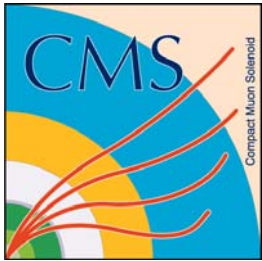


**НАУЧНАЯ СЕССИЯ
ОТДЕЛЕНИЯ ФИЗИКИ ВЫСОКИХ ЭНЕРГИЙ
28 декабря 2010**

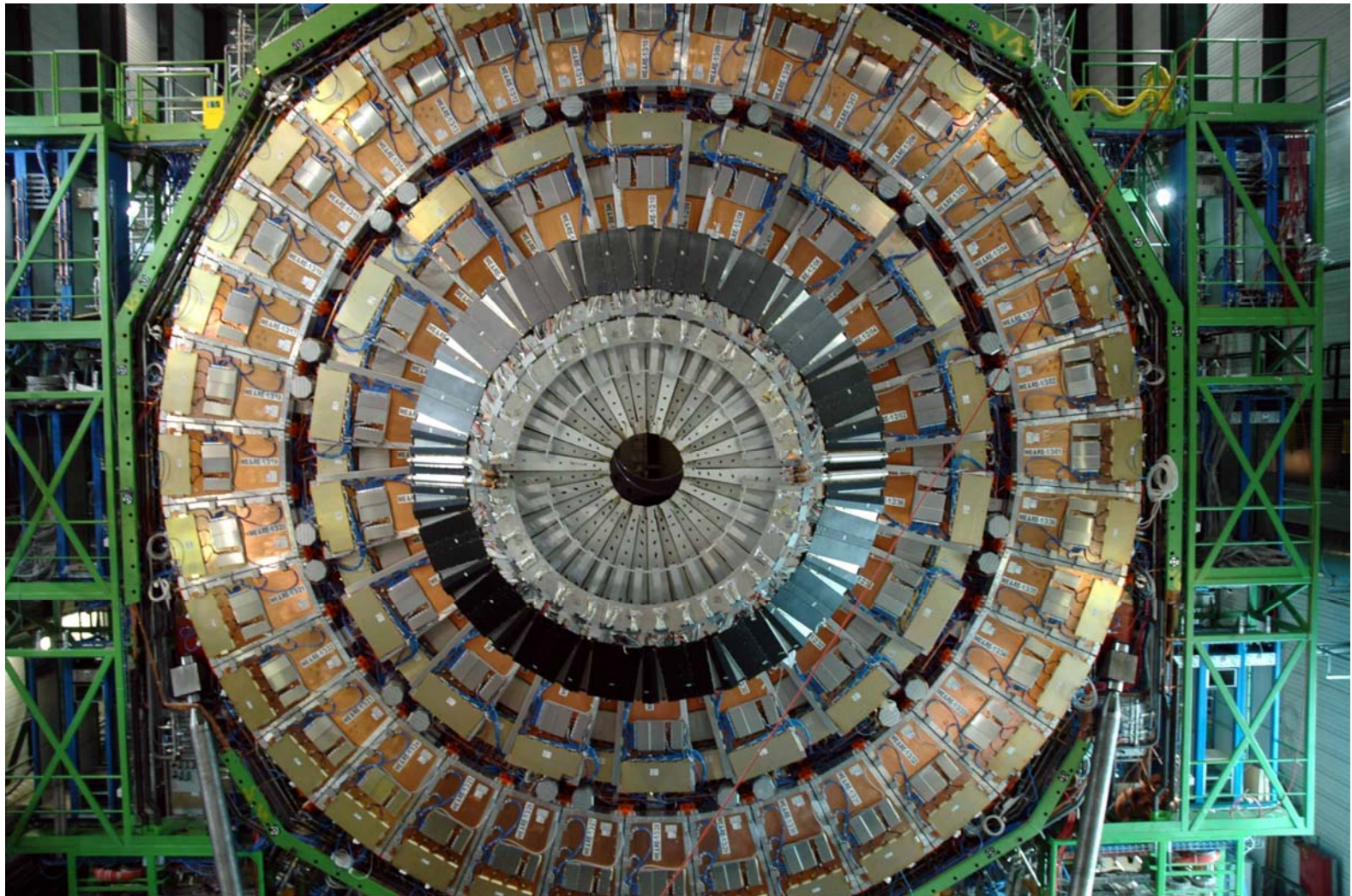


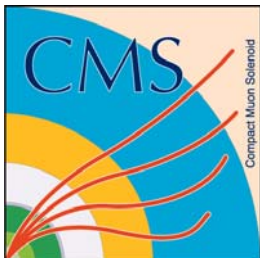
Проект CMS в 2010

В.Сулимов

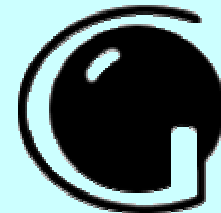


Muon Subsystem

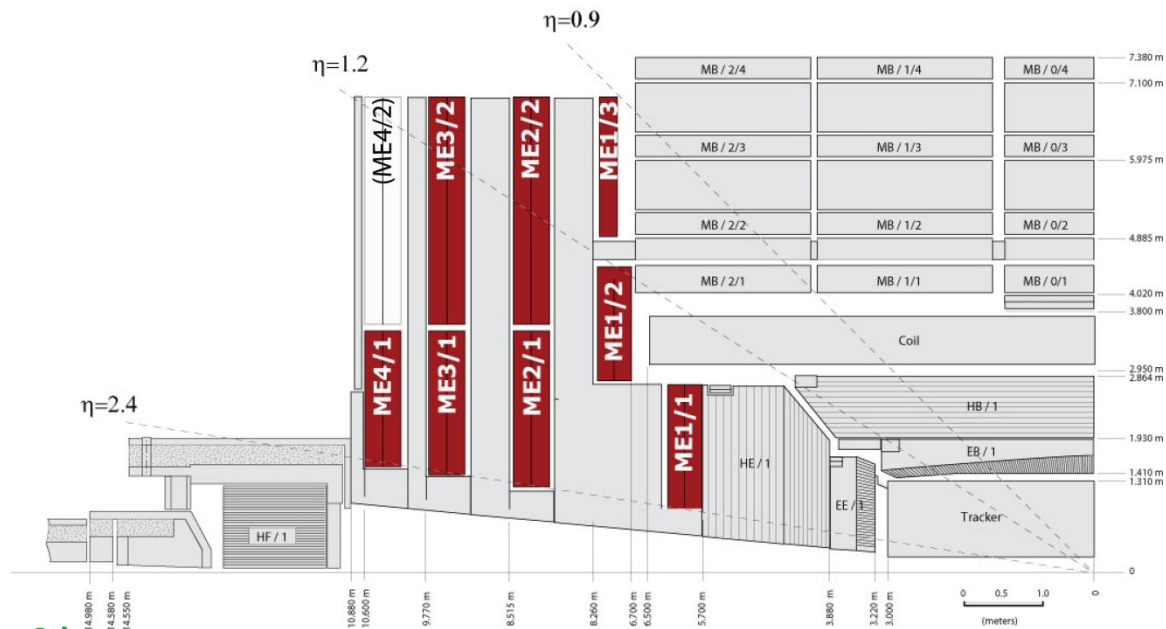




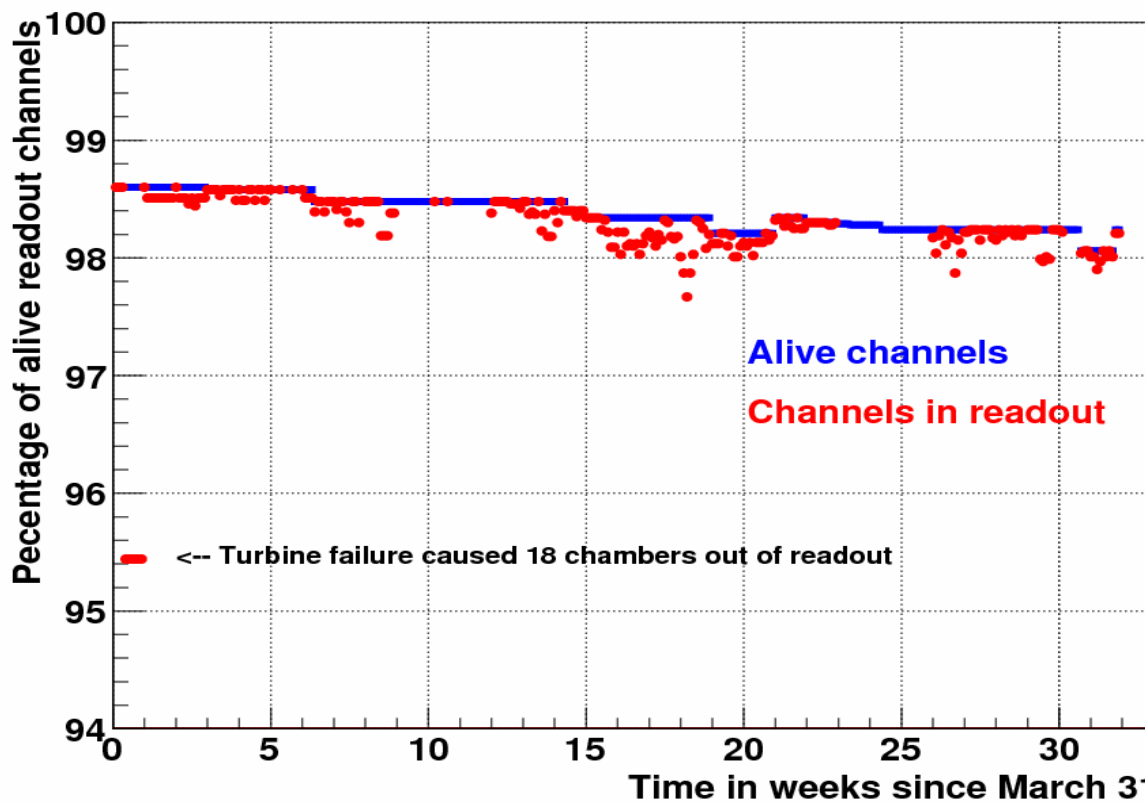
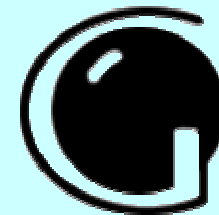
Status Muon Subsystem



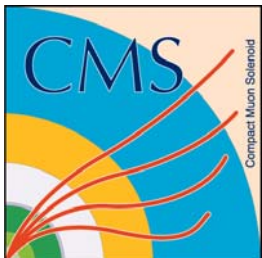
- ME1/1 72 1.5×0.5 m²**
- ME1/2 72 1.6×0.8 m²**
- ME1/3 72 1.7×0.9m²**
- ME 2/1 36 1.9×1.25 m²**
- ME3/1 36 1.7×1.25 m²**
- ME4/1 36 1.5×1.25m²**
- ME23/2 144 3.2×1.3m²**
- 473 CSCs (cover about 6000 m²)**
- 2.3 10**6 anode wires**
- 183168 anode readout channels**
- 217728 cathode readout channels**



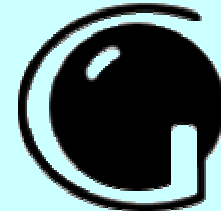
Stability of CSC electronics



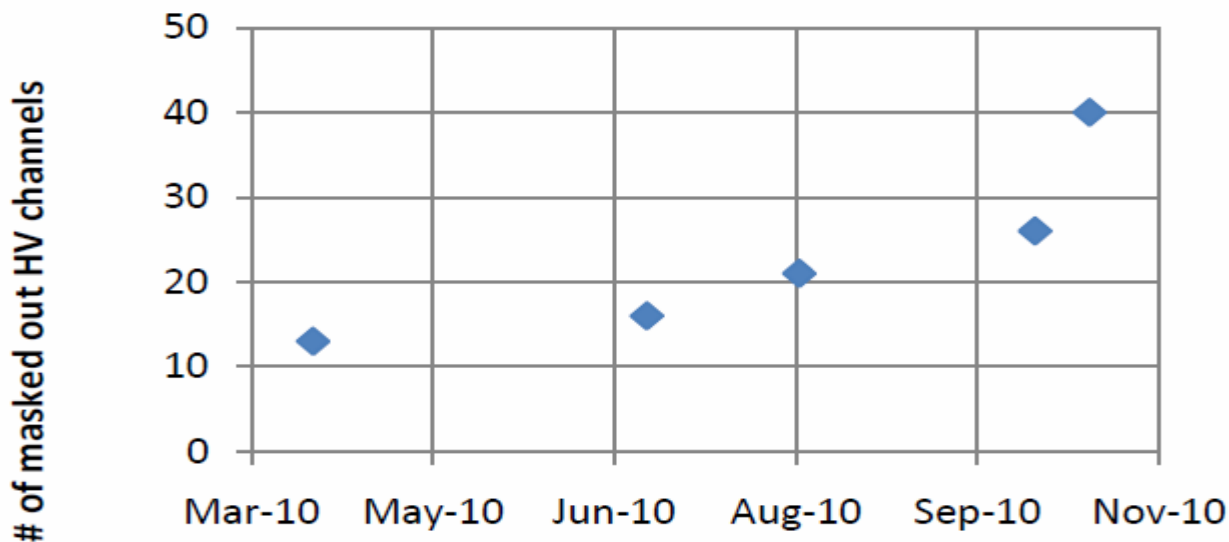
The main source of electronics losses is FPGA EPROMs lost information.



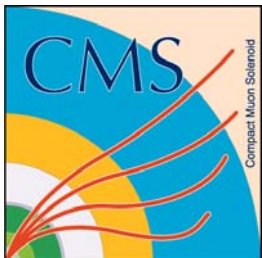
CSC operation -HV trips



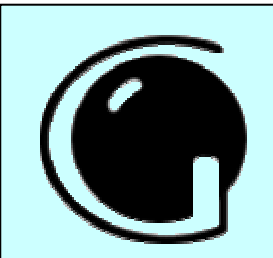
1. In 2008-2009 the number of HV channels which had a HV current trip history was small (12 channels).
2. Before the LHC reached an instantaneous luminosity 10^{32} the number of tripped channels slowly grew up with time to 25.
3. At luminosity = 2×10^{32} the number of HV tripped channels went unexpectedly up to 40.



It is still low number (CSC has more than 9400 HV channels).

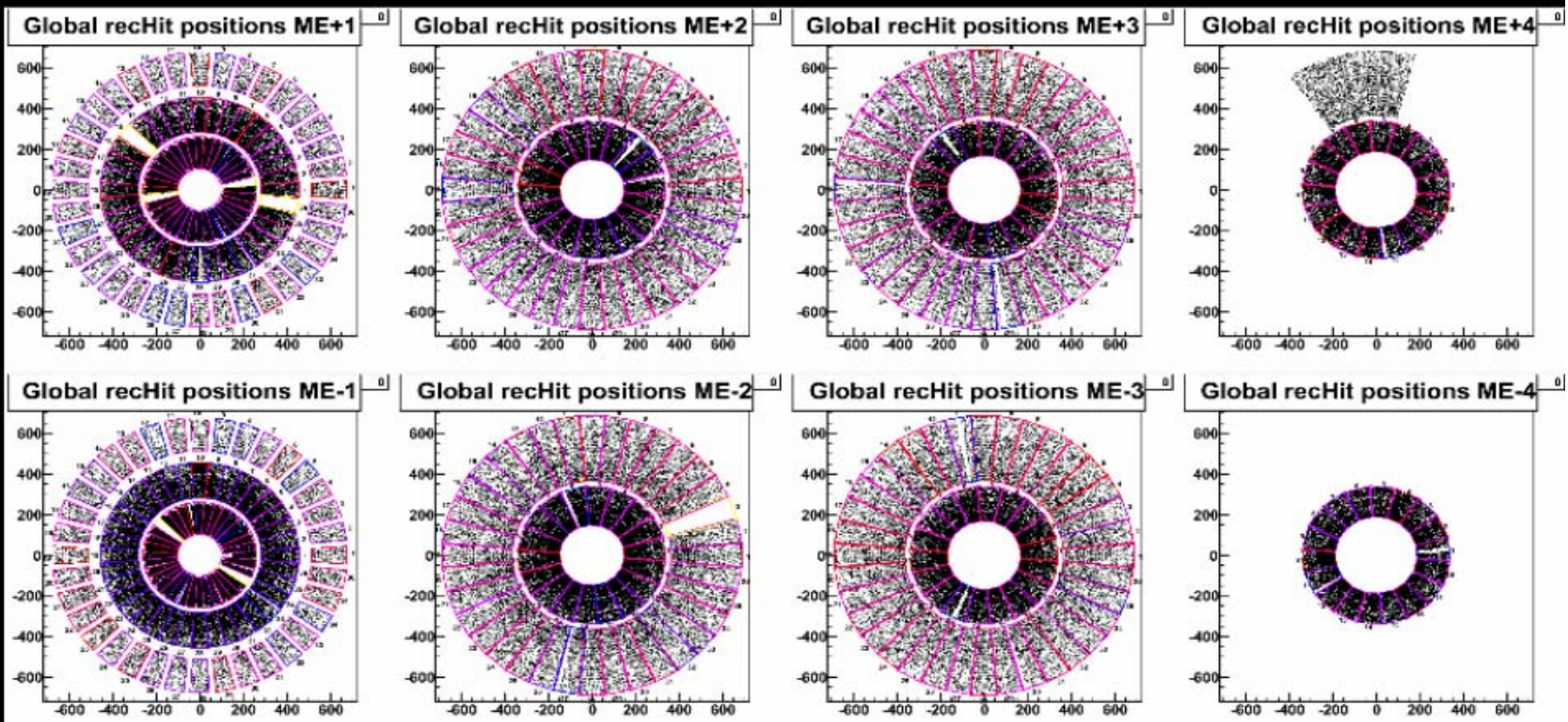


CSC status at the end of LHC proton run

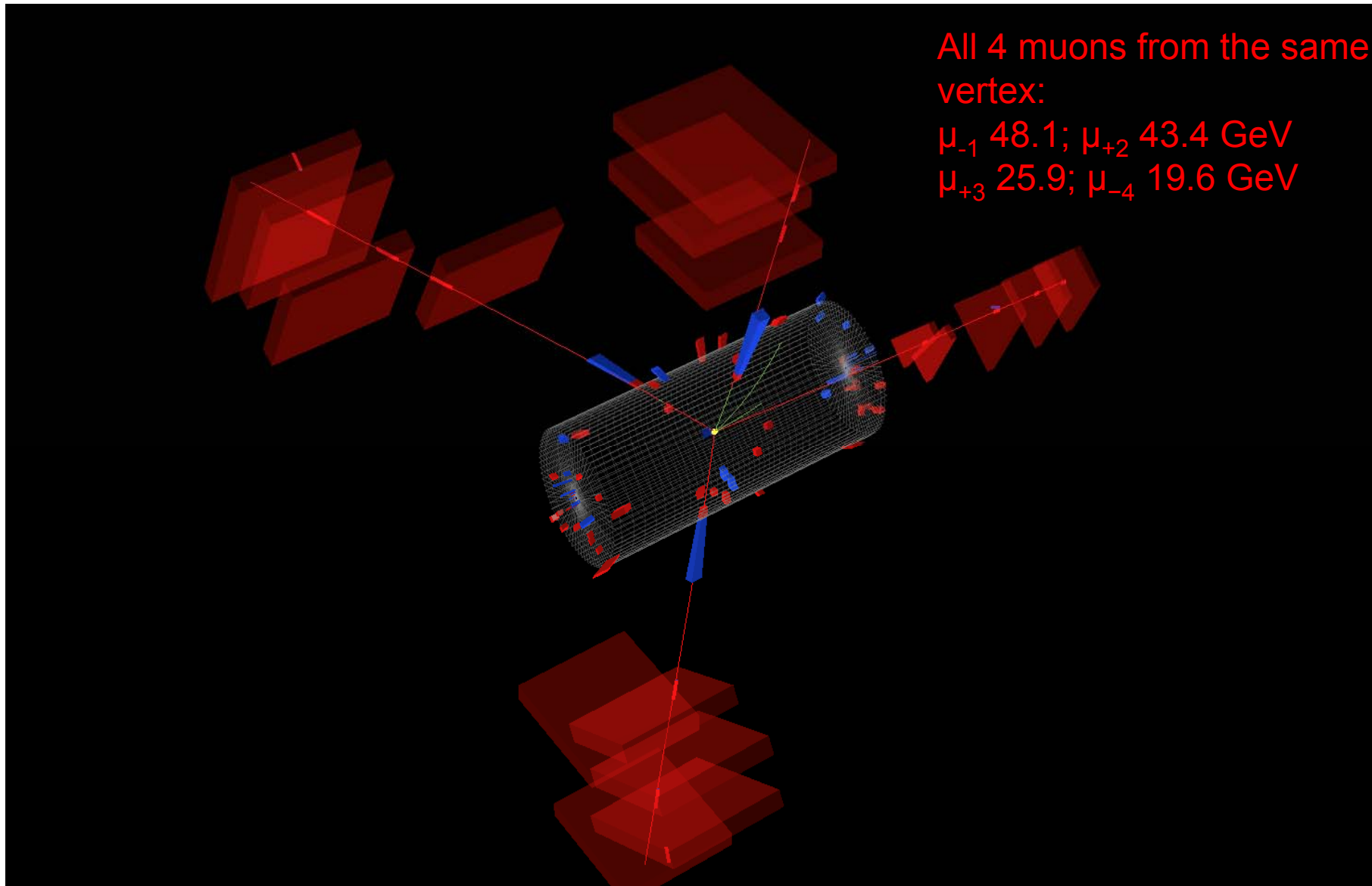


CSC finished the LHC $p - p$ collisions 2010 run with efficiency 98.24% .
We lost 8 CFEBs & 4CFEBs were disable

rechHit Global Positions

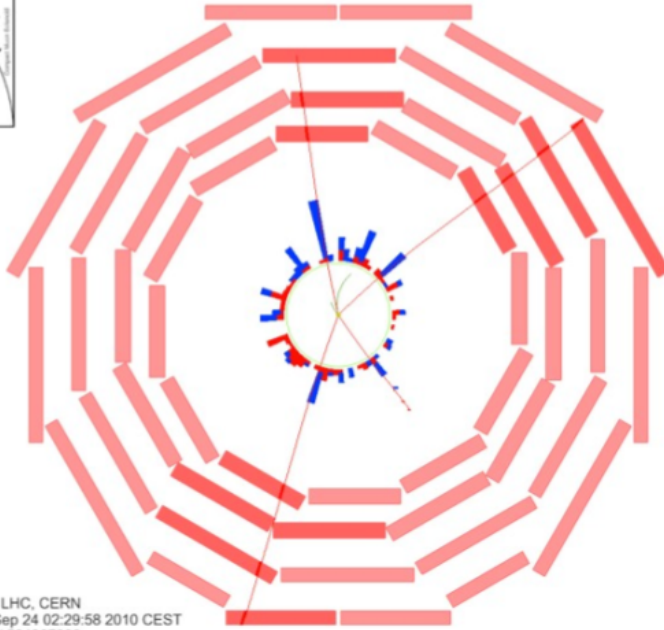


The first $ZZ \rightarrow 4\mu$ event



The first $ZZ \rightarrow 4\mu$ event

ρ - ϕ view



CMS Experiment at LHC, CERN
Data recorded: Fri Sep 24 02:29:58 2010 CEST
Run/Event: 146511 / 504867308

Only tracks with $p_T > 1$ GeV are displayed

Probability to find such an event in the first 22pb^{-1} of data: 16%.

Invariant Masses

$\mu_0 + \mu_1$: 92.15 GeV (total(Z) p_T 26.5 GeV, ϕ -3.03),
 $\mu_2 + \mu_3$: 92.24 GeV (total(Z) p_T 29.4 GeV, ϕ +.06),
 $\mu_0 + \mu_2$: 70.12 GeV (total p_T 27 GeV),
 $\mu_3 + \mu_1$: 83.1 GeV (total p_T 26.1 GeV).

Invariant Mass of 4μ : 201 GeV

Just a reminder...

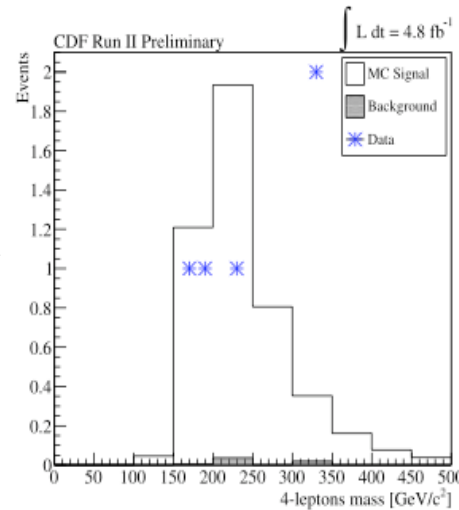


Figure 4: CDF ZZ result.

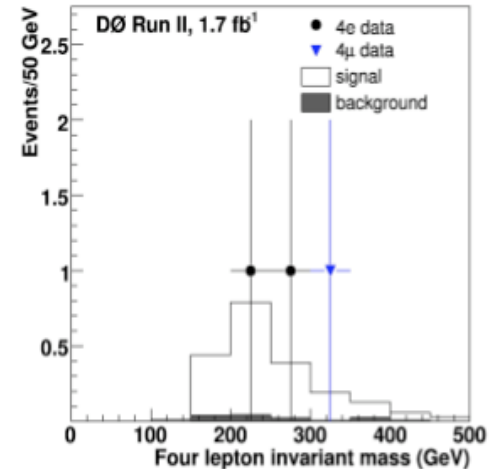
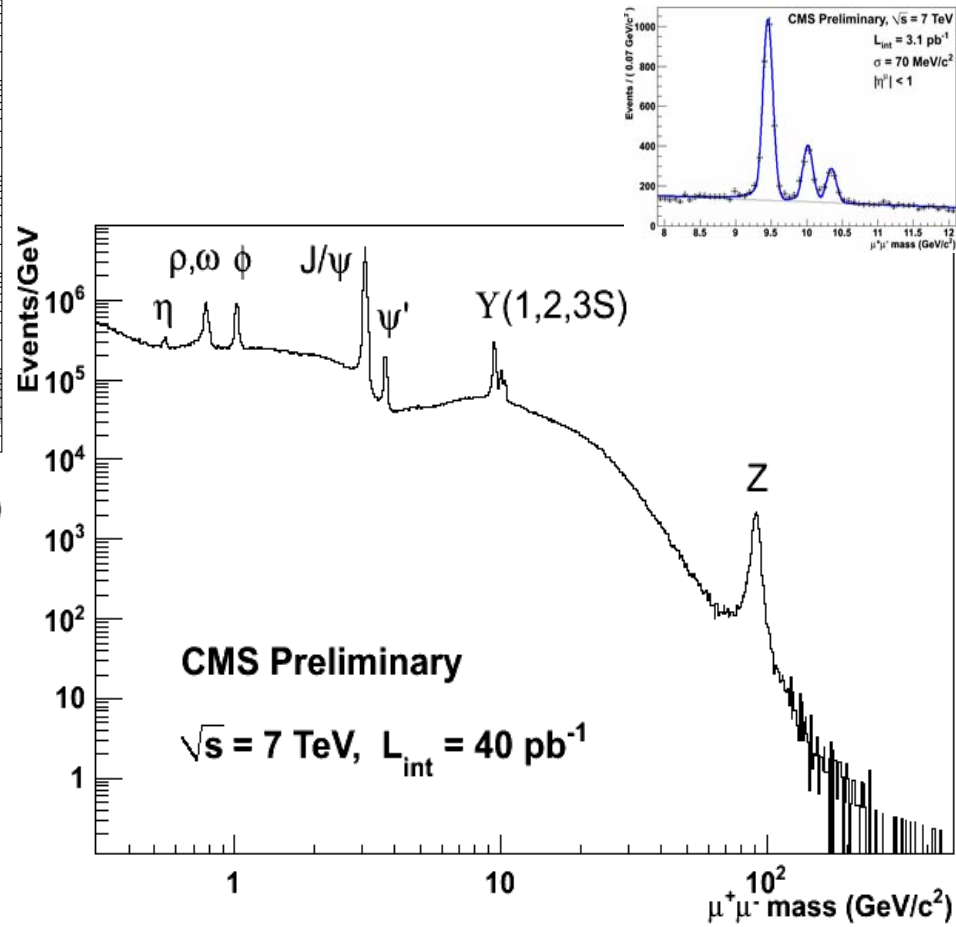
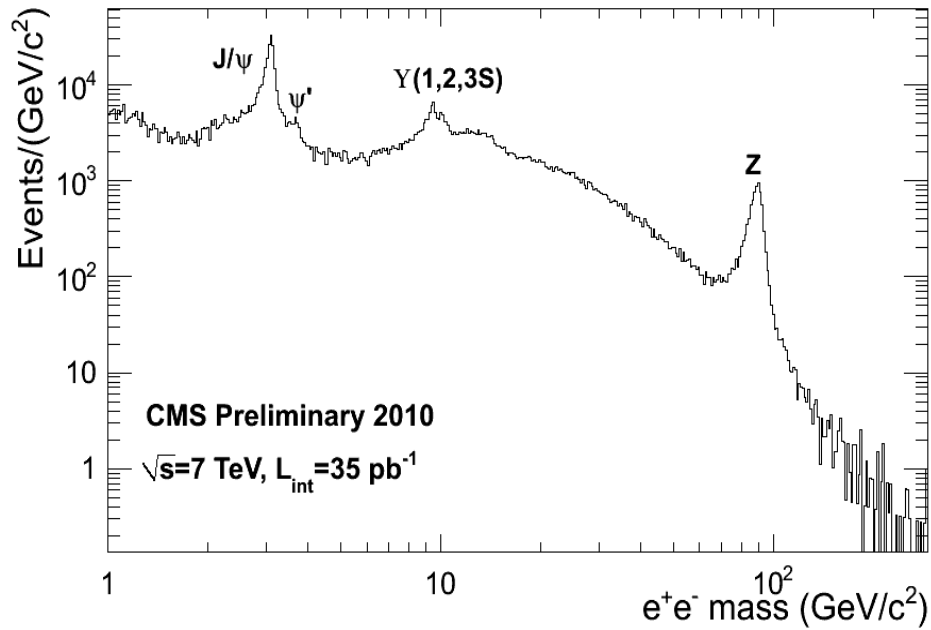
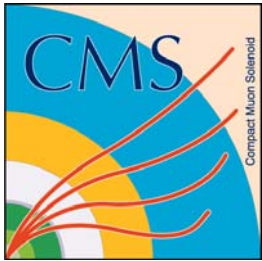


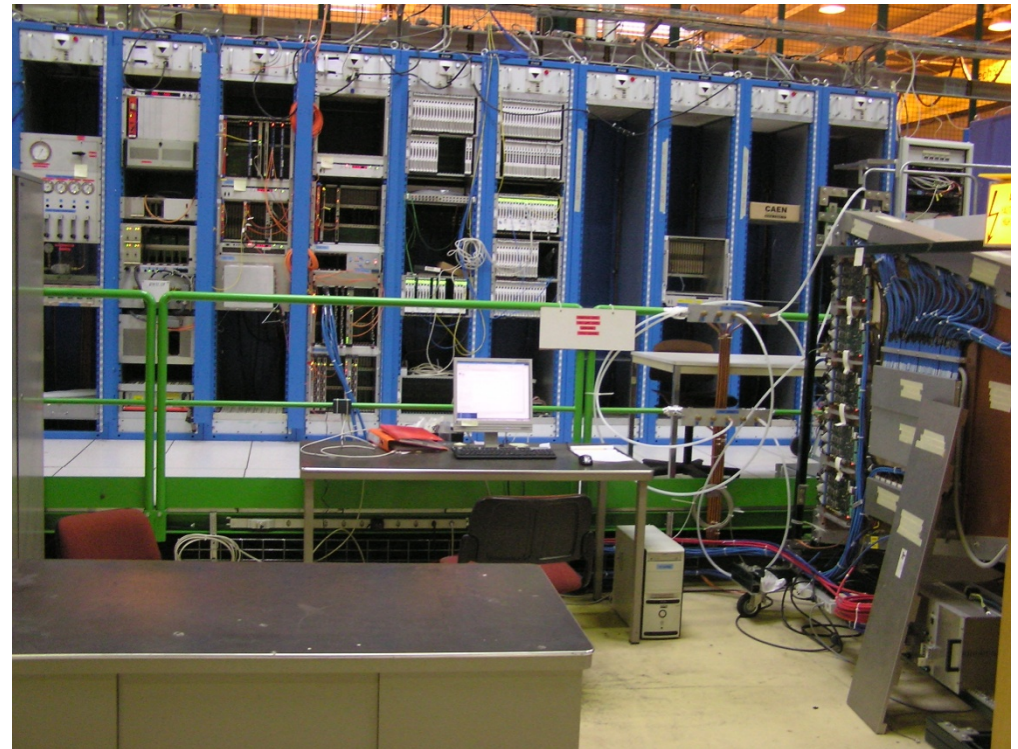
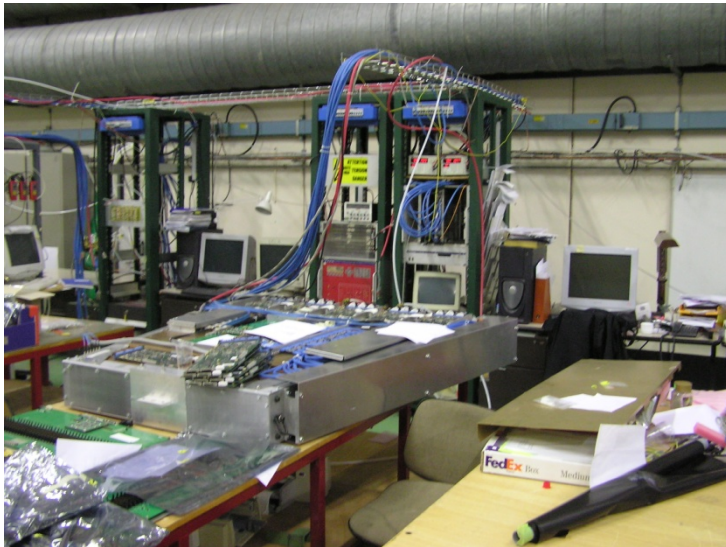
Figure 5: D0 ZZ result.

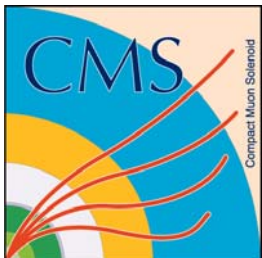
The Standard Model at 7TeV



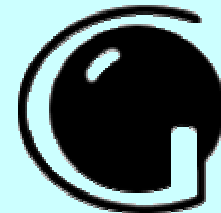


ISR → 904



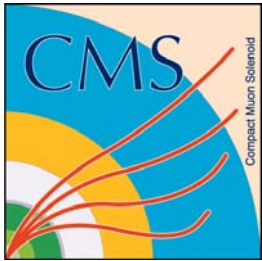


Shifts in 2010



General Requirement for 2010: 6 points per Author

- PNPI participates in Trigger and DCS Central shifts --- **69.75 points (54 shifts)**.
- CSC shifts --- **119 shifts**.
- CSC DQM shifts --- **7 shifts**



CSC Upgrade I

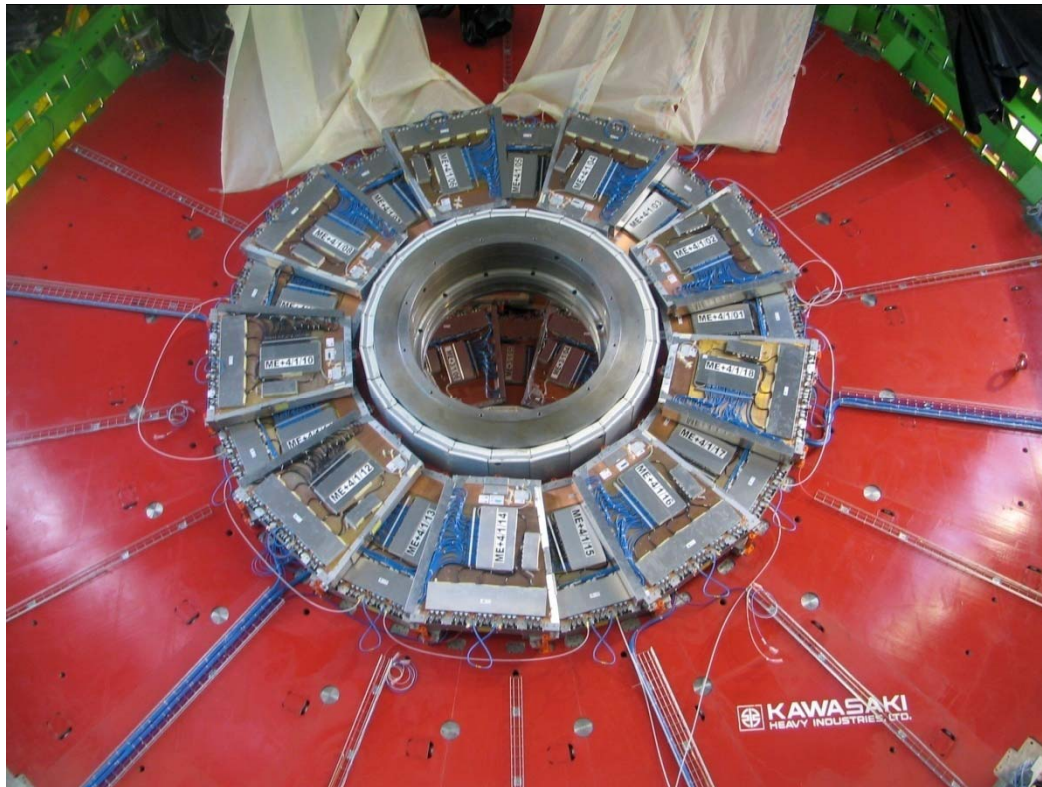


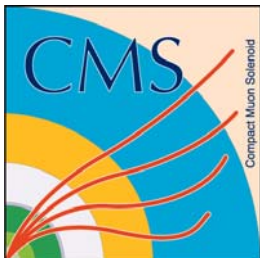
- Original design unfinished – ME4/2 not built
- 72 ME4/2 chambers to complete system
 - Identical to chambers already built and working well
 - Increase redundancy of system
 - Efficient triggering at high luminosities

ME4/2 Upgrade

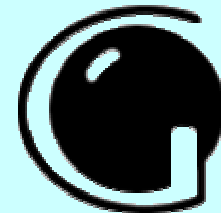


R&D
Production of 31 CSC

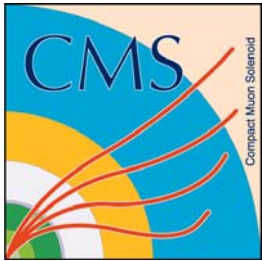




CSC Production Plans



- **Assembly in B904 factory at CERN**
 - Currently being renovated – occupancy end of 2010
 - ~1000 m² space with good services
 - CERN will provide two clean rooms for CSC
- **Shipped tooling and parts from Fermilab**
 - Parts for approximately 3 prototypes + spares
 - Shipment has arrived in B904
- **Plans for 2011**
 - Plan to set up machines in January – February 2011
 - Then produce 2-3 prototypes as part of a learning curve (debug systems and train personnel)



CSC tooling in B904

