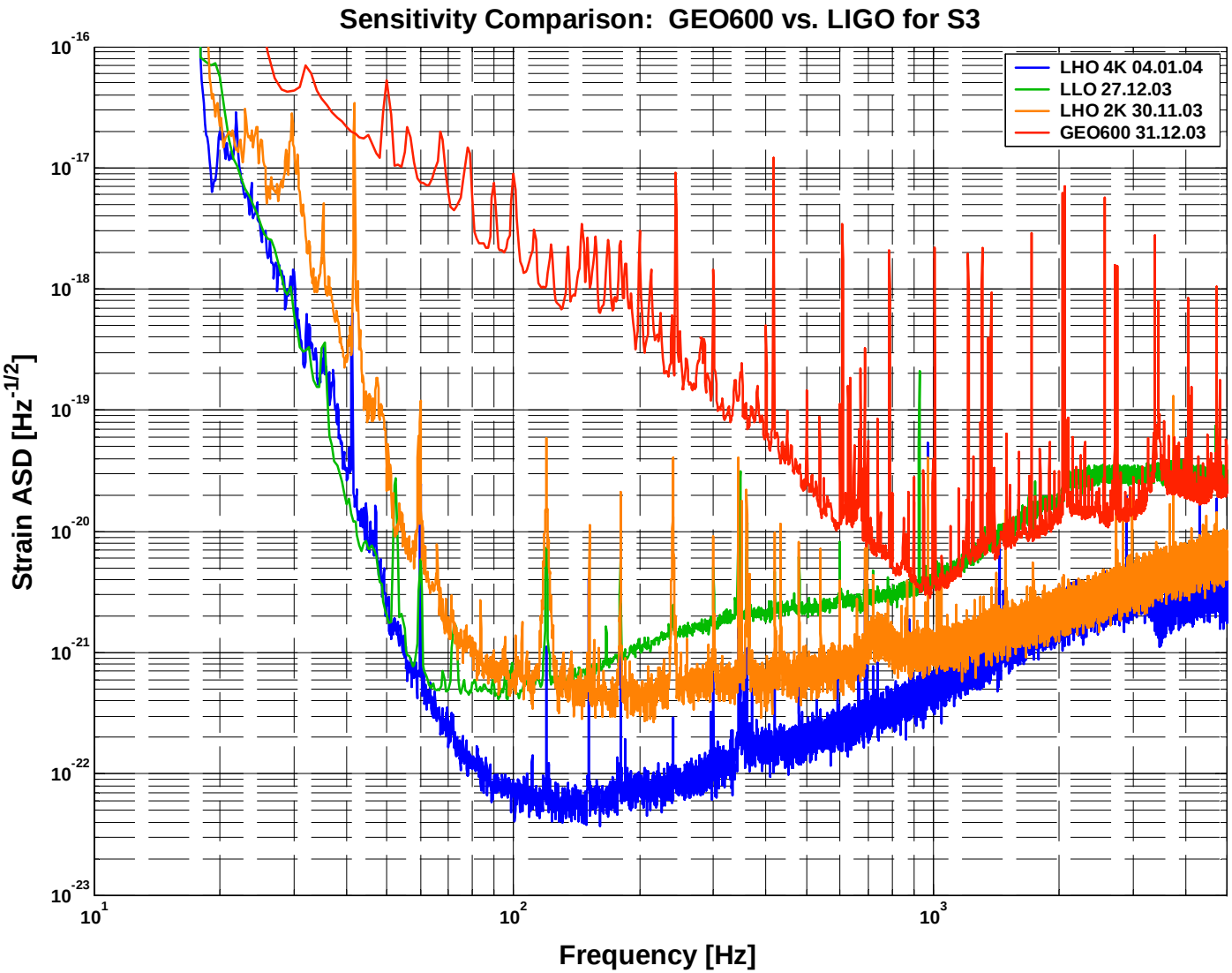
duty cycle > 98%
longest lock > 95h

followed by 2 days for burst and inspiral injections

Alignment Control

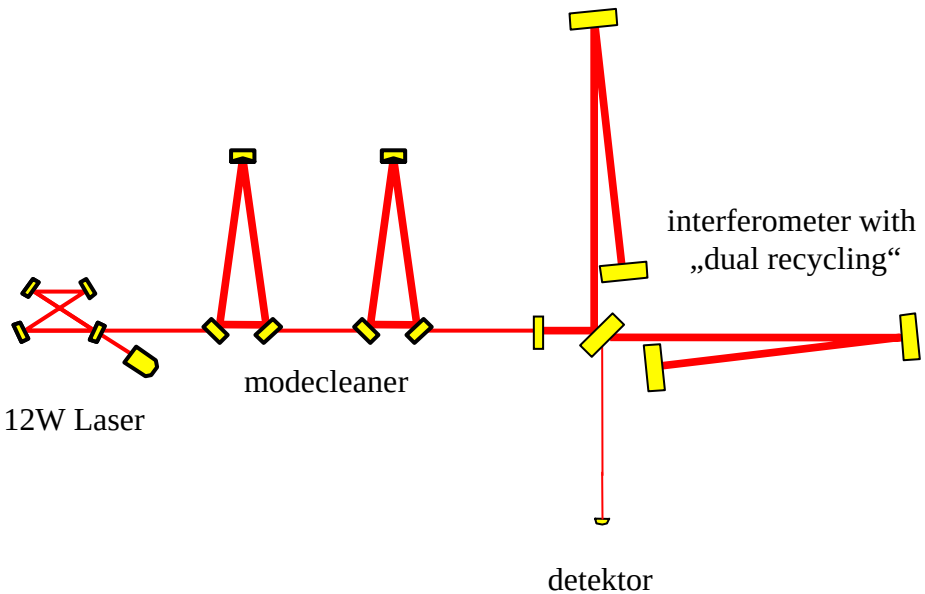


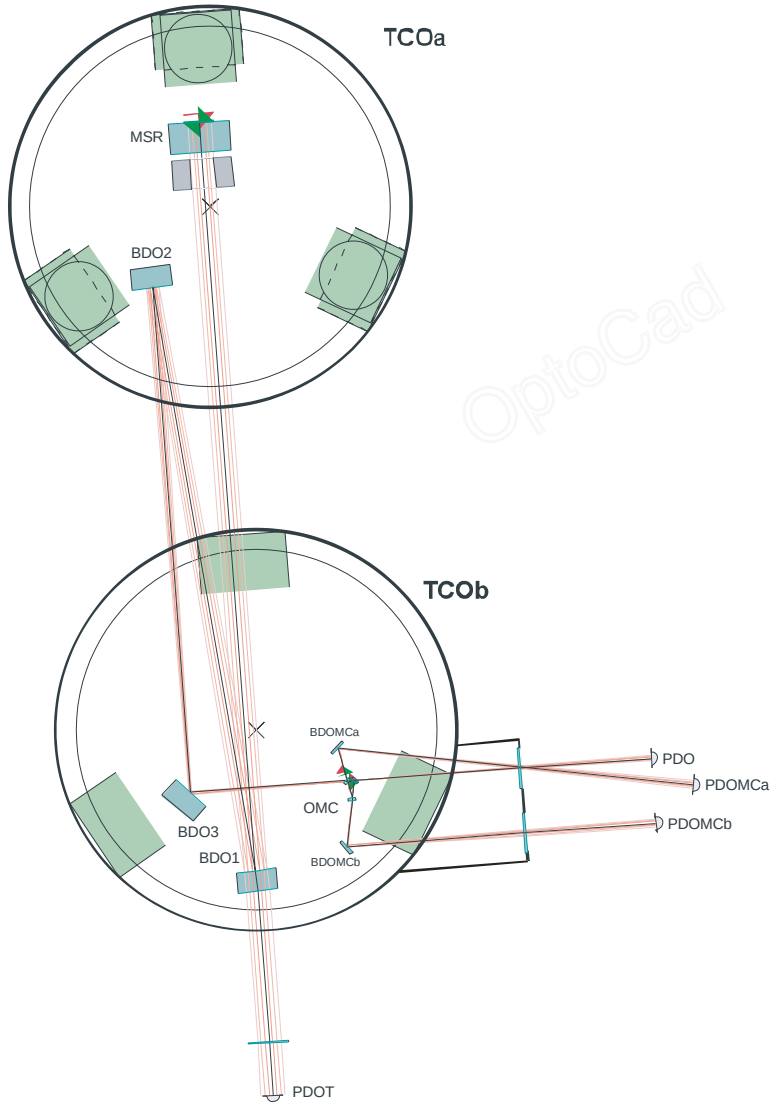
LIGO – GEO Sensitivity During S3



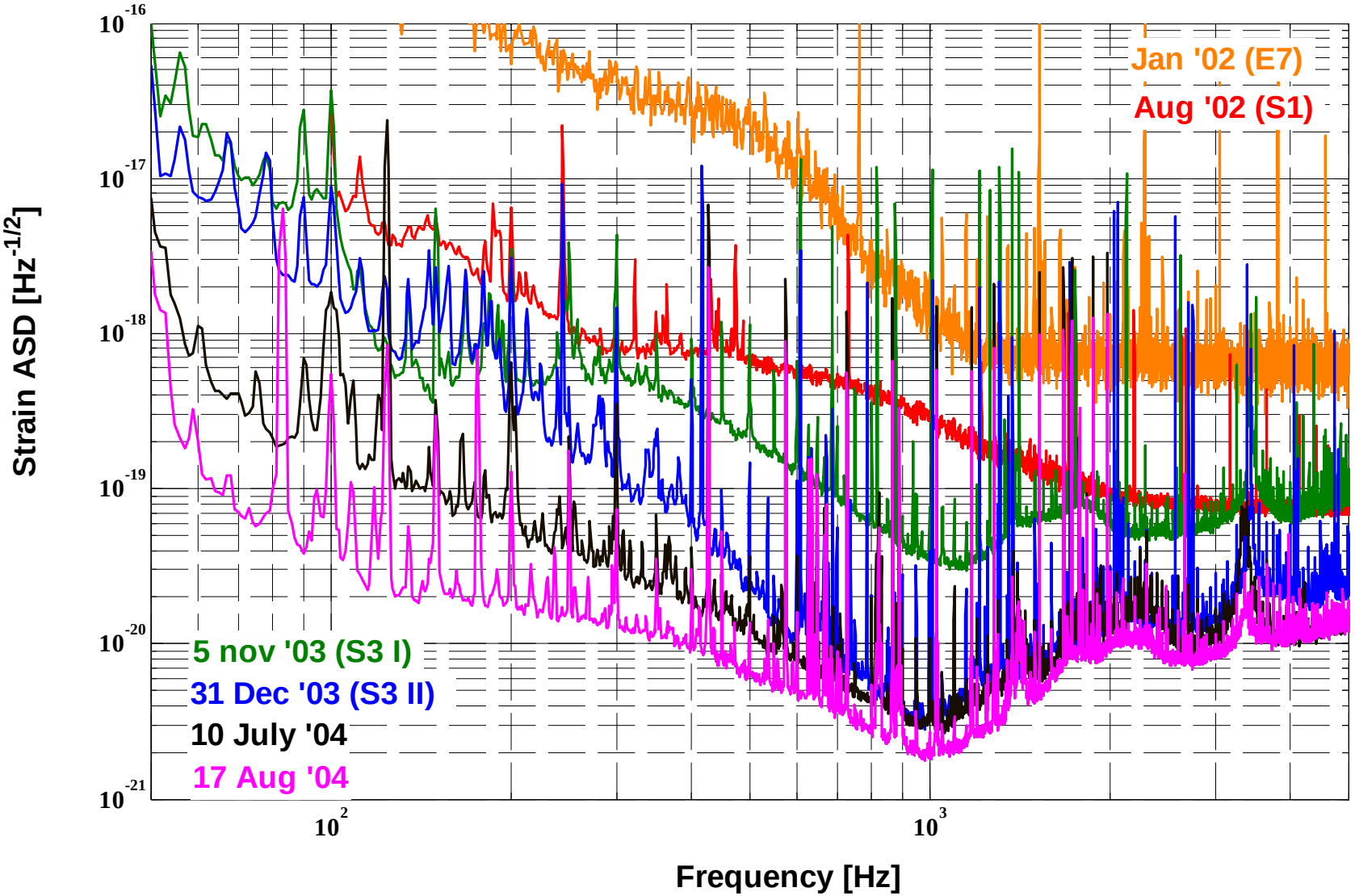
Commissioning in 2004

- new sensor (HPD) for MI length control
- change of rf-oscillators
- installation of suspended output optics / HPD in vacuum
- new gain distribution in MI length control

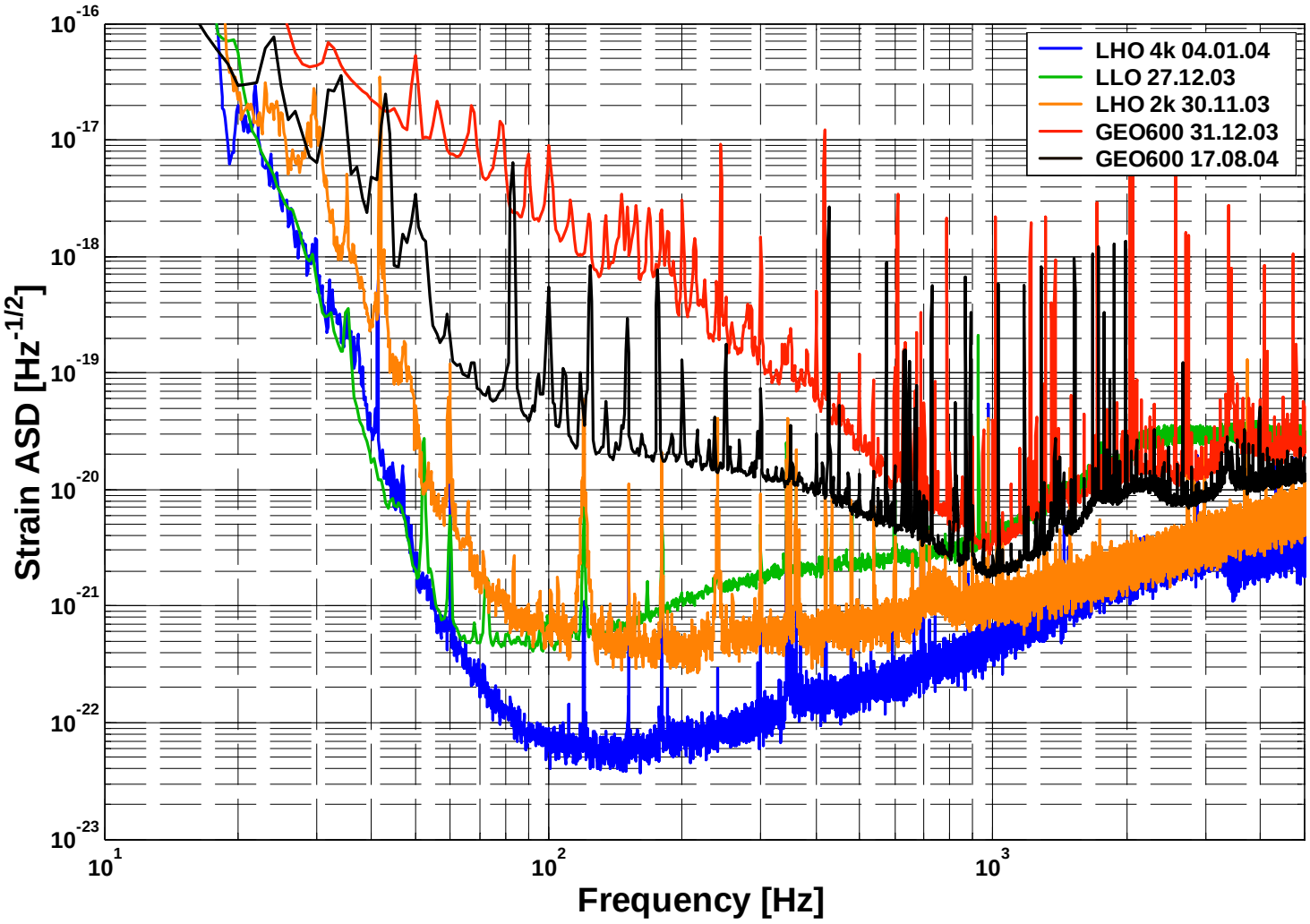




GEO sensitivity development

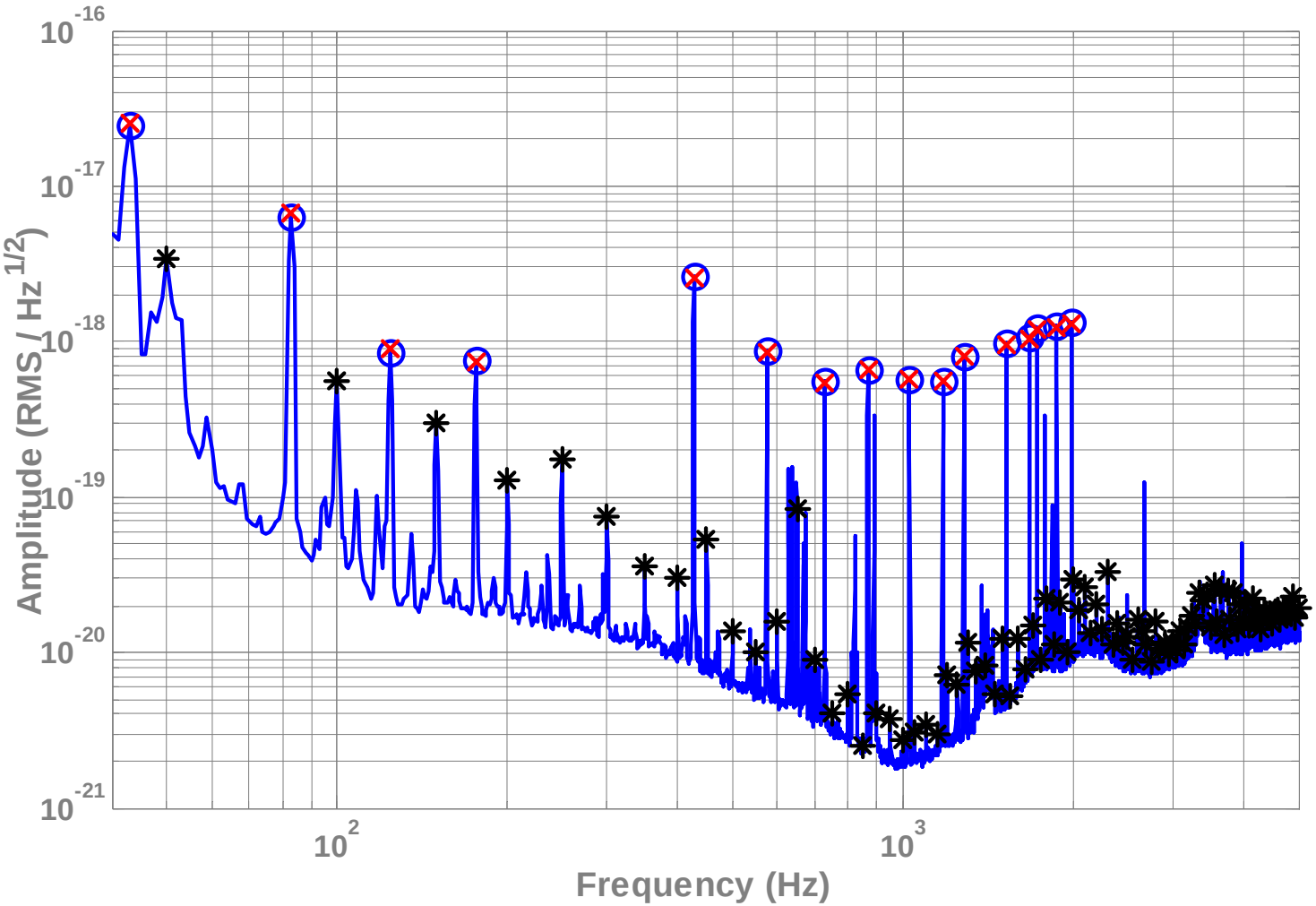


GEO600 vs. LIGO

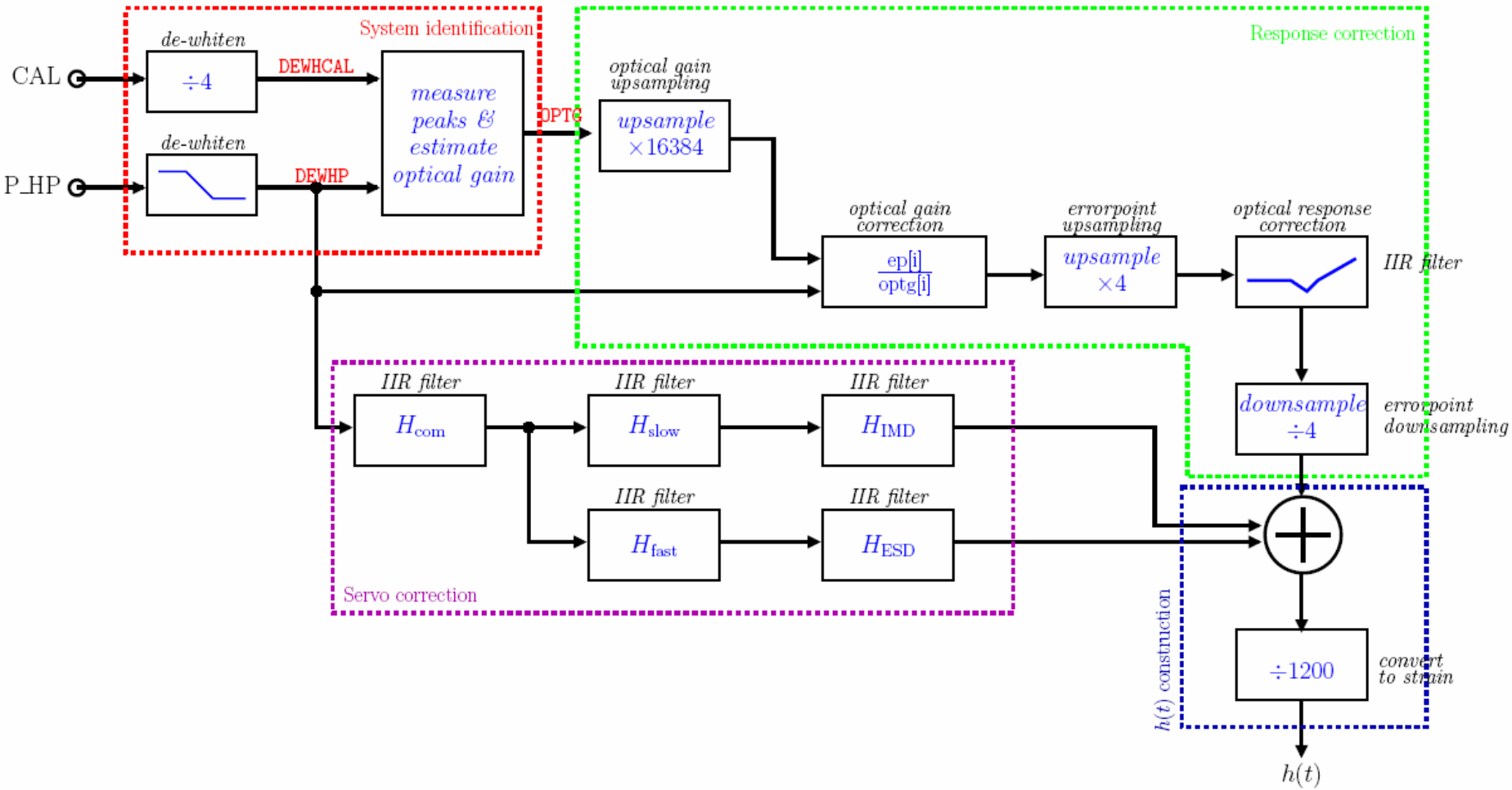


noise projection talk by J. Smith, Thursday

GEO Calibration

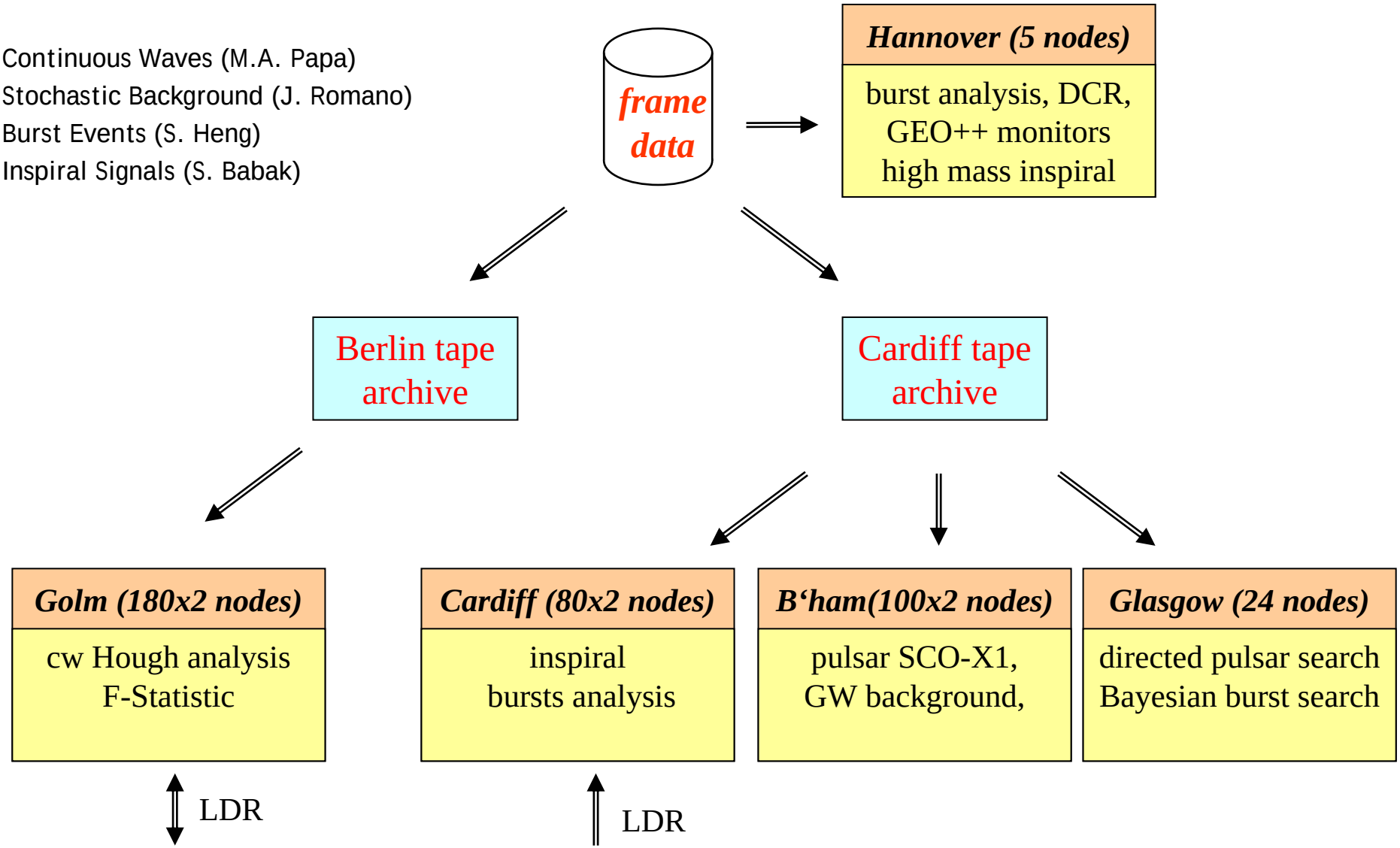


DR Michelson Online Calibration



Data Analysis Network

Continuous Waves (M.A. Papa)
Stochastic Background (J. Romano)
Burst Events (S. Heng)
Inspiral Signals (S. Babak)



GEO600 future

- improve sensitivity towards S4
- data taking at night and on weekends
  - after detector work turn maintenance switch to “off” and make sure that calibration works
  - we provide h(t) and calibration-quality information
  - data might be useful for all searches that do not need instrumental vetoes (cw, triggered bursts, …)
- increase injected power
- increase power recycling factor
  - lock acquisition might cause problems
  - simulations and testing needed, maybe OMC required