



# *Welcome - Herzlich willkommen*

**Besuch Architekt Moser  
16 Maerz 2018**



to



*Accelerating Science and Innovation*

# CERN

*What is it ?*



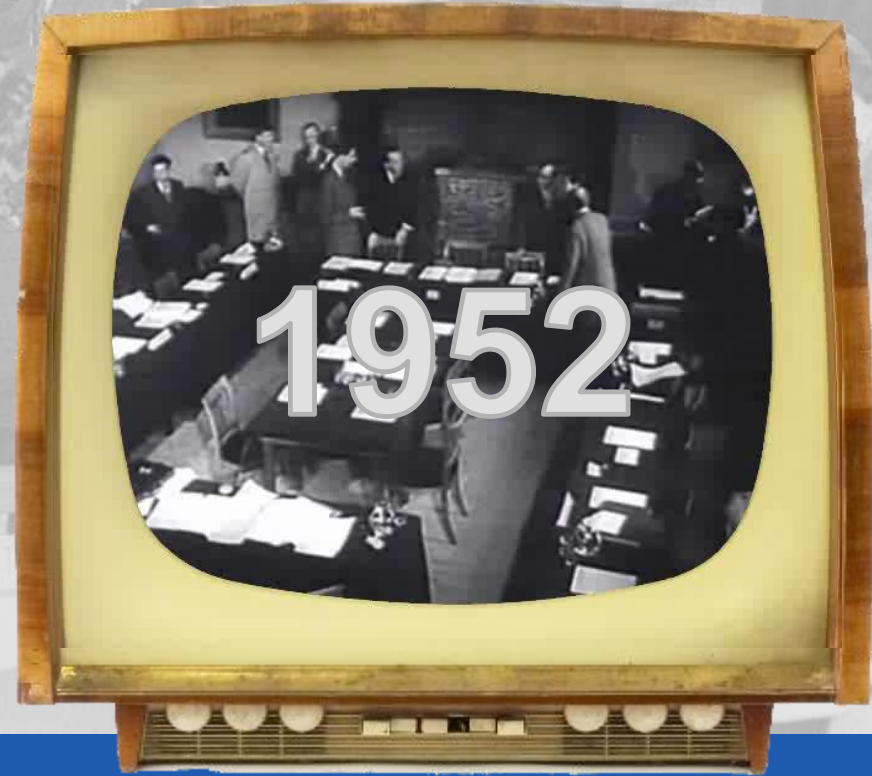
# What does « CERN » stand for?

European

Organization for the

Research

Centre



# What does « CERN » stand for?

European  
Organization for  
Nuclear  
Research



# Nuclear?



European laboratory for particle physics

# CERN

*Who is it ?*













































# Member states



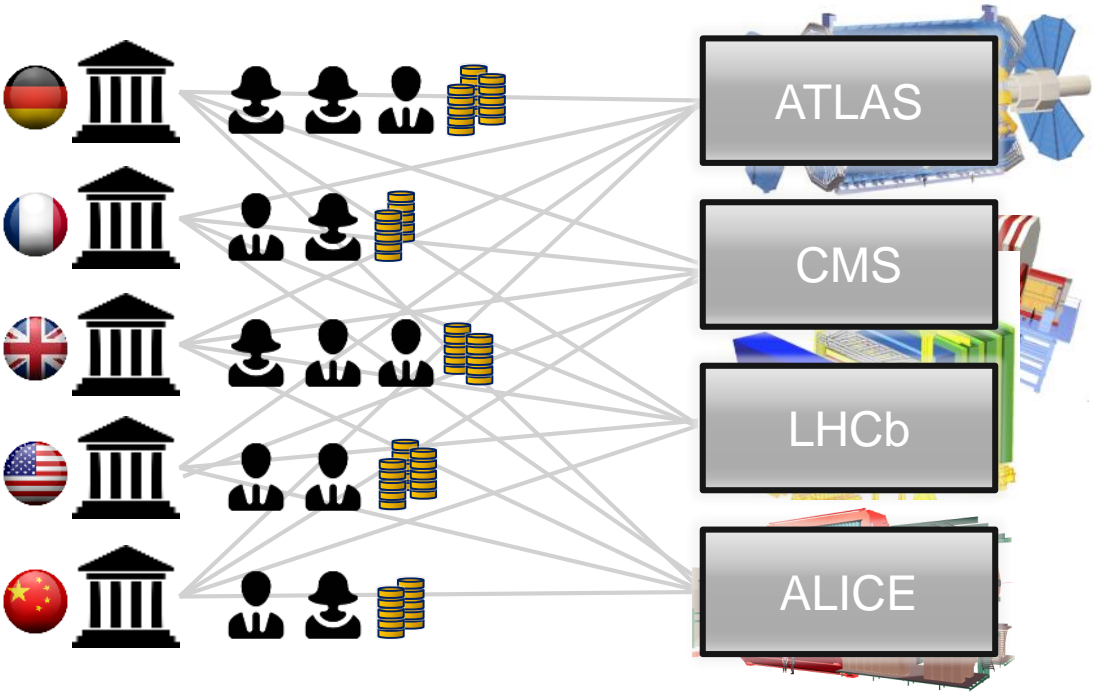
ca 1 Bn CHF



Germany		20.27%	
France		15.39%	
United Kingdom		13.88%	
Italy		11.48%	
Spain		8.28%	
Netherlands		4.60%	
Switzerland		3.64%	
Belgium		2.78%	
Poland		2.66%	
Sweden		2.61%	
Norway		2.55%	
Austria		2.22%	
Denmark		1.76%	
Greece		1.64%	
Finland		1.39%	
Portugal		1.20%	
Israel		1.19%	
Czech Republic		1.03%	
Hungary		0.65%	
Slovakia		0.50%	
Bulgaria		0.28%	



# Collaborations



# A world collaboration

22 members

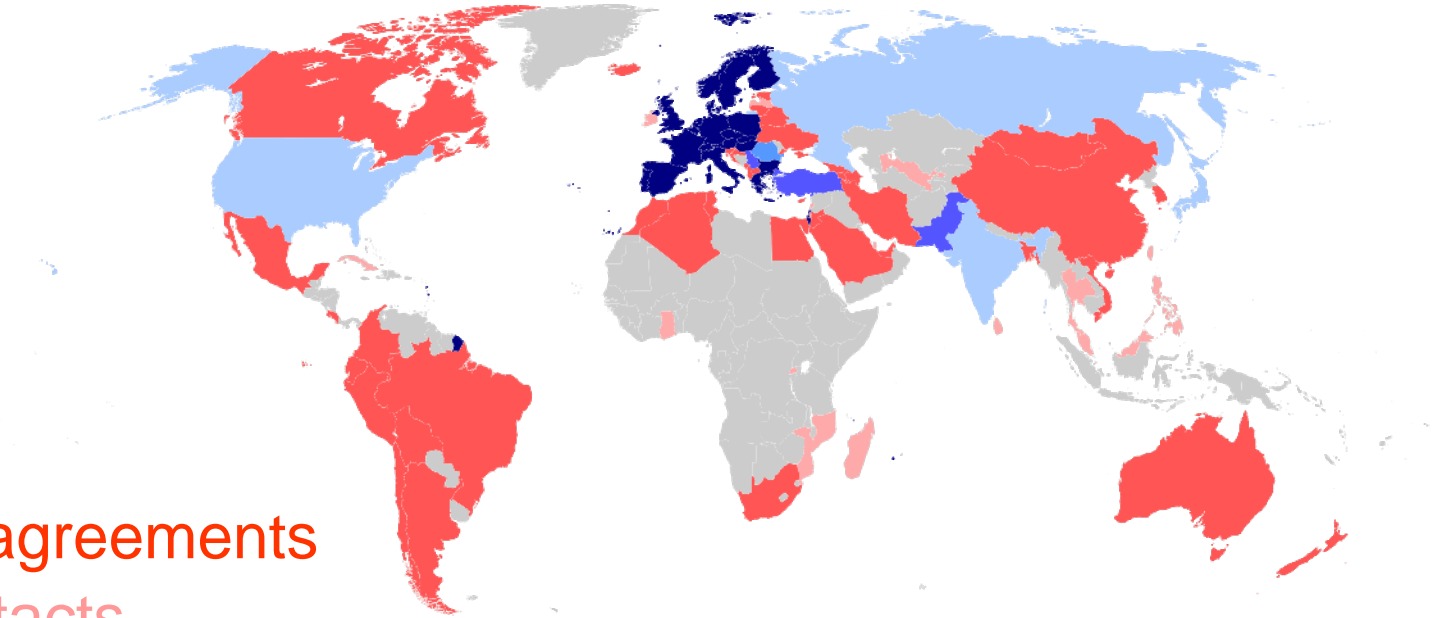
2 associates

2 candidate

Observers

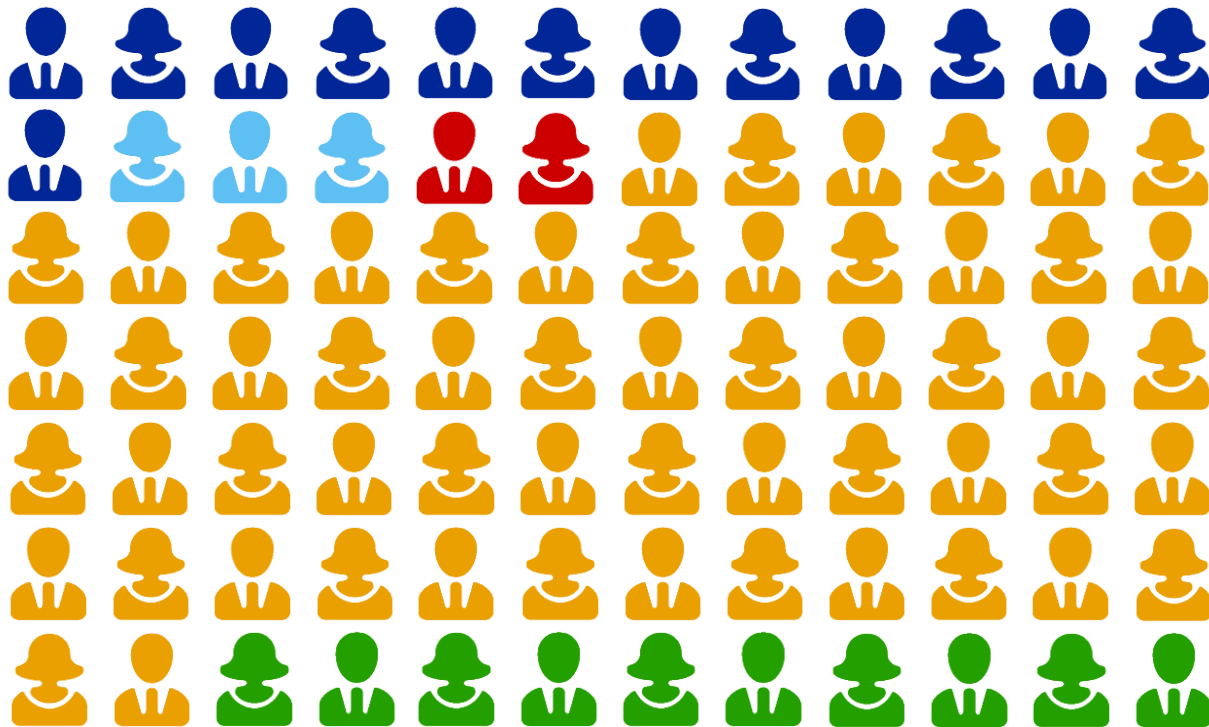
Cooperation agreements

Scientific contacts



# How many persons?

+15'000!



2'500 staff

600 fellows & apprentices

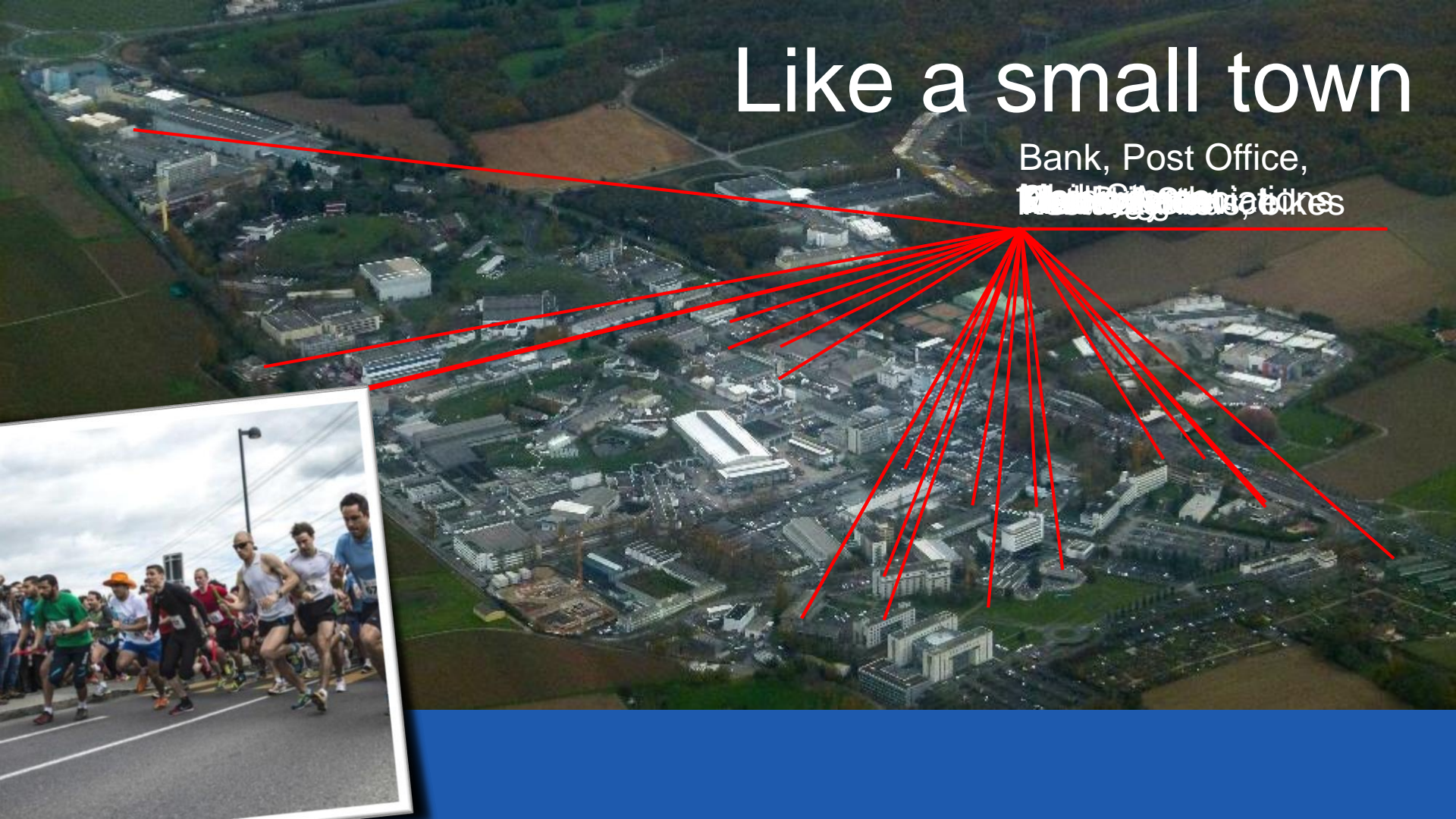
500 students

11'000 users

2'000 external companies

# Like a small town

Bank, Post Office,  
Retail, Cafes, etc.



# CERN

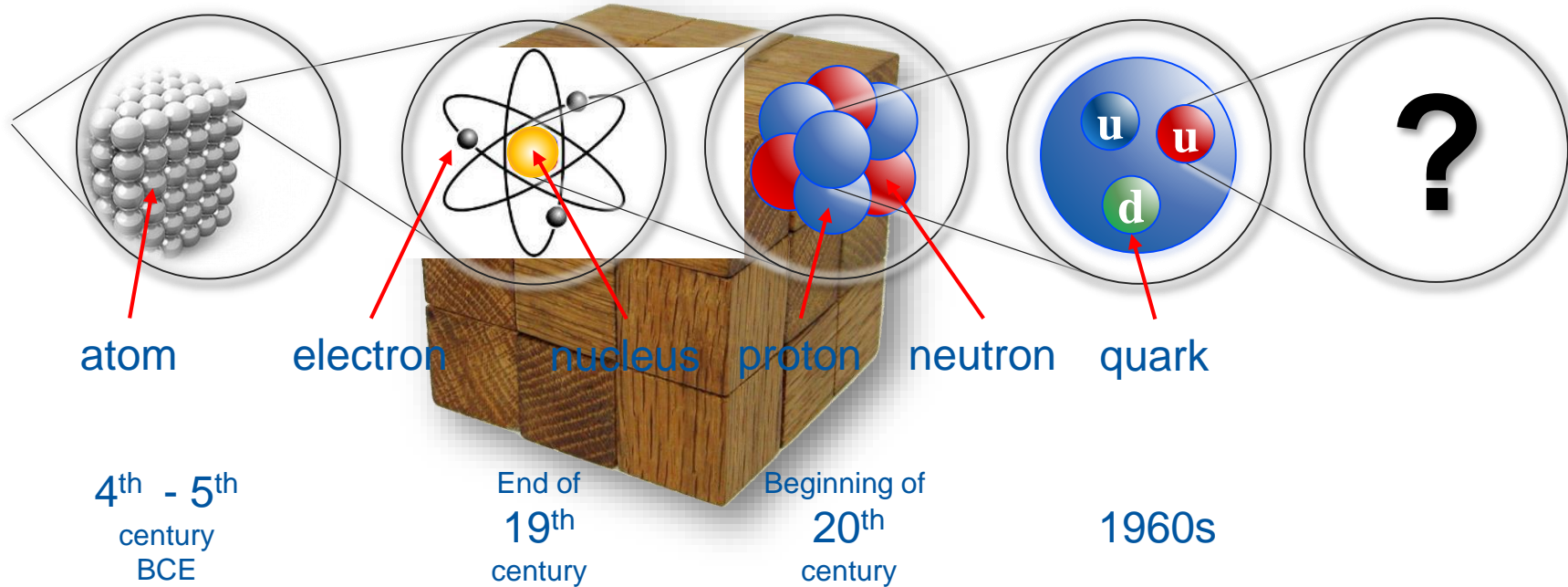
*What for ?*



# ***Fundamental research***



# What is the matter made of ?



# Standard Model

Images:  
[www.particlezoo.net](http://www.particlezoo.net)

LEPTONS

QUARKS

ORDINARY  
MATTER



POSITRON



ANTIPROTON



ANTINEUTRON



ANTIMUON



ANTITAU



ANTI-UP  
QUARK



ANTI-DOWN  
QUARK



ANTI-STRANGE  
QUARK



ANTI-CHARM  
QUARK



ANTI-BOTTOM  
QUARK



ANTI-TOP  
QUARK

Strong force

Electro-magnetic force

Weak force

Gravity



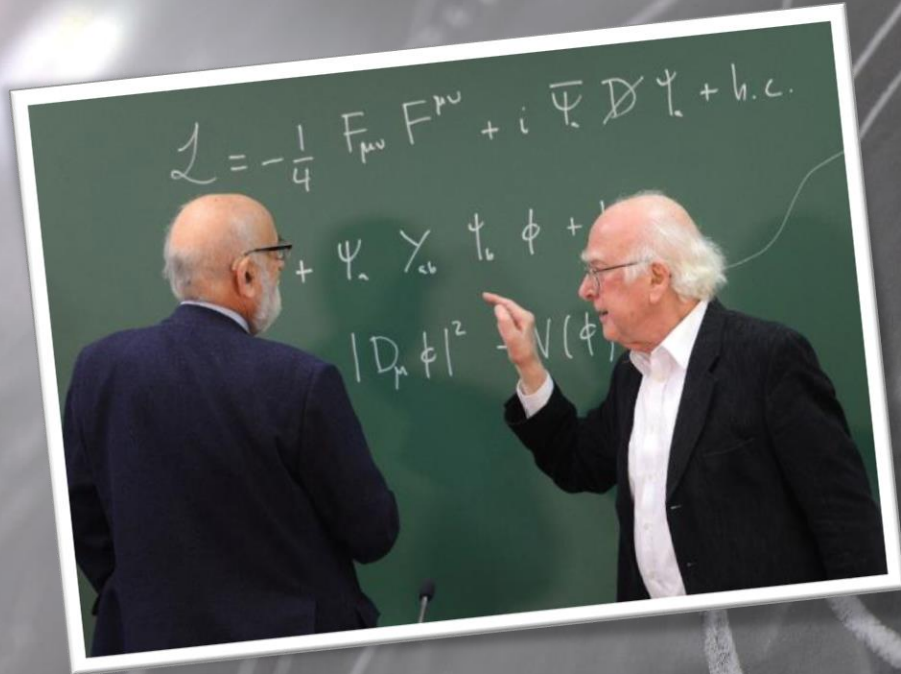


# Answering questions...



## *Antimatter ?*

# Answering questions...



Higgs

*Higgs ?*

# Answering questions...

*Dark matter ?*

# Collaborate



# Educate



# CERN

*How does it work ?*



# Accelerating and colliding









# Accelerators chain

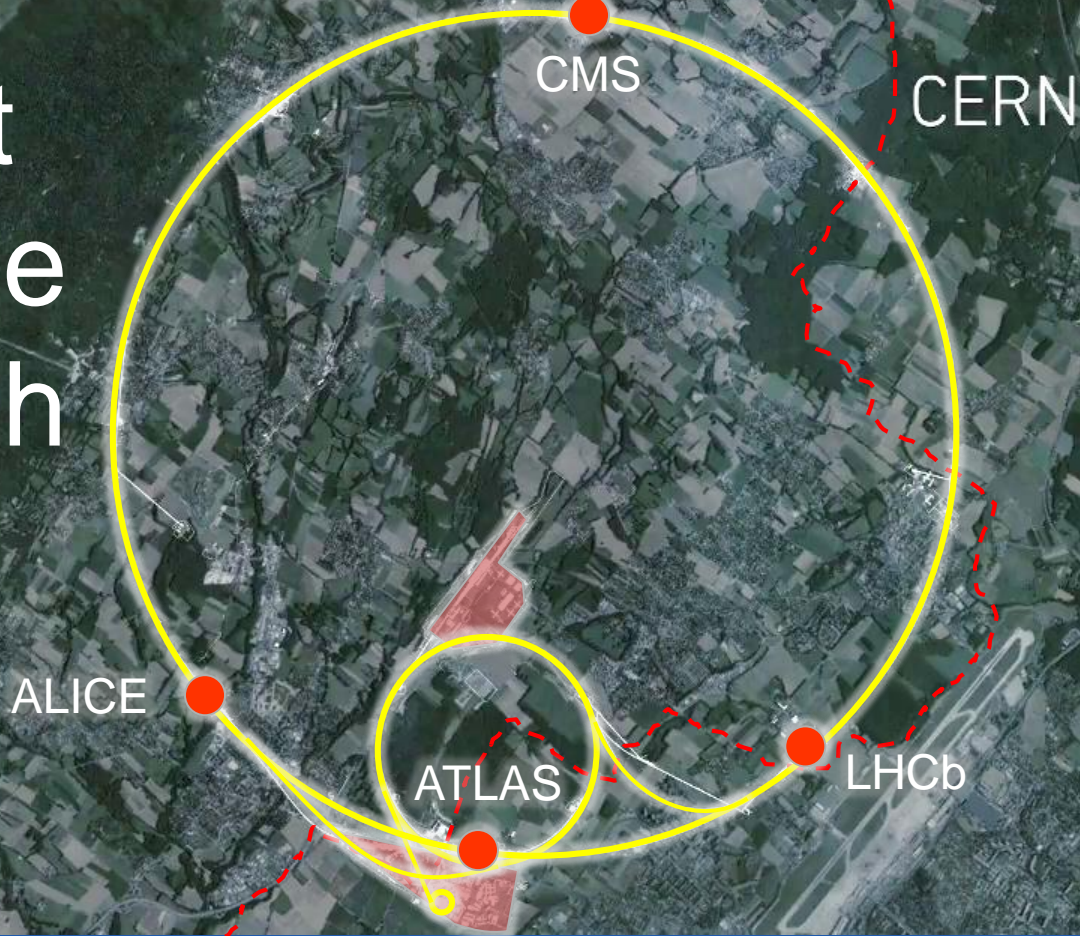


# Million of collisions



25 ns bunch crossing  
25 ns entre les paquets

# Largest machine on Earth





The most  
powerful  
magnets

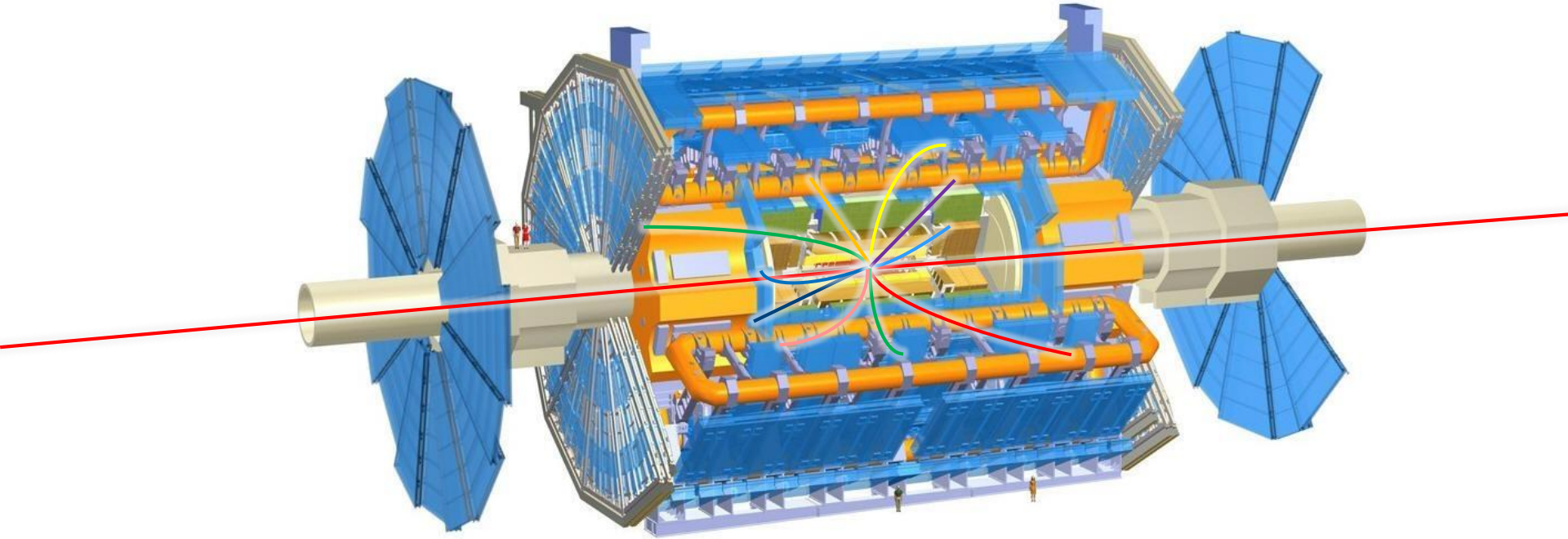


# The highest vacuum

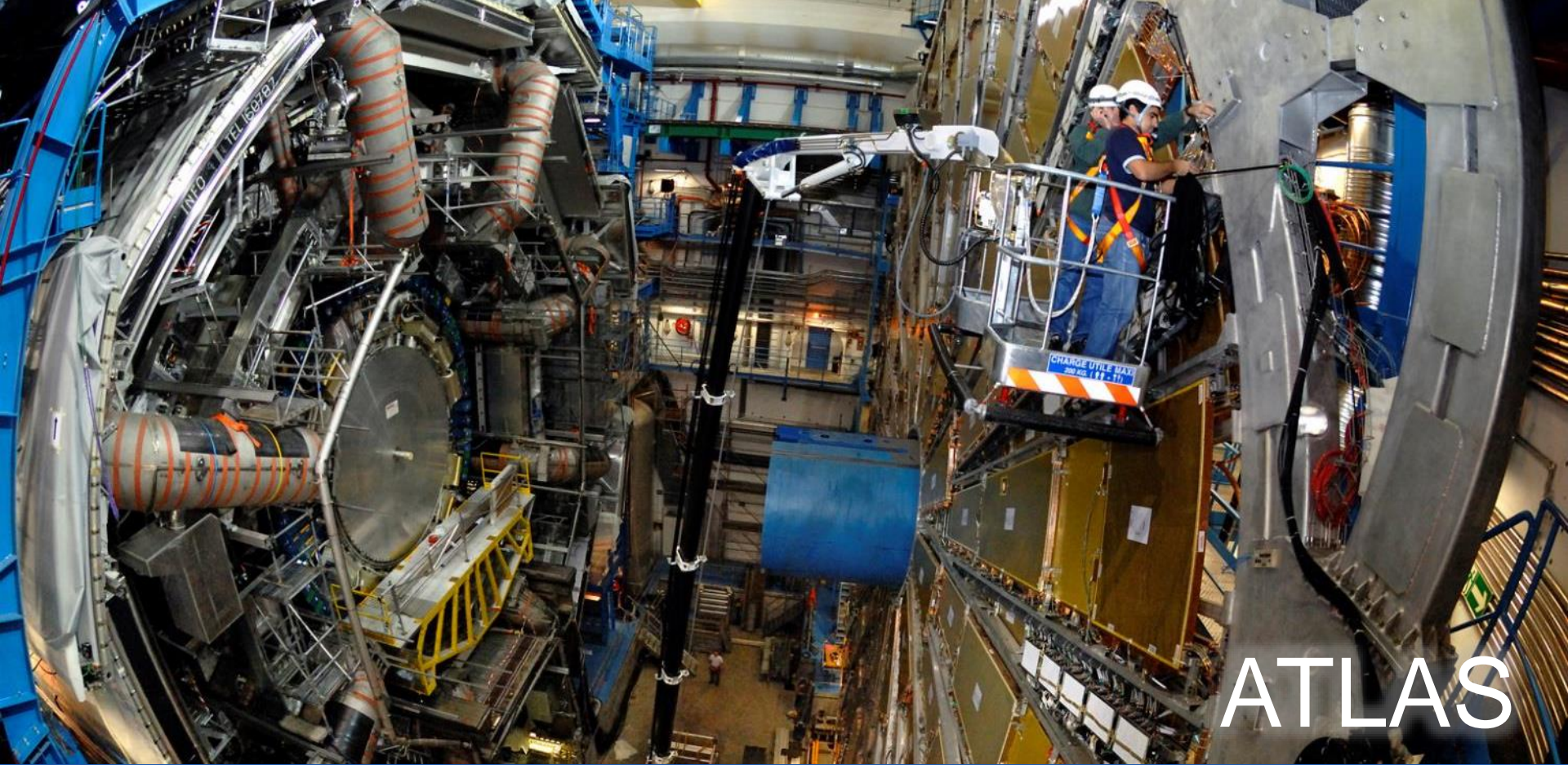


# The coldest temperature

# The largest detectors

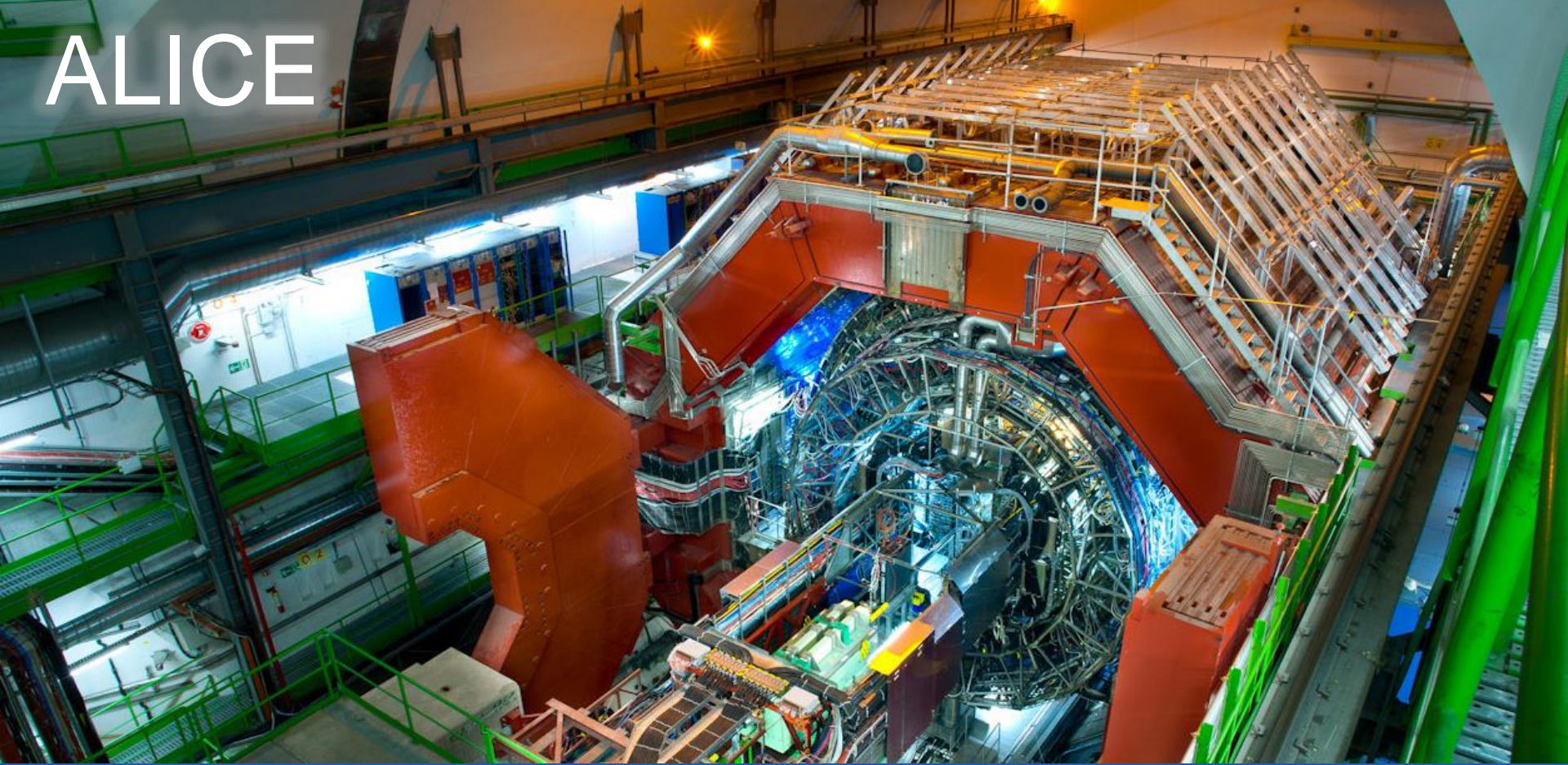






ATLAS

# ALICE



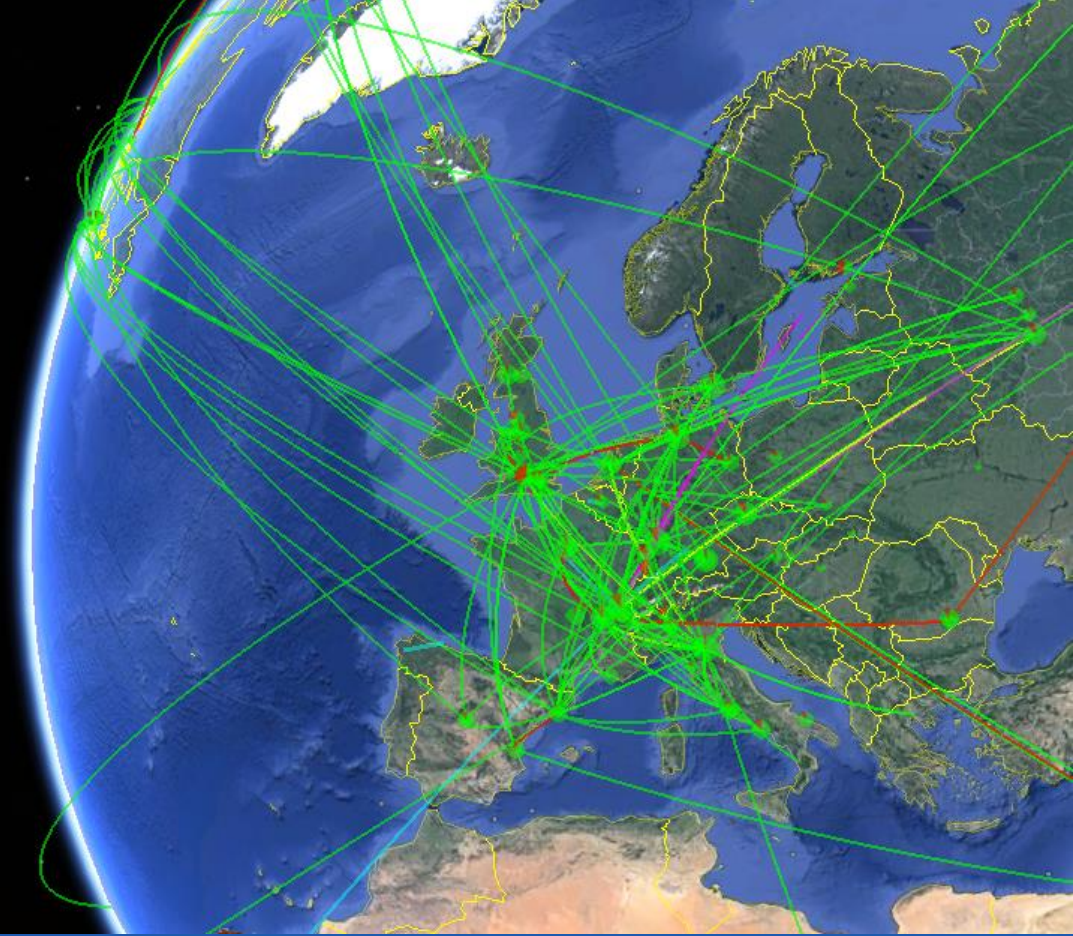
# CMS





LHCb

# The largest computing grid



# World Wide Web

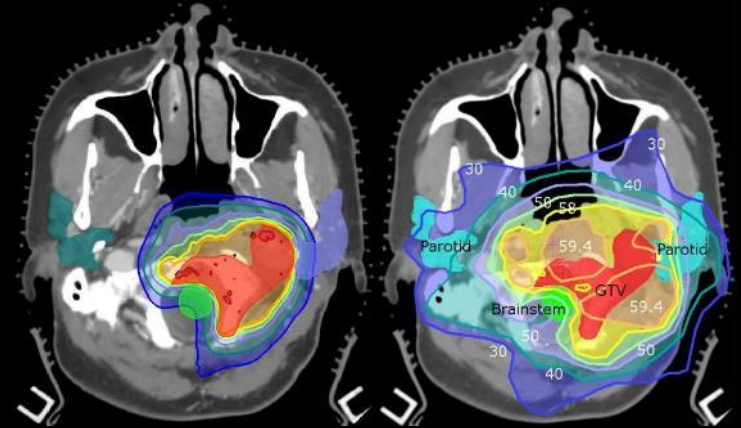
WWW



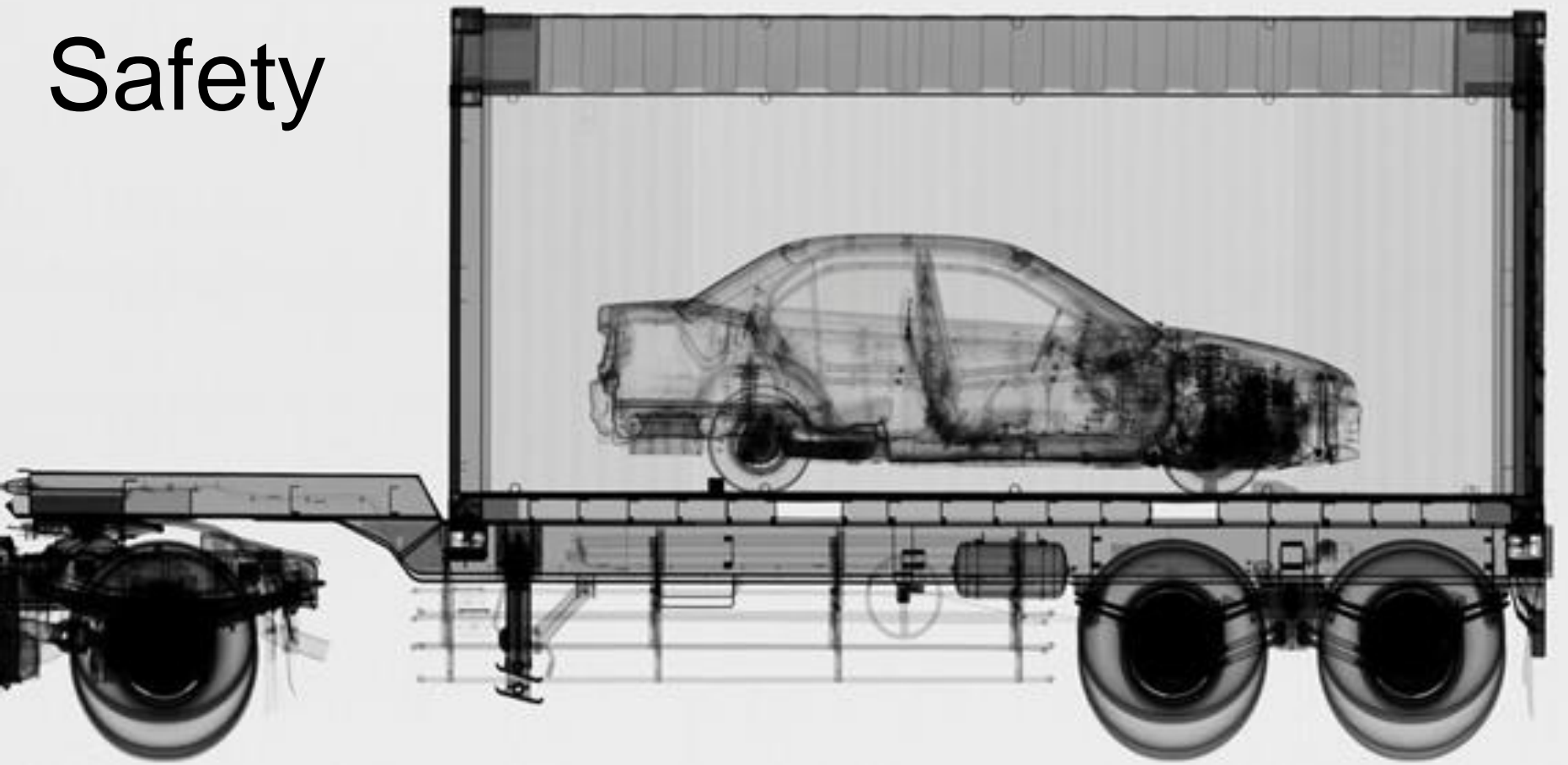
# Medical applications: MedAustron collaboration



- Knowledge and technology transfer are central CERN activities.
- Realisation of the MedAustron ion therapy accelerator in Wiener Neustadt



# Safety

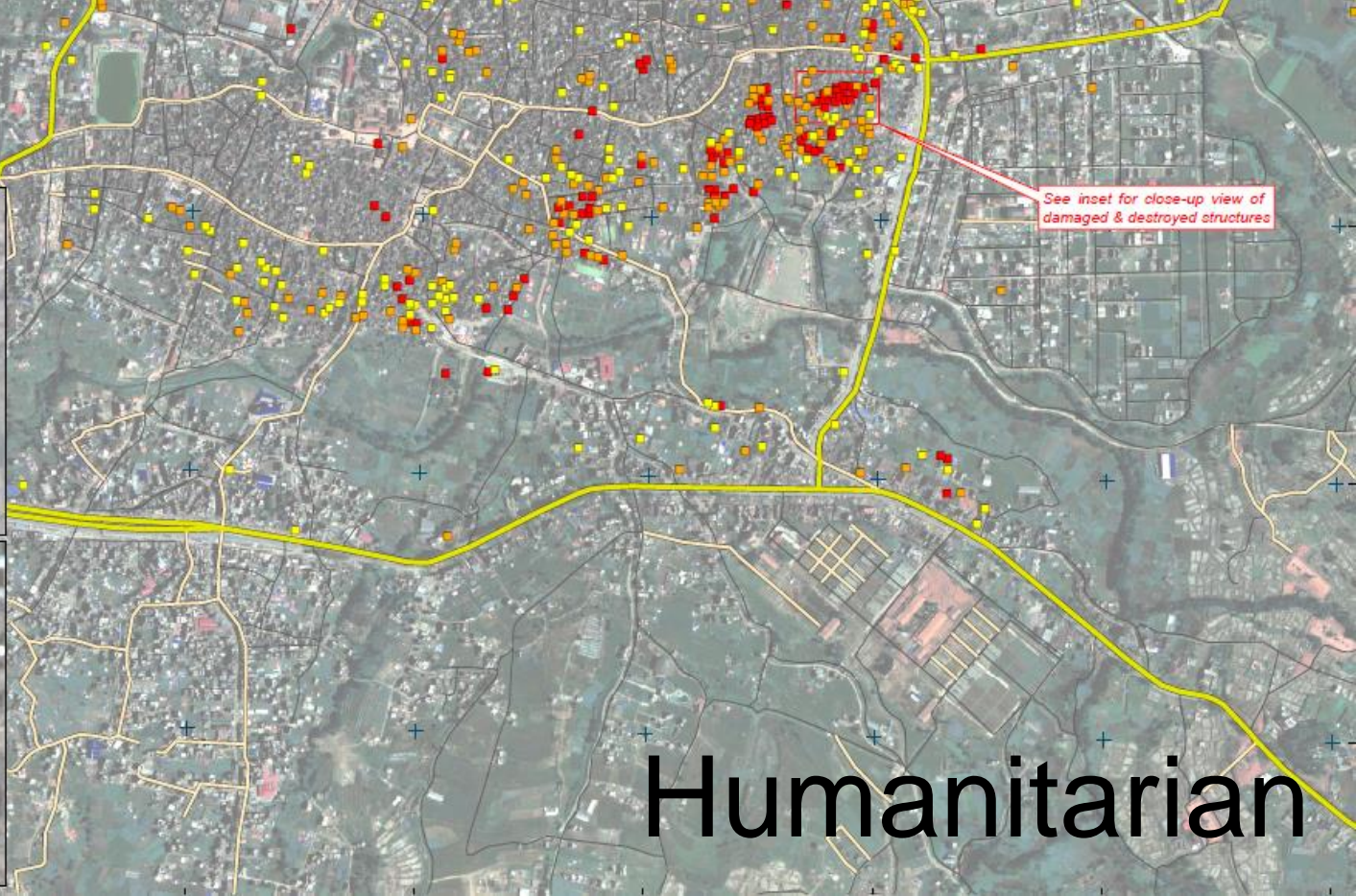




**INSET: PRE-CRISIS**



**INSET: 27 APRIL 2015**

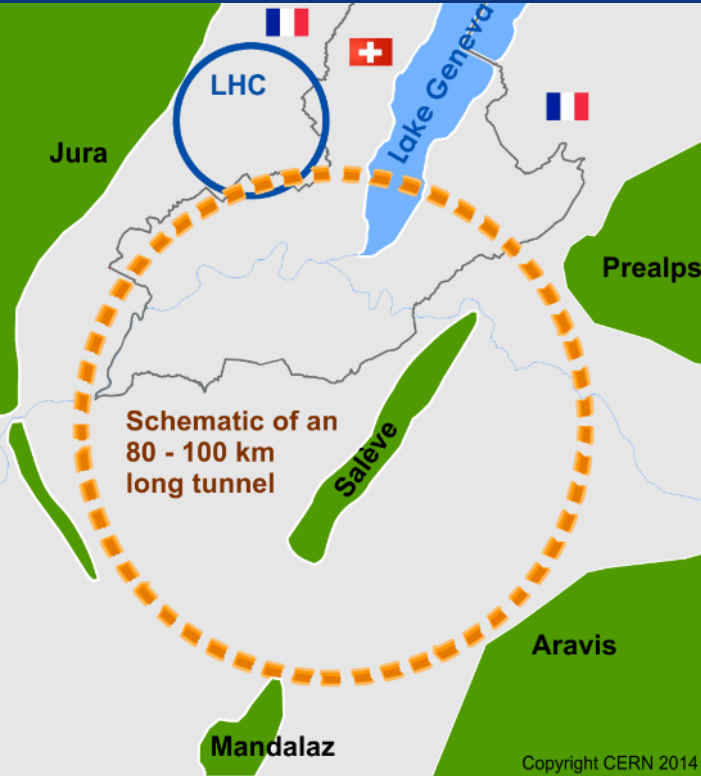


# Humanitarian

CERN

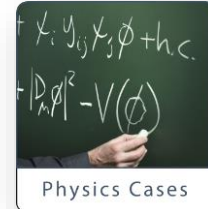
*What's next ?*



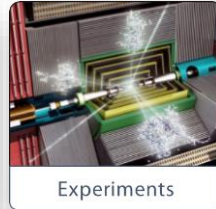


## International FCC collaboration (CERN as host lab) to study:

- ***pp*-collider (FCC-*hh*)**  
→ main emphasis, defining infrastructure requirements
- **~16 T ⇒ 100 TeV *pp* in 100 km**
- in Geneva area, site specific
- ***e<sup>+</sup>e<sup>-</sup>* collider (FCC-*ee*)**, as potential first step
- ***p-e* (FCC-*he*) option**, integration one IP, e from ERL
- **HE-LHC** with *FCC-hh* technology
- **CDR for end 2018**



Physics Cases



Experiments



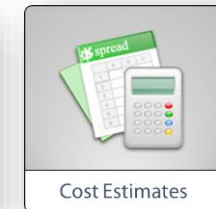
Collider Designs



R&D Programs



Infrastructures



Cost Estimates

# In a nutshell...



# Some links...

Information : [www.cern.ch](http://www.cern.ch)

CERN TV : [youtube.com/cern](https://youtube.com/cern)

Recruitment : [www.cern.ch/jobs](http://www.cern.ch/jobs)





[www.cern.ch](http://www.cern.ch)