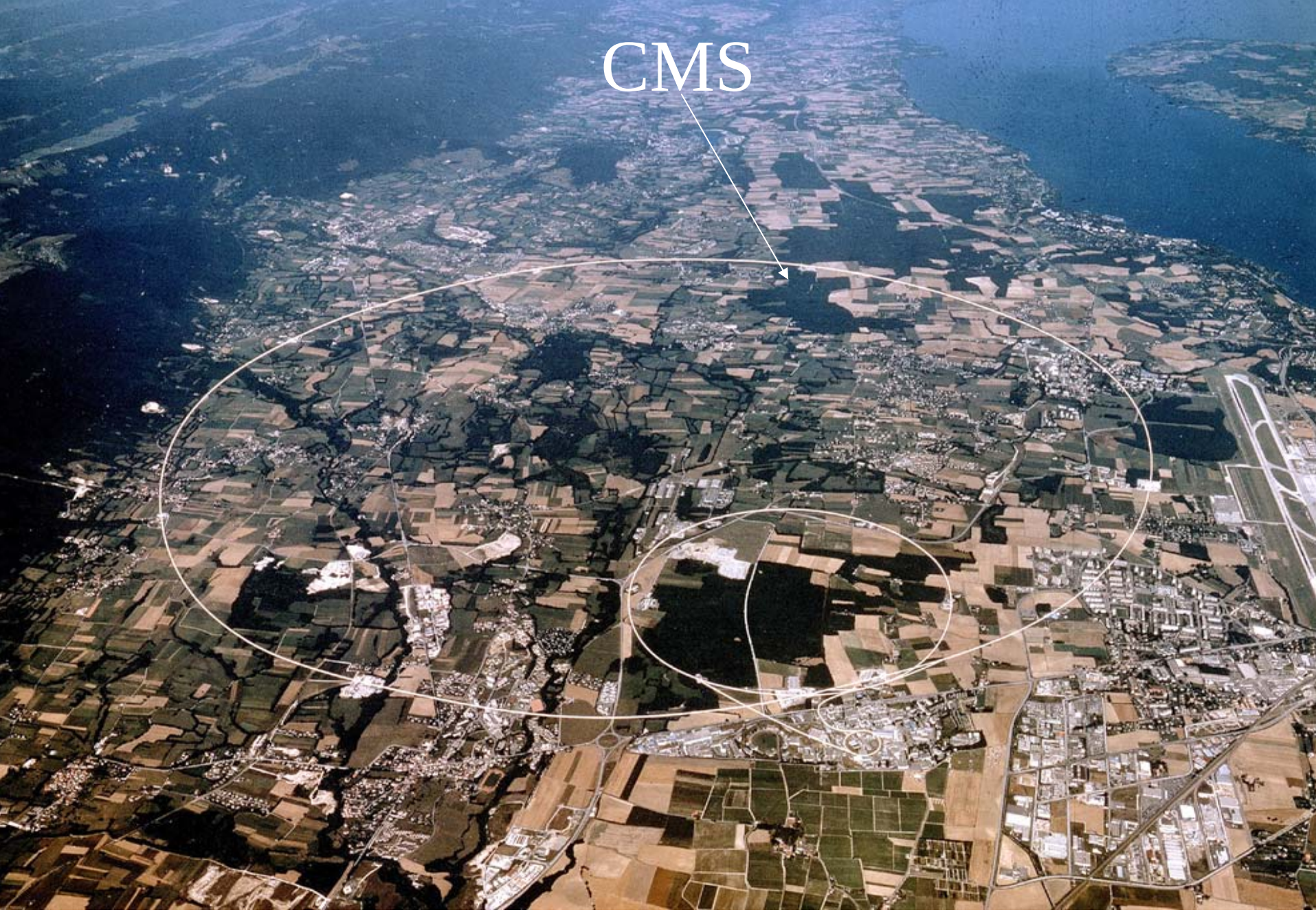
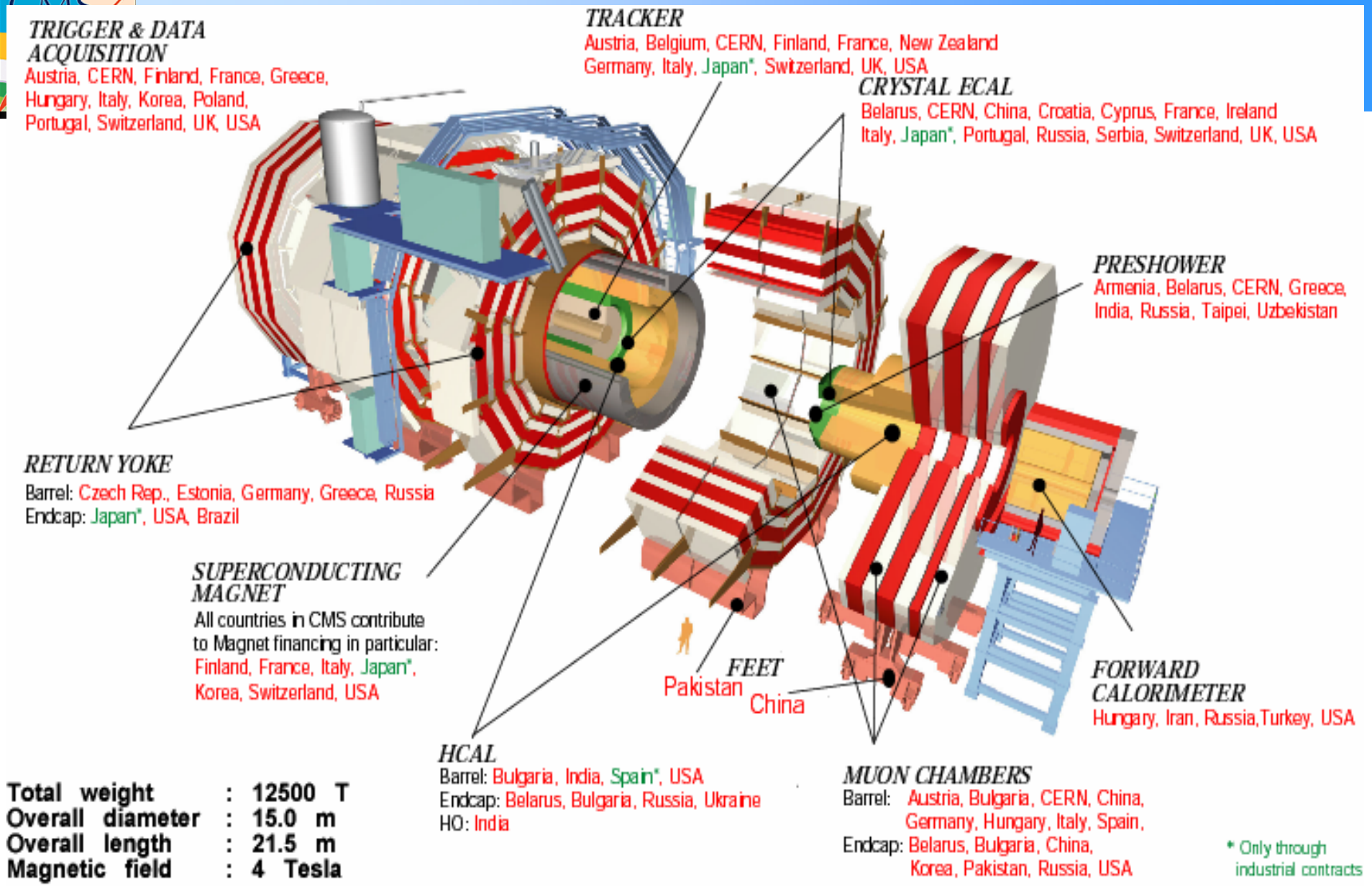
Проект CMS в 2007

Ю.М.Иванов


CMS



2008 scientists and engineers	160 institutes	36 countries

ПИЯФ в CMS

В проект вовлечены:

Лаборатория физики элементарных частиц ОФВЭ
Лаборатория мезоатомов ОФВЭ
Группа экзотических ядер ОФВЭ

Отдел мюонных камер ОФВЭ
Отдел радиоэлектроники ОФВЭ
Отдел вычислительных систем ОФВЭ

Центральные службы и подразделения

ПИЯФ в CMS

- проектирование катодно-стриповых мюонных камер;
- изготовление мюонных камер для станций ME2/1, ME3/1 и ME4/1;
- создание анодной электроники переднего уровня мюонных камер;
- создание многоканальной системы высоковольтного питания мюонных камер;
- создание триггера первого уровня мюонной системы;
- монтаж и запуск мюонных камер в ЦЕРНе;
- разработка и исследование радиационно-стойких вакуумных фототриодов для торцевого электромагнитного калориметра CMS;
- проведение измерений и анализ экспериментальных данных

Nomination of RIE for CMS Gold Award

Research Institute Electron

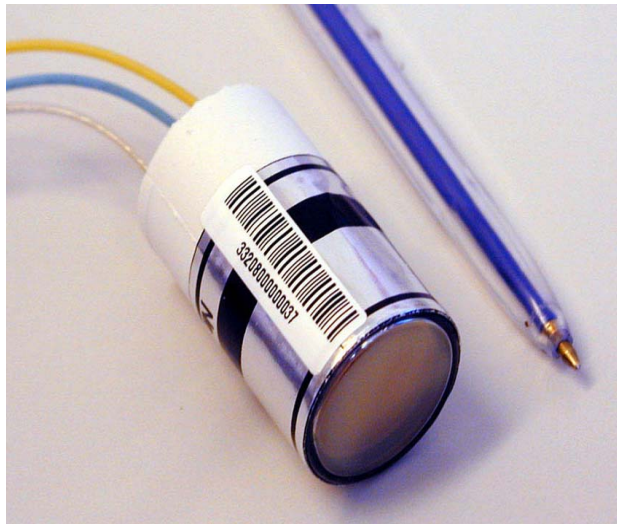
Supply of Vacuum Phototriodes for ECAL endcap

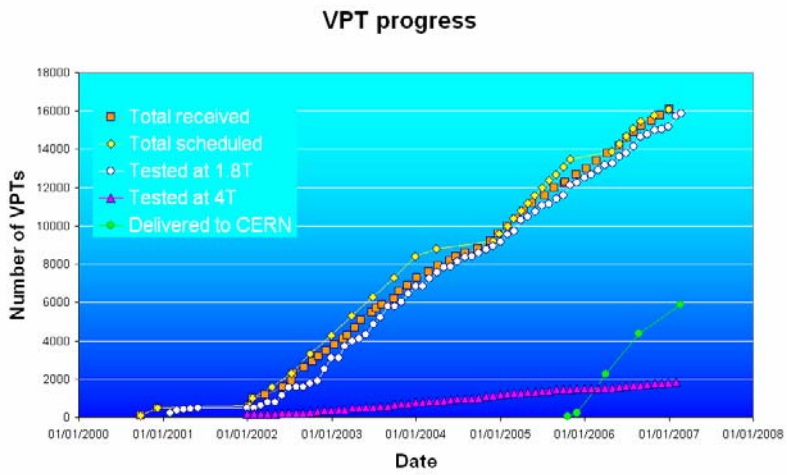
- Developed by RAL + Russian institutes in collaboration with RIE
- 16100 supplied from 2001 to 2006
- VPTs meet physics needs of CMS

Regular meetings at CERN, RAL, and St Petersburg

- Good working relationship
- Free exchange of information helped to solve production problems

Delighted to nominate RIE to receive a CMS Gold Award





Delivery of CMS Gold Award 2007

Направления работы в 2007

Тестирование мюонных камер в ISR, SX5

Сборка Торцевой Мюонной Системы в SX5

Тестирование LV и HV источников питания в ISR

Тестирование электроники в ISR, bld. 904

Участие в работе физических групп CMS

End-Cap Muon System

468 CSCs, not counting ME4/2

- **144 Large CSCs (3.4x1.5 m²):**

72 ME2/2 chambers
72 ME3/2 chambers

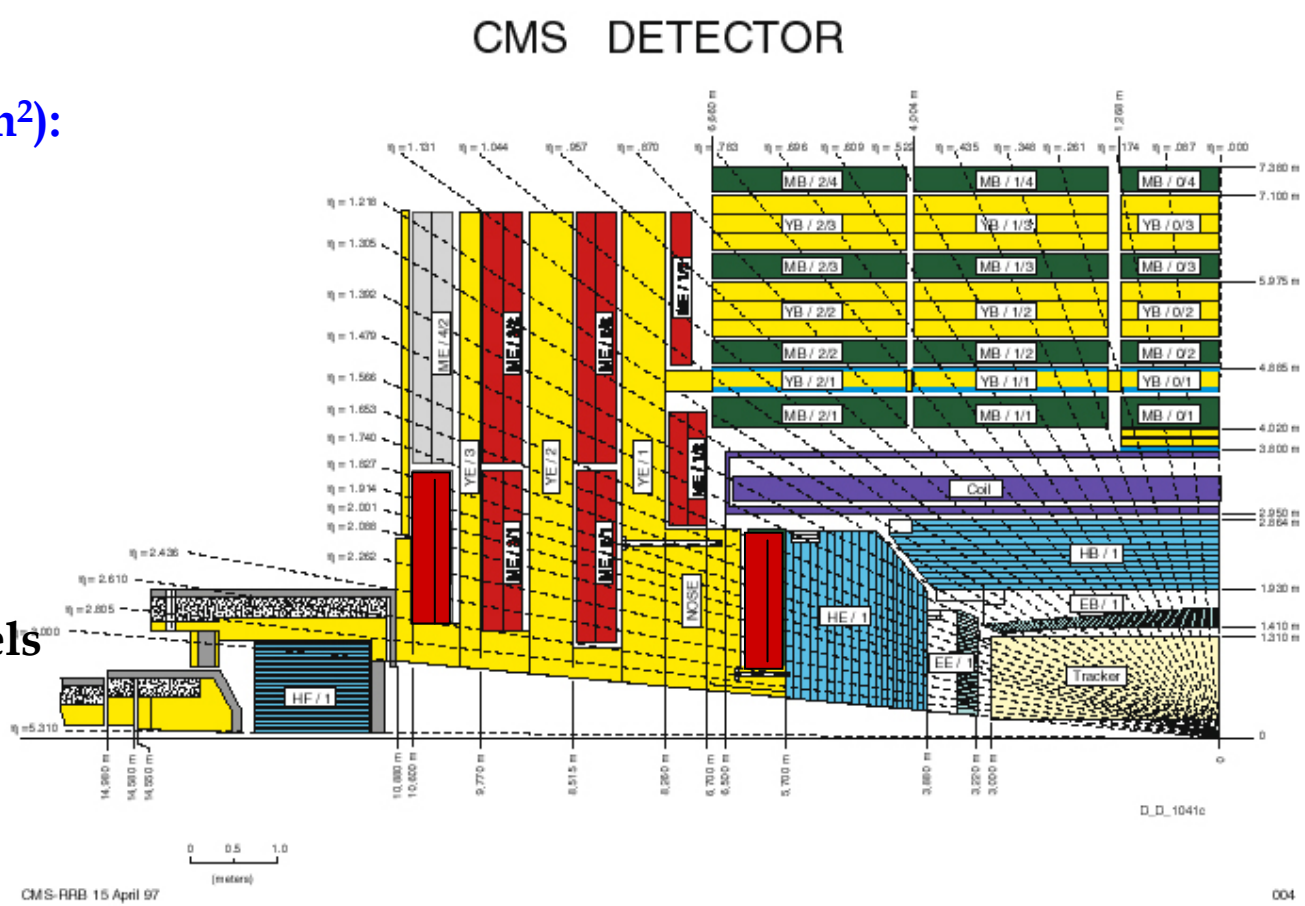
- **Small CSCs (1.8x1.1 m²):**

72 ME1/2 chambers
72 ME1/3 chambers
72 ME1/1 chambers

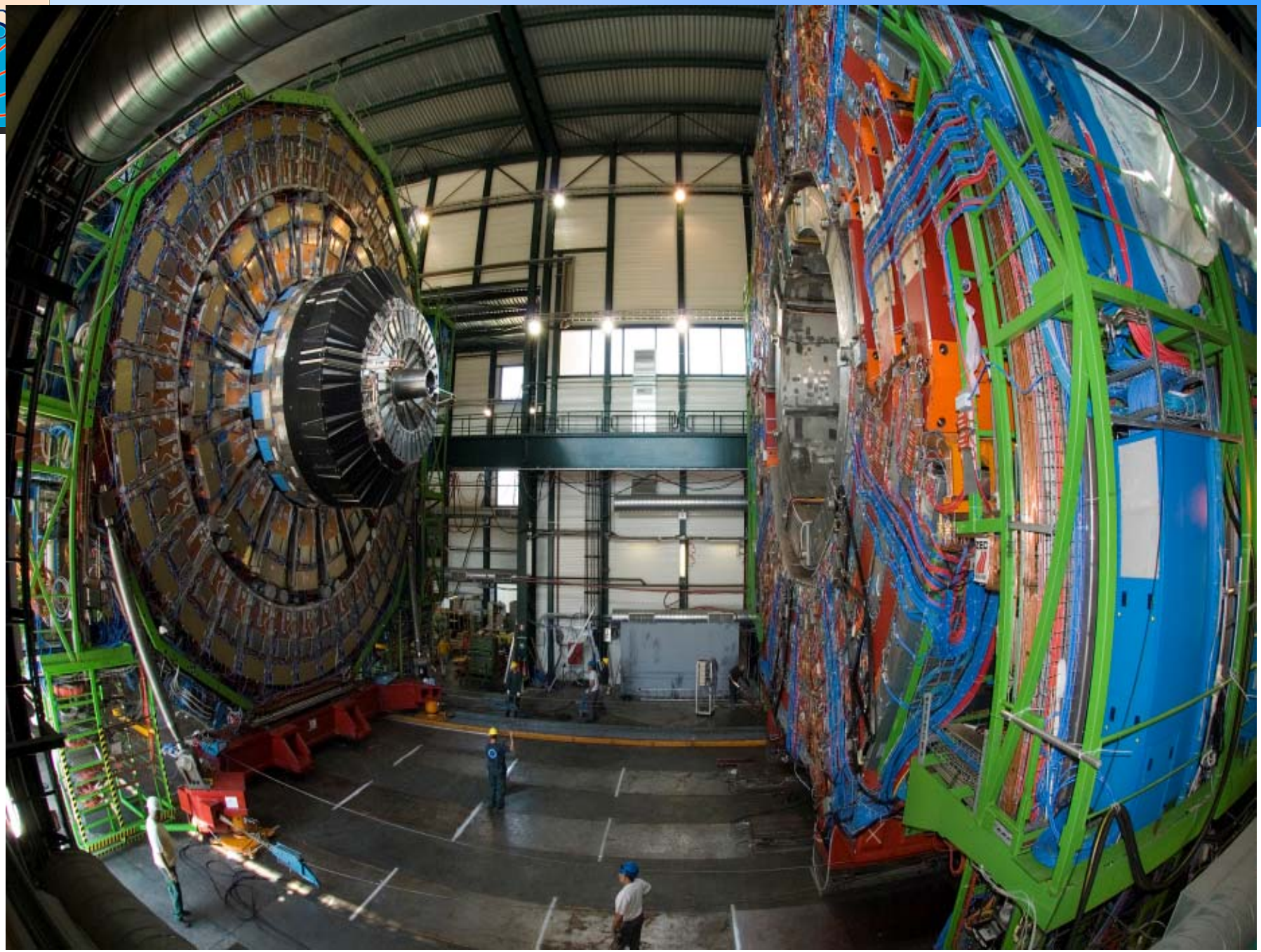
- **20º CSCs (1.9x1.5 m²):**

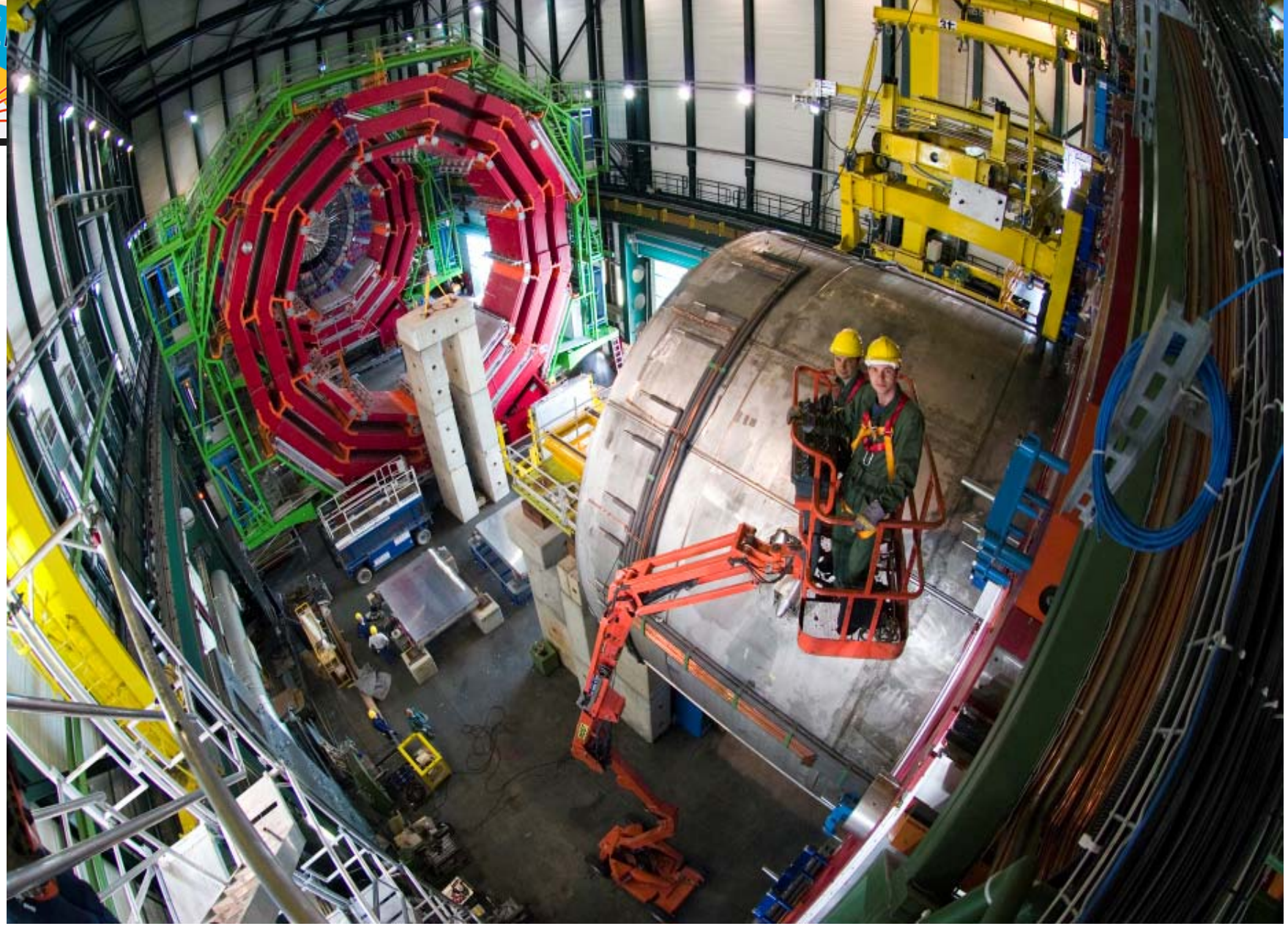
36 ME2/1 chambers
36 ME3/1 chambers
36 ME4/1 chambers

- **Frontend Electronics:**
- 170K Cathode channels
  140K Anode channels
- **Trigger&DAQ**
  (on-chamber part)
- **Alignment&Services**

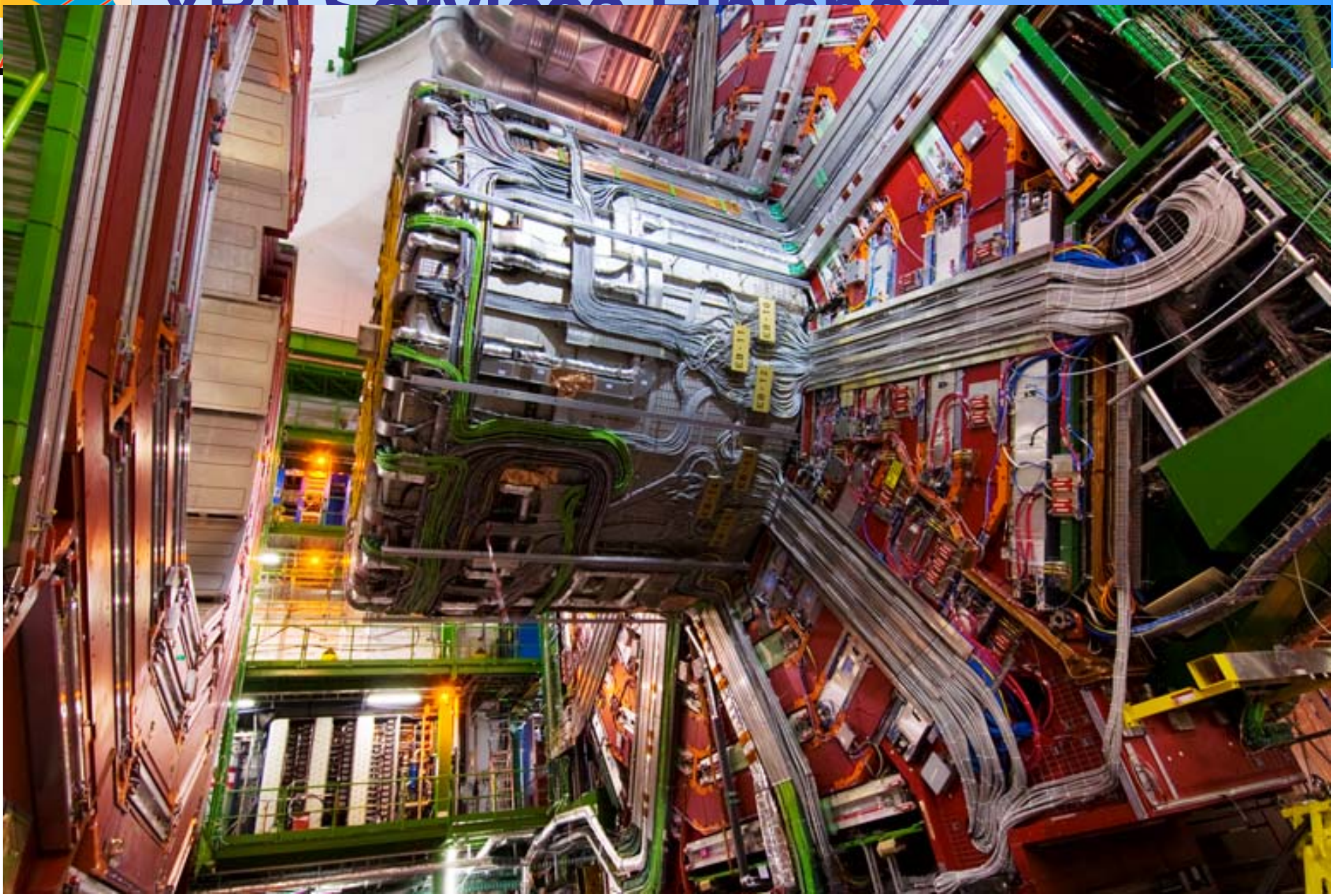


CMS Site at Point 5 (Cessy)

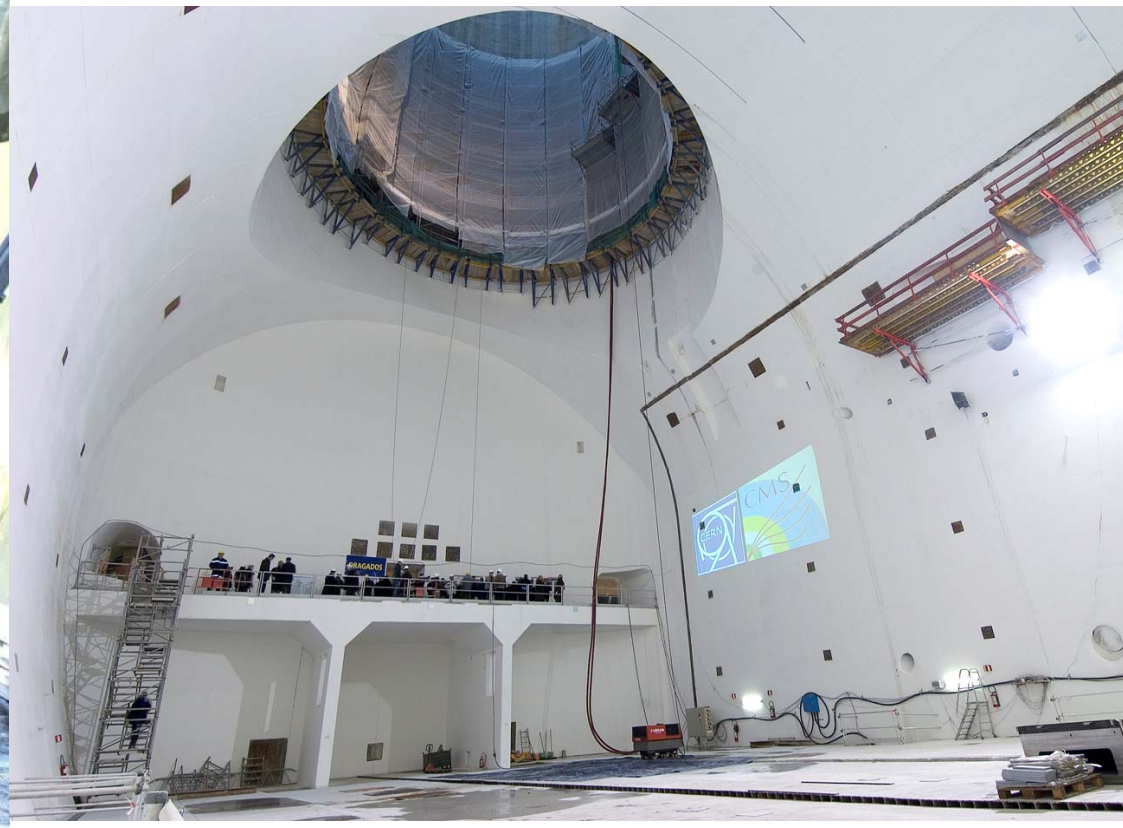




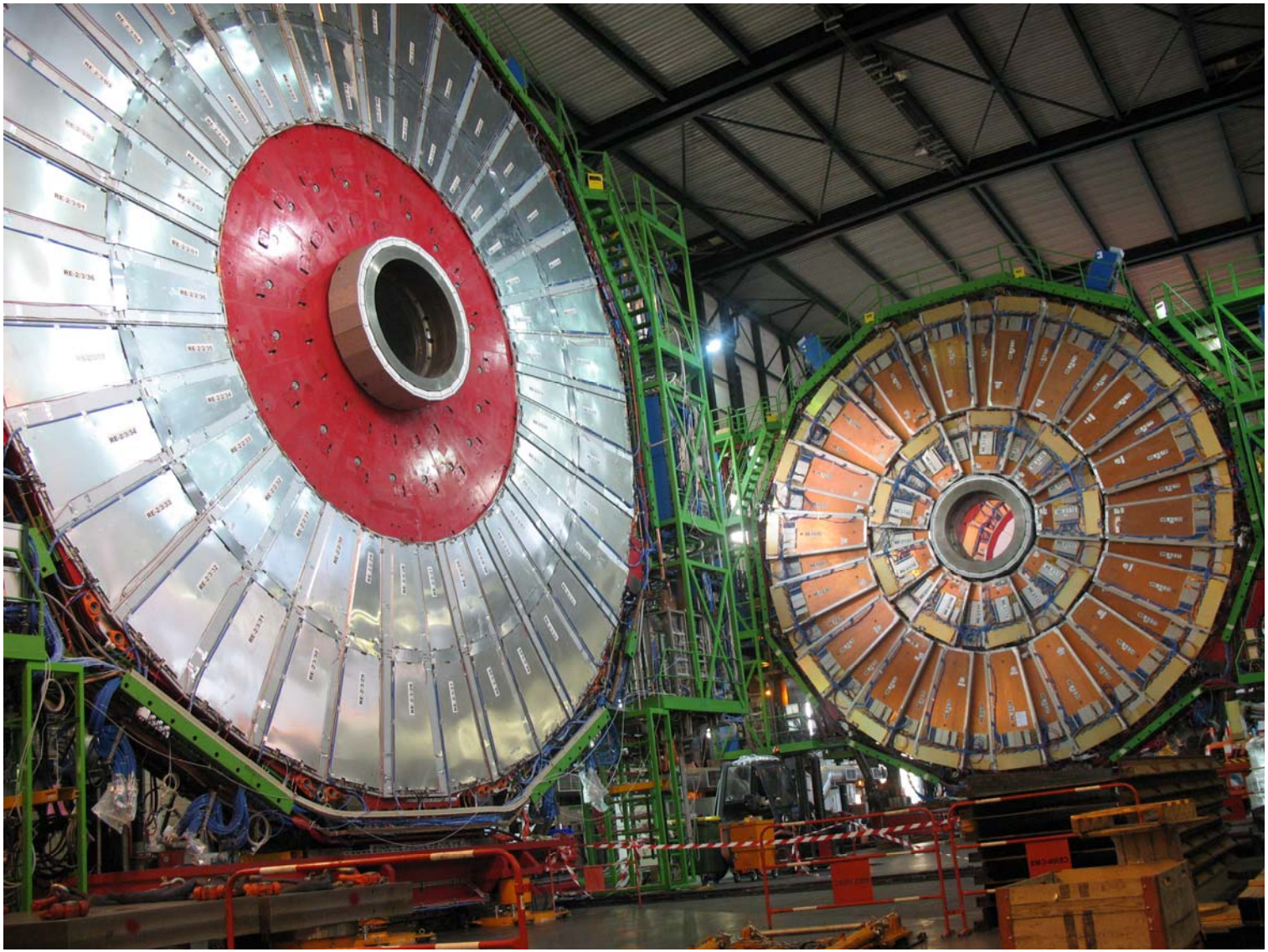
YB0 Services Finished



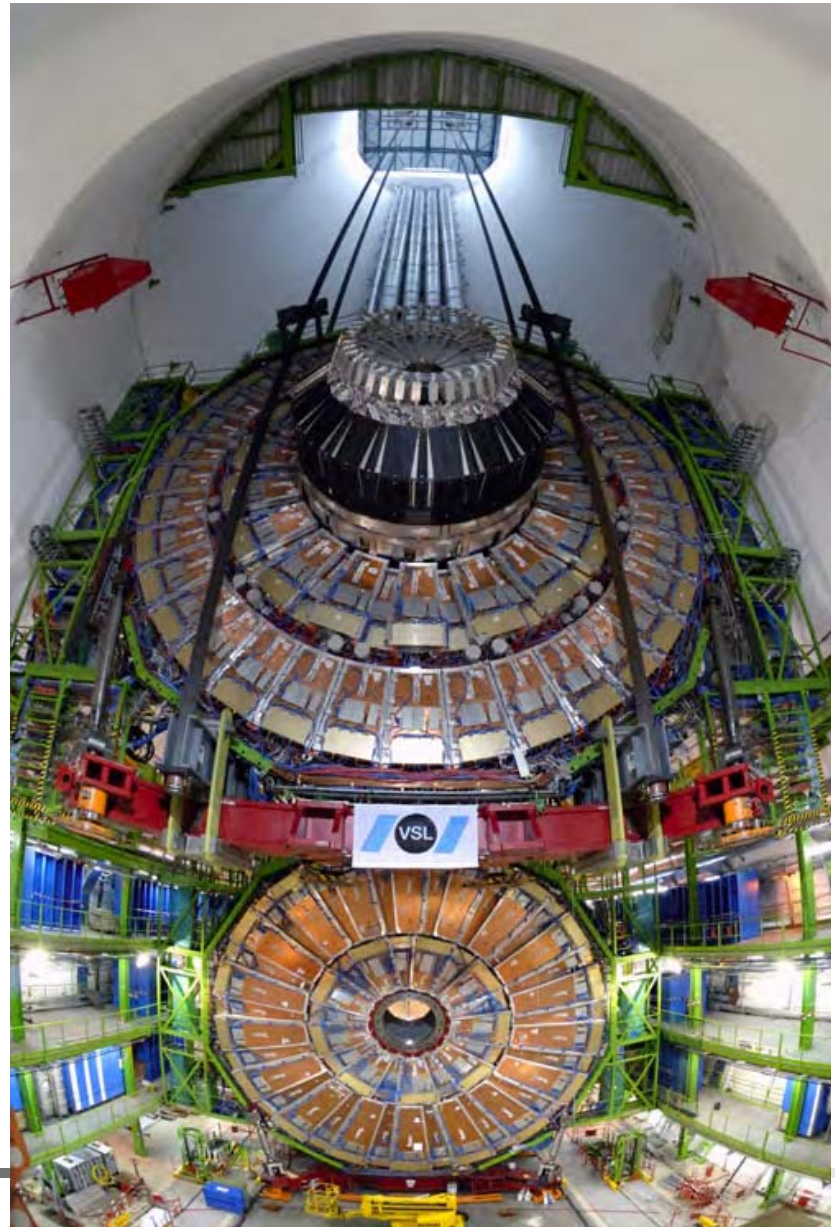
Experiment Cavern



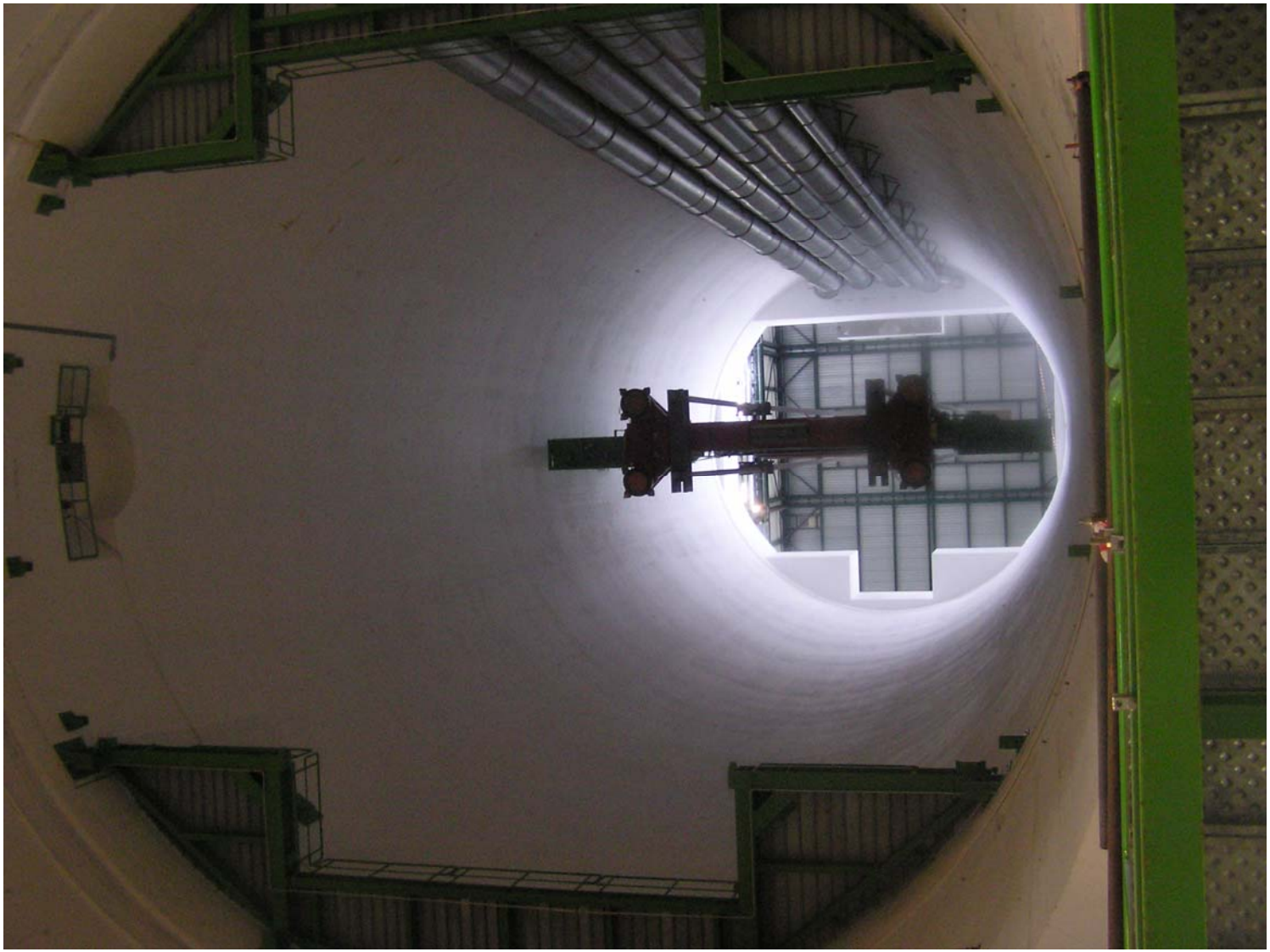
Rotation of Disks



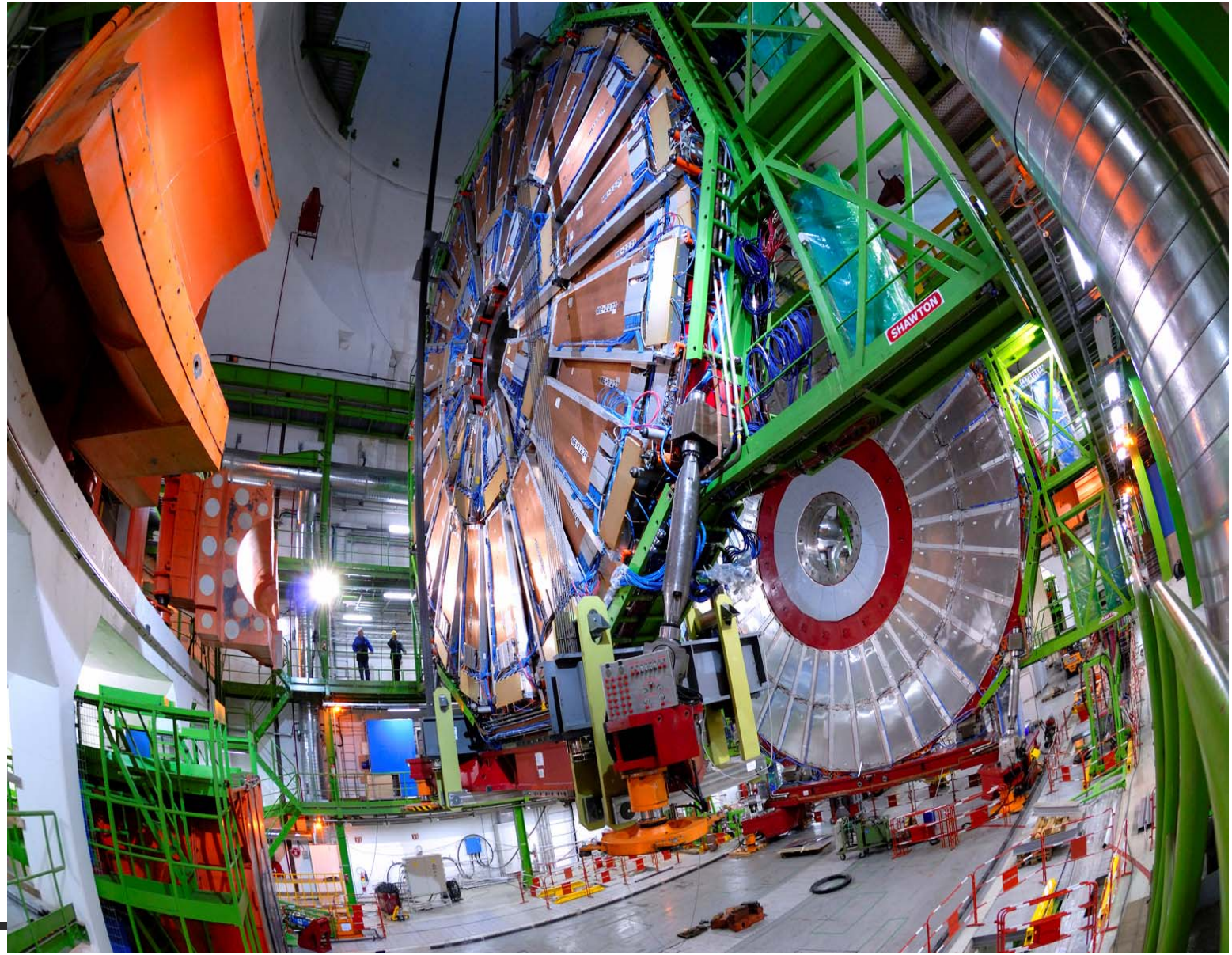
Спуск в шахту



YE-3 from below



Спуск в шахту



Перед проведением работ на дисках

Тесты источников питания в шахте

CSC Status

- **Gas**
  - **All +endcap chambers have final gas**
- **Cooling**
  - **All +endcap chambers have cooling water**
    - About 6-7 bar pressure
    - No leaks
- **Low voltage**
  - **All +endcap LV cabling finished**
  - **5/18 +endcap Maraton LV supplies operational**
  - **Trouble with DCS cable connectors**
- **High voltage**
  - **All +endcap chambers have HV (except one crate)**

CSC: Commissioning

At the surface: Minus Endcap

- Commissioning stopped for the "dance of the Disks"
- Finalize the ME- FED installation in USC

Next:

- Bring the remainder of 234 plus-endcap chambers back online
- Prepare for the commissioning of the minus-endcap chambers
  - As soon as ME- services are ready and stable

ME4/2 Prototype Production

Make a prototype to ensure that:

- chamber material availability (out-of-business vendors, discontinue products,…)

- critical tooling availability (Axiom, Gerber, winding, soldering, tension,…)

- know-how has not been lost (most of the people involved in the production are gone…)

ME4/2 Critical Chamber Material

- FR4 copper-clad skin (5′ x 12′)
- Panels production
- Anode wire fixation bars
- Gap bars
- Anode wire
- Resistors (carbon composite), HV capacitance
- HV connectors
- Al frame extrusion

ME4/2 Tooling Preparation

- Axion machine should be revived in Dec 2007
  Will be tested with old materials for cutting and drilling

- Gerber machine operational
  Check old programs, make strip artwork on the paper

- Winding machine was moved from MP-9 to Lab 6 without disassemb
  Should be good to go, but we need to check

- Soldering machine is expected to be operational, to be checked

ME4/2 Prototype Production Plan

FNAL has no area and manpower for prototype production
MP-9 has a project, Lab 6 also is not available

We propose to split prototype production between FNAL and CERN

FNAL (Lab 8):

- cut and drill panels, mill artwork
- glue anode and gap bars
- wind anode panel
- solder wires
- dry assemble the prototype and ship it to CERN for completion

→ Everything to be done in Lab 8, preliminary agreement received

CERN (ISR Clean room):

- solder component
- electrical tests, tension, wire spacing (tooling is available at CERN)
- clean, assemble, and seal the chamber
- final chamber tests

→ All tooling is available at CERN

ME4/2 Prototype Schedule and Manpower

Manpower:

- Resources for panel production are available at FNAL
- 1 technician (PNPI) will be needed at CERN for 2-3 months
- Need to clean the ISR Clean Room

Schedule:

- Panel cutting, milling - Feb 2008
- Panel winding, soldering - April 2008
- Shipping to CERN - May 2008
- Completion chamber at CERN - summer (2-3 months)

BFKL effects in jet production at CMS

PNPI, Gatchina — V. Kim, V. Murzin, A. Ezhilov, S. Evstyukhin

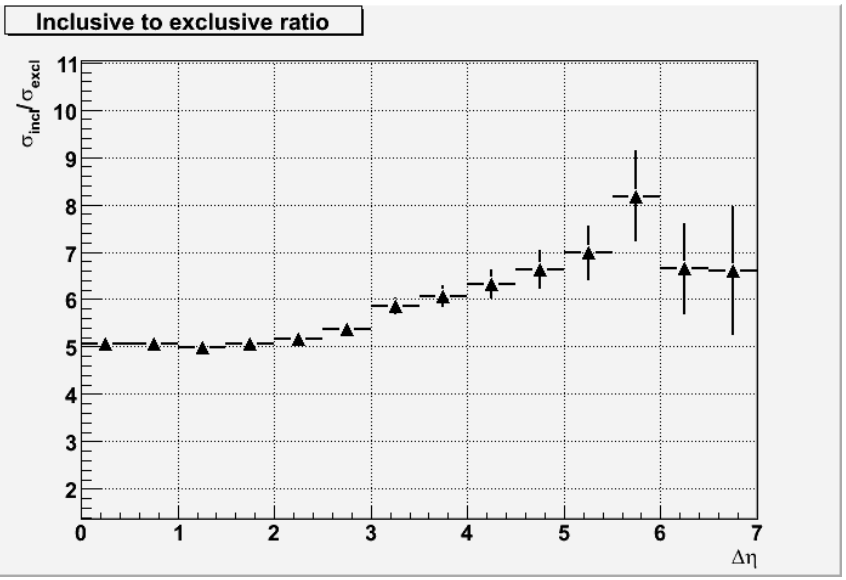
ITEP, Moscow — V. Gavrilov, A. Krokhotin, G. Safronov

INR, Moscow — G. Pivovarov

Search for new QCD effects (BFKL-evolution):

- **It should be a dominant effect at asymptotic energies**
- **Search for new physics: graviton, extra dimensions, etc.**

Dijet k-factor = inclusive dijet / "exclusive" dijet at CMS:



L = 0.02 Fb^{-1}

dijets: $E_\perp$ > 60 GeV

Development of MC event generator ULYSSES with BFKL-evolution
Reconstruction & trigger within CMS SW

Jets in hard diffraction in CMS&TOTEM

PNPI, Gatchina **V. Kim, V. Oreshkin**

INFN, Genova F.Ferro, M. Macri

INR, Moscow G. Pivovarov

- **Parton structure of Pomeron**
- **Background at search for new physics: new resonances, Higgs, etc.**

Development of MC event generator GoZo
Reconstruction and trigger within CMS SW

Планы на 2008 год

- **Участие в подготовке Мюонной системы CMS к проведению физических измерений. Участие в измерительных сеансах.**

- **Освоение программного обеспечения эксперимента CMS. Подготовка к анализу экспериментальных данных.**