



Aram Santogidis
<aram.santogidis@cern.ch>

Athanasios Topaloudis
<athanasios.Topaloudis@cern.ch>

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Lazaros Lazaridis
<lazaros.lazaridis@cern.ch>

Andreas Alexopoulos
<a.alexopoulos@cern.ch>

CERN

What is it ?



Conseil Européen pour la Recherche Nucléaire European Organization for Nuclear Research

What is the universe made of?
How did it start?

Physicists at CERN are seeking answers,
using some of the world's most powerful
particle accelerators



CERN

Who is it ?



The twenty two Member States of CERN

Member States (date of accession)

- | | |
|---|--------------------------|
|  | Austria (1959) |
|  | Belgium (1953) |
|  | Bulgaria (1999) |
|  | Czech Republic (1993) |
|  | Denmark (1953) |
|  | Finland (1991) |
|  | France (1953) |
|  | Germany (1953) |
|  | Greece (1953) |
|  | Hungary (1992) |
|  | Israel (2014) |
|  | Italy (1953) |
|  | Netherlands (1953) |
|  | Norway (1953) |
|  | Poland (1991) |
|  | Portugal (1986) |
|  | Romania (2016) |
|  | Slovakia (1993) |
|  | Spain (1981-1986, 1983-) |
|  | Sweden (1953) |
|  | Switzerland (1953) |
|  | United Kingdom (1953) |

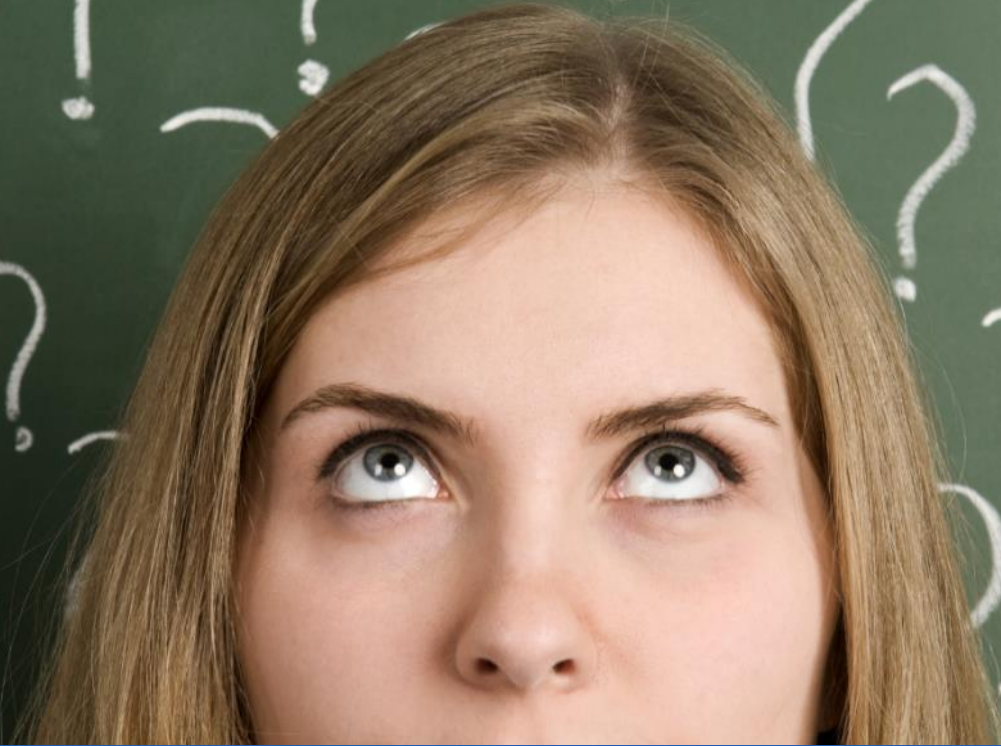


CERN

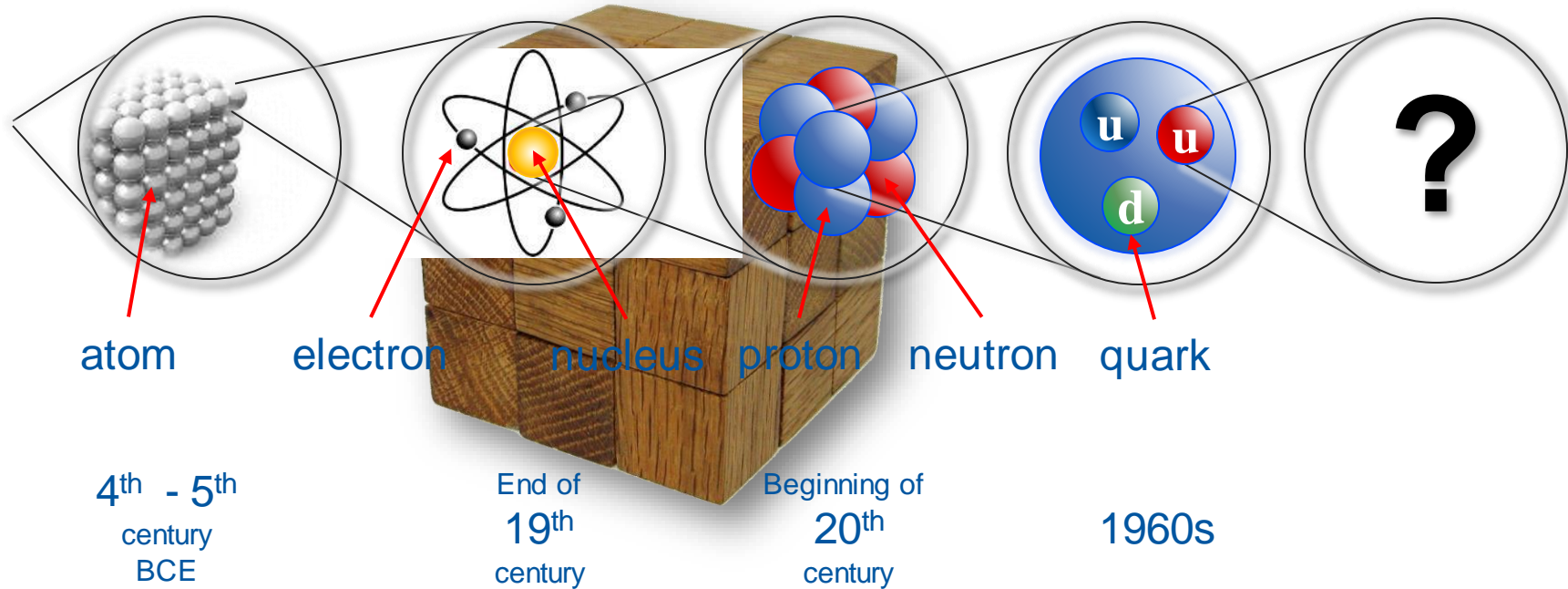
What for ?



Fundamental research



What is the matter made of ?



Answering questions...



Higgs

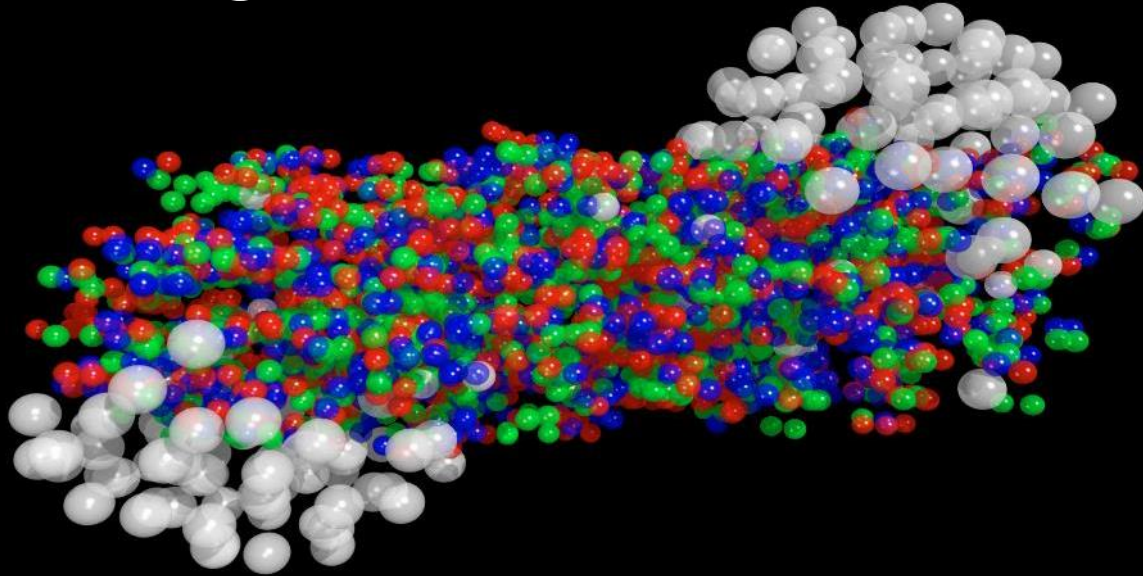
Higgs ?

Answering questions...



Antimatter ?

Answering questions...



Quark-gluon plasma ?

Answering questions...

Dark matter ?

Collaborate



Educate

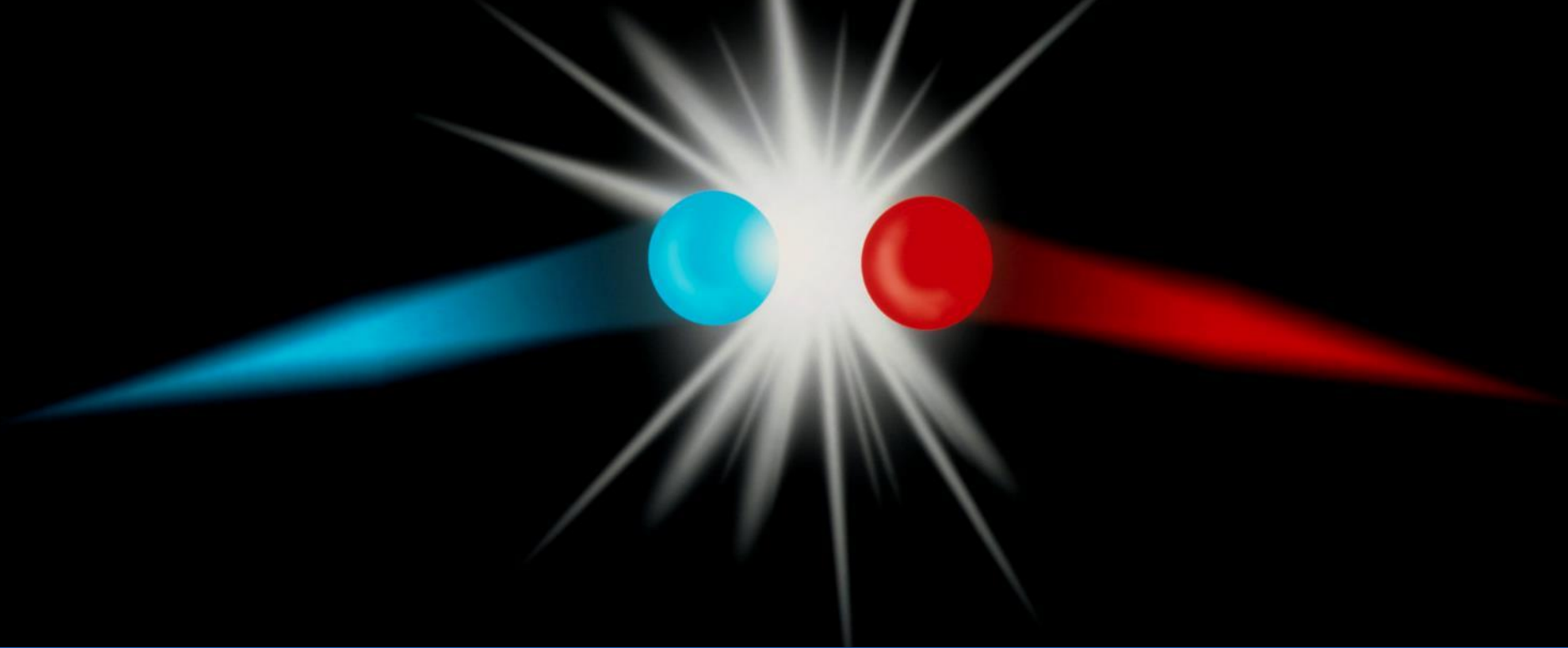


CERN

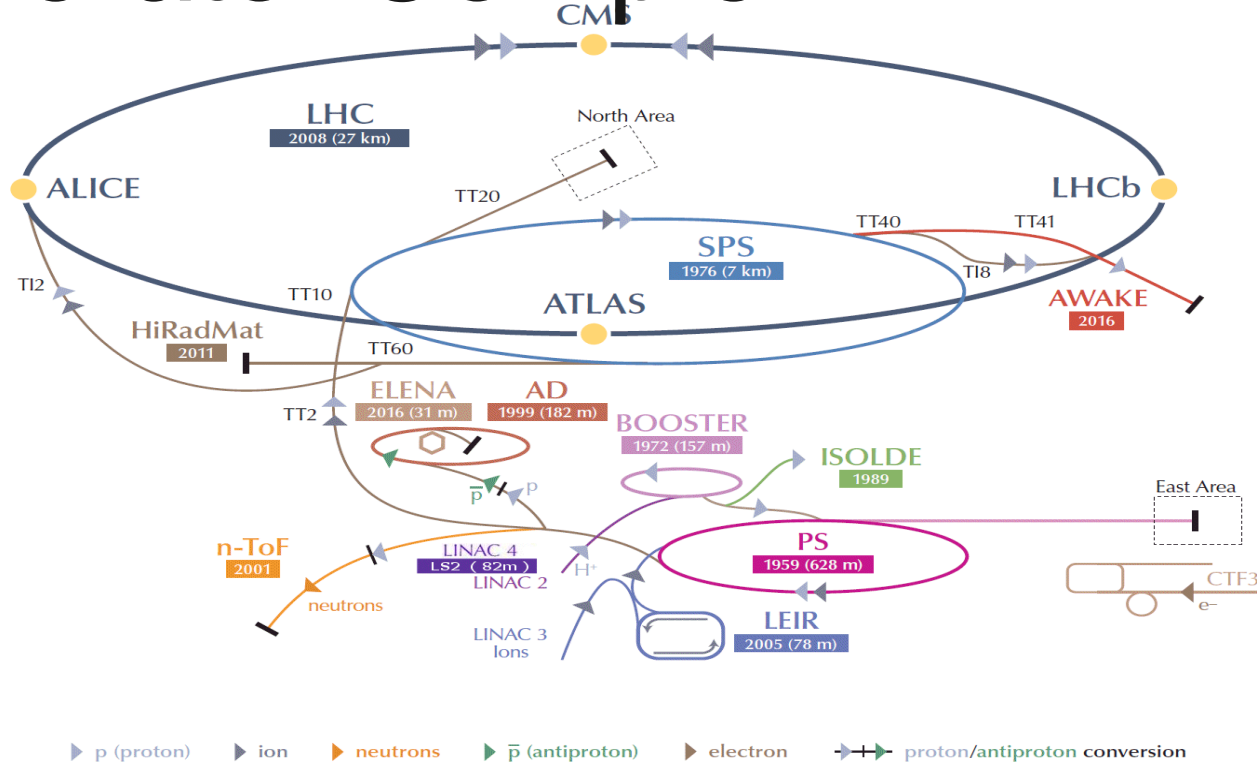
How does it work ?



Accelerating and colliding



Accelerator Complex



Accelerators chain

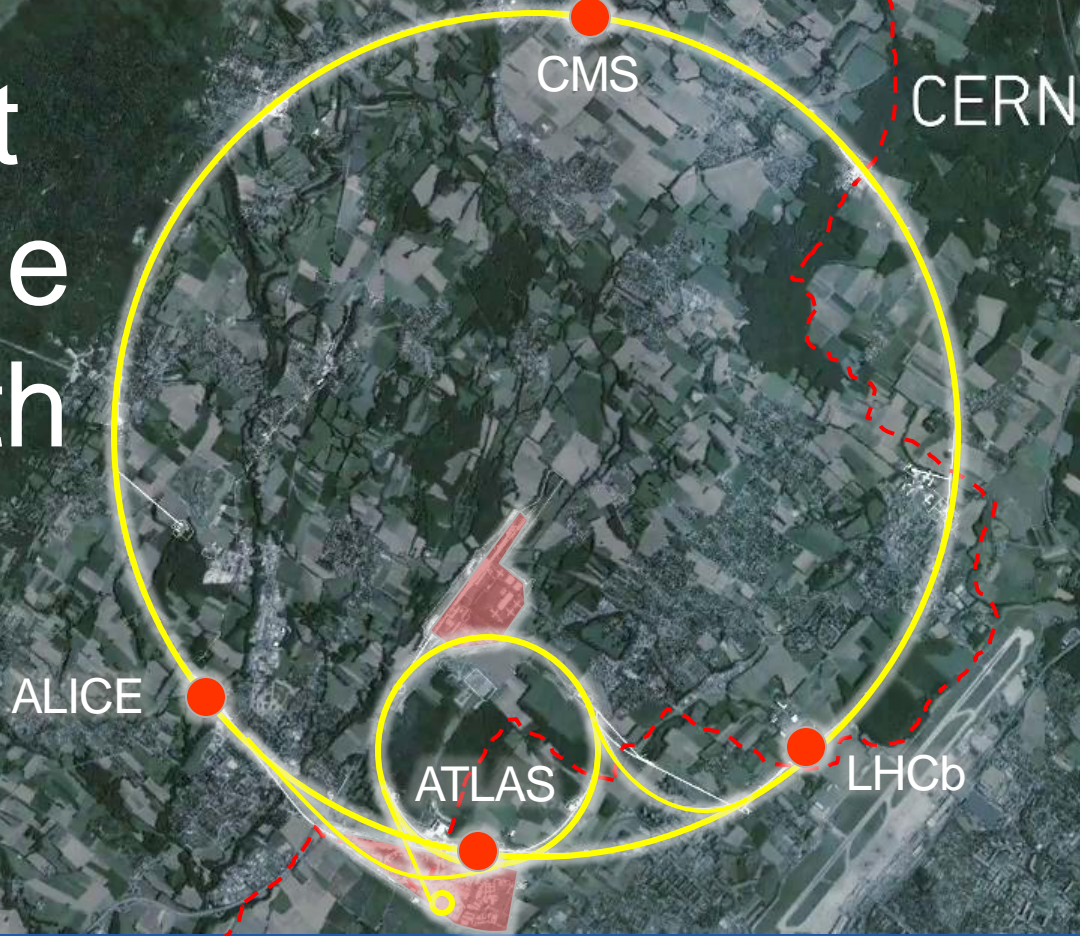


Million of collisions

A 3D rendering of a particle accelerator tunnel. Two red laser beams travel from opposite ends towards the center, where they collide, creating a bright yellow spark. The tunnel is composed of various cylindrical and rectangular components, all rendered in a semi-transparent blue color. The background is a dark blue gradient.

25 ns bunch crossing
25 ns entre les paquets

Largest machine on Earth





The most
powerful
magnets

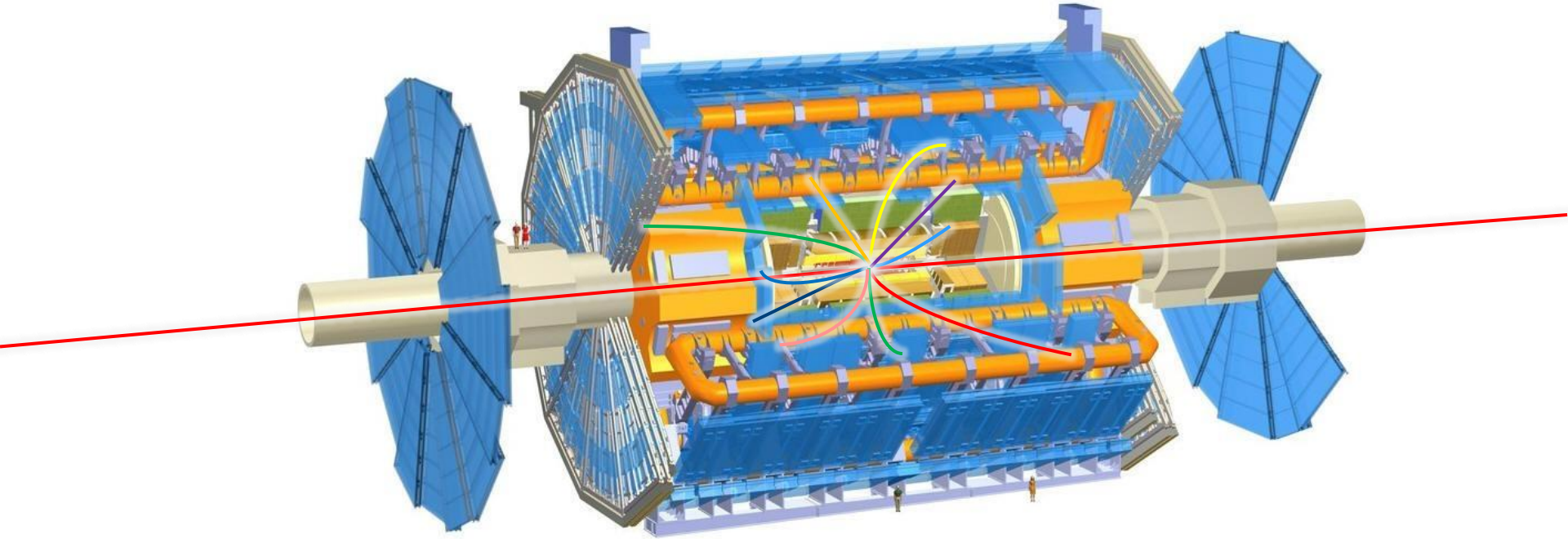


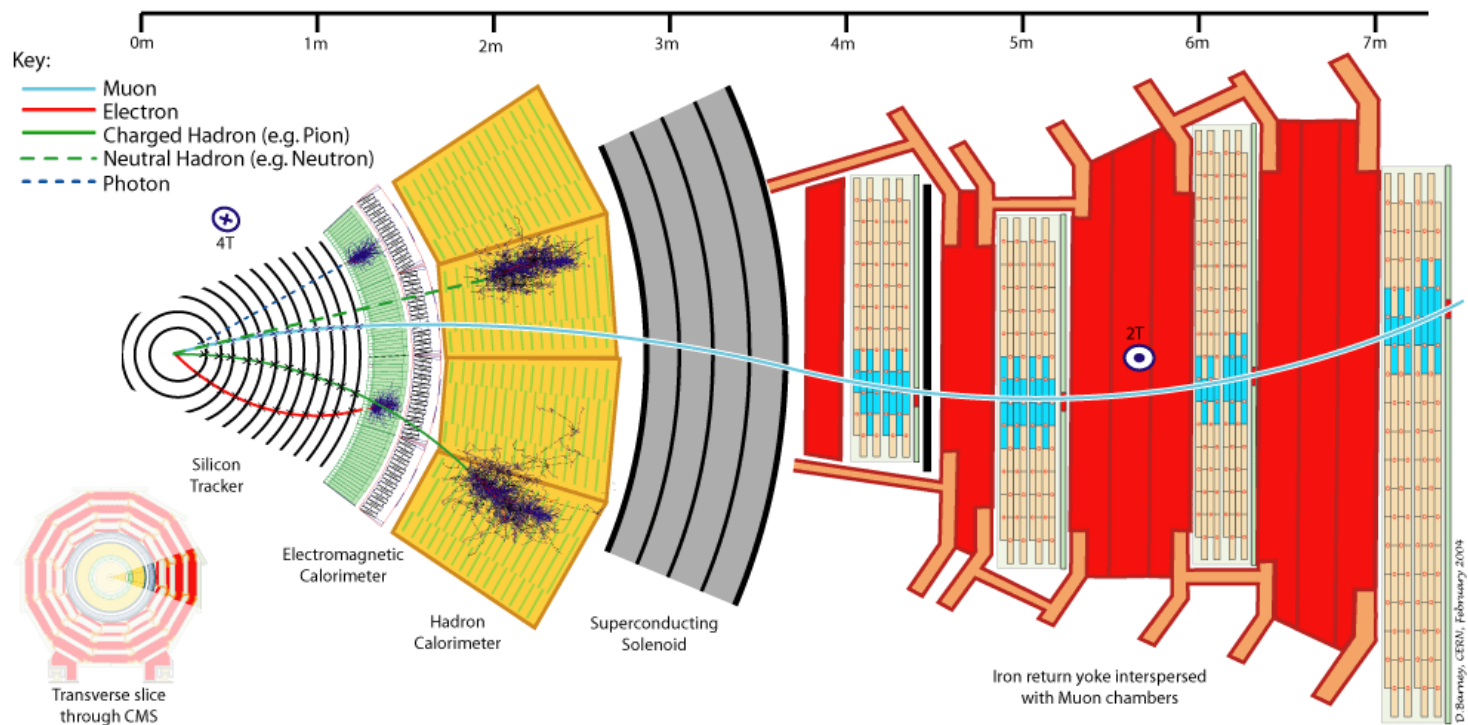
The coldest temperature



The highest vacuum

The largest detectors

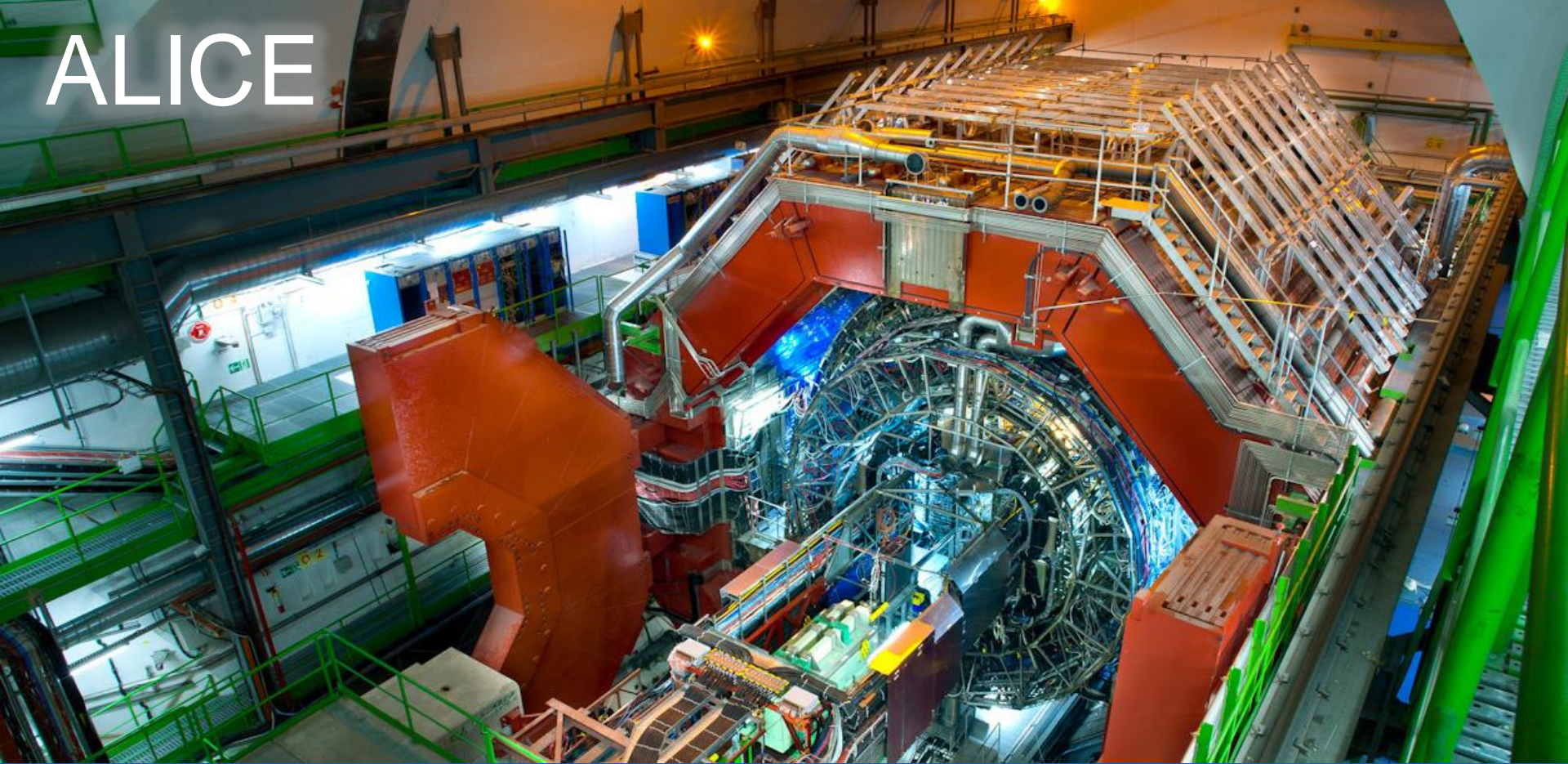






ATLAS

ALICE



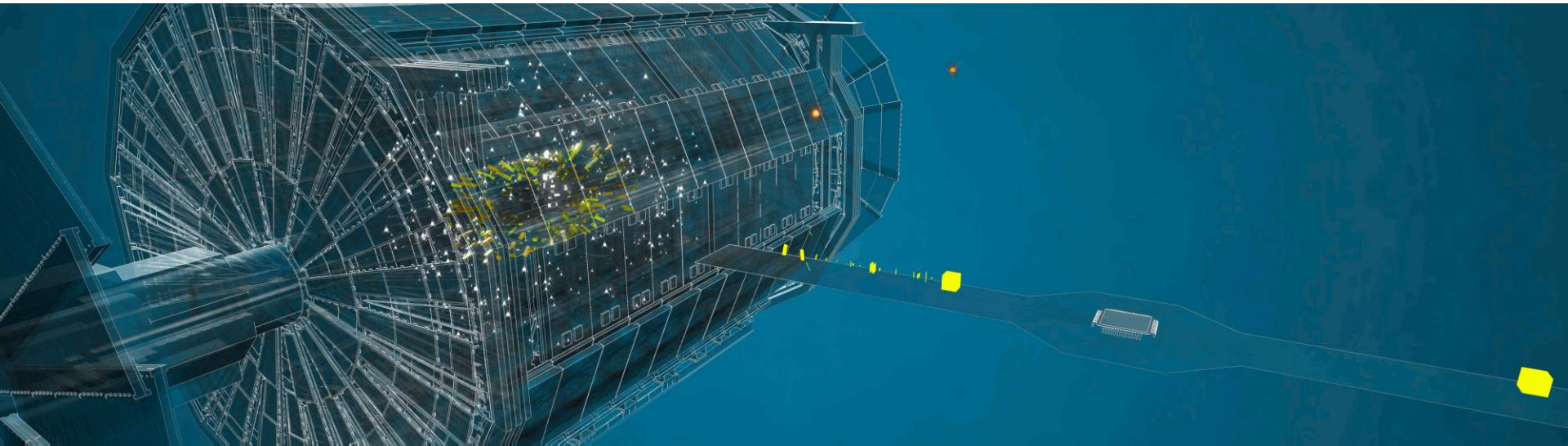
CMS



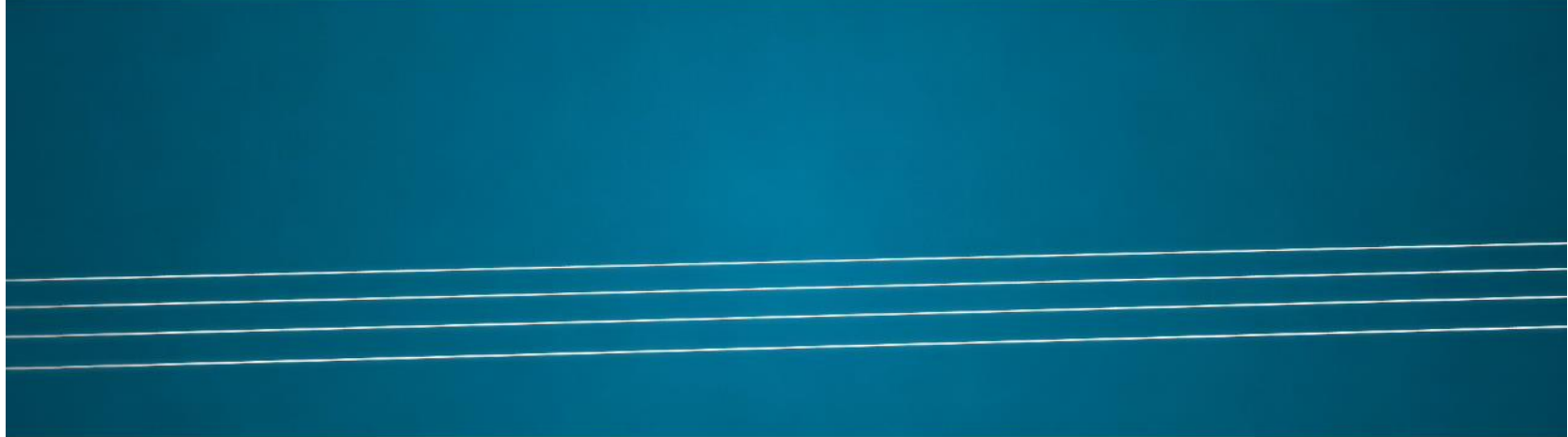


LHCb

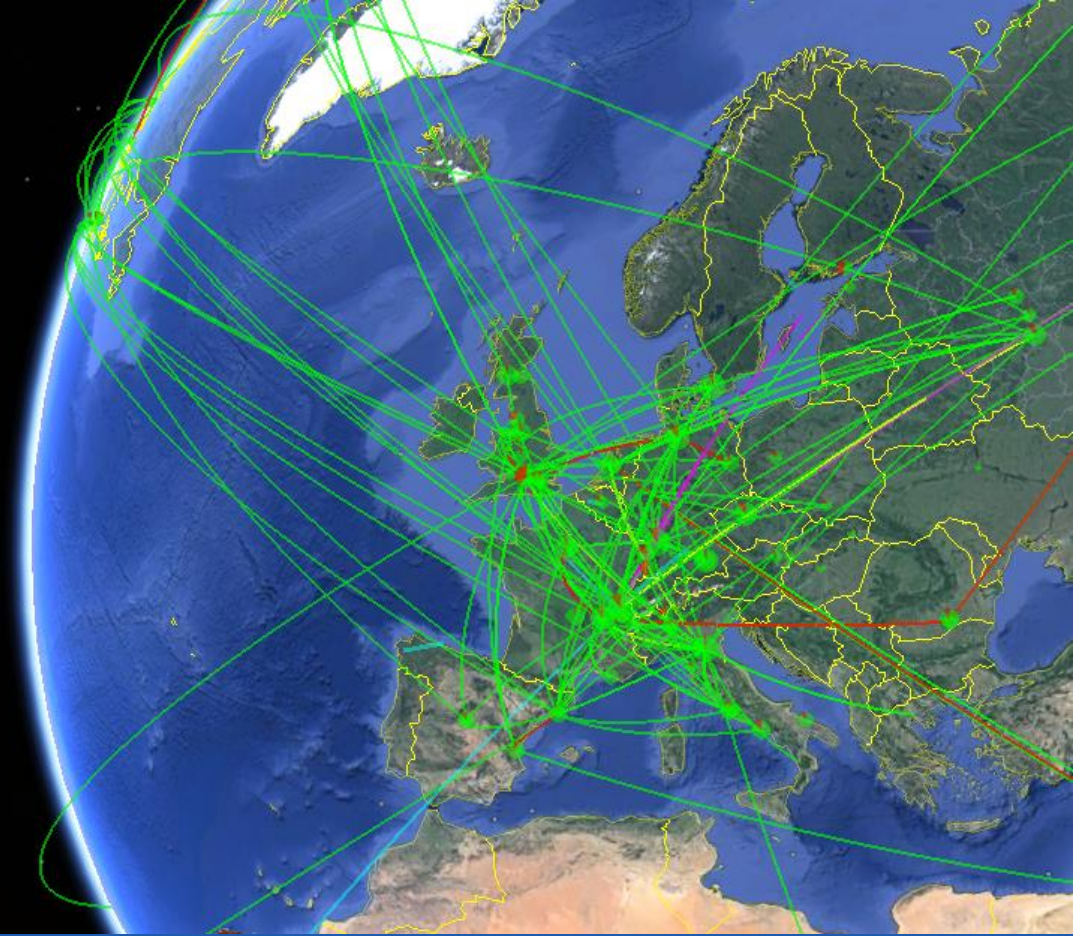
Data Production – Trigger



Event reconstruction - Storage



The largest computing grid



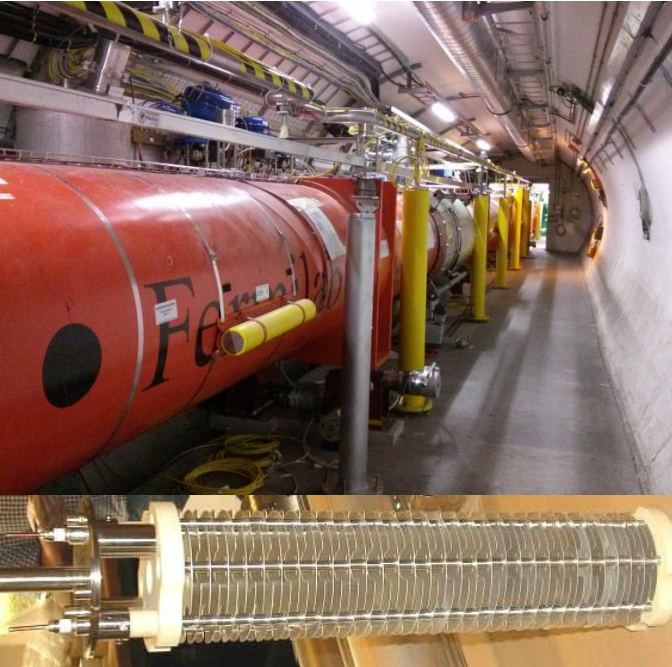
What does a computer engineer
(allergic to physics)
do at CERN ?

Personal stories

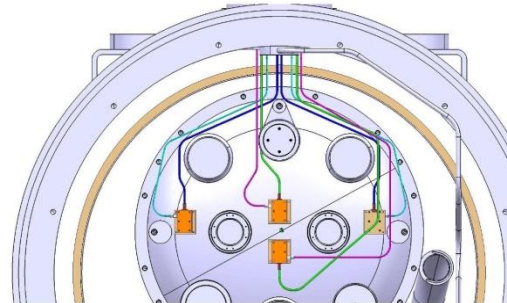
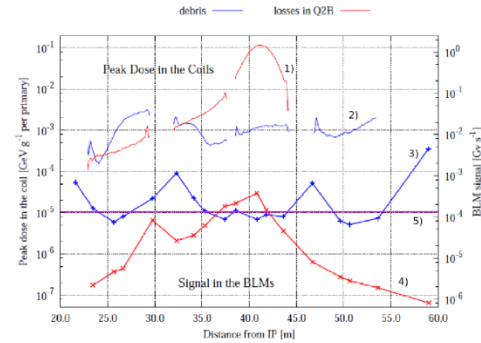
Beam Loss Monitors

CryoBLM

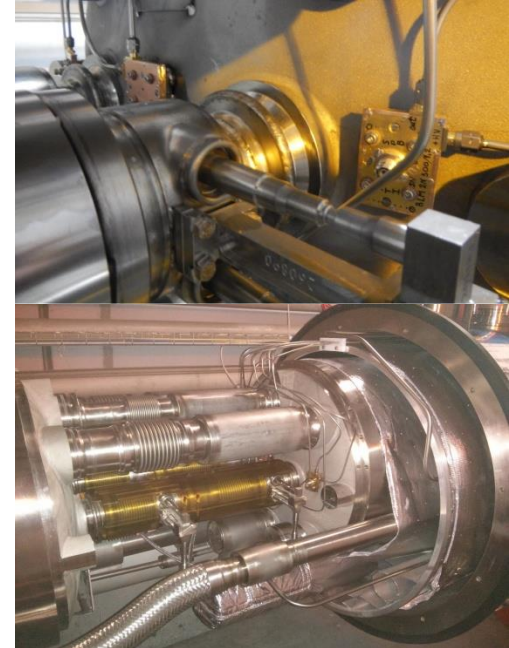
State of the Art



Simulation & Design



Installation



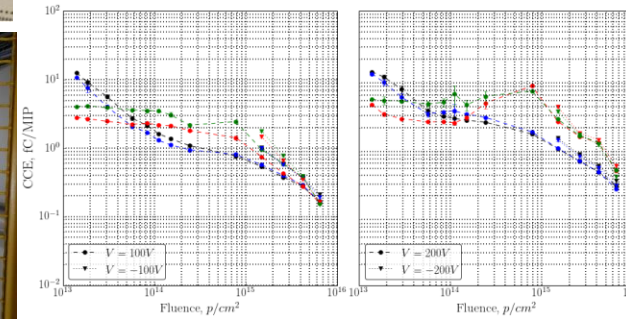
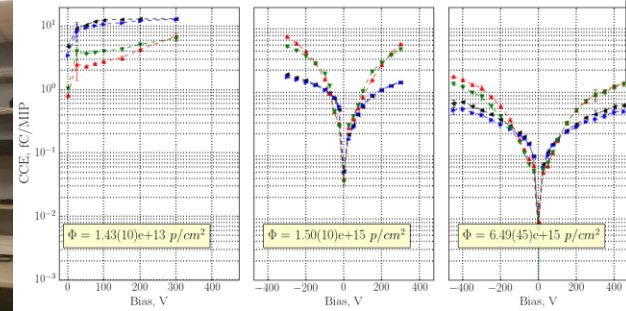
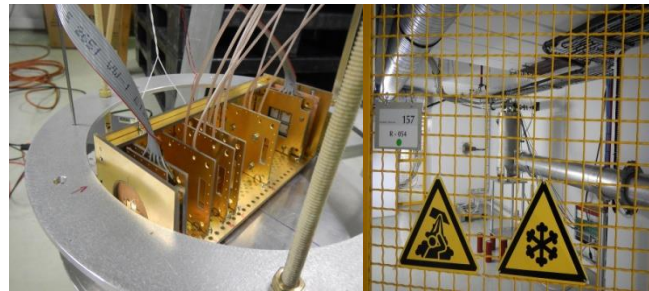
Beam Loss Monitors

CryoBLM

SW / HW Development

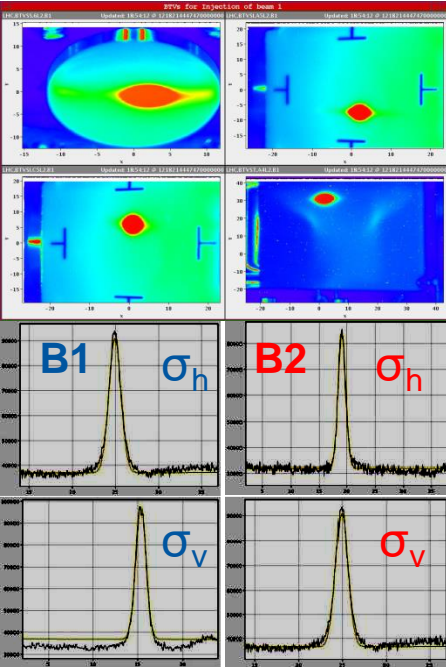
Irradiation Test

Results

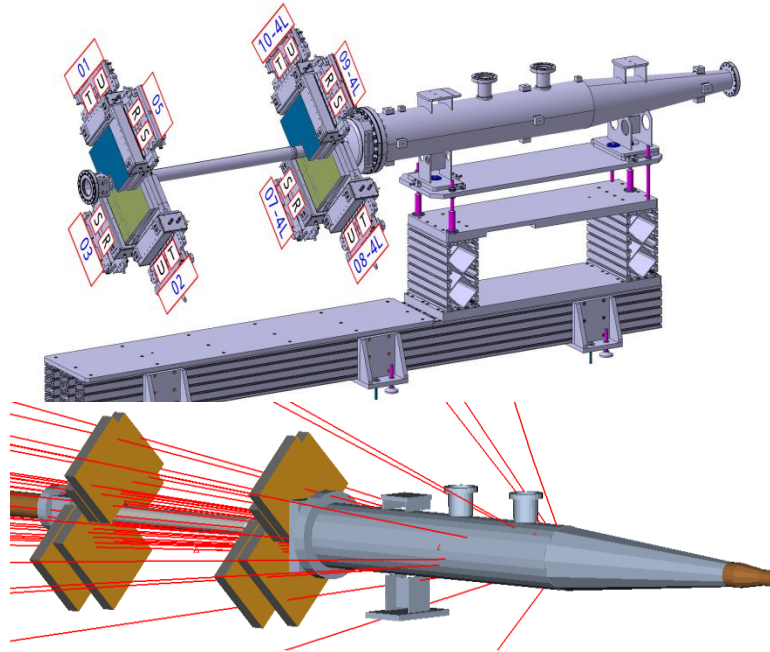


Beam Profile Monitors

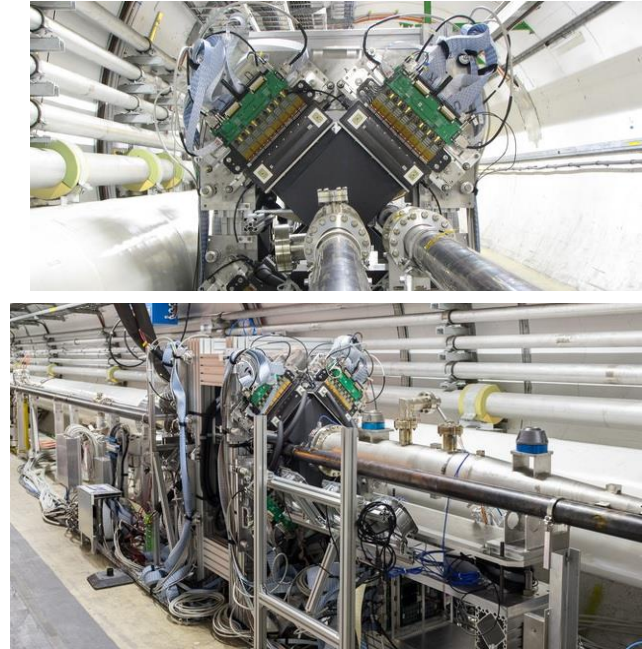
State of the Art



Simulation & Design



Installation

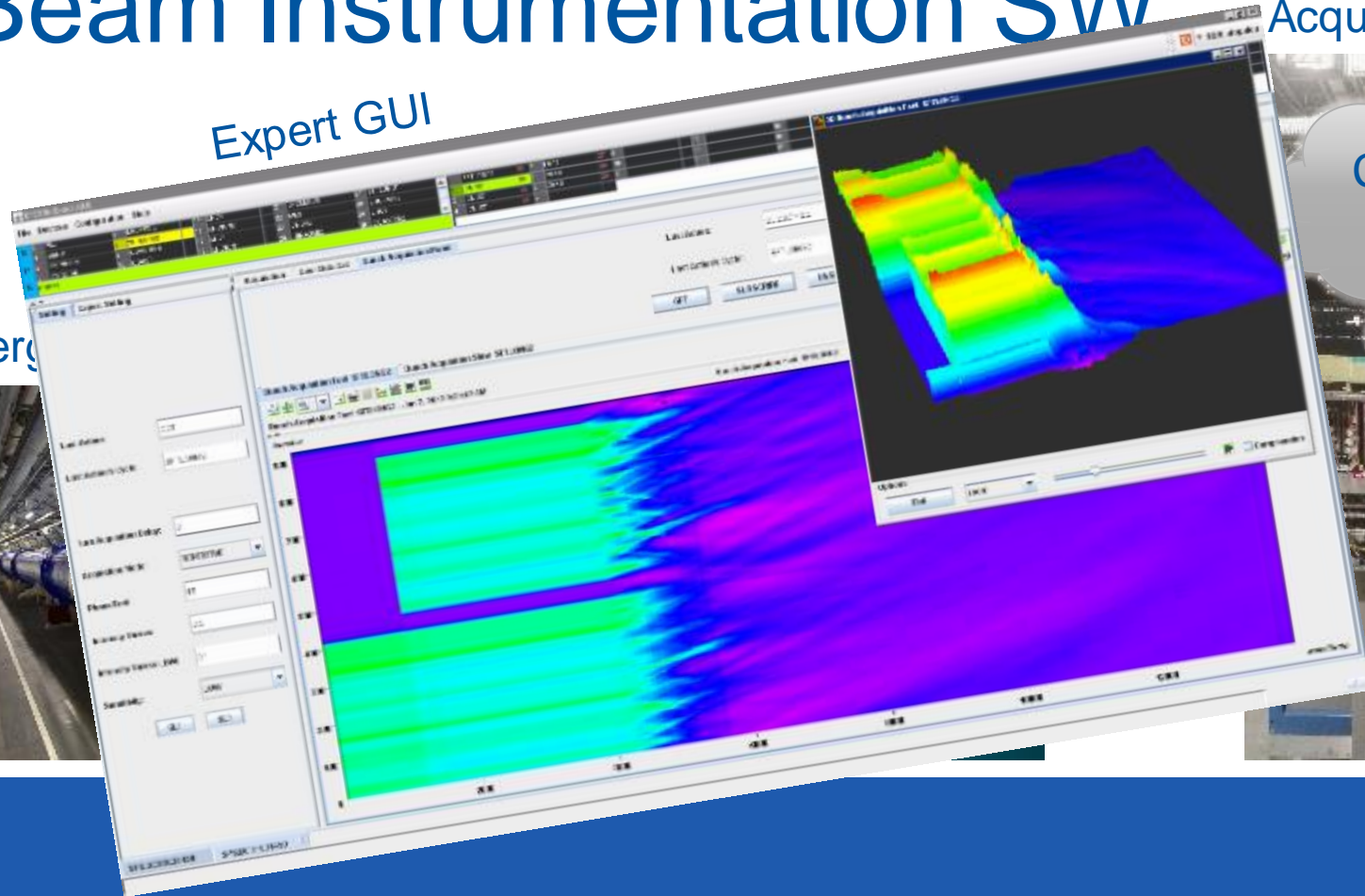


Beam Instrumentation SW

Industrial CPU with
Acquisition Cards

Expert GUI

Underground



C++ Server
24/7



Operational SW



Timeline

Present

2015

2014

2013

2012

2011



Fellow a student at CERN
Technical CERN



Graduate staff at UTH
Staff from UTH

Diploma thesis: a ticket to start careers

Add some Olives to your coffee: A Java-based GUI for the Octopus system

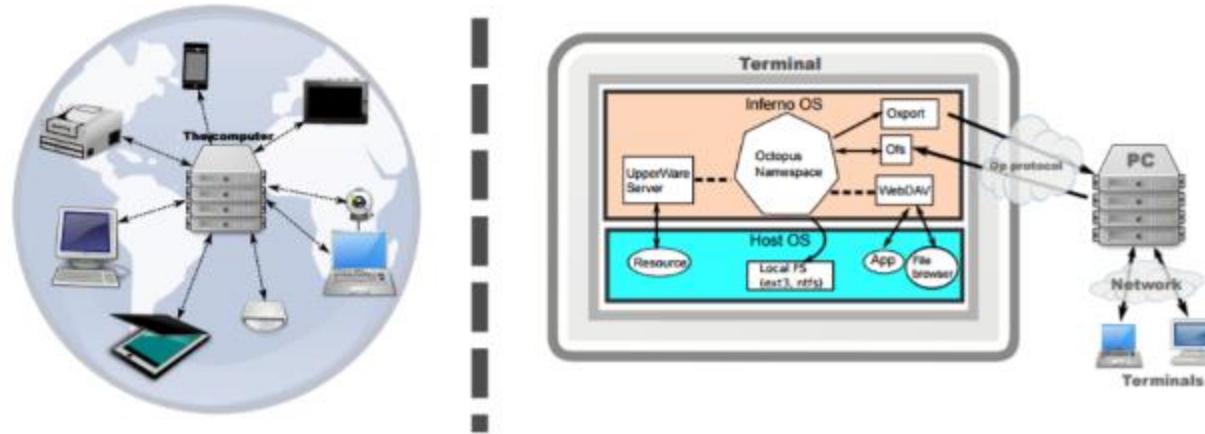


Figure 1: Various terminal resources connect to the central PC and export resources.

Alcatel·Lucent



Bell Labs

 Dublin



Maynooth University
National University
of Ireland Maynooth



Geneva  Munich



 Volos

Data SIO, NOAA, U.S. Navy, NGA, GEBCO
© 2016 Google
Image Landsat
US Dept of State Geographer

Google Earth

Imagery Date: 12/14/2015 47°36'42.03" N 14°20'07.96" E elev 858 m eye alt 4878.90 km



My work at CERN

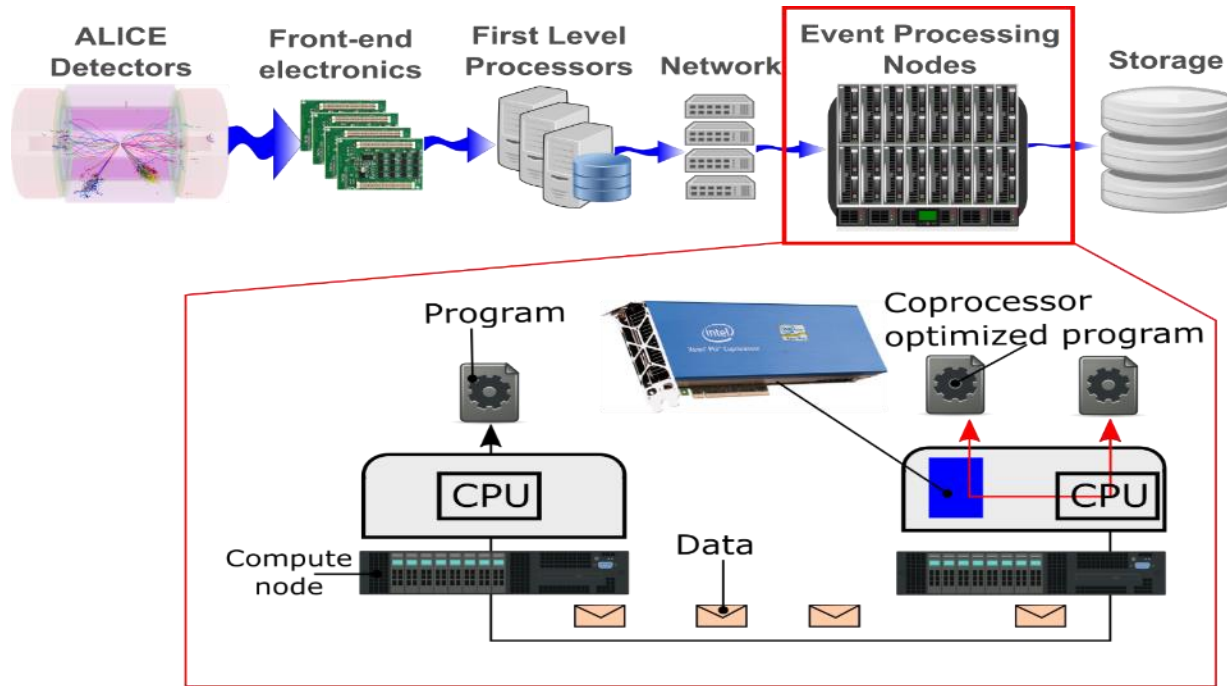


Figure 1. An overview of the ALICE data acquisition process with emphasis on the Event Processing Nodes.

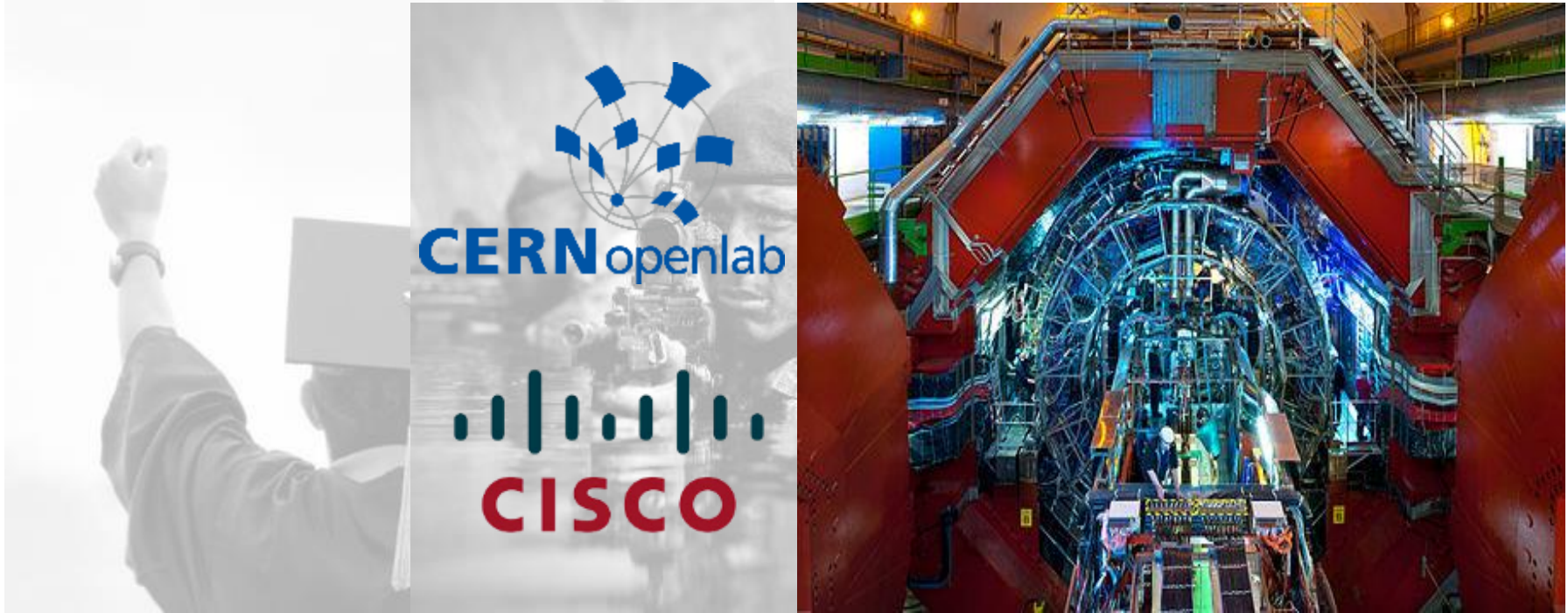
About Me



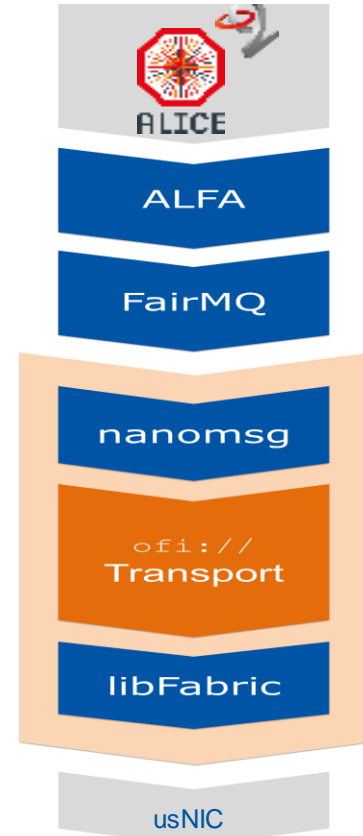
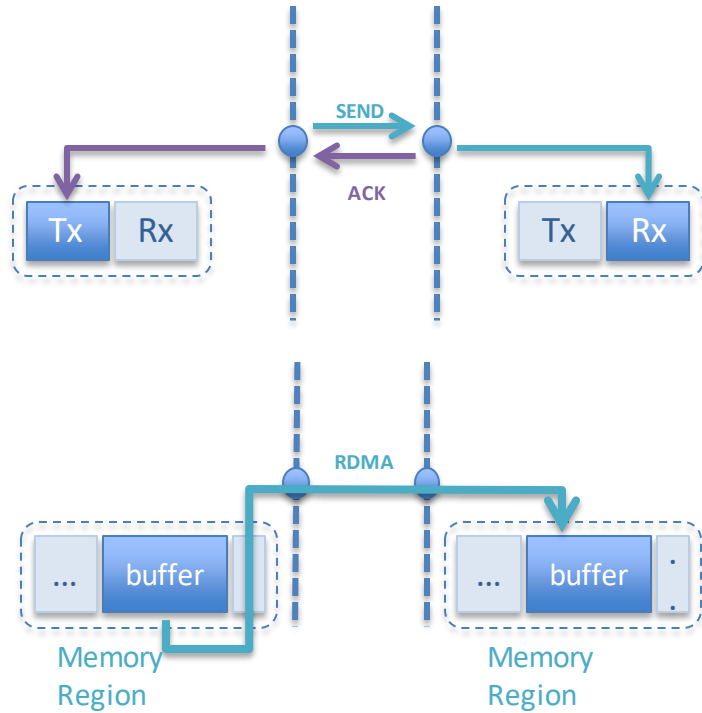
About Me



About Me



My work at CERN



My advice





Acknowledgements

Many thanks University of Thessaly and Professor Spyros Lalis for the invitation and his support ...

... also

- François Briard for the slides
- Beams Instrumentation group (BI)
- CERN openlab - the ICE-DIP project and Cisco

Backups

CERN

So what ?

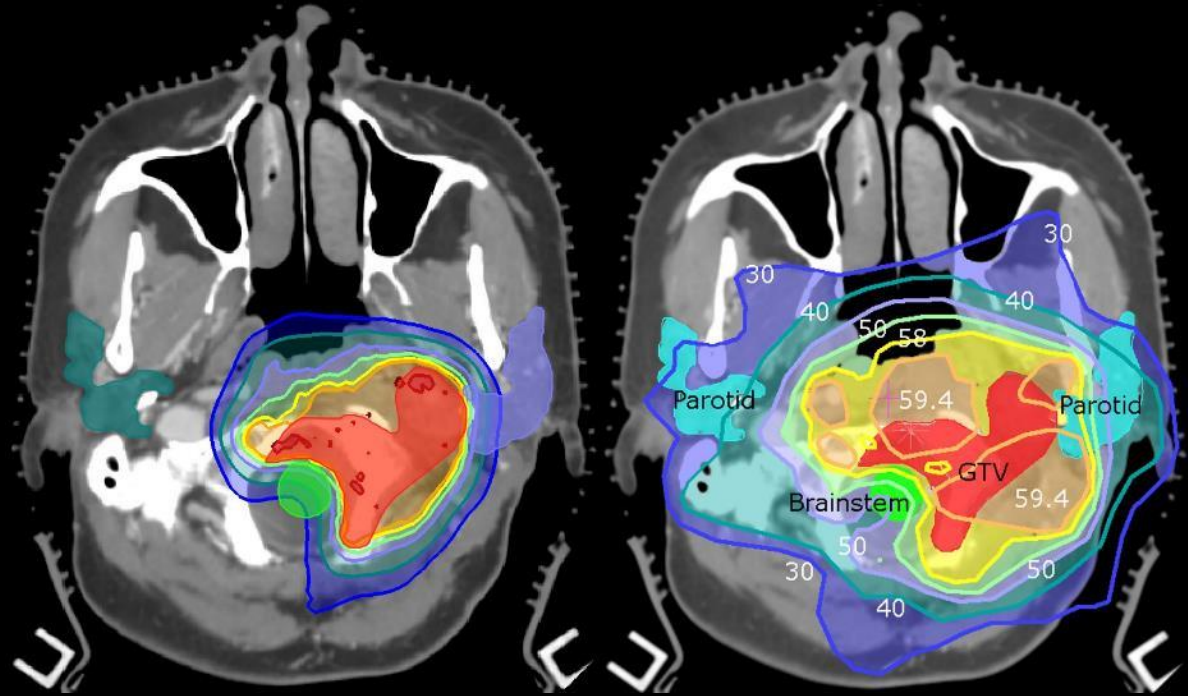


World Wide Web

HTTP



Medical applications



INSET: PRE-CRISIS

Source: Esri, DigitalGlobe,
GeoEye, GeoEye, Earthstar
Geographics, CNES/Airbus DS,
USDA, USGS, AEX, Getmapping.

INSET: 27 APRIL 2015

See inset for close-up view of
damaged & destroyed structures

Humanitarian



www.cern.ch