



**НАУЧНАЯ СЕССИЯ
ОТДЕЛЕНИЯ ФИЗИКИ ВЫСОКИХ ЭНЕРГИЙ
24 декабря 2013**

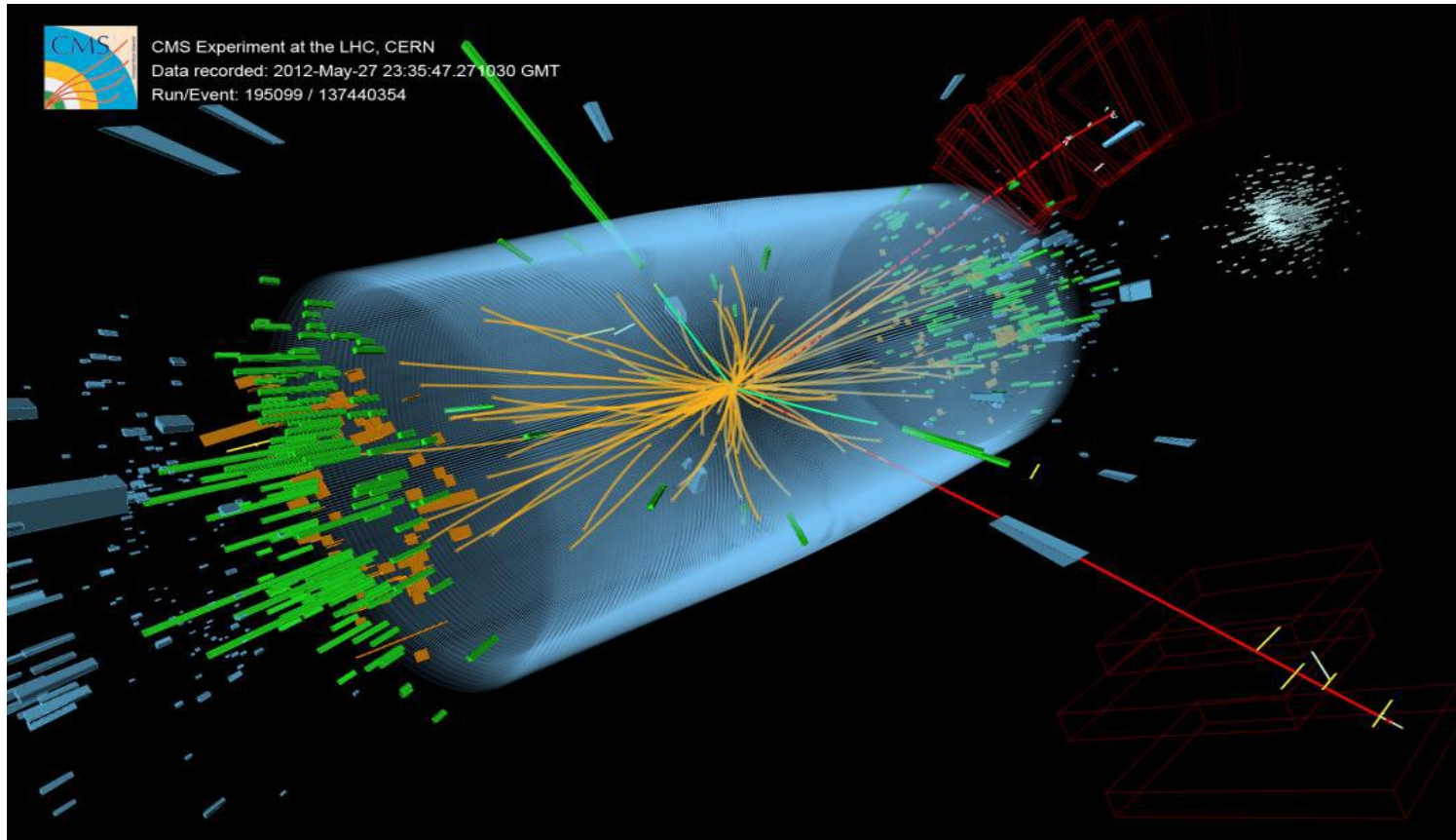


Проект CMS в 2013

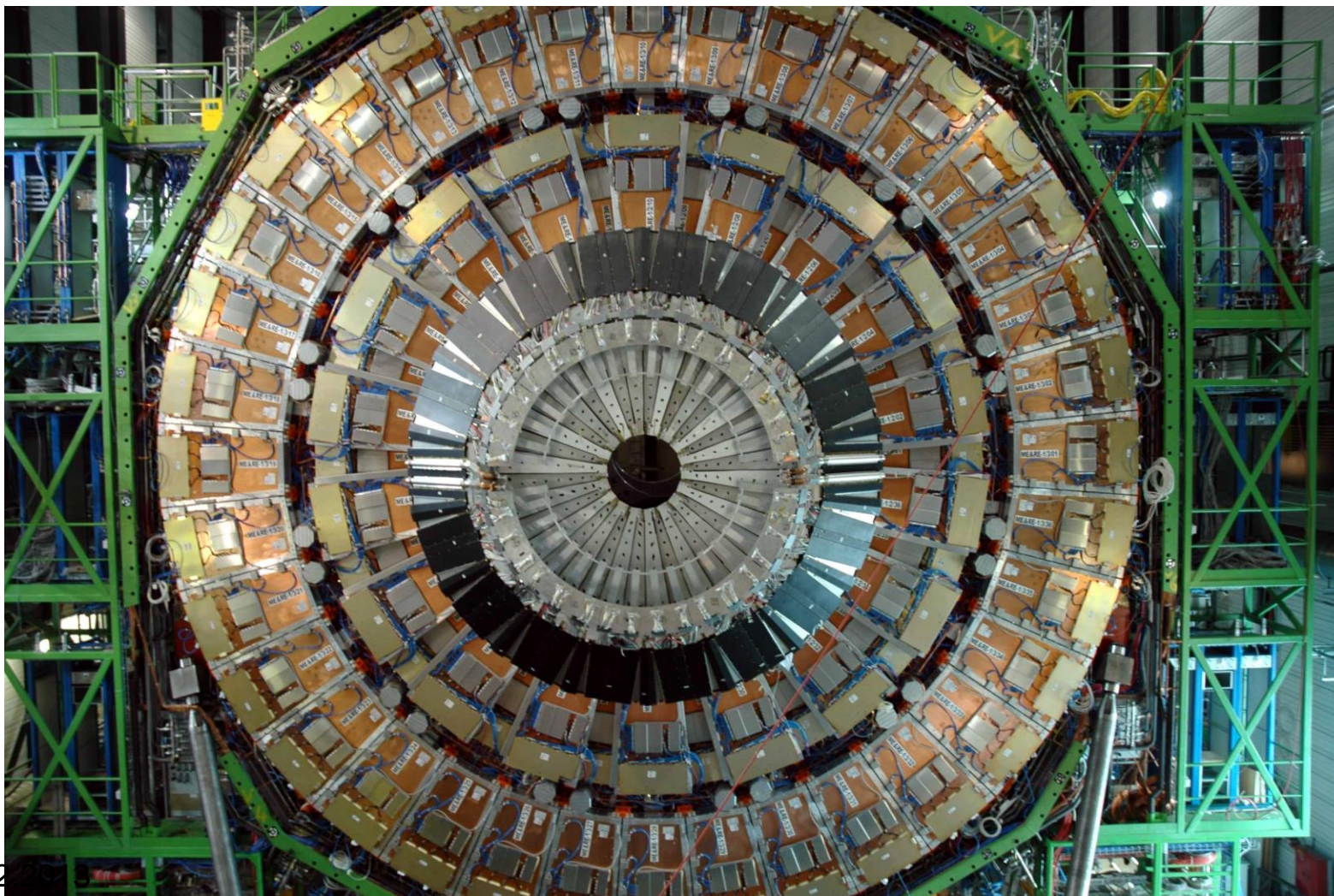
В.Сулимов



Observation of a New Particle with a Mass of 125 GeV

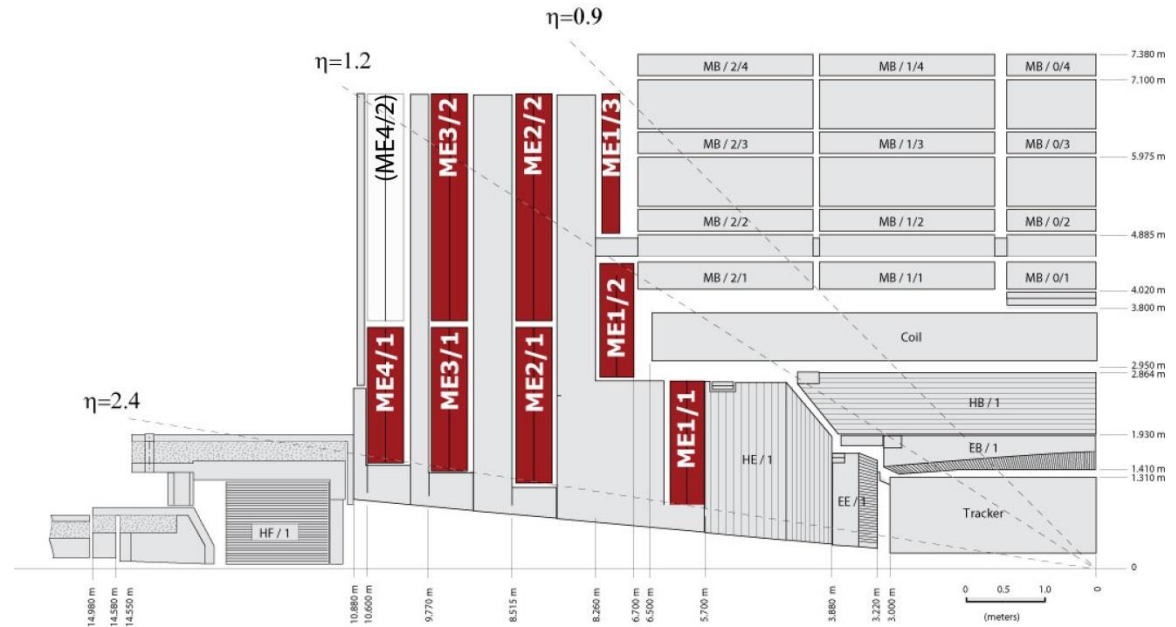


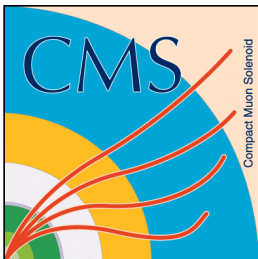
Muon Subsystem





- 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**
- ME4/2 5 + 31+36 3.2×1.3m²**
- 473 (540) CSCs (cover about 6000 m²)**
- 2.3 10**6 anode wires**
- 183168 anode readout channels**
- 217728 cathode readout channels**



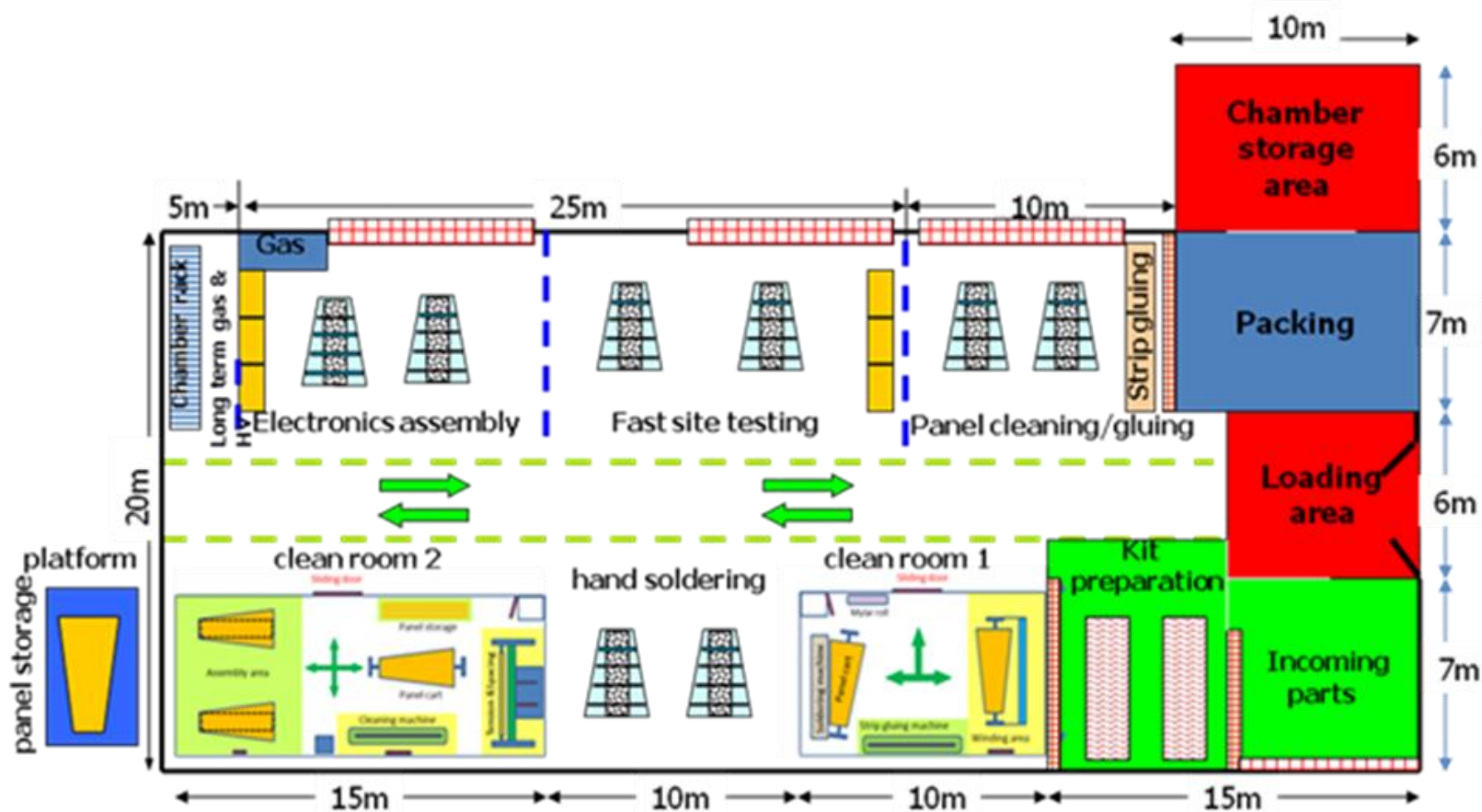


CSC Production Milestones



- May 2010: Refurbishing B904
- Nov 2010: Equipment from FNAL arrived, set up, commissioned
- May 2011: Factory ready for CSC construction
- June 3, 2011: First CSC construction began using parts from old production
 - Completed July
- Beginning of 2012: Five chambers built
- Feb 2012: Delivery of new chamber parts
- May 2012: Delivery of new panels
- Jun 2012: Started “mass production” of chambers.
- 11 Feb 2013: Final chamber for first endcap (prod.number 230) completed
- 11 Oct 2013: Final Chamber For Second Endcap (prod. Number 266) completed
 - Expect Final testing To Complete mid--February, 1.5 Months Before April installation date
- 17 Oct 2013: Chambers For First Endcap Sent To P5

CSC Production





CSC Production



December 2010



June 2011

CSC Production



Today

CSC Production



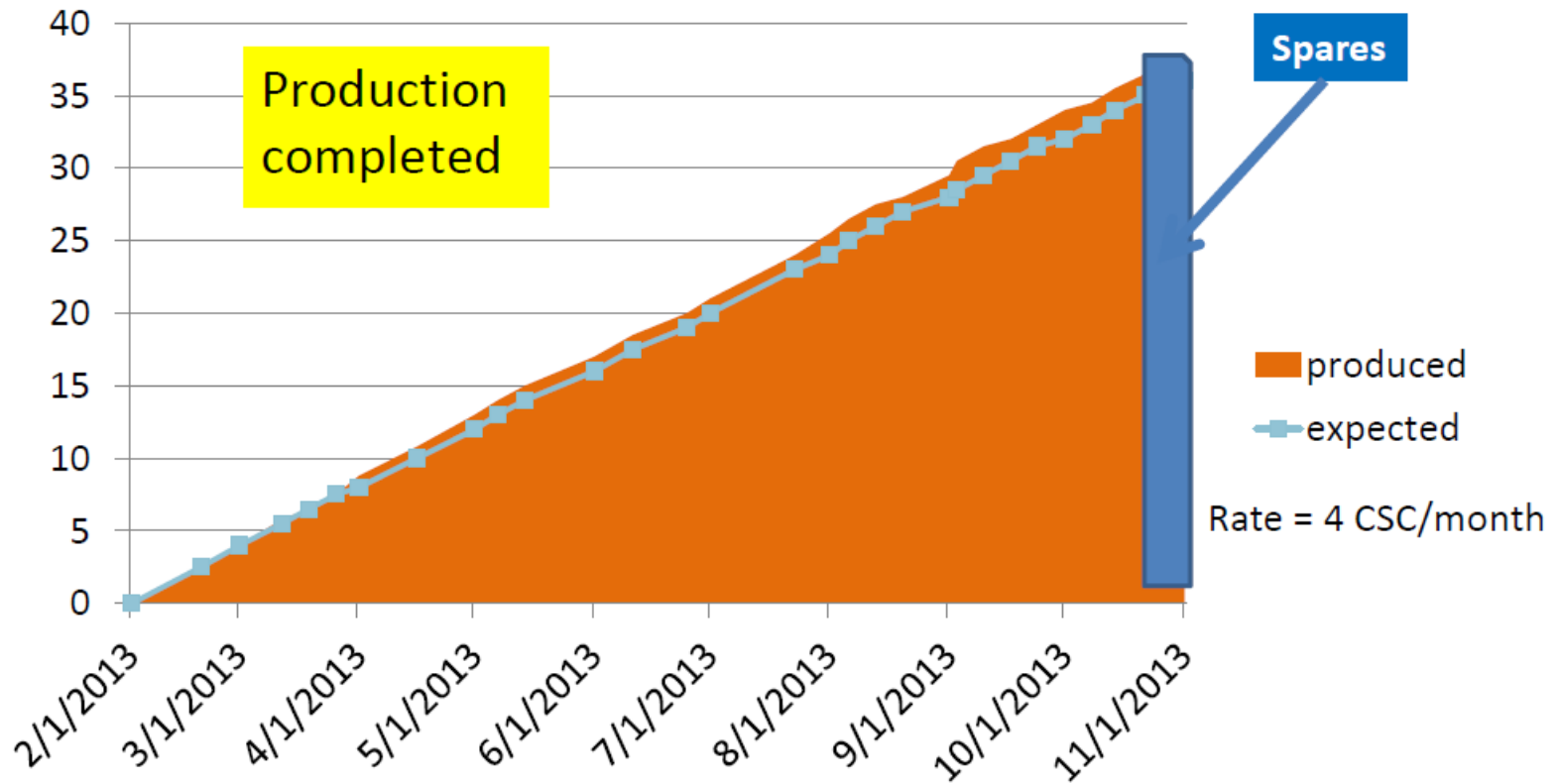
CSC Production



24.12.2013



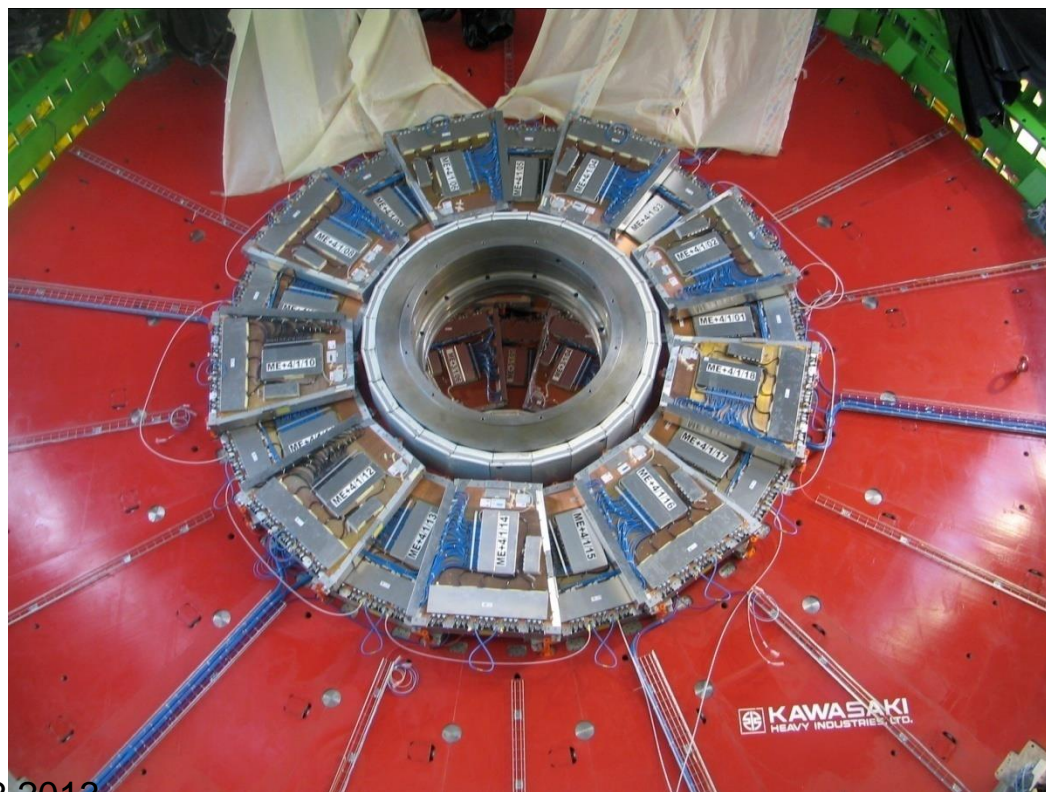
CSC Production

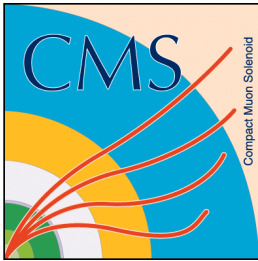


ME4/2 Upgrade



Нужно изготовить: 31 CSC для YE+3 (5 установлено ранее)
36 CSC для YE-3
5 CSC – запасных





CSC Upgrade LS1

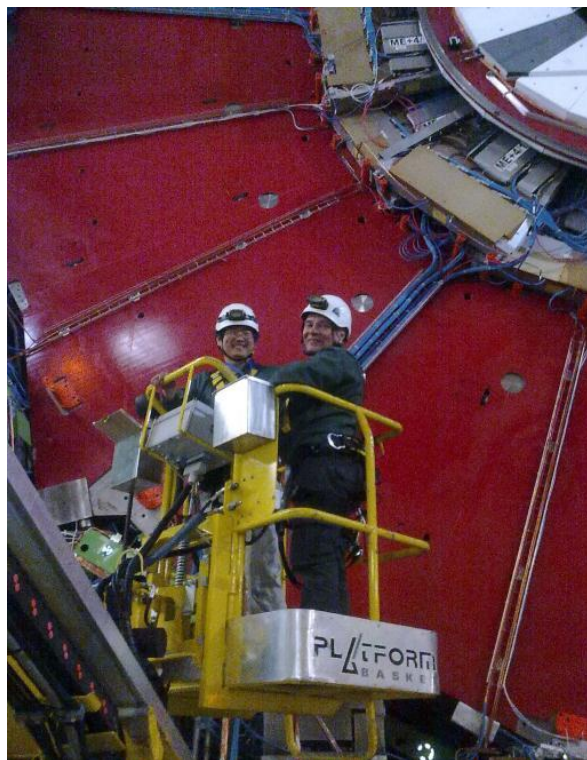


- Original design unfinished – ME4/2 not built
- 72 ME4/2 chambers to complete system
 - Identical to chambers already built and working well
 - Increase redundancy of system
 - Efficient triggering at high luminosities

LS1 activities at P5

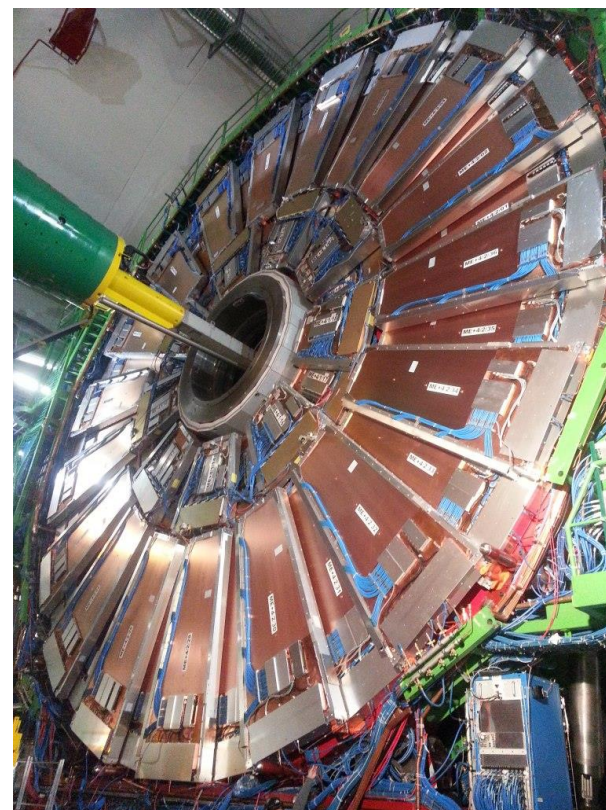
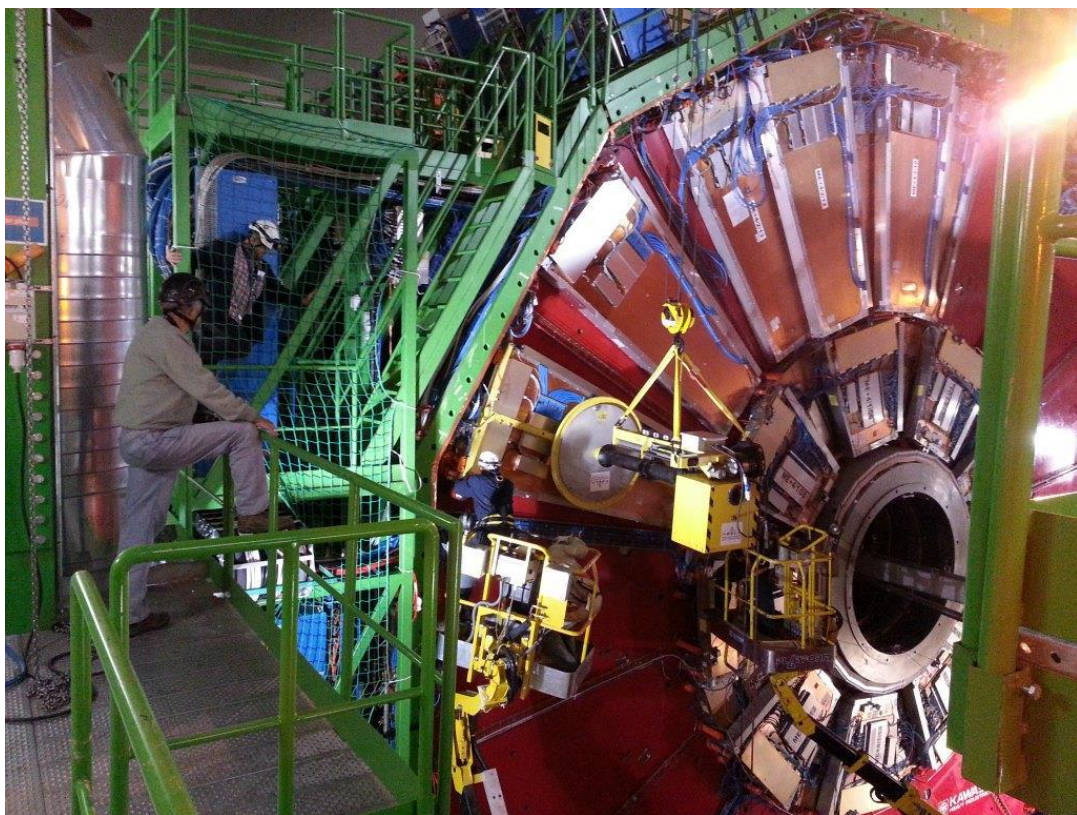


- Reinstallation all CSC posts on YE+3.
- Reinstallation 2 special posts on YE-3.
- Installation 31 ME4/2 LV cables on YE+3
- Installation 31 ME4/2 CSC+gas+cooling

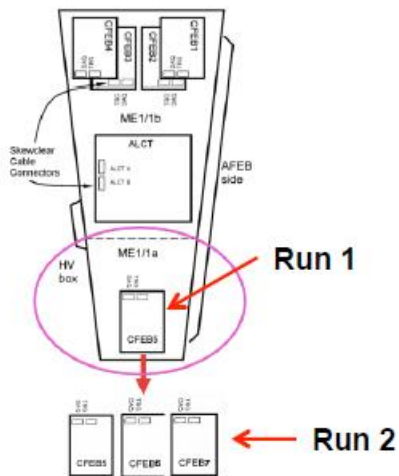


24.12.2013

LS1 activities at P5



ME11 CFEB upgrade



OSU DCFEB



- In the Run 1 ME11a had only 1 CFEB for readout 48 strips in each 6 planes.
Originally ME11 was designed to be readout by 7 CFEBs (3 CFEBs for ME11a and 4 CFEBs for ME11b).
HL-LHC requires to use fine ME11a strip granularity for optimal trigger performance and pattern recognition.

Existing CFEBs cause efficiency loses at high luminosities if the L1ac latency is bigger than 6 us.

- A new design must satisfy future requirements:

- Effectively no dead time
- No L1A latency dependence
- Does not use local trigger (LCT), waits patiently for LCT•L1A
- It uses a trigger not a pre-trigger decision for readout.

It cost CSC ~3 times increase in a LV current consumption.



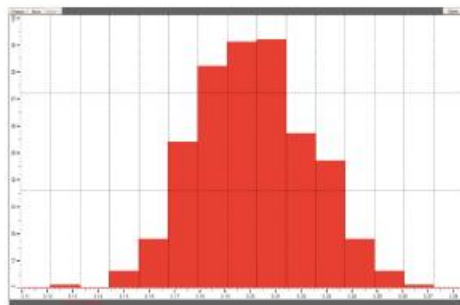
1. Backplane LV connector replacement.

Fretting of gold to tin plated connectors was the major factor of voltage drop in delivering 3.3 V to the main FPGA of TMB.

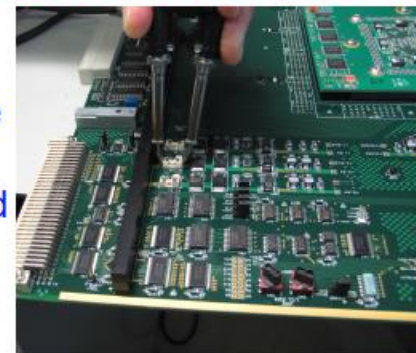
All connectors on station 1 of both endcaps have been replaced.

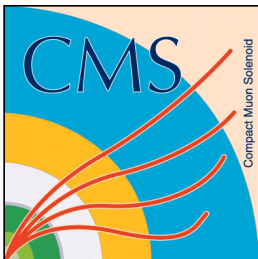


2. 3.3 V fuse replacement on all trigger mother boards.



Lead plated fuses was another source for voltage drop.
Fuses have been replaced on all 540 TMBs.





Shifts in 2013



General Requirement for 2013: 2.4 points per Author

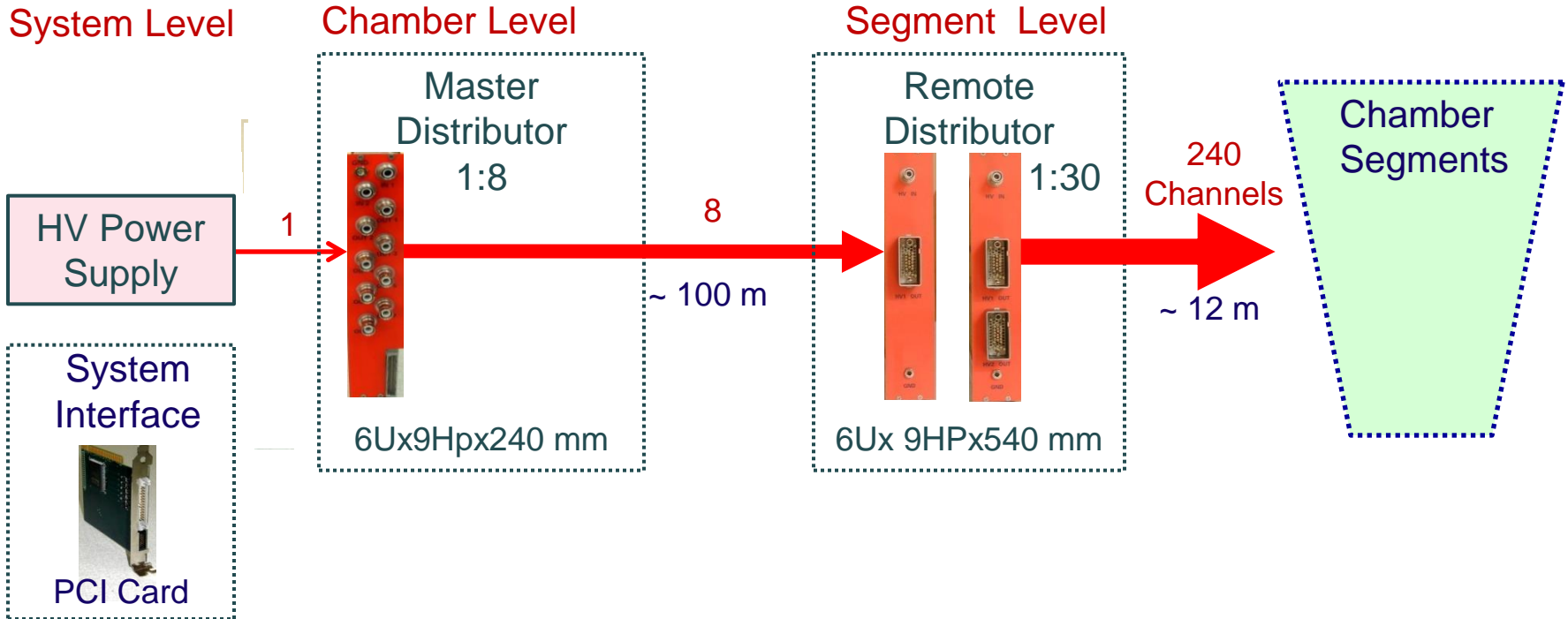
- PNPI participates in DCS Central shifts --- **25.75/24**
(shift-points).
- CSC DQM shifts --- **7 shifts (1 week)**
- **Run Coordinator: CMS need in Central shifts during LS1 2014**
- **Proposed: each institute needs to contribute with**
- **4.5 credits per M&O author in 2014**

UF/ PNPI HV system

System development

- 2003 - Tender win over CAEN on 10000-channel system
- 2005-2006 - Production and test of 11500-channel system at PNPI
- 2007 - System installation at CERN
- 2008 - 2013 - System run at CERN
- 2012-2013 - Production and test of 2500-channel system for ME4/2

UF/ PNPI HV system specification



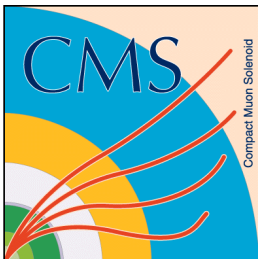
1	Voltage regulation	0 – V max = 4000 V
2	Voltage regulation step	20 V
3	Voltage measurement resolution	10 V
4	Max current per channel	100 mA
5	Current measurement resolution	100 nA

2500-channel HV system production plan

Items to manufacture

N	Item	Quantity (including spares)
1	Remote Distributor	86
2	Master Distributor	10
3	Regulator 1 kV	2840
4	Regulator 4 kV	90
5	Relay board	90

**Production of the whole system
should be completed by 15 Feb 2014**



ME4/2 Upgrade



- The production of 72 ME42 chambers (67 needed and 5 spares) has successfully finished.
- All ME+4/2 chambers have been installed.
- The testing of ME-4/2 chambers is in progress and will continue in January-February 2014.
- Installation and commissioning of ME-4/2 chambers is scheduled in April-June 2014.