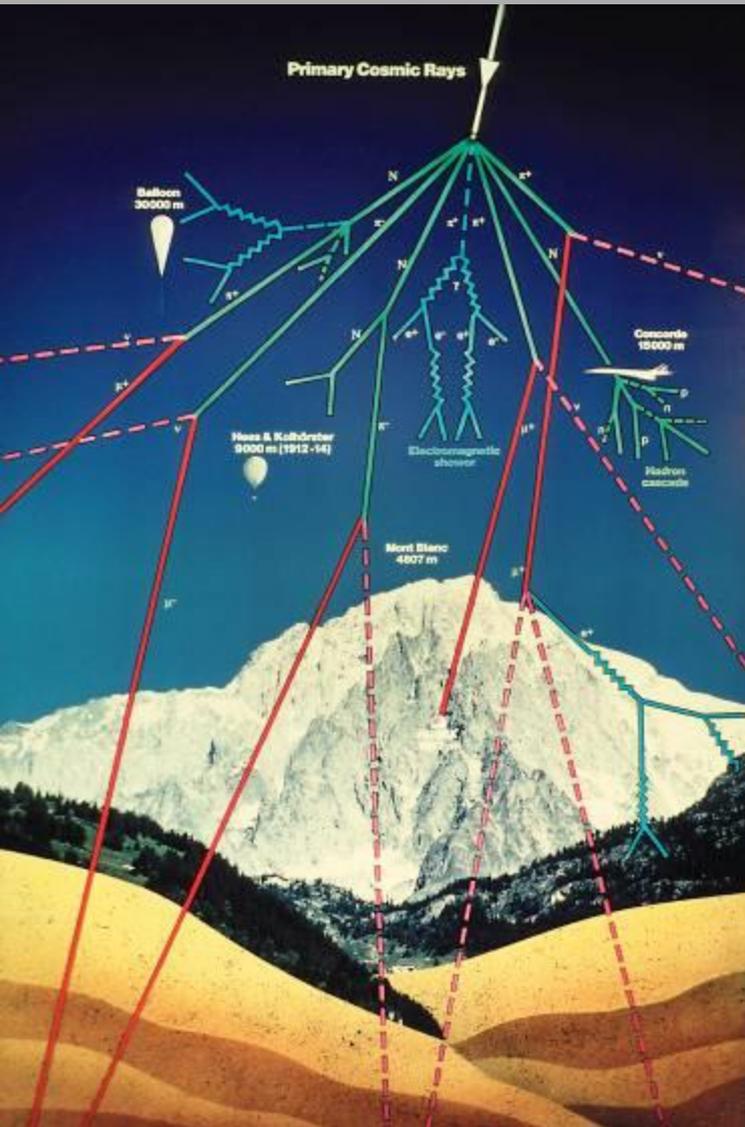


An aerial photograph of a vast valley, likely the Jura region in Switzerland, with a red circle highlighting the area where the CERN particle accelerator is located. In the background, there are snow-capped mountains under a clear blue sky. The text is overlaid on the image.

# CERN a European Collaborative Project and a Centre for Particle Physics

Torsten Åkesson

# From cosmic rays ... to CERN



“Über Beobachtungen der durchdringenden Strahlung bei sieben Freiballonfahrten“ (Hess, 1912).



CERN was established to study these particles.

# Particle Physics

**The fundamental principles governing our world; forces and basic constituents. The conceptual picture is quantified by mathematically formulated theories (before called Laws of Nature).**

**Evolves through experiments, development of theories and models. Today's theory is the Standard Model which has an exceptional predictive power, but is incomplete.**

**We explore the predictions of the Standard Model and seek a more complete understanding, i.e. Beyond the Standard Model.**

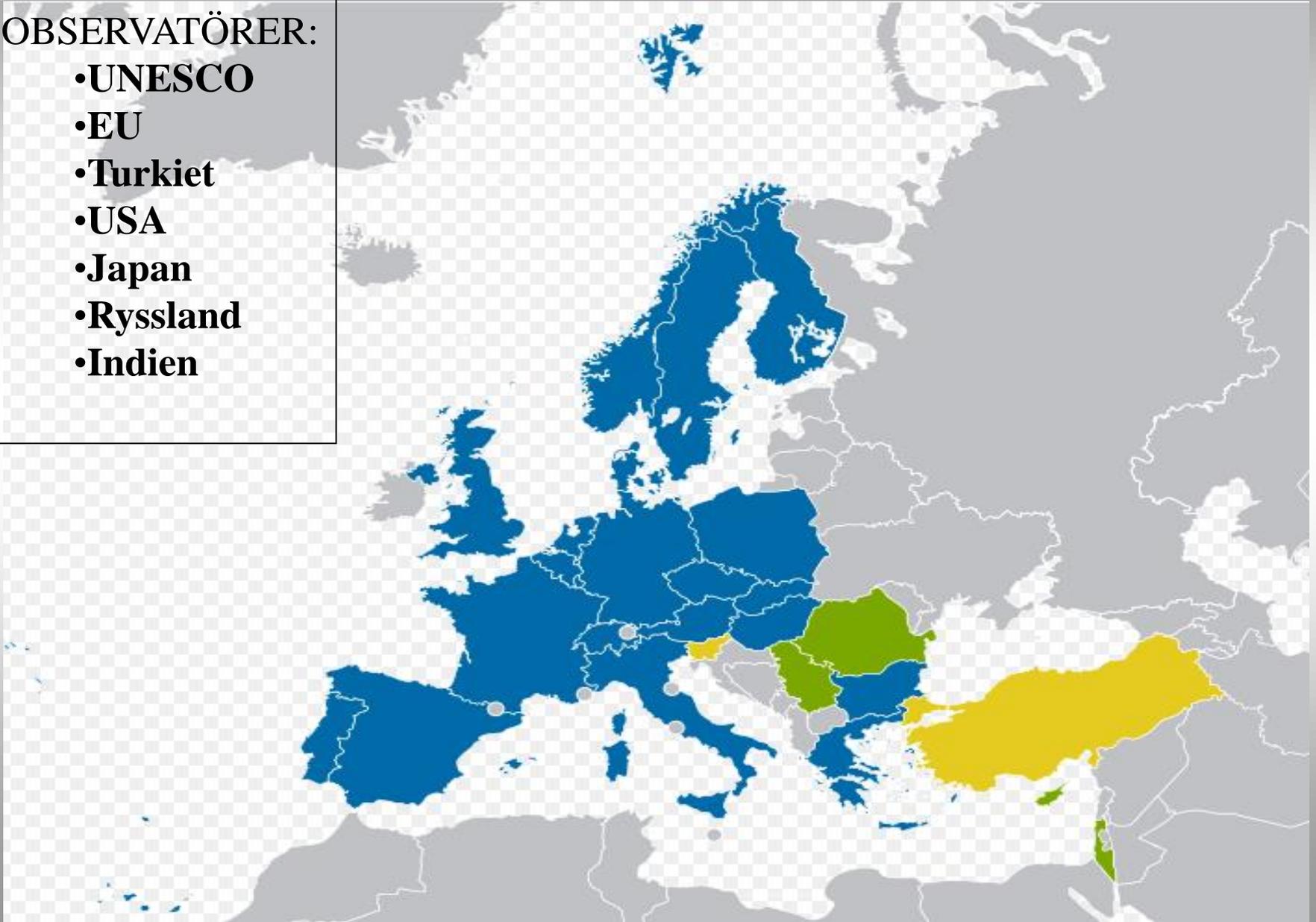
# Convention

- ◆ **1954: An International Organization with two related missions:**
  - ◆ *Construction and operation of laboratories for research with high energy particles including cosmic rays*
    - ◆ *Particle Accelerators*
    - ◆ *Auxilliary equipment*
  - ◆ *Organization and sponsring of international collaboration in the field, including outside the CERN laboratories*
    - ◆ *Theoretical research;*
    - ◆ *Contacts among researchers, exchange and training*
    - ◆ *Collaborate with, and advice, other research institutions*
    - ◆ *Research with cosmic rays*

# Member States

## OBSERVATÖRER:

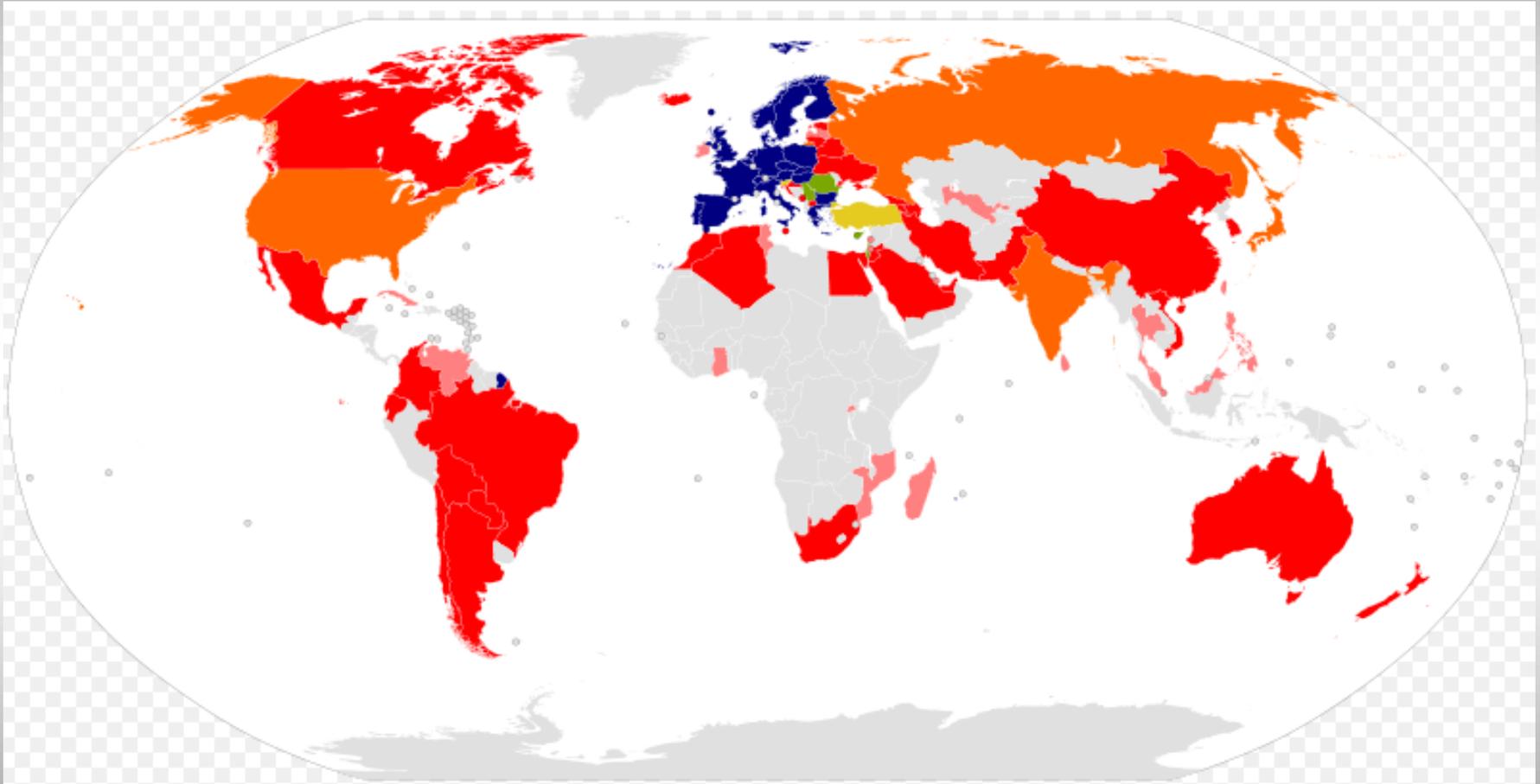
- UNESCO
- EU
- Turkiet
- USA
- Japan
- Ryssland
- Indien



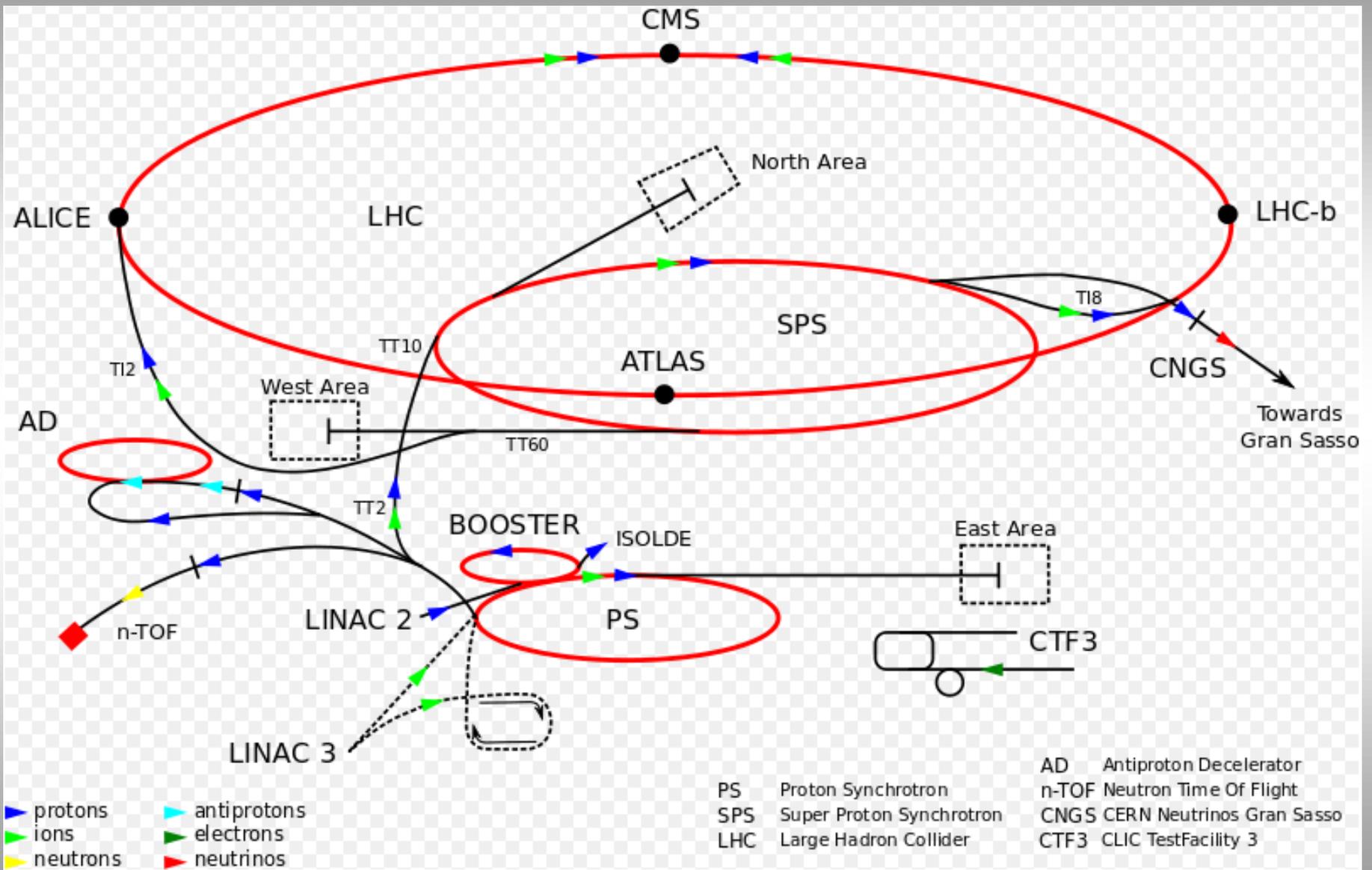
# Resources

- ◆ **Annual budget ~ 8,2 miljarder kronor**
  - ◆ Sweden ~ 208 miljoner kronor
- ◆ **Employees: ~ 2'400 + 1'500 part time**

# 10'000 researchers use CERN: 50% of the world Particle Physicists

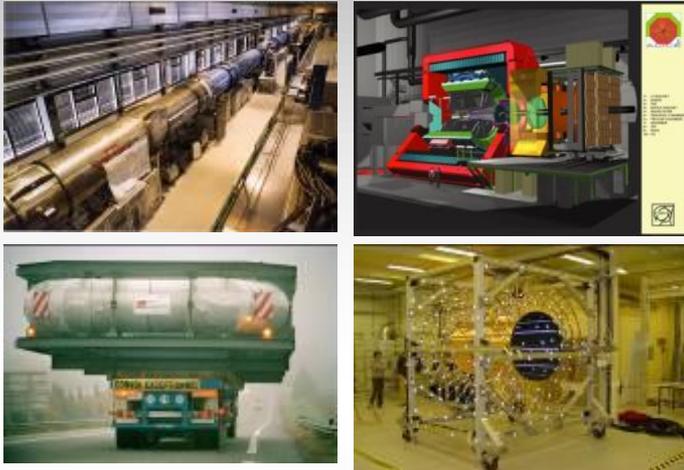


# Infra Structure



# Different activities at CERN

## Large Hadron Collider



## Accelerator R&D



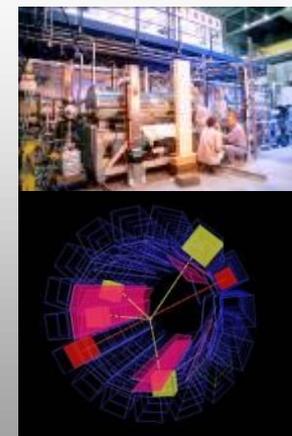
## Theoretical Physics



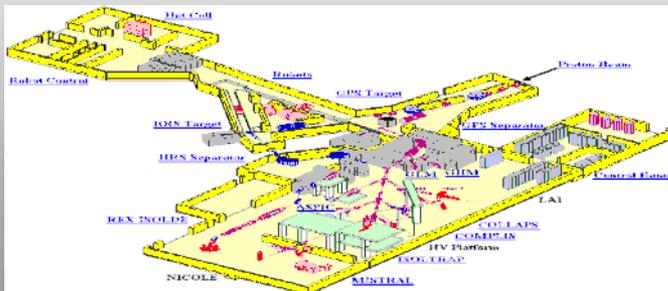
## Grid computing



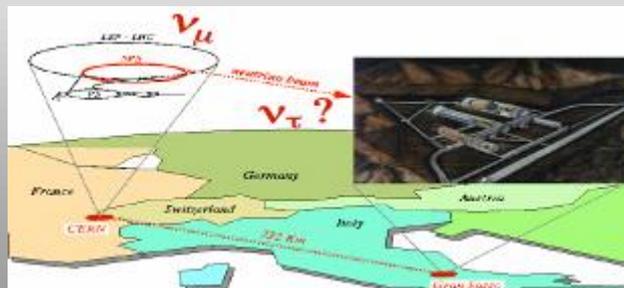
## Forskning med antimateria



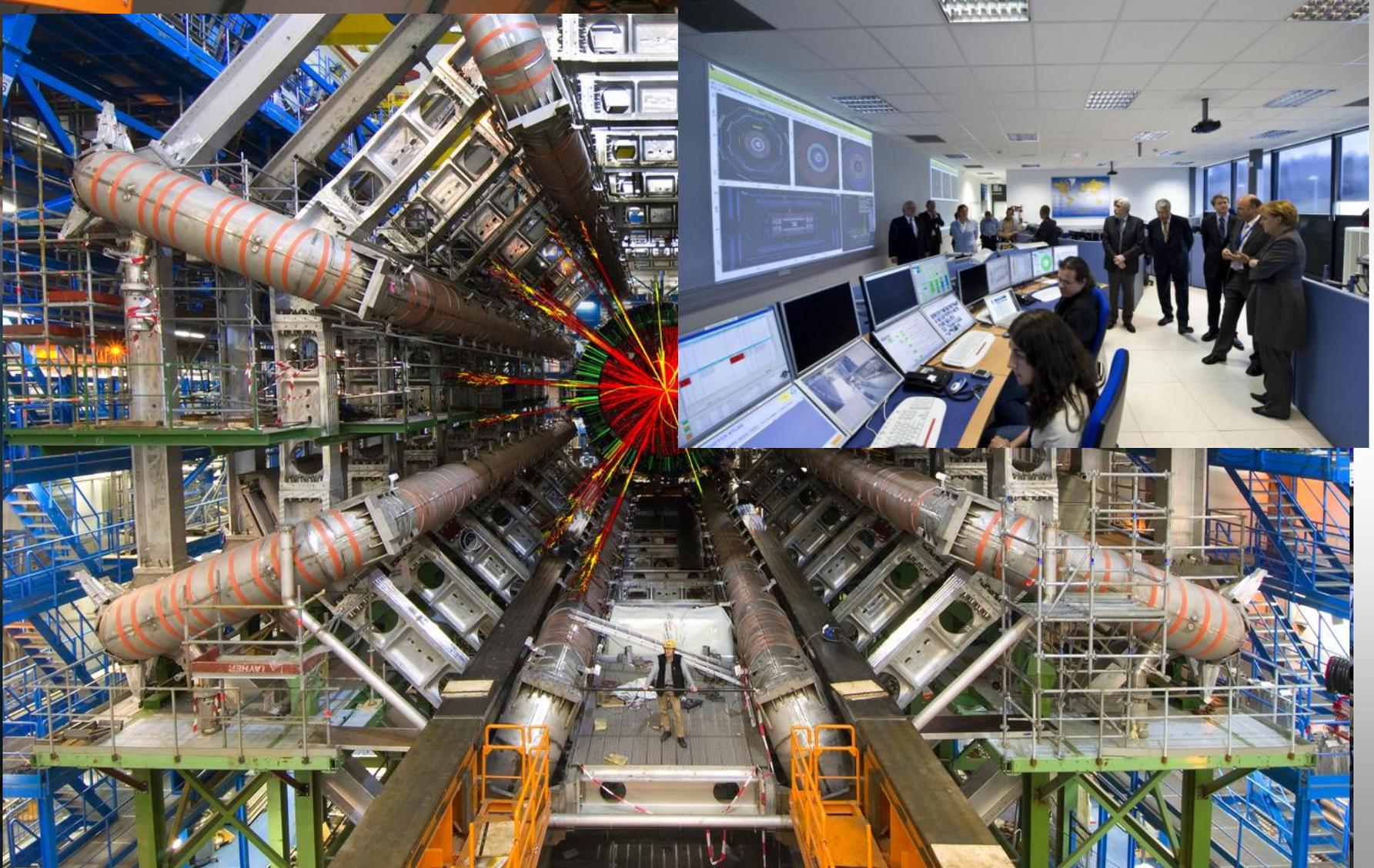
## Beams with radioactive ions



## Neutrino beam

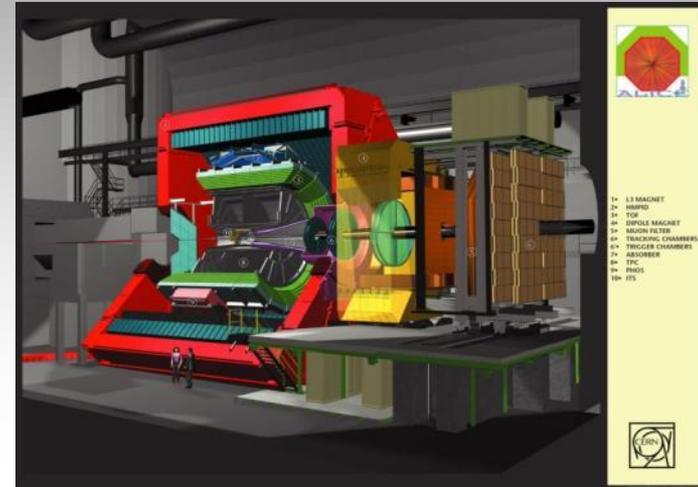


# Accelerators supplied by CERN and experiments by research groups at Universities/Research Councils & CERN



# Collaborations: Experiments at CERN

- ◆ Research groups with common scientific interest creates and operates experiments
  - ◆ 3'000 forskare
  - ◆ 50 länder
- ◆ CERN is legal entity fo the experiments
- ◆ Use CERN administrative infrastructure
- ◆ Formalized between CERN and the Research Councils



# An Experiment

## Global network for collaboration among scientists

Utvecklar, bygger utrustning som transporteras till CERN

