Welcome – 환영합니다

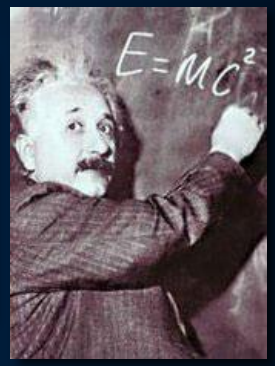
Korean High School Teachers

to Accelerating Science and Innovation

The Mission of CERN

- **Push forward** the frontiers of knowledge

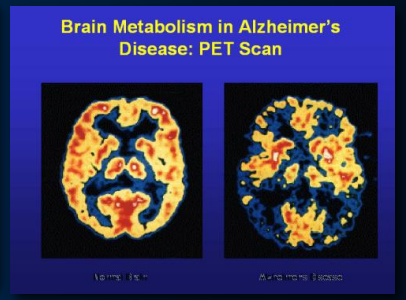
  E.g. the secrets of the Big Bang ... what was the matter like within the first moments of the Universe's existence?



- **Develop** new technologies for accelerators and detectors

  Information technology

  Medicine - diagnosis and therapy



- **Train** scientists and engineers of tomorrow

- **Unite** people from different countries and cultures

CERN was founded 1954: 12 European States

"Science for Peace"

Today: 20 Member States

~ 2300 staff
~ 790 other paid personnel
> 10000 users

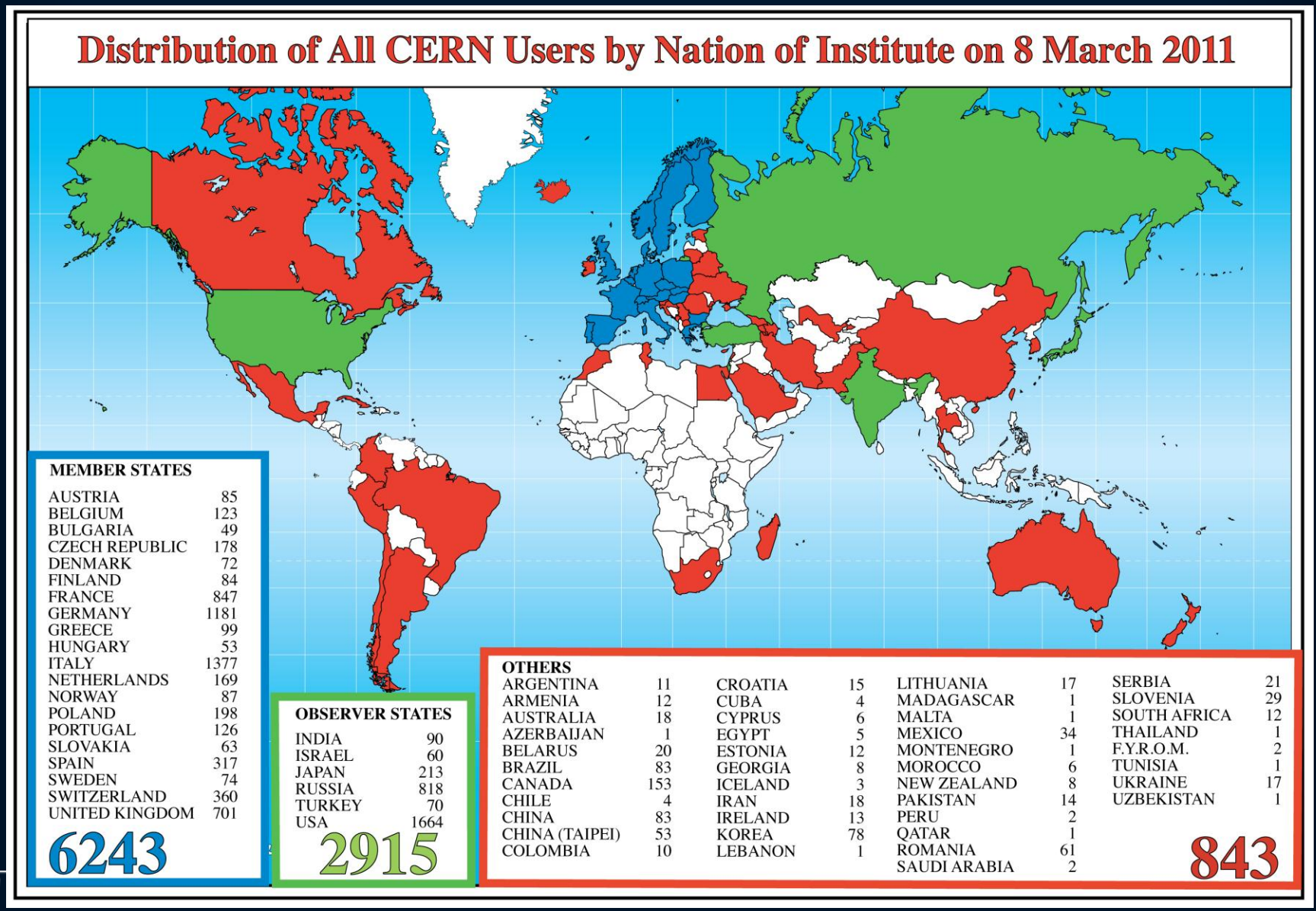
Budget (2011) ~1000 MCHF

20 Member States: Austria, Belgium, Bulgaria, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Italy, Netherlands, Norway, Poland, Portugal, Slovakia, Spain, Sweden, Switzerland and the United Kingdom

1 Candidate for Accession: Romania

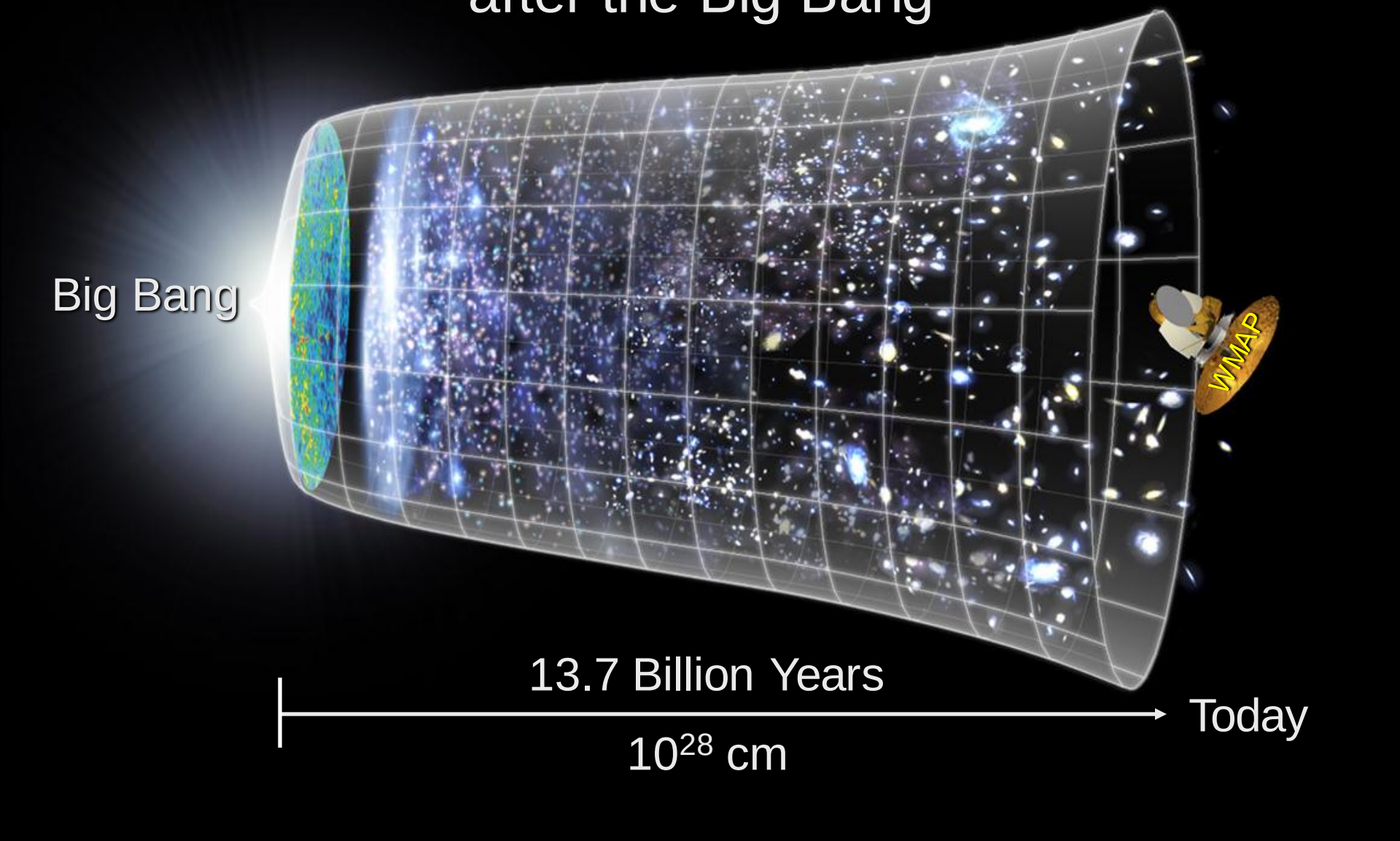
8 Observers to Council: India, Israel, Japan, the Russian Federation, the United States of America, Turkey, the European Commission and UNESCO

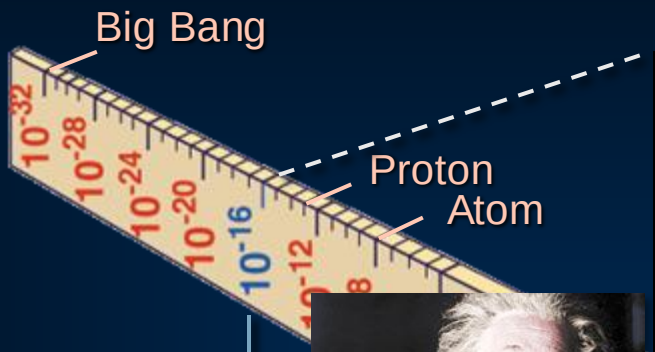
Science is getting more and more global

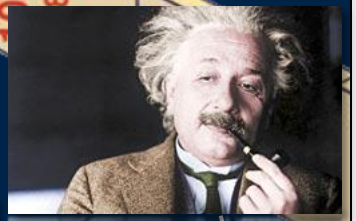


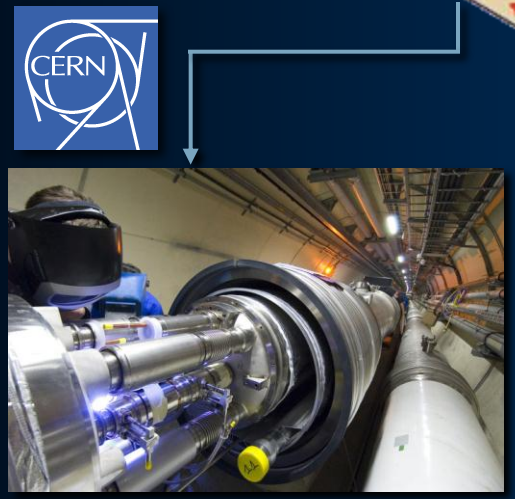
Next Scientific Challenge:

to understand the very first moments of our Universe after the Big Bang



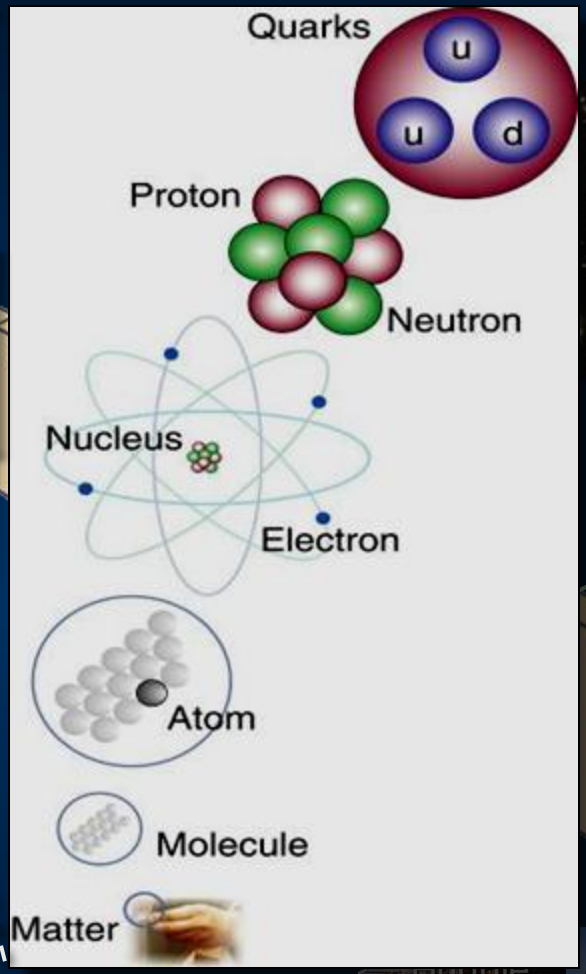


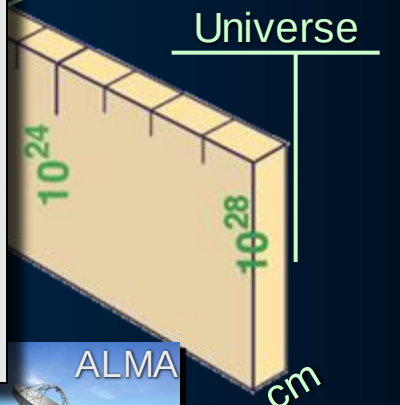


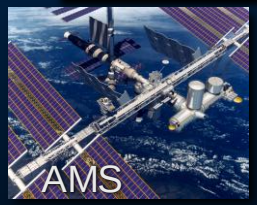


LHC

Super-Microscope

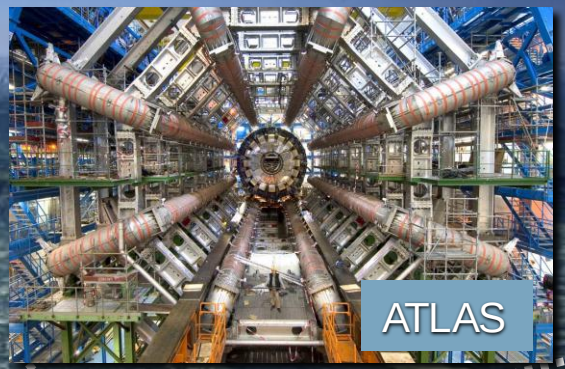


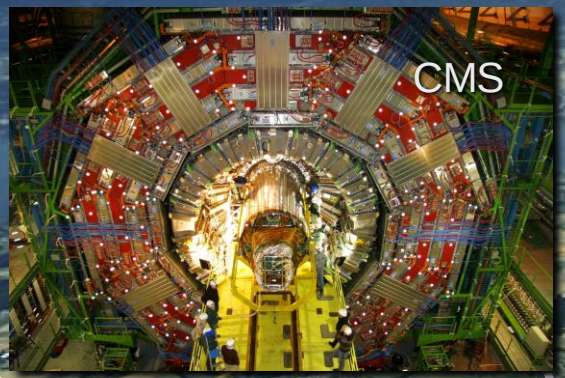




Study physics laws of first moments after Big Bang
increasing Symbiosis between Particle Physics,
Astrophysics and Cosmology

a New Era in Fundamental Science

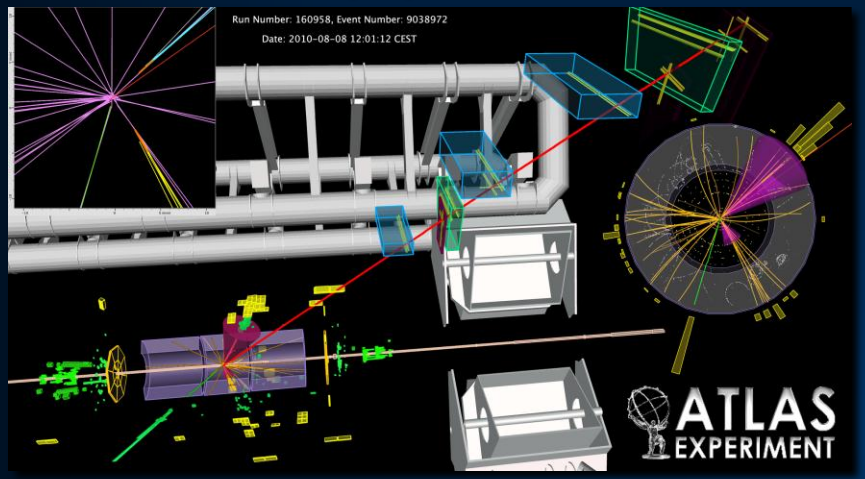


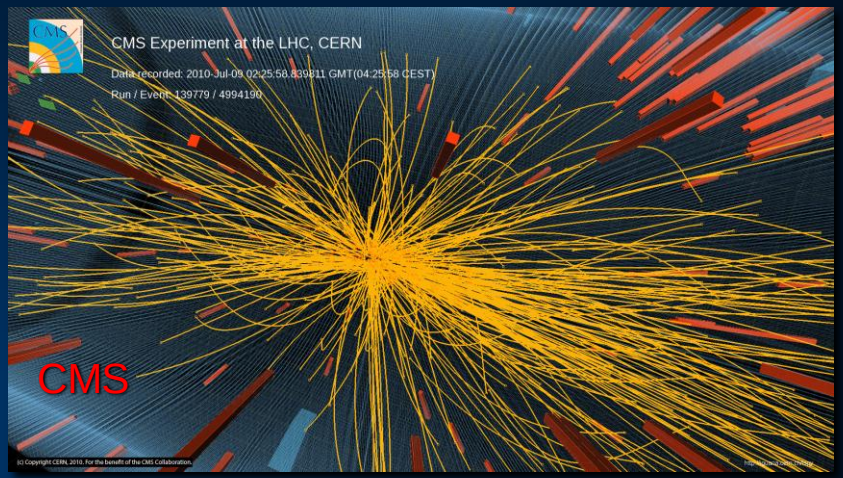


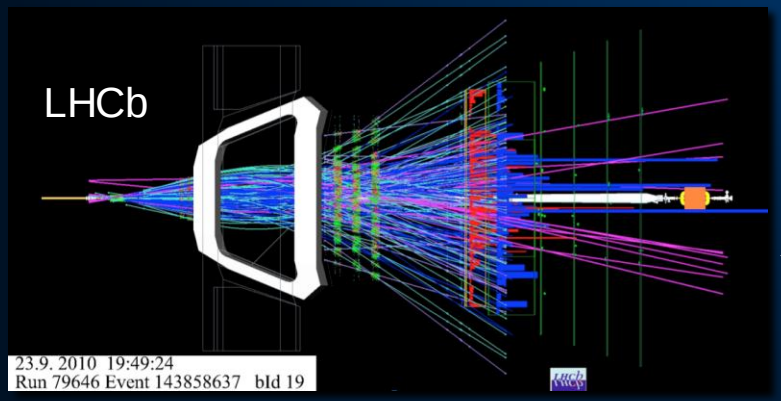
Exploration of a new energy frontier
in p-p and Pb-Pb collisions

LHC + Experiments: spectacular start-up in 2010

First p-p collisions at √s = 7 TeV on 30 March 2010







First Pb-Pb collisions at √s = 2.76TeV/N on 7 Nov 2010

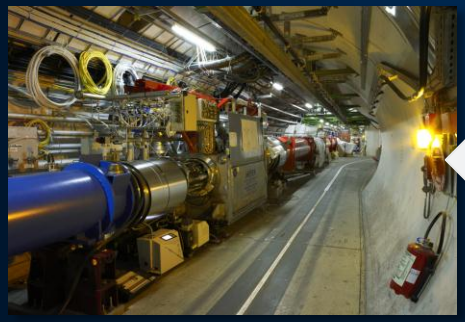
→ Brilliant performances of LHC, experiments and GRID computing

→ 1st collisions in 2011 on 13 March

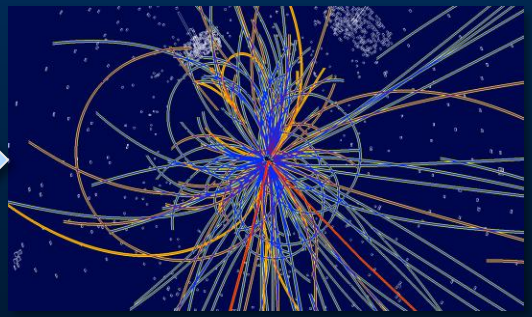
CERN: Particle Physics and Innovation

- Interfacing between fundamental science and key technological developments

- CERN Technologies and Innovation



Accelerating particle beams



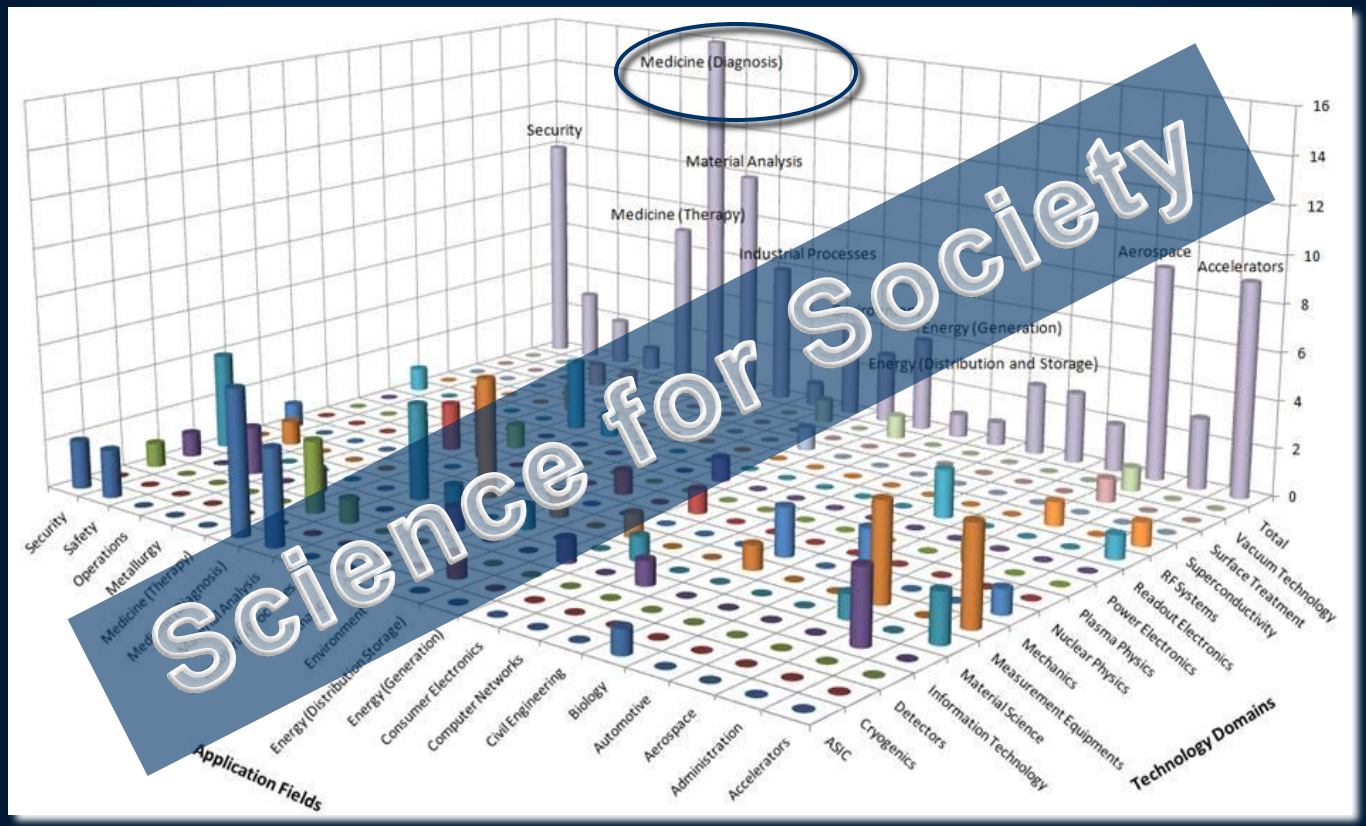
Detecting particles

Large-scale computing (Grid)

Innovation Education
CERN
uniting people
Research

CERN Technologies and Innovation

Cutting edge Research Infrastructures play a key role in a knowledge driven society

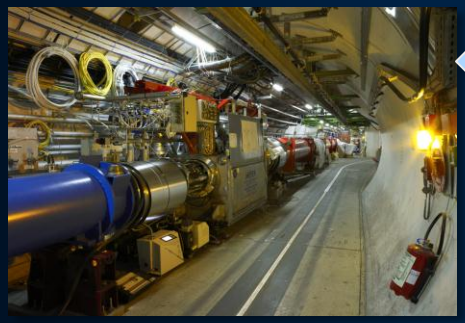


Knowledge is − and will be more and more − the most precious resource for a sustainable development

CERN Technologies and Innovation

Example: Medical applications

Combining Physics, ICT, Biology and Medicine to fight cancer

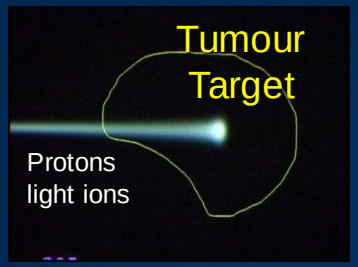


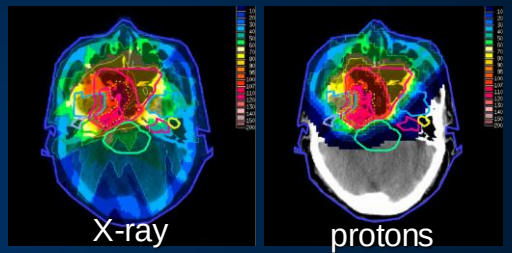
Accelerating particle beams

~30'000 accelerators worldwide

~17'000 used for medicine

Hadron Therapy

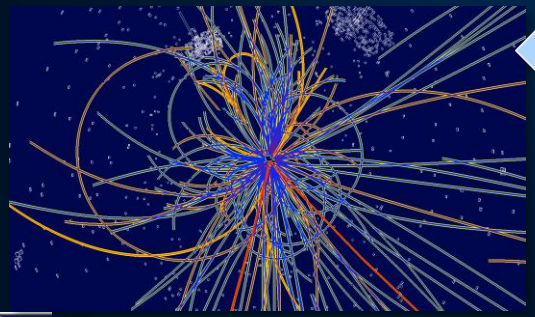




Leadership in Ion Beam Therapy now in Europe and Japan

>70'000 patients treated worldwide (30 facilities)

>21'000 patients treated in Europe (9 facilities)

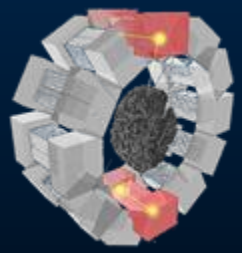


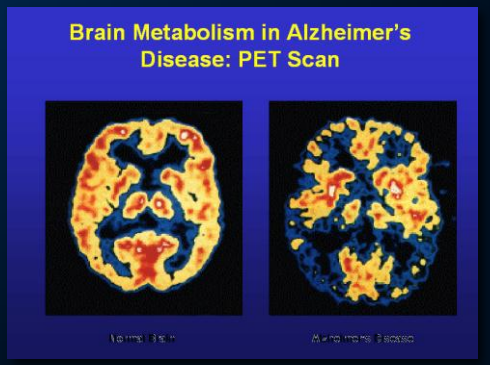
Detecting particles

Imaging

Clinical trial in Portugal for new breast imaging system (ClearPEM)

PET Scanner





CERN Education Activities

Scientists at CERN
Academic Training Programme

Young Researchers
CERN School of High Energy Physics
CERN School of Computing
CERN Accelerator School

Physics Students
Summer Students Programme

CERN Teacher Schools
International and National Programmes

Korea and CERN

First contacts between CERN and the Government of the Republic of Korea were established more than a decade ago

Since 1997 involvement in the LHC experiments ALICE and CMS

ALICE

4 Institutes

Kangnung National Univ.
Pusan National University
Sejong University
Yonsei University

Total :
~ 30 Participants
including ~20 students

CMS

6 Institutes

Chunnam National University
Kangwon National University
Korea University
Kyungpook National University
Sungkyunkwan University
University of Seoul

Total :
~ 55 Participants
including ~ 30 students

Contributions to detector construction, commissioning, data analysis, Grid Computing

Other activities

- NA61(SHINE) and Opera experiments
- ISOLDE-KoRIA Collaboration
- Collaboration with **CERN Theory group** on LHC physics and training of young scientists

Thank You!

매우 감사합니다!