

Large Hadron Collider

Nobel Prize 1985 for decisive contributions to the large project which discovered the W, Z boson at the UA1 experiment, CERN SPS.

Carlo Rubbia Director General of CERN 1989-1994

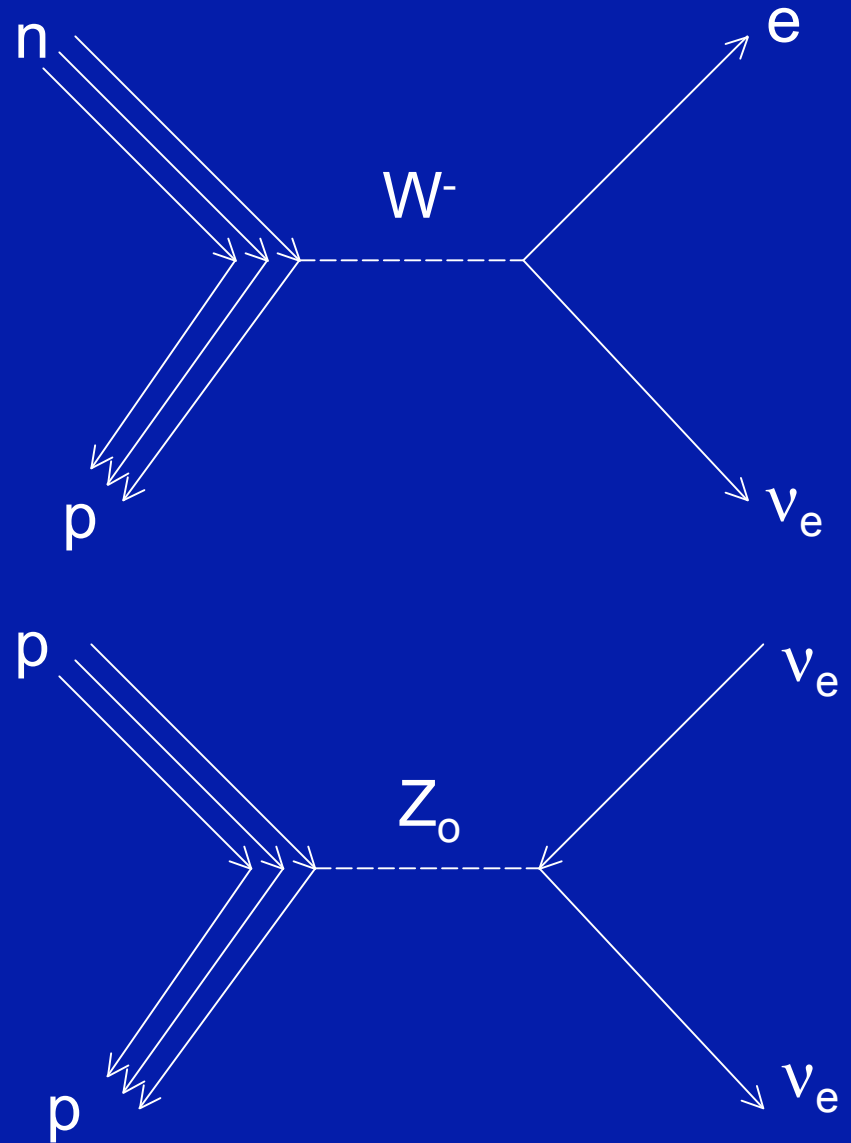
At the end of 1991 Carlo Rubbia has been given the o.k to the project LHC (Large Hadron Collider), the new super accelerator to develop power or millions of electron volts. According to the policy of Chinese boxes, LHC has been inserted into the same tunnel of LEP to improve the performances and the voltage to let Europe earn time and money, before the Americans that still have to build their SSC.



- **Superconducting accelerator and collider in the LEP tunnel**
 - **LEP**
 - **Constructed 1984-89**
 - **Operated 1989-2000**
 - **Dismantled 2001/2002**
 - **LHC**
 - **Civil engineering and preparation of tunnel 1998-2005**
 - **Installation 2003-2007**
 - **Commissioning 2008**

Weak Interaction

Fermi Theory
Beta decay
1950's



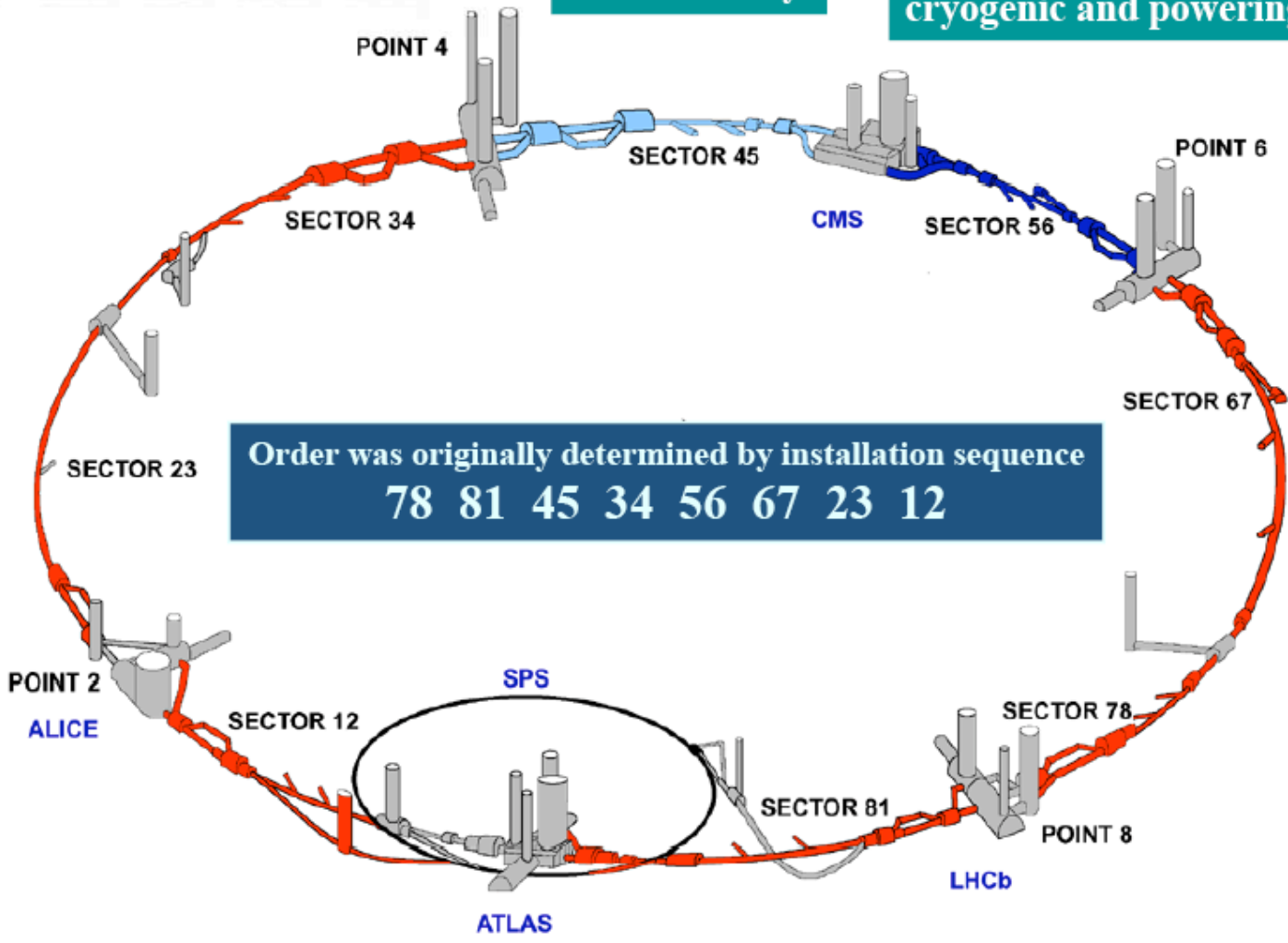
LHC at CERN



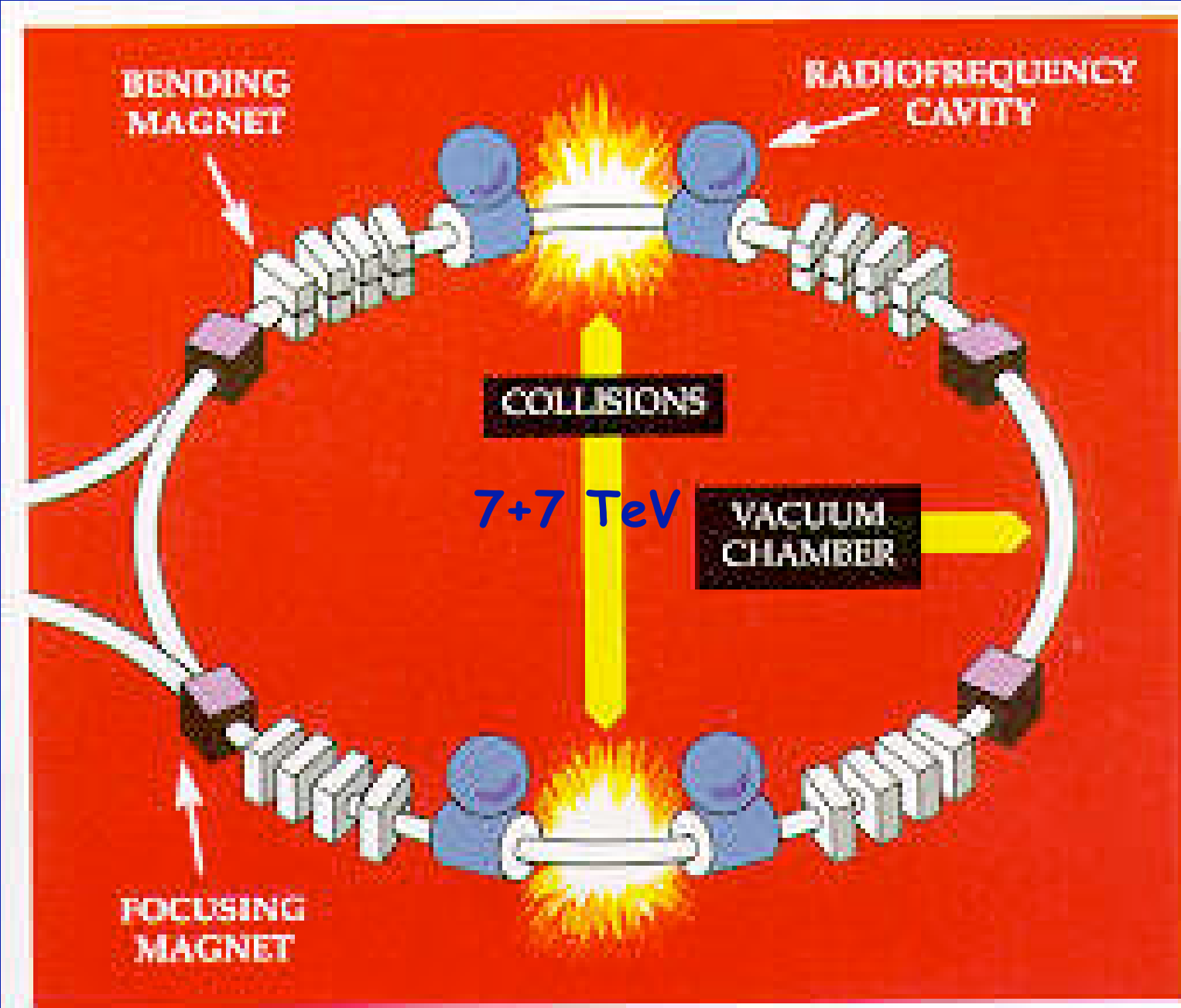


Picture today

8 distinct sectors for cryogenic and powering

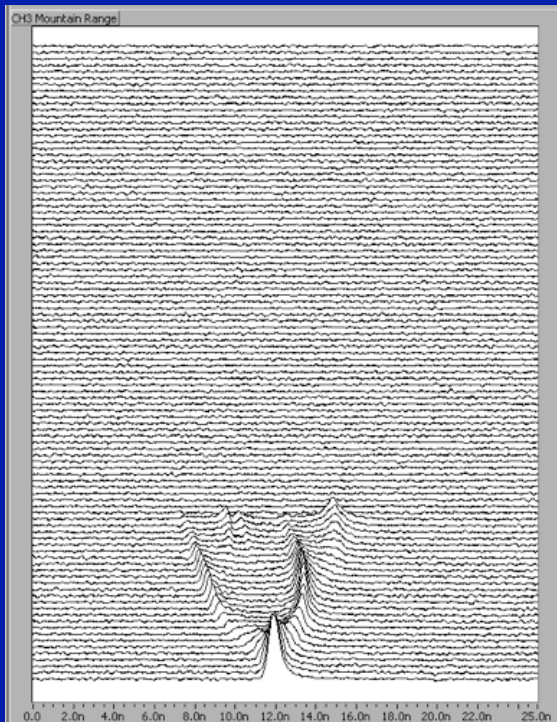


Order was originally determined by installation sequence
78 81 45 34 56 67 23 12

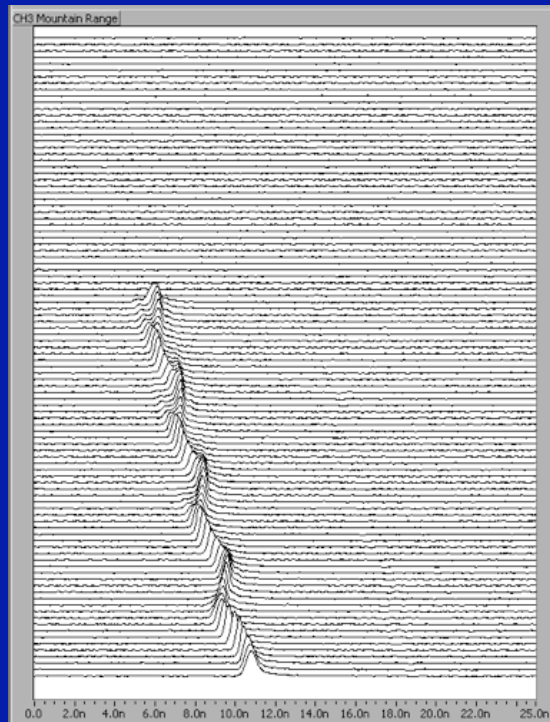


First Beam Circulation w RF Phasing

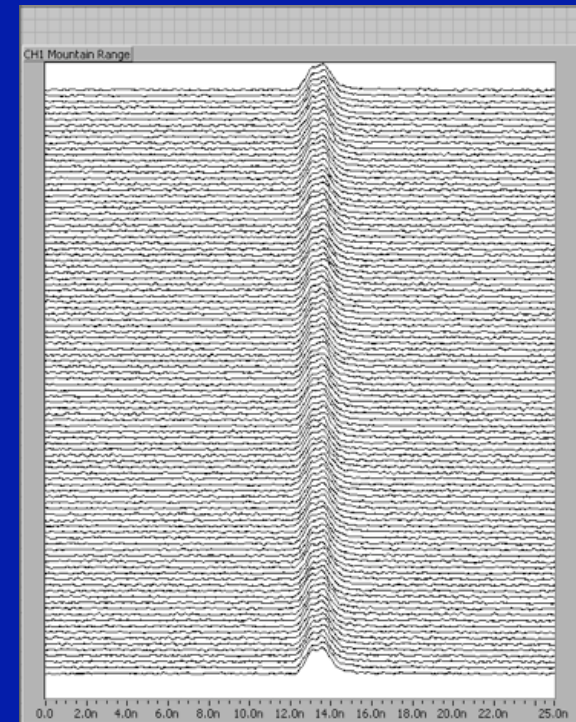
Poor injection phasing



Near injection phasing

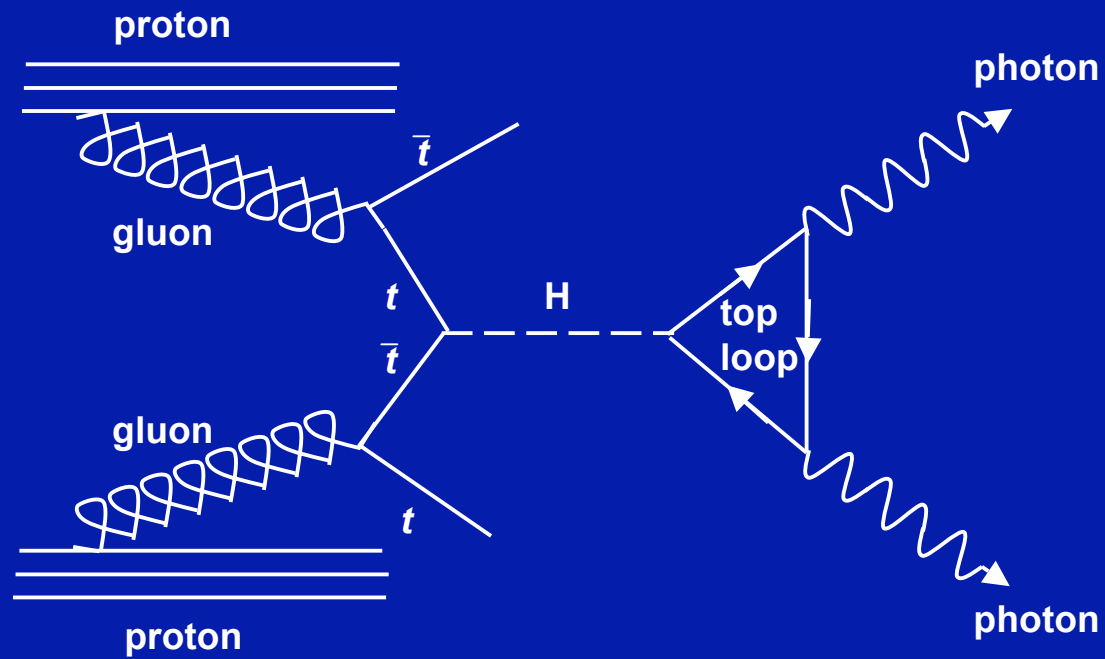


Injection phasing



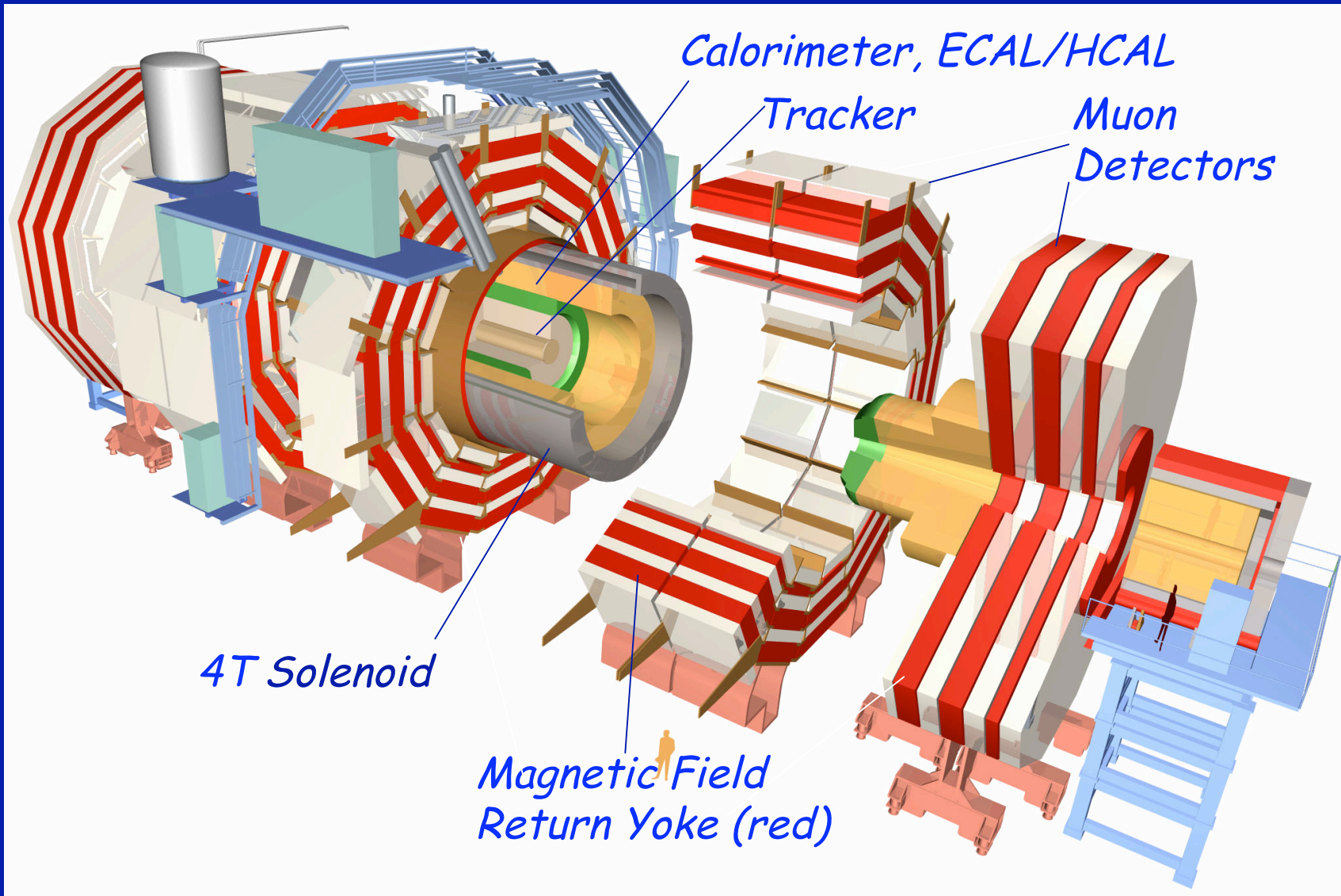
Accelerator Physicist at work.
Each trace indicates the position after on turn.

Higgs $\rightarrow \gamma\gamma$ Production

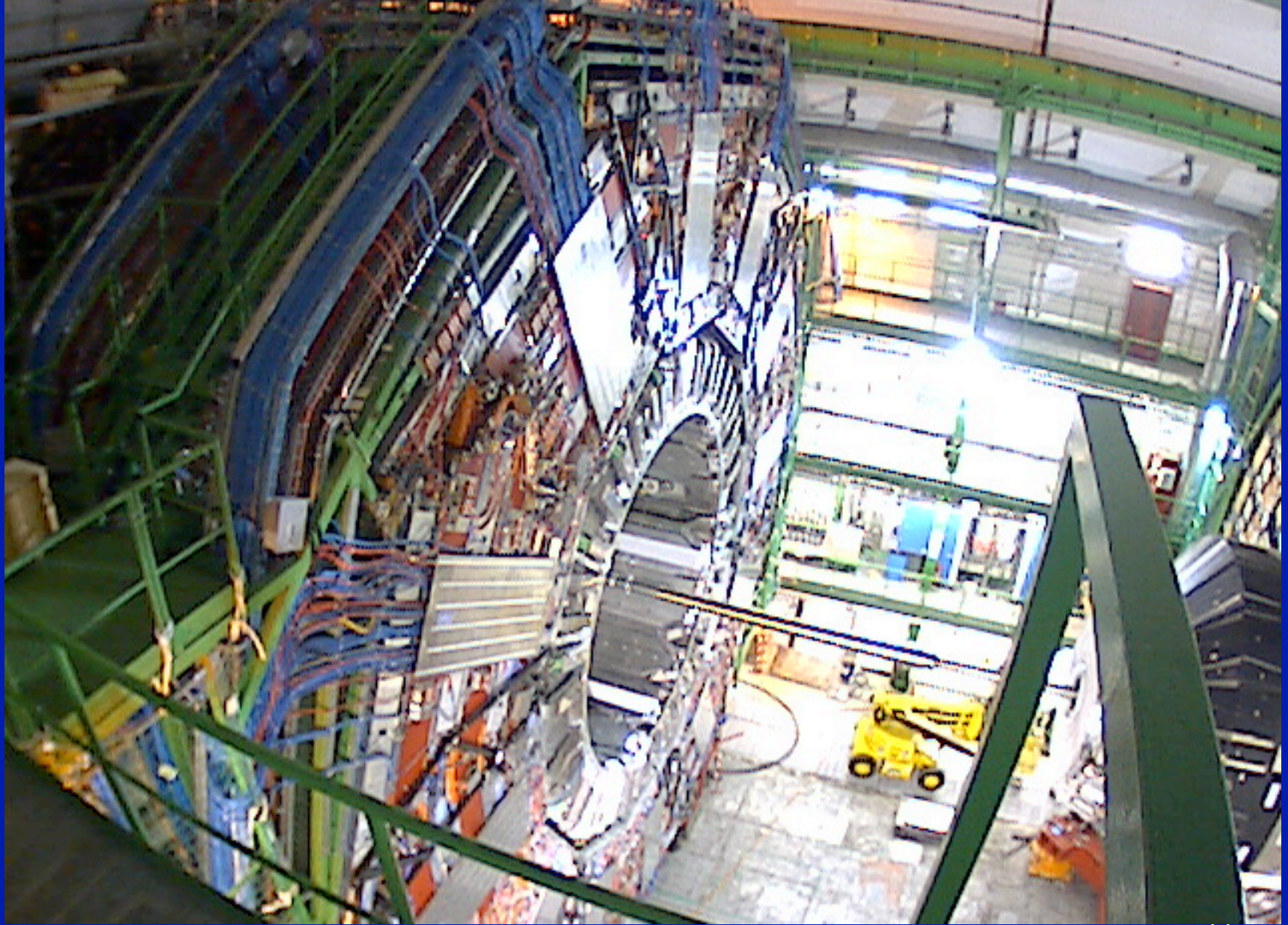


$$m_H^2 = (P_{r1} + P_{r2})^2 = 2(E_{r1}E_{r2} - \vec{p}_{r1} \cdot \vec{p}_{r2})$$

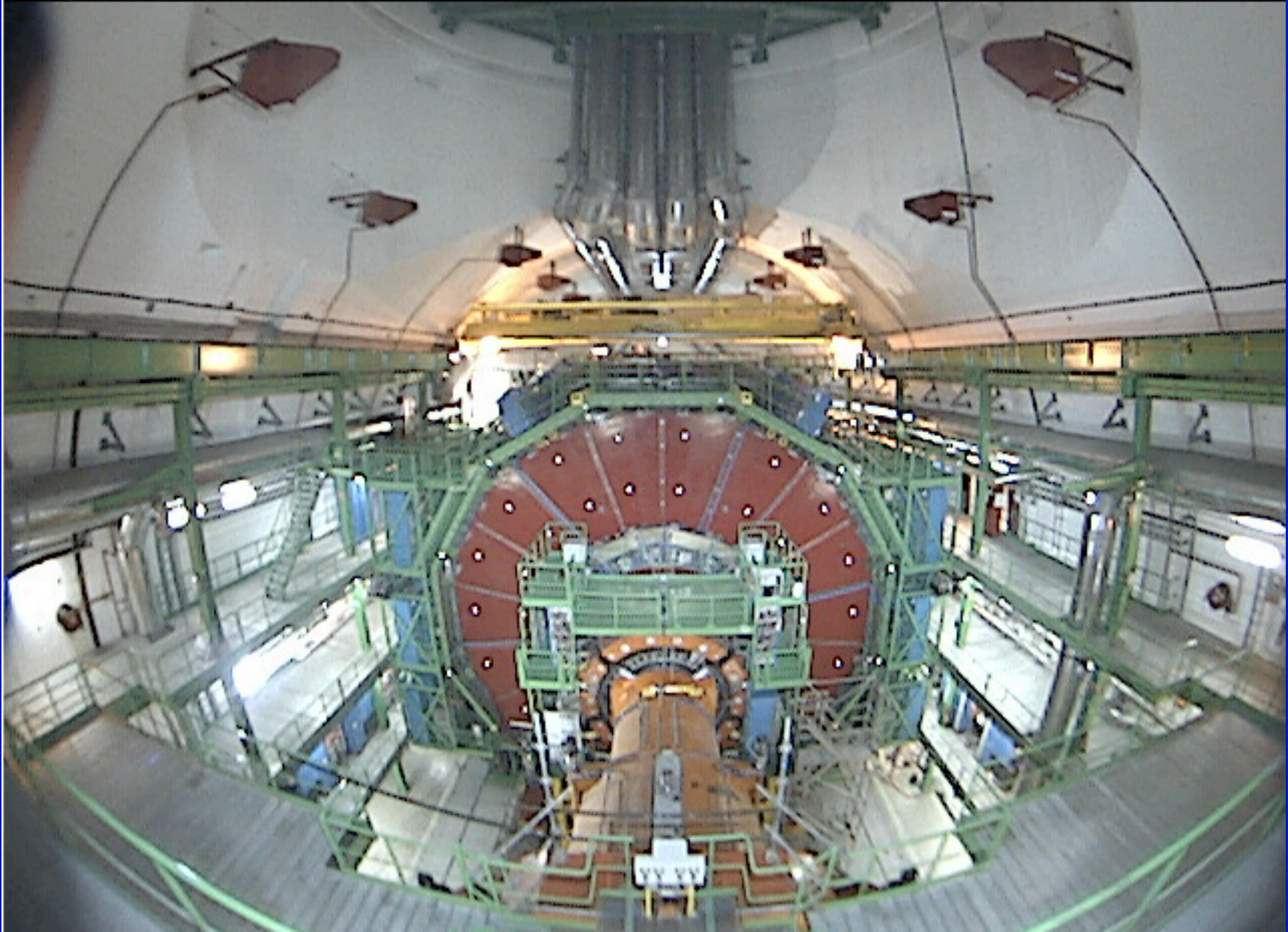
CMS Detector



cmseyel 0 08/21 /2008 20:57:33



cmseye07 2008-10-09 17:46:31



QuarkNet

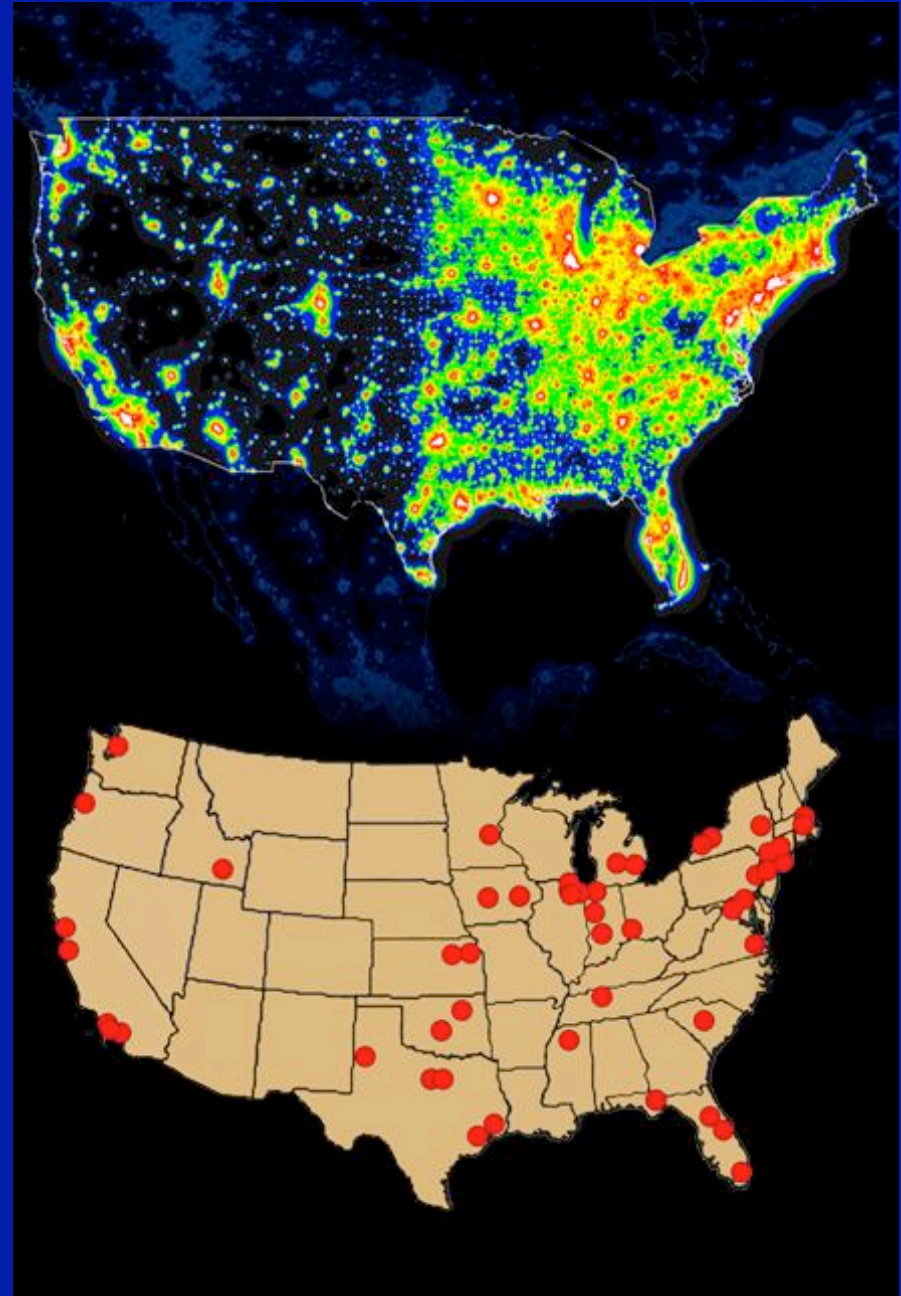
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Energy Amplifier - Rubbia

