



# Virgo Status

B. Mours



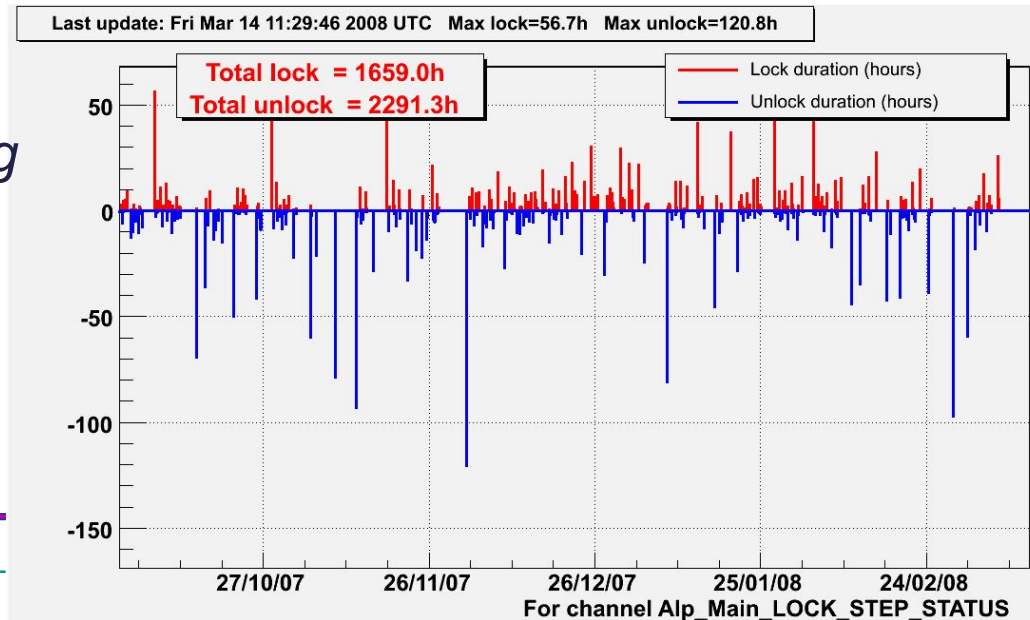


# Post-VSR1 activities

- Commissioning/Detector work:

- ◆ Characterization of ITF controls, Calibration,
- ◆ Improving the injection system (Temp., Alignment, PZT...)
- ◆ Investigation of the resonances
- ◆ Study the Environmental noises
- ◆ Diffuse light reduction
- ◆ Reduction of control noises at low frequency
- ◆ Air conditioning upgrade in DAQ room
- ◆ Replace some mirror magnets
- ◆ ...

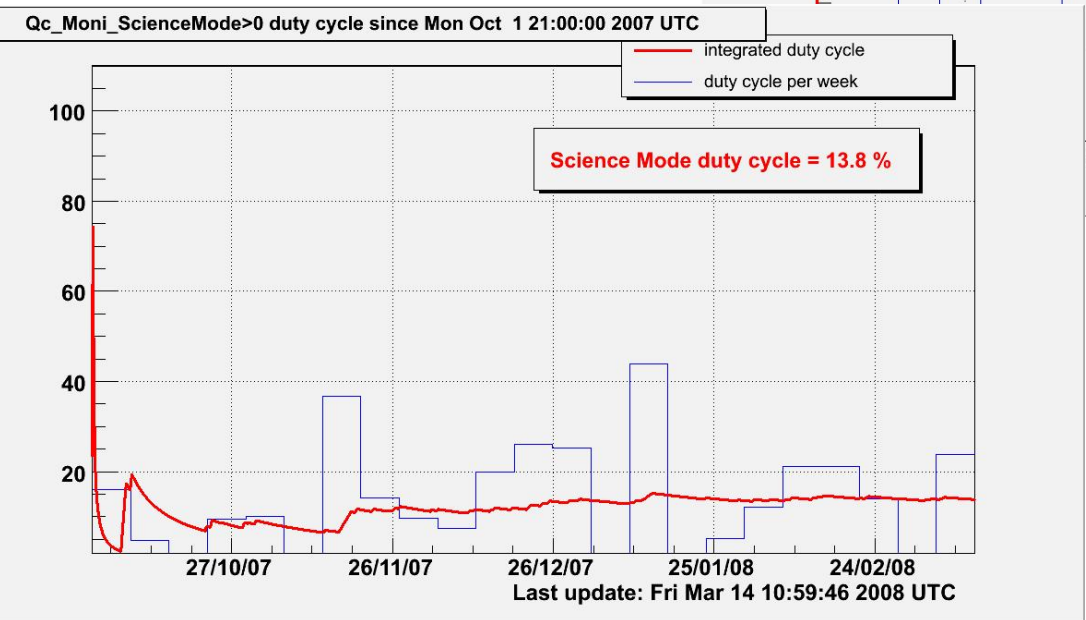
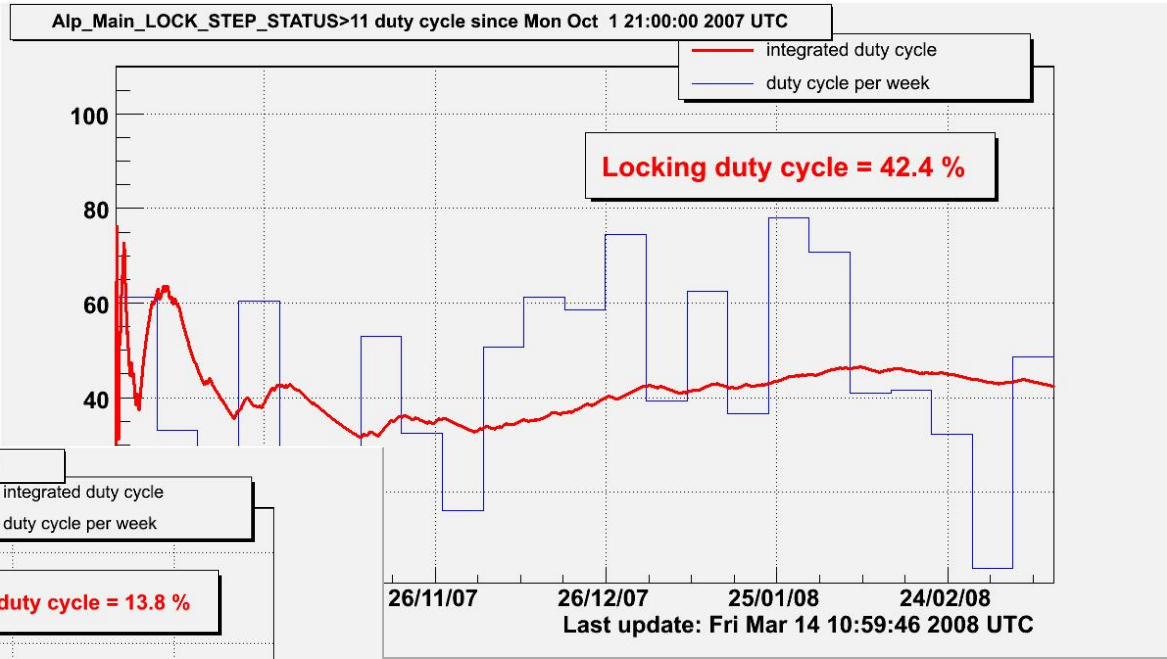
*See Edwige talk this morning*





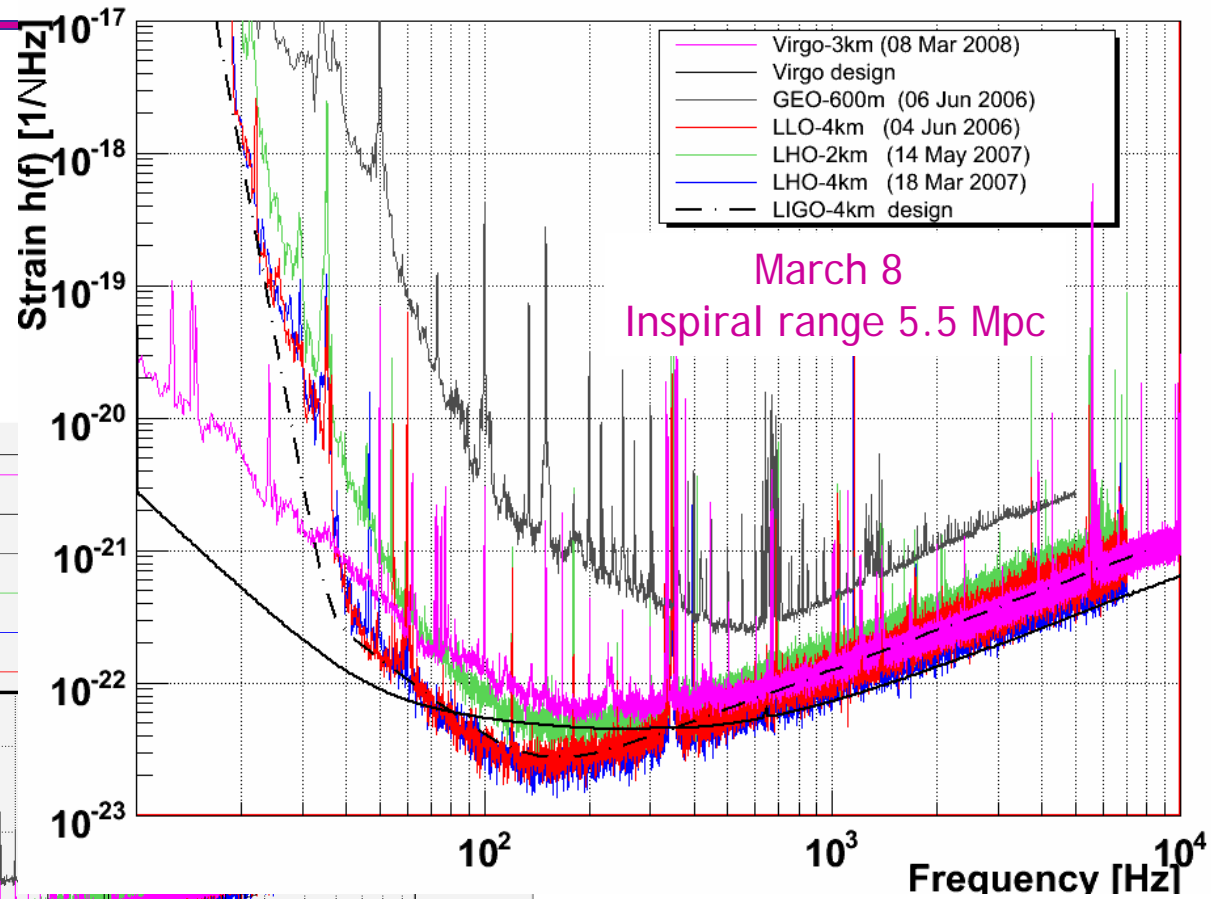
# Post-VSR1 Duty Cycles

- ITF Lock: 42%
  - Science Mode: 14%
- Astrowatch data

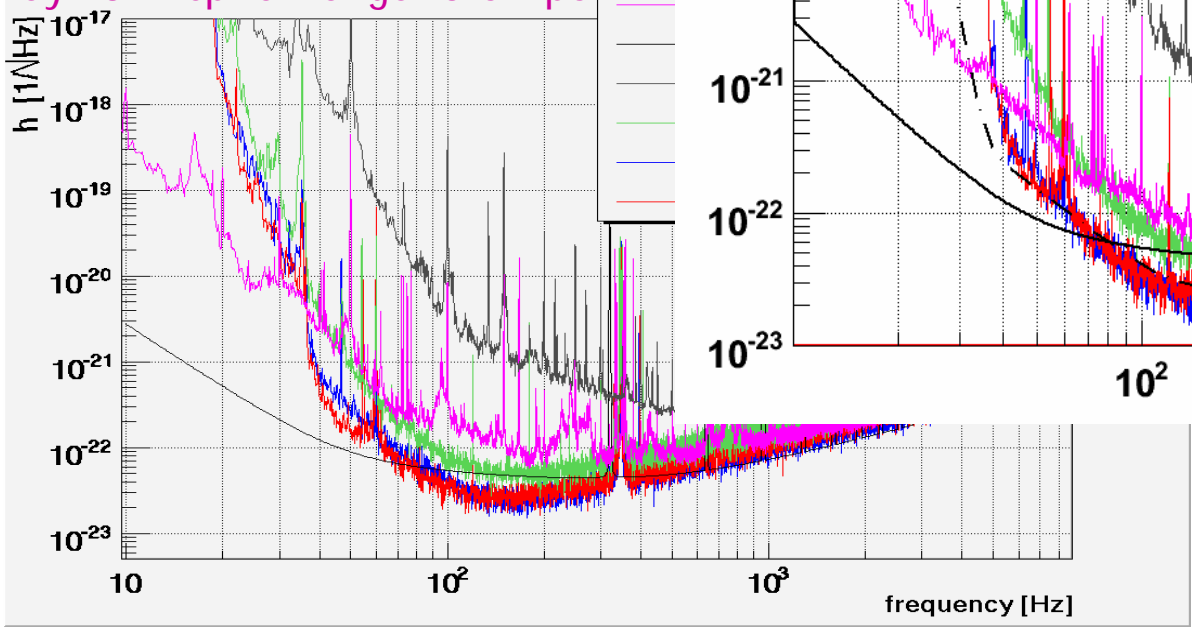




# Virgo Sensitivity progress



May 18: Inspiral range: 3.6 Mpc



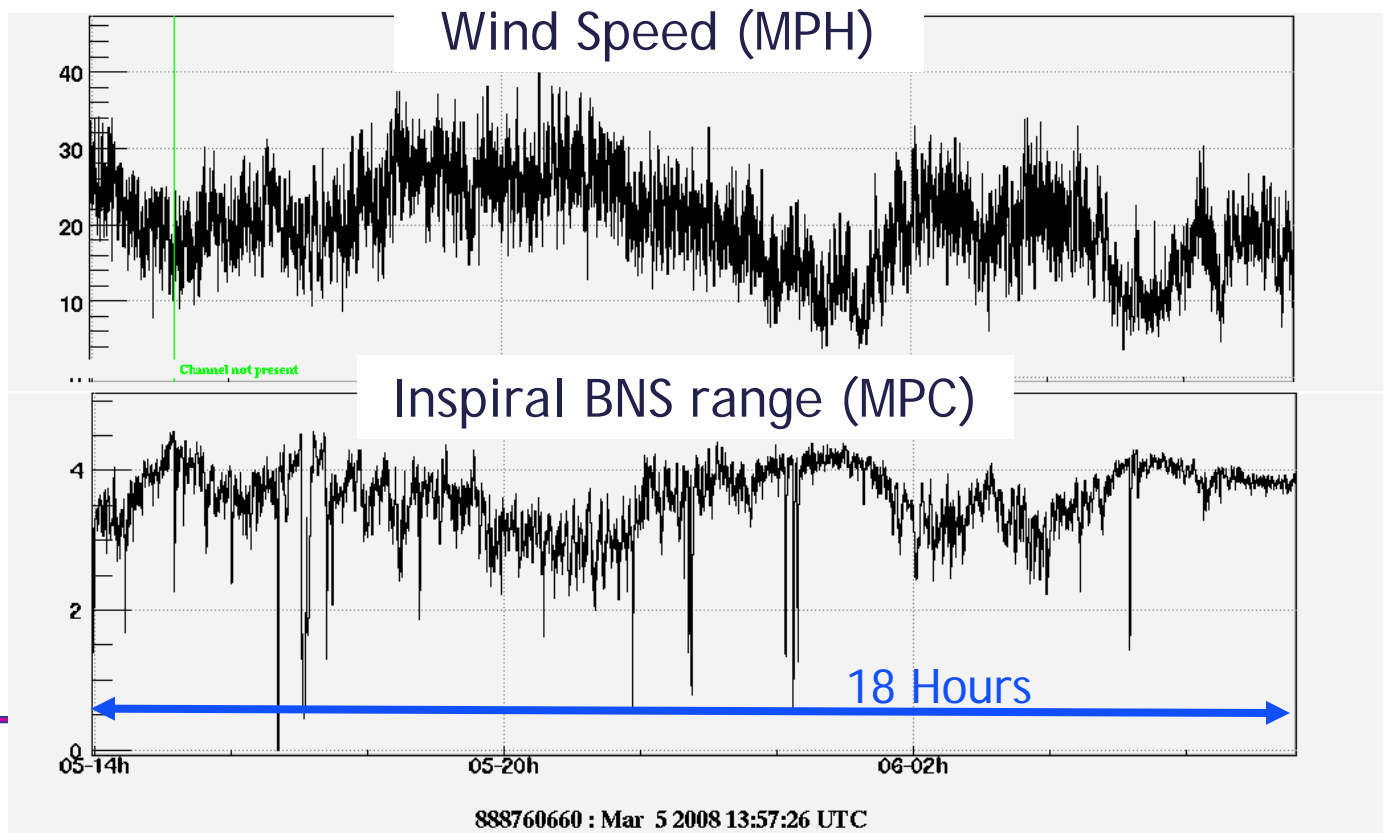


# Robustness improvement

● Stay locked under stormy weather (strong wind) thanks to:

- ◆ “Global Inverted Pendulum Control” (“GIPC”)
- ◆ Angular control improvements
- ◆ Multiple low noise setting for the actuators

March 5: Wind speed close to the maximum level ever observed on site.





# From now to Virgo+

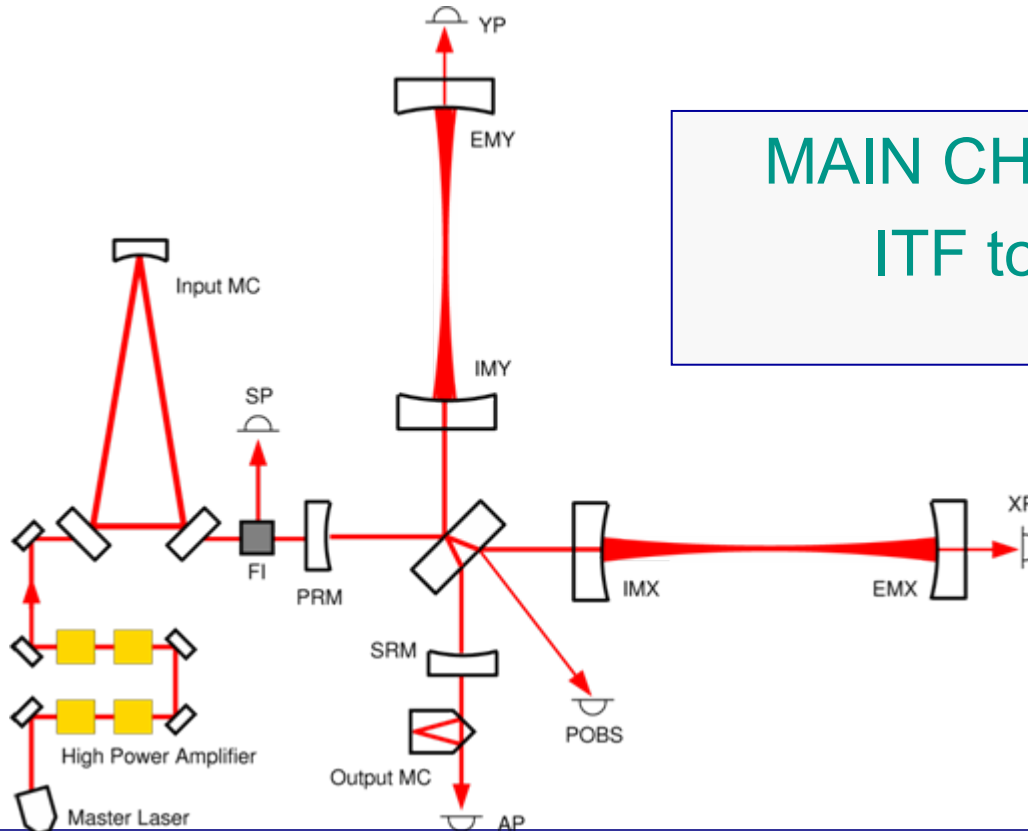
- Next months commissioning
  - ◆ Environmental noise coupling to the dark fringe
    - » Brewster → Cryogenic trap (Last week)
  - ◆ Install the Thermal Compensation System and commission it
  - ◆ More magnets change
- Q2/Q3-2008:
  - ◆ Install the Laser amplifier, Mode Cleaner, New control electronics
- Second half of 2008 to Q1-2009
  - ◆ Global commissioning
- Q2-2009
  - ◆ Start VSR2 with the existing mirrors
- Late 2009/2010
  - ◆ Install the new mirrors/monolithic suspension when ready



# Advanced Virgo (AdV)

## GOALS:

- Sensitivity: about 10x better than Virgo
- Timeline: be back online with AdvLIGO



MAIN CHANGES:  
ITF topology

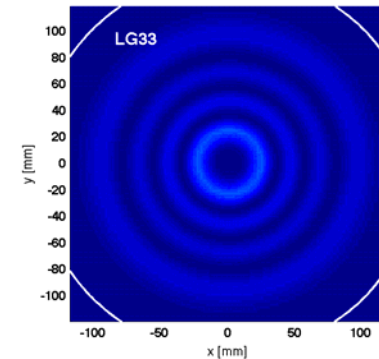


# BEAM - DETECTION

## OPT. LAYOUT BASELINE:

- $TEM_{00}$
- WAIST IN THE CAVITY CENTER
- LARGER BEAM: requires changing the vacuum links in the central area.

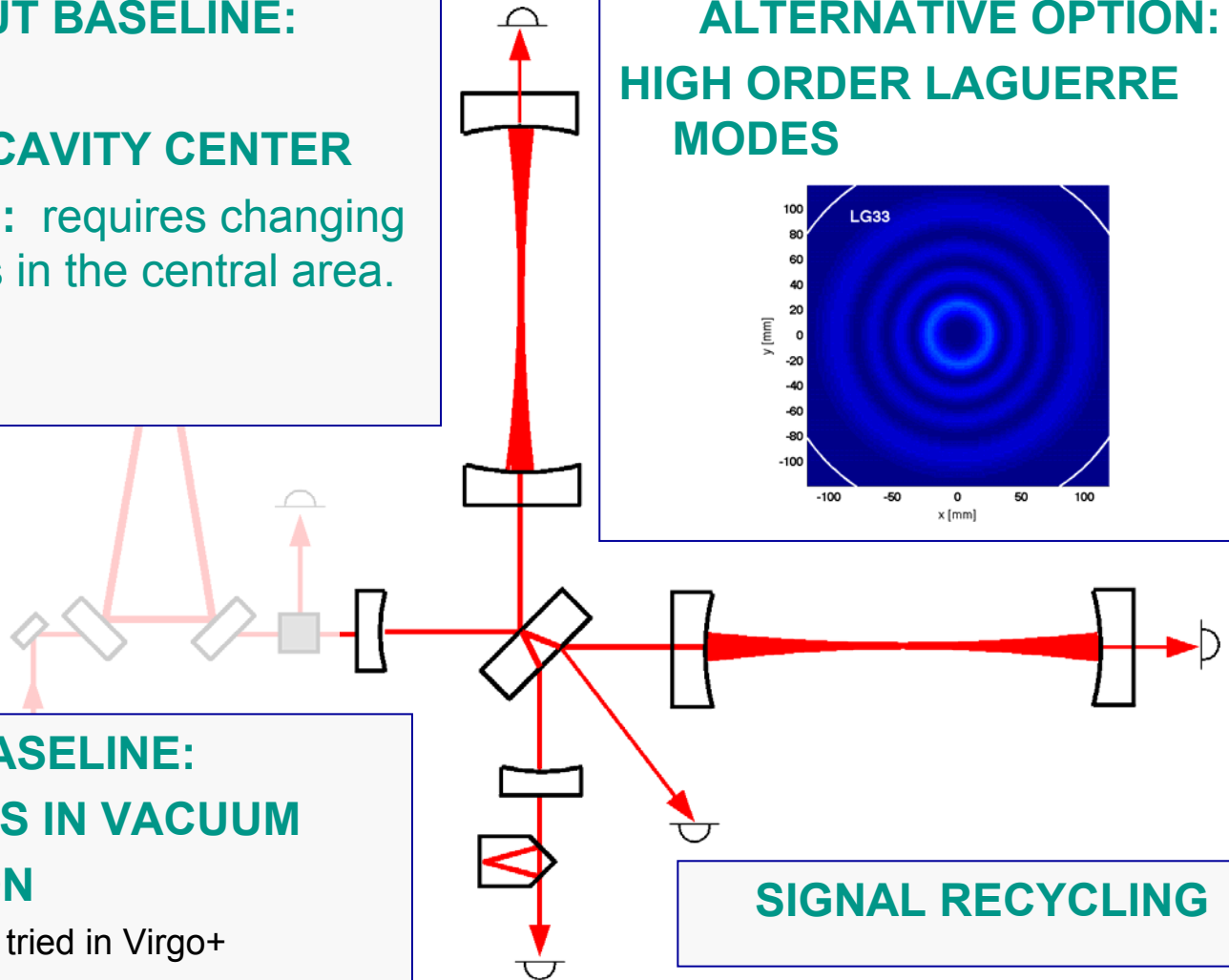
## ALTERNATIVE OPTION: HIGH ORDER LAGUERRE MODES



## DET. BASELINE:

- PHOTODIODES IN VACUUM
- DC DETECTION
  - ◆ remark: to be tried in Virgo+

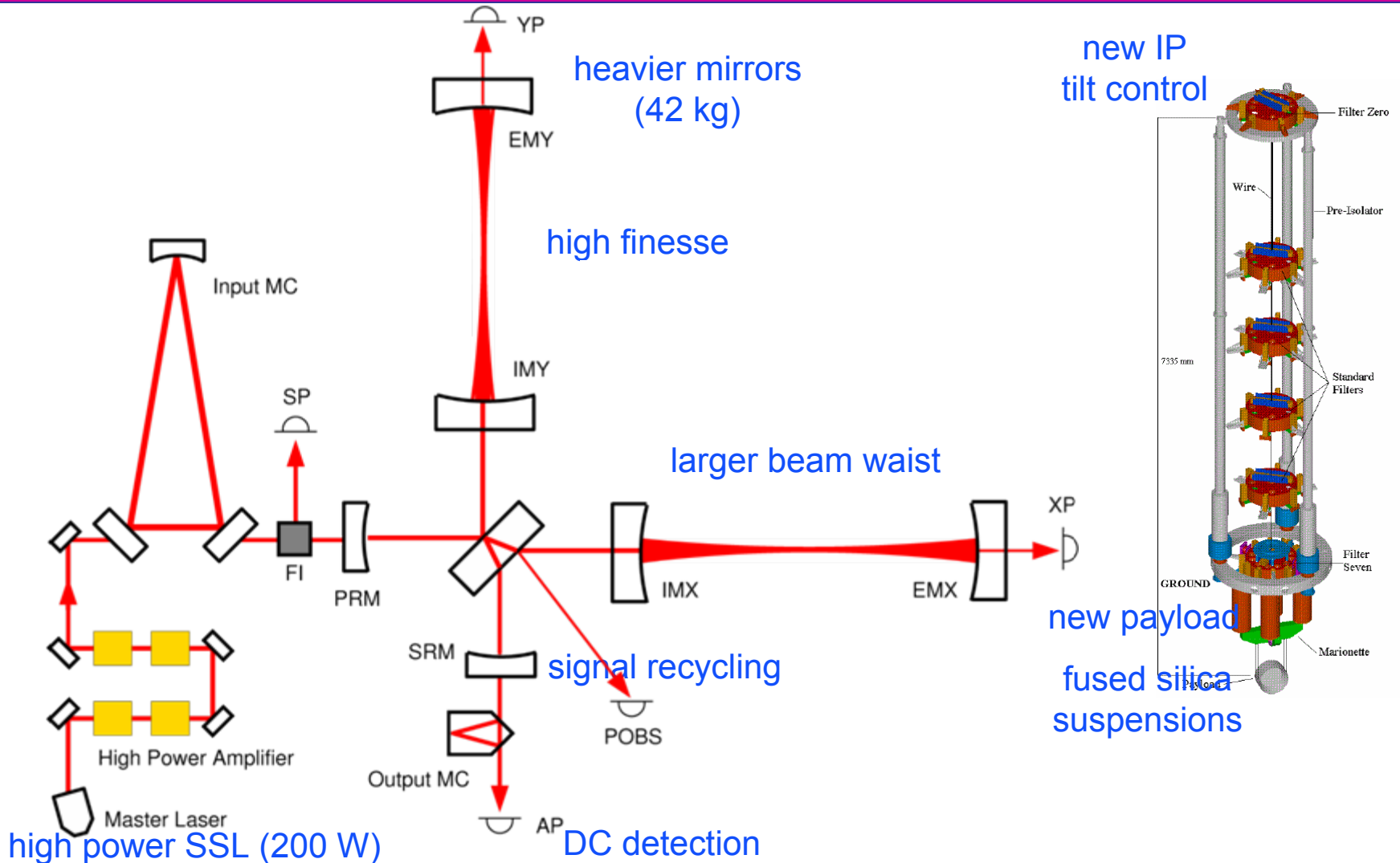
**SIGNAL RECYCLING**







# AdV Baseline Summary





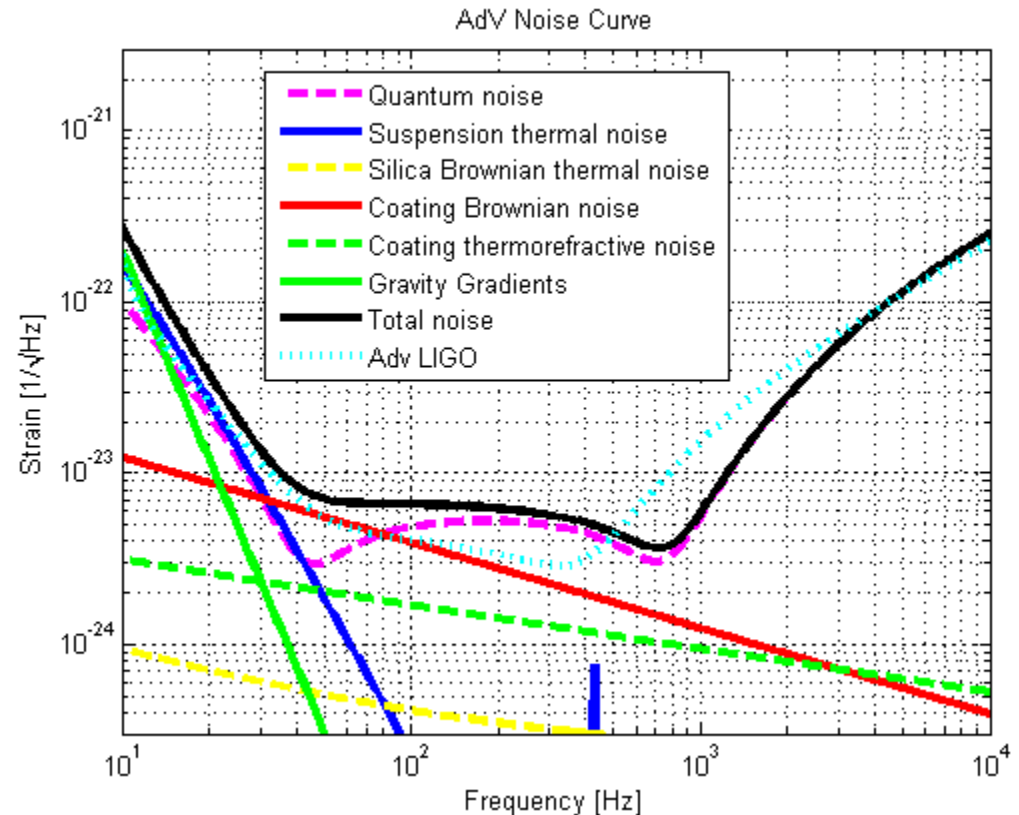
# AdV Sensitivity Curve - *Preliminary*

This example:

## DESIGN PARAMETERS:

- ◆ SR mirror transmittance: 0.04
- ◆ Input mirror transm: 0.007
- ◆ Finesse: 885
- ◆ PR factor: 23.5
- ◆ Power on BS: 2.9 kW

BNS range: **121 Mpc**  
BBH range: **856 Mpc**  
1 kHz sens.:  $6 \cdot 10^{-24}/\sqrt{\text{Hz}}$





# Advanced Virgo Status

- Last October:
  - ◆ Conceptual Design and Preliminary Cost Plan and Project Execution Plan submitted to the STAC and funding agencies.
  - ◆ Estimate AdV capital investment 16M€ over 3-4 years
- EGO Council reaction (end of November):
  - ◆ **“The Council supports the Advanced Virgo project and takes note of the proposed milestones.**
- Not yet a formal approval with financial commitment
  - ◆ But the first AdVirgo expenses are expected to be made only in 2009.
  - ◆ Real decision to be made next November when approving the 2009 EGO Budget
- We are now preparing the detailed design
  - ◆ System managers appointment in progress



# Collaboration News

- Next Virgo Spokesperson;

- ◆ A new spokesperson will start his 3 year term on May 3rd
- ◆ The candidate selected by the Collaboration is Francesco Fidecaro
- ◆ The EGO Council is likely to go along the Collaboration choice in April

- New group

- ◆ The POLGRAW (A. Krolak et al.) apply for membership
  - » To be decided during the April Virgo week

- Next Virgo (and LV) meetings

- ◆ April 21 EGO Council (EGO Scientific Director appointment, Budget issues,...)
- ◆ April 21-24: VirgoWeek; Cascina (One day for R&D review at the beginning)
- ◆ May 6: VSC meeting to review the Virgo R&D proposition
- ◆ June 9-12: LV meeting; Orsay (D.A. focus)
- ◆ June 23-24: EGO Council meeting (R&D Budget?)
- ◆ July 15-17: V Week; Cascina

Sep 22-25 ? LV meeting Amsterdam (With “Instrument Science” topics)