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# Virgo Status

B. Mours (LAPP Annecy)

- **Detector Status**
- **Computing**
- **Data Analysis status and Plans**



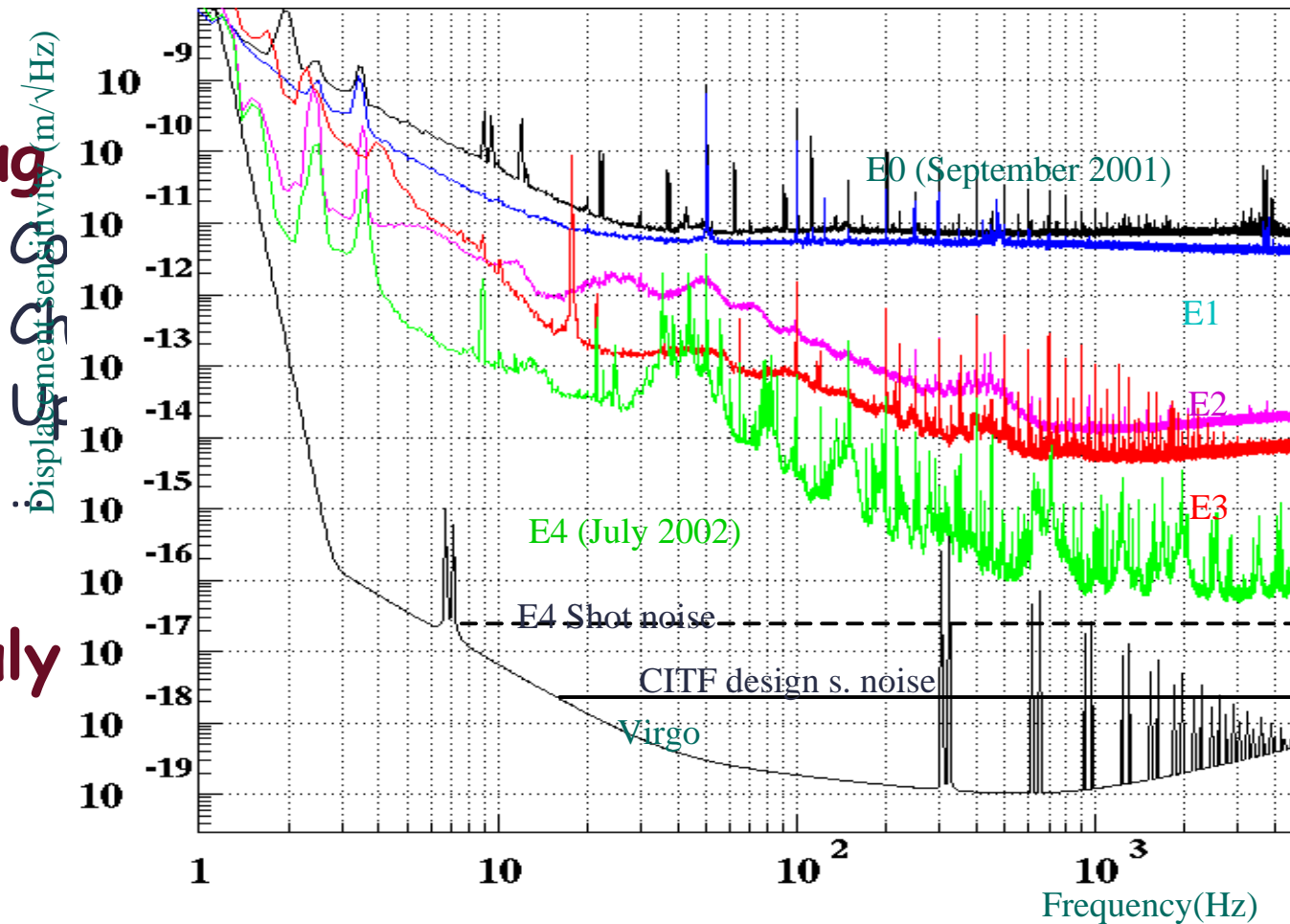
# Recent history

- **Sept 01 - July 02: Central ITF (CITF) commissioning**
  - ◆ 5 Engineering RUN (Sept 01 - July 02)

● **Aug**

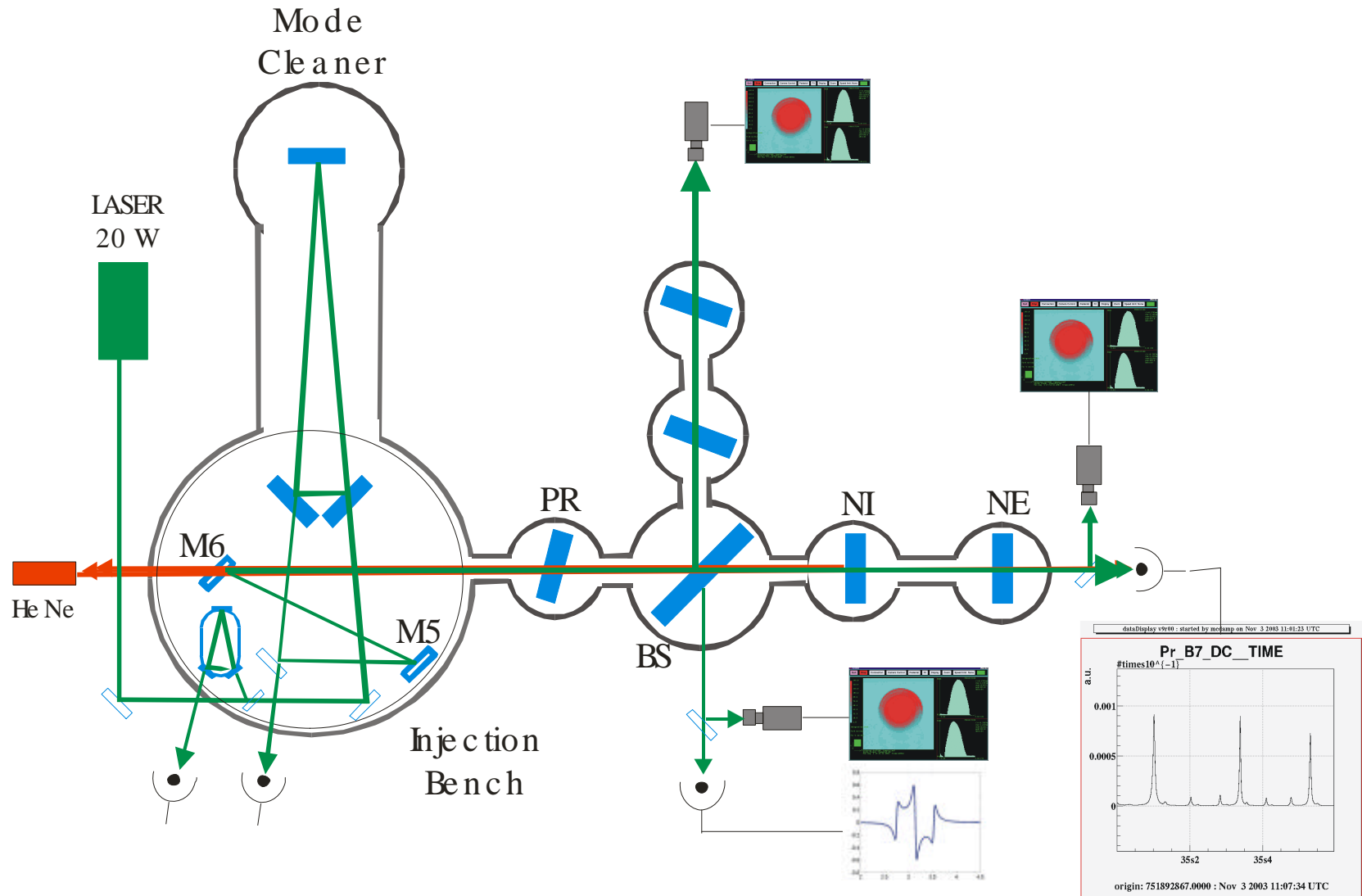
- ◆  $\dot{\Delta} L$  Sensitivity ( $m/\sqrt{Hz}$ )
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● **July**





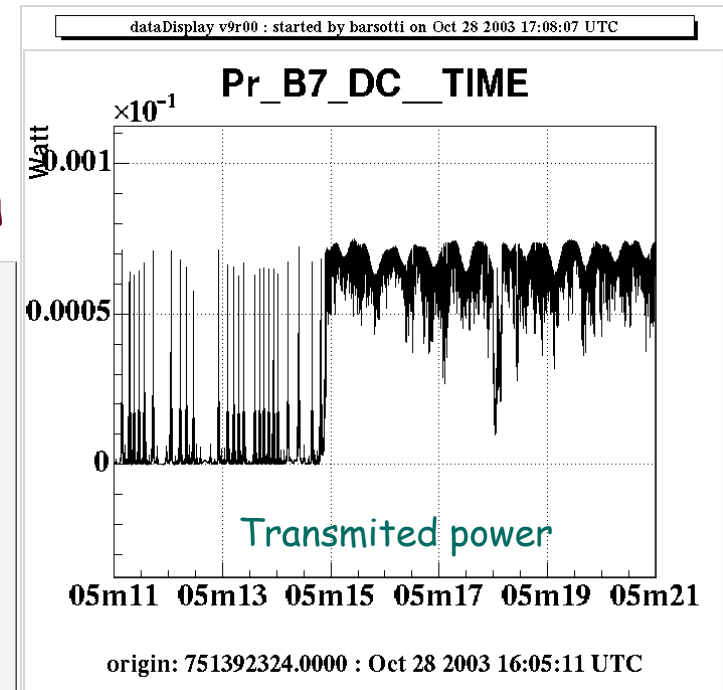
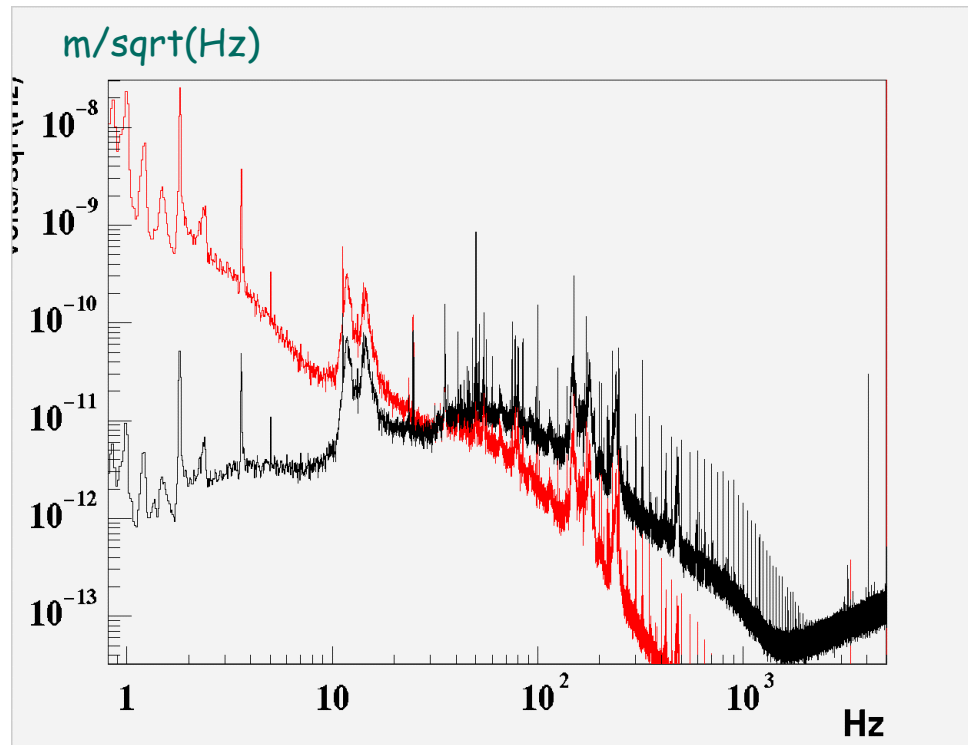
# Alignment status (Now)





# North Arm Cavity

- First lock: October 28
- First sensitivity estimation

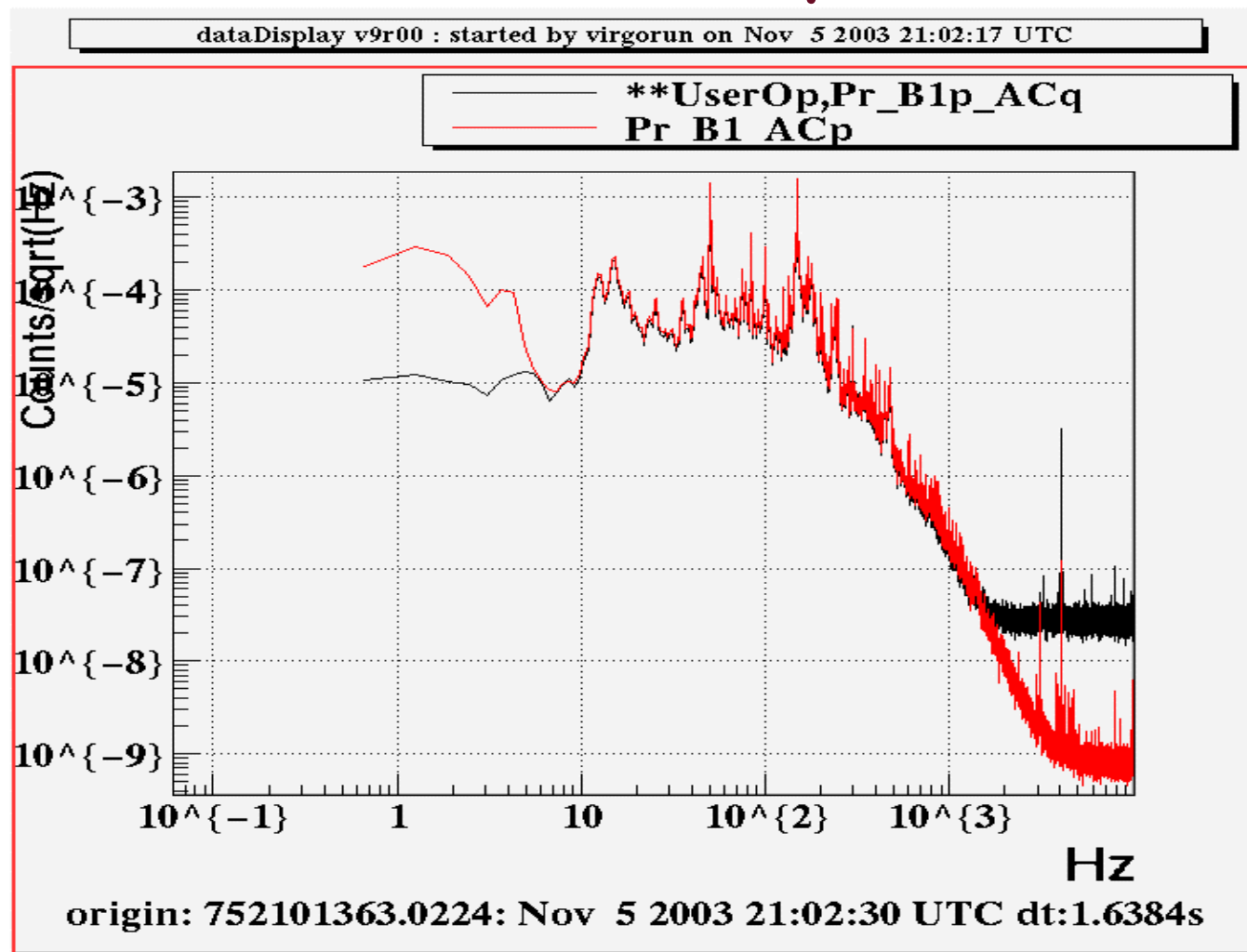


◆ Dominated by frequency noise



# Output Mode Cleaner

- Locked with the North Cavity locked





## Next steps

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- **North Cavity**
  - ◆ Linear alignment (work in progress )
  - ◆ Laser frequency stabilization (next weeks)
- **West cavity:**
  - ◆ Tuning local control (work in progress)
  - ◆ Ready for lock: in December
- **Recombined Michelson:**
  - ◆ Start work on January 2004
- **First science run: fall 2004 ???**



# On site (Cascina) Computing

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- **Purpose:**
  - ◆ Online/On-time analysis
  - ◆ Commissioning support
- **Storage**
  - ◆ 20 TB available
    - 10TB for the raw data circular buffer (1 month)
  - ◆ Additional 50 TB almost installed
- **Data analysis computing**
  - ◆ 16 Bi-pro Linux PC available
  - ◆ 2004: add a '300 Gflops machine' (450 KEuros)
- **Network:**
  - ◆ 34 Mbits/s now
  - ◆ Upgraded to 155 Mbits/s in 2004



# Off site Computing

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- **2 National Computing centers:**
  - ◆ Bologna (+ Italian lab using Grid) and Lyon
  - ◆ Ressources shared with other HEP experiments
- **To be used for:**
  - ◆ Data archiving and distribution for the runs:
    - Medium term ('One year on disk'): Bologna
    - Long term: Lyon
  - ◆ Simulation
  - ◆ Offline analysis
- **Request for 2004:**
  - ◆ 46000kSPECINT2000.day (about 150 CPU\*365days)
  - ◆ 8 time 2003 use
  - ◆ 80% requested by periodic searches





# Data Analysis Organization

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- **Commissioning activities**

- ◆ investigations with E. run data

- Calibration, control performances, detector noises, lines studies, glitches identifications...

→ Driven by Engineering runs

- **Data Analysis working groups**

- ◆ Calibration/Reconstruction

- ◆ Noises studies

- ◆ Periodic searches

- ◆ Burst searches

- ◆ Binary coalescence searches

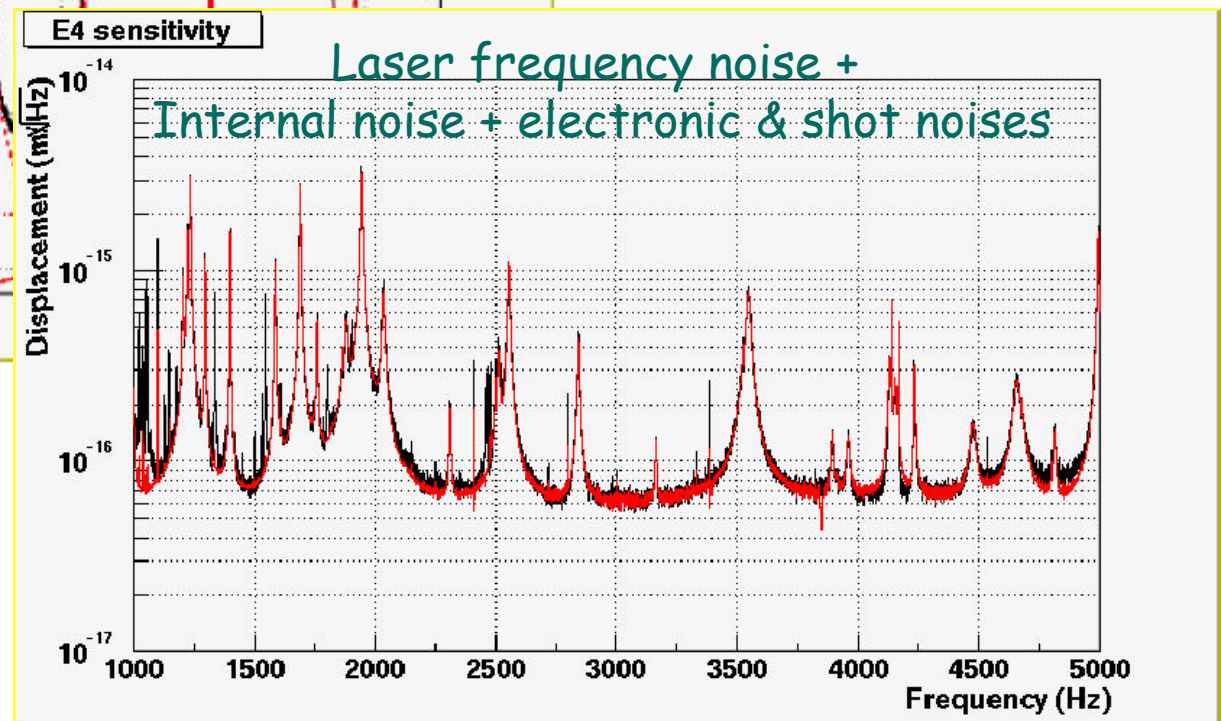
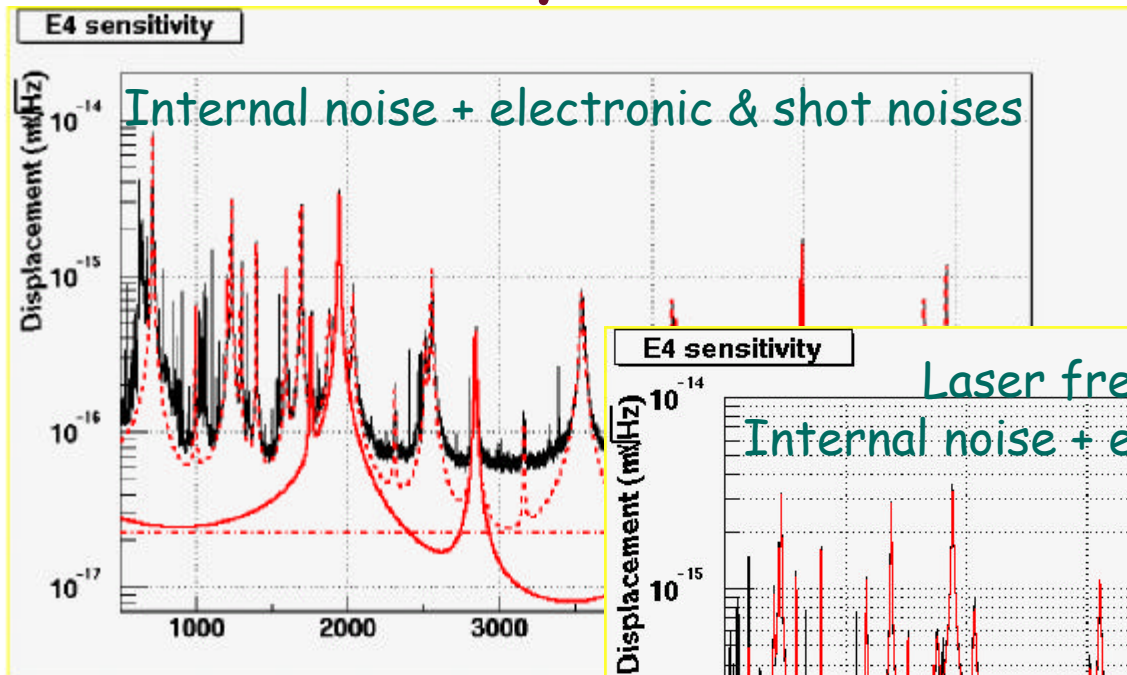
- ◆ Stochastique

→ Up to now, mainly driven by Mock Data Challenges  
(3 MDC's in 2003)



# CITF Analysis: Example I

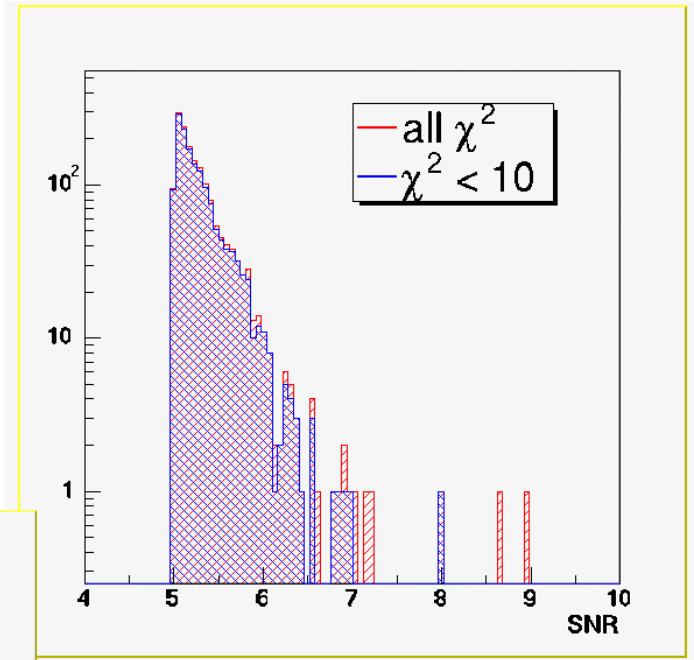
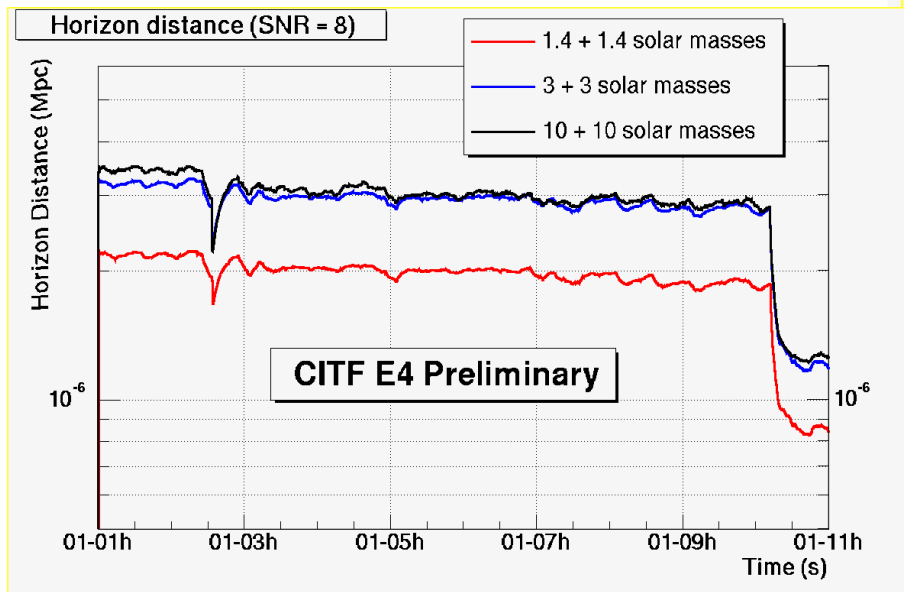
- E4 Sensitivity curve understanding





# CITF Analysis: Example II

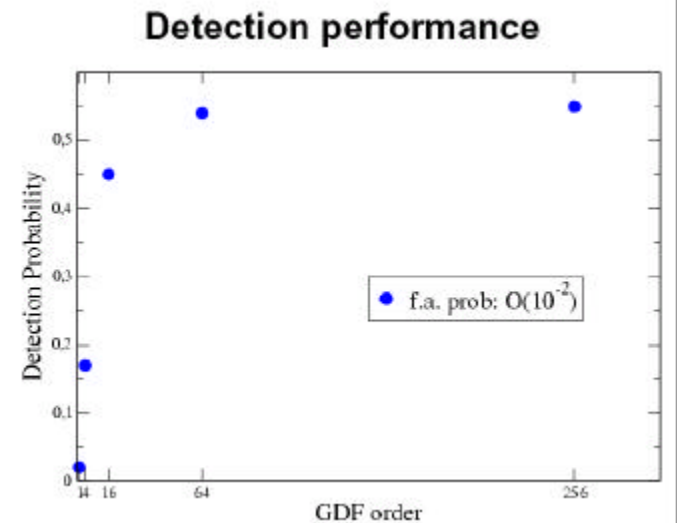
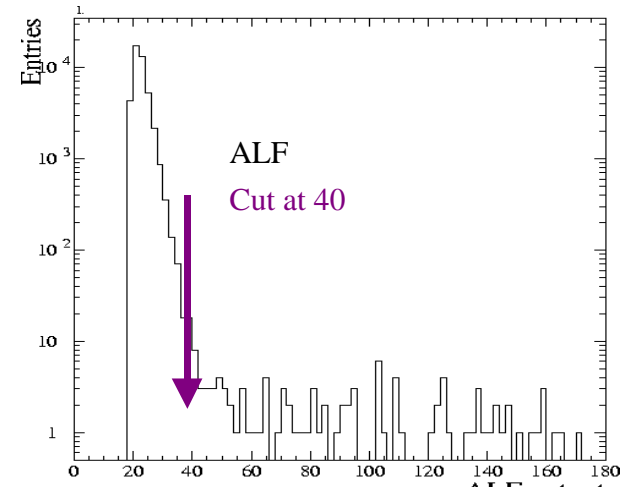
- Binary search on E4 Data
  - ◆ Events distribution (1.4 S.M.)
    - Very few detector glitches
  - ◆ Horizon distance





# MDC: Example for Bursts

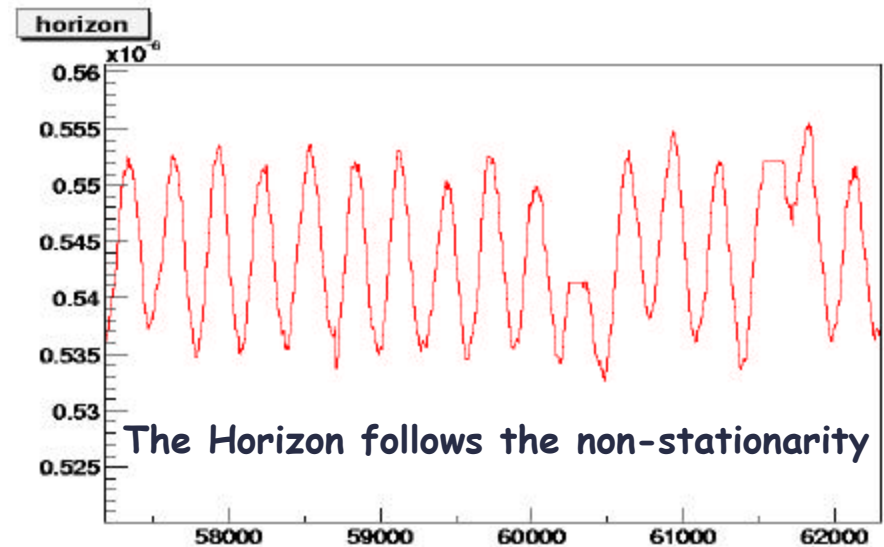
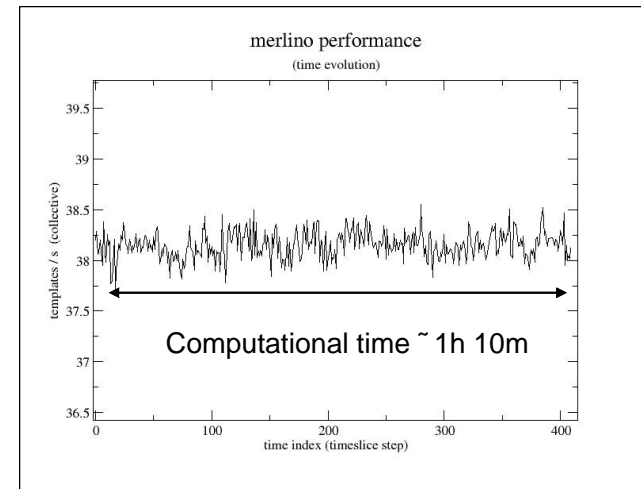
- Inject ZM events in 9 hours of E4 noise
  - ◆ Non stationarity for MDC3
  - ◆ Lock segment for MDC3
- Produce
  - ◆ Calibrated channel
  - ◆ Whitened channel
- Run different algorithms:
  - ◆ Mean Filter (MF),
  - ◆ Slope filter (ALF),
  - ◆ Peak Correlator (PC)
  - ◆ Generalized Delta Filter (GDF)
- Get:
  - ◆ Event list, efficiency, SNR ratio,...





# MDC: Example for Binary

- **Inject events with:**
  - ◆ Different masses, SNR, models
- **Run different analysis:**
  - ◆ Merlino: Parallel flat search
    - MPI based
  - ◆ Multi-Band Template Analysis
- **Get:**
  - ◆ Speed,
  - ◆ Event list,
  - ◆ Efficiency, false alarms
  - ◆ SNR ratio...





## Coming up data

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- **Commissioning runs:**
  - ◆ C1: Nov 14-17 (One Arm)
  - ◆ C2: Jan 16-19 (One/two arms) with linear alignment
- **MDC4: January 04**
  - ◆ run part of the online pipeline
  - ◆ Some data conditioning tests (like lines removal)
- **Goal: Be ready for the first Virgo science run**
  - ◆ Fall 2004 ??