

#askCERN

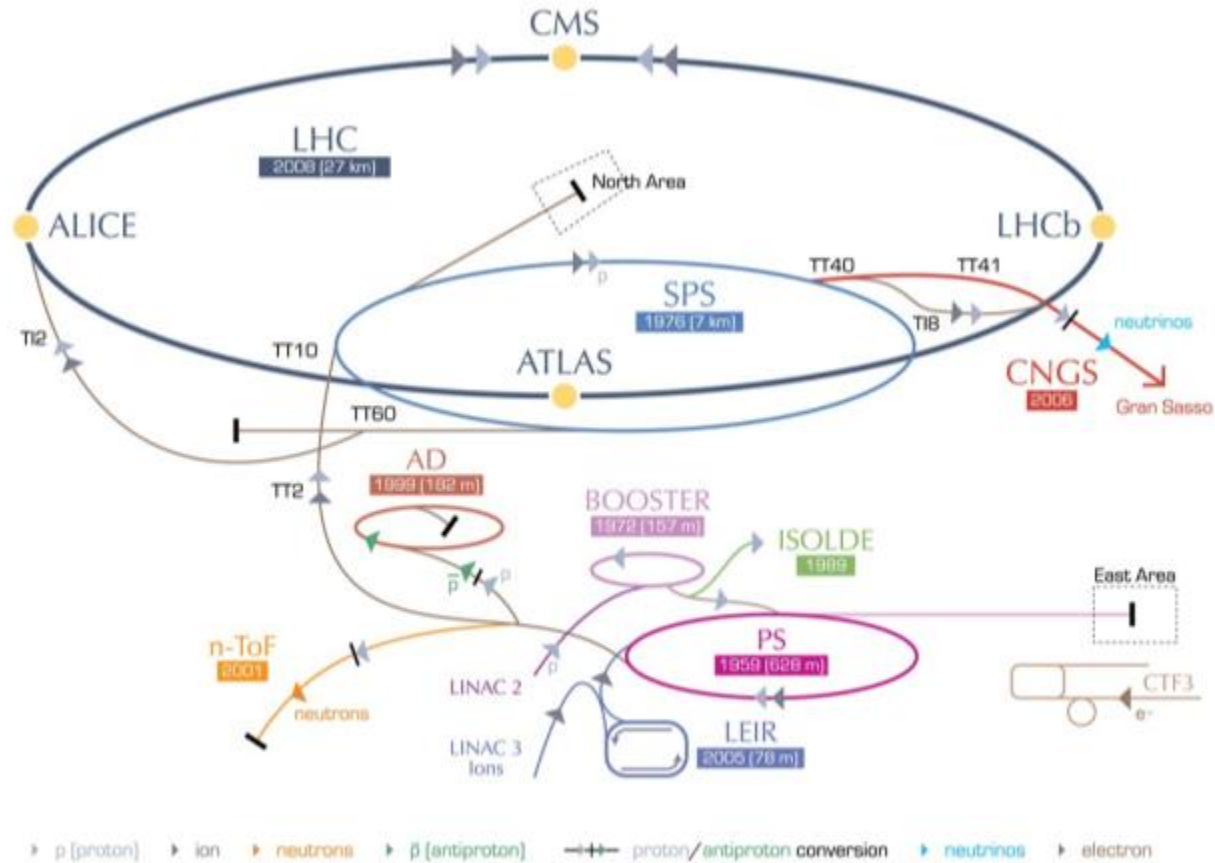
Hangout with CERN: Upgrading with TALENT

13 June 2013



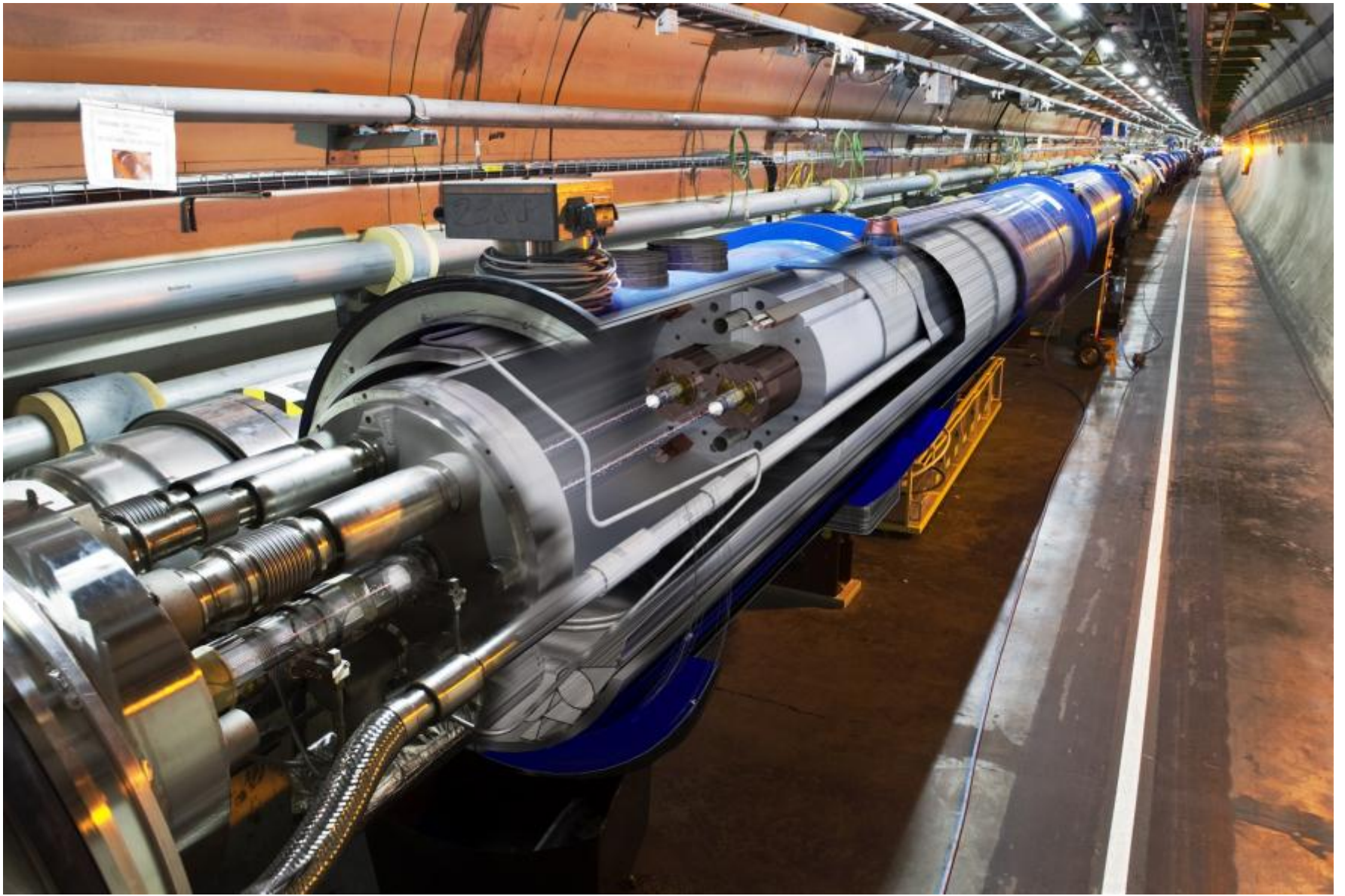


CERN's Accelerator complex



LHC Large Hadron Collider SPS Super Proton Synchrotron PS Proton Synchrotron

AD Antiproton Decelerator CTF3 Clic Test Facility CNGS Cern Neutrinos to Gran Sasso ISOLDE Isotope Separator OnLine DEvice
 LEIR Low Energy Ion Ring LINAC LINEar ACcelerator n-ToF Neutrons Time Of Flight



The main 2013-14 LHC consolidations

1695 Openings and final reclosures of the interconnections

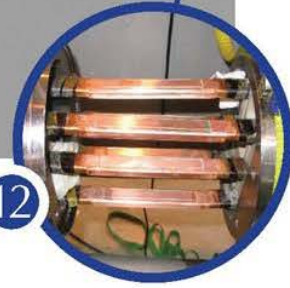
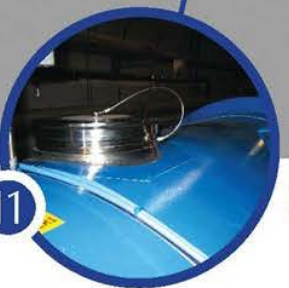
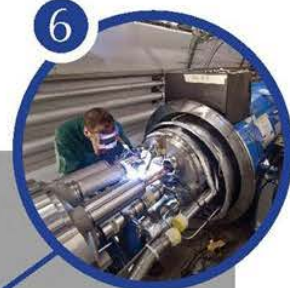
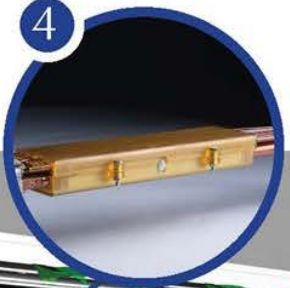
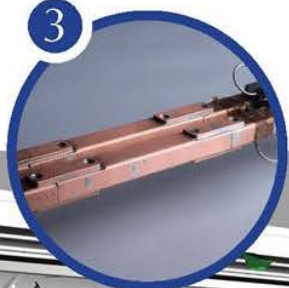
Complete reconstruction of 1500 of these splices

Consolidation of the 10170 13kA splices, installing 27 000 shunts

Installation of 5000 consolidated electrical insulation systems

300 000 electrical resistance measurements

10170 orbital welding of stainless steel lines



18 000 electrical Quality Assurance tests

10170 leak tightness tests

4 quadrupole magnets to be replaced

15 dipole magnets to be replaced

Installation of 612 pressure relief devices to bring the total to 1344

Consolidation of the 13 kA circuits in the 16 main electrical feed-boxes



SUISSE
FRANCE

CMS

LHCb

ATLAS

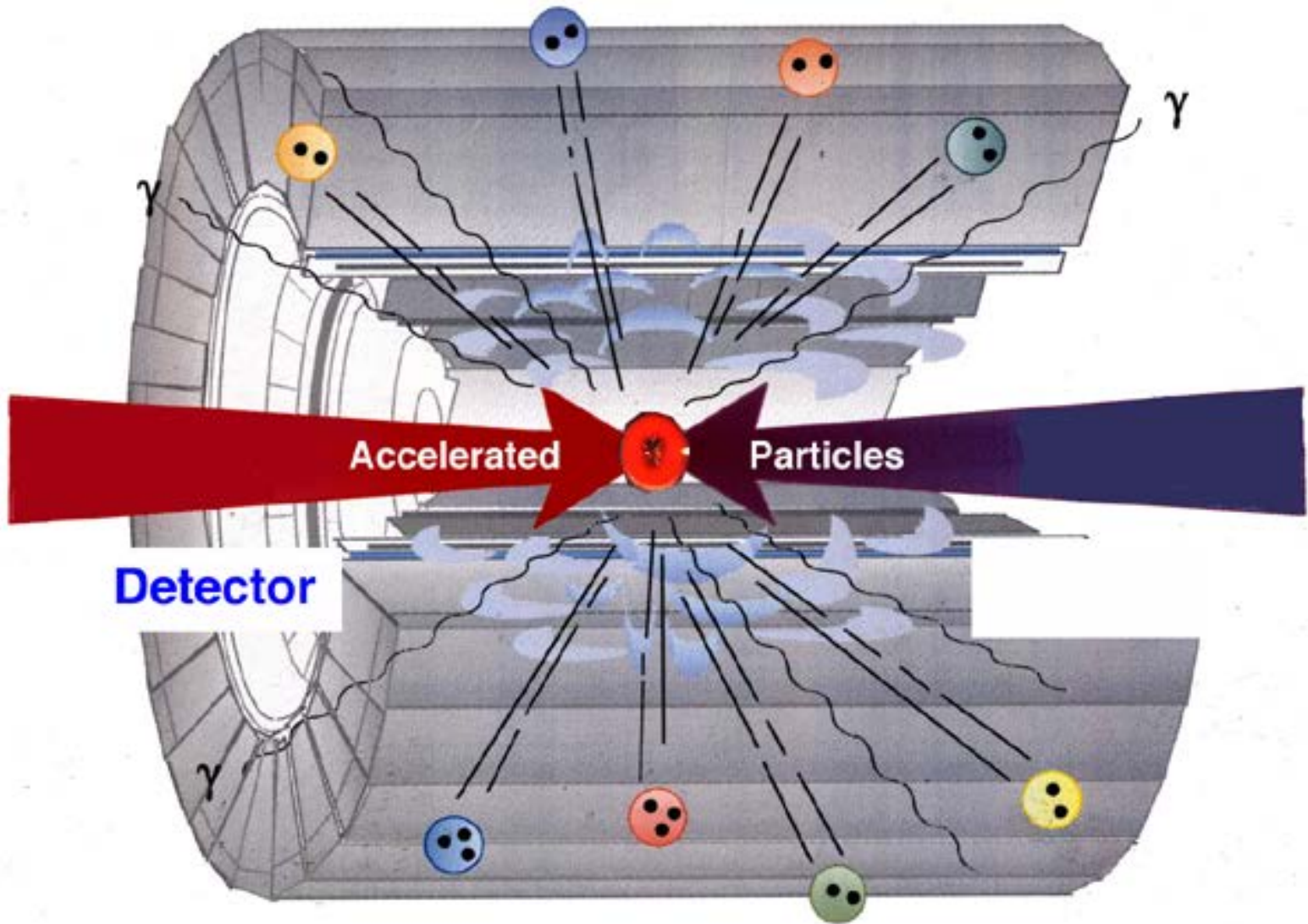
CERN Meyrin

CERN Prévessin

SPS 7 km

ALICE

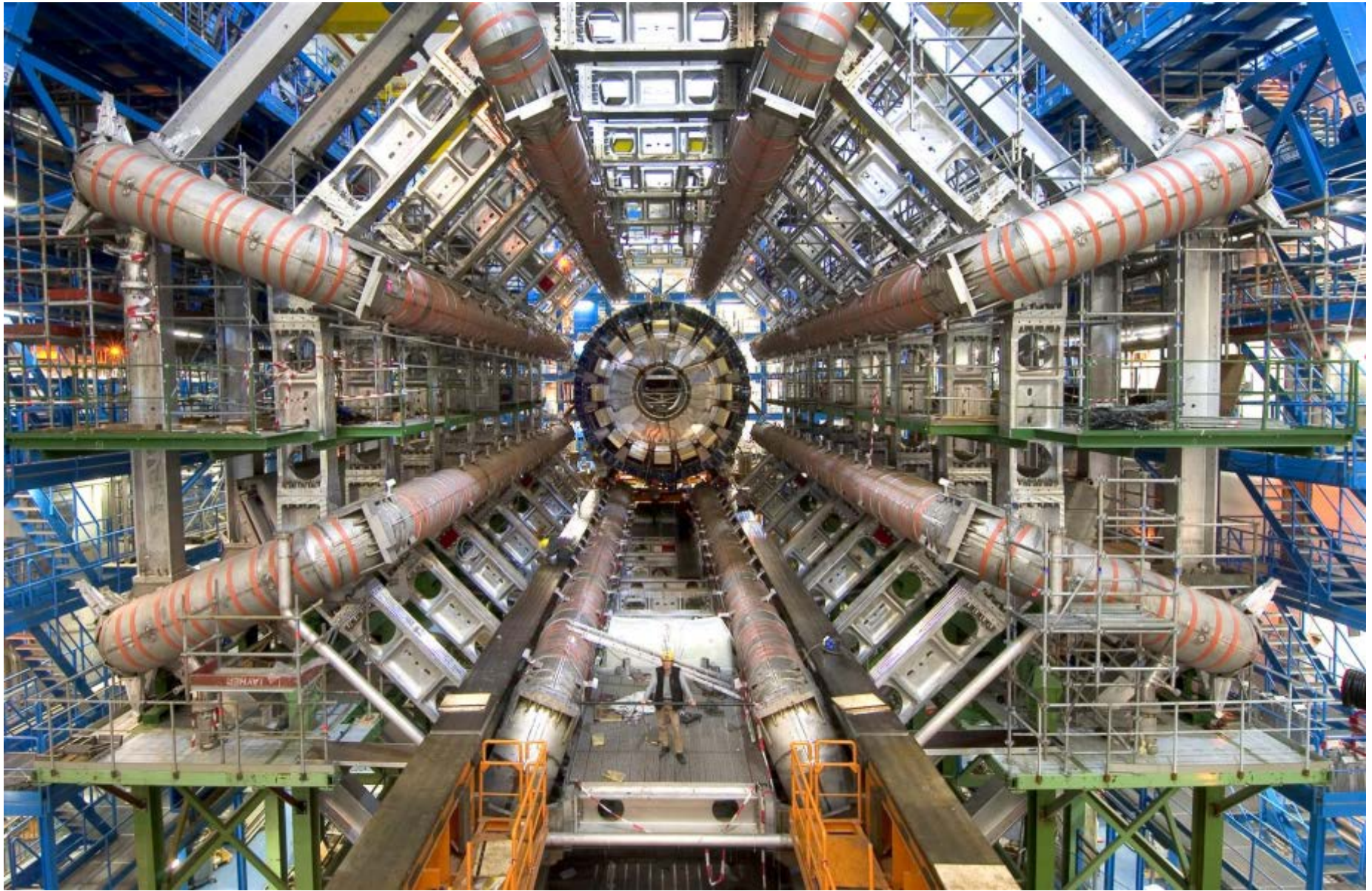
LHC 27 km

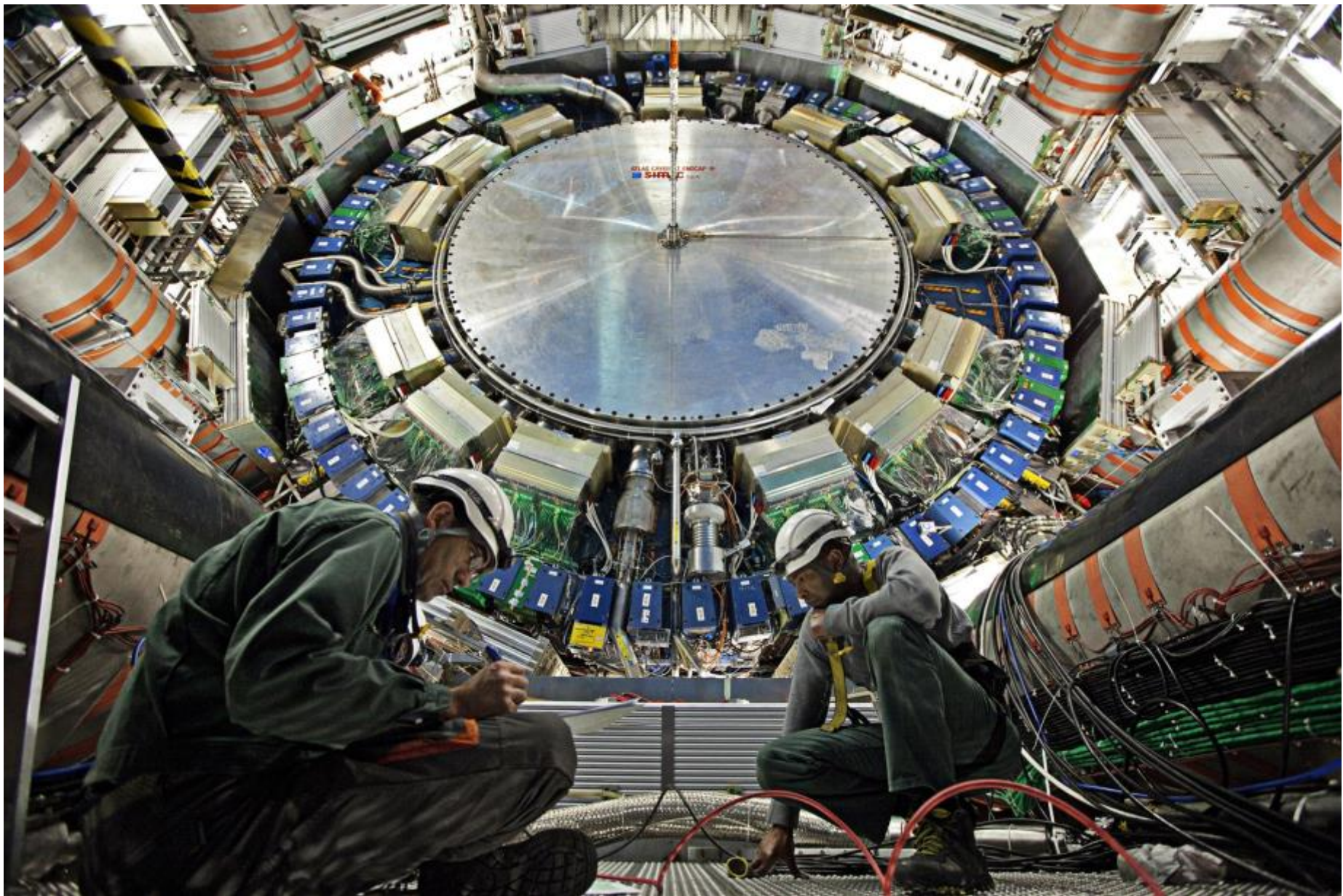


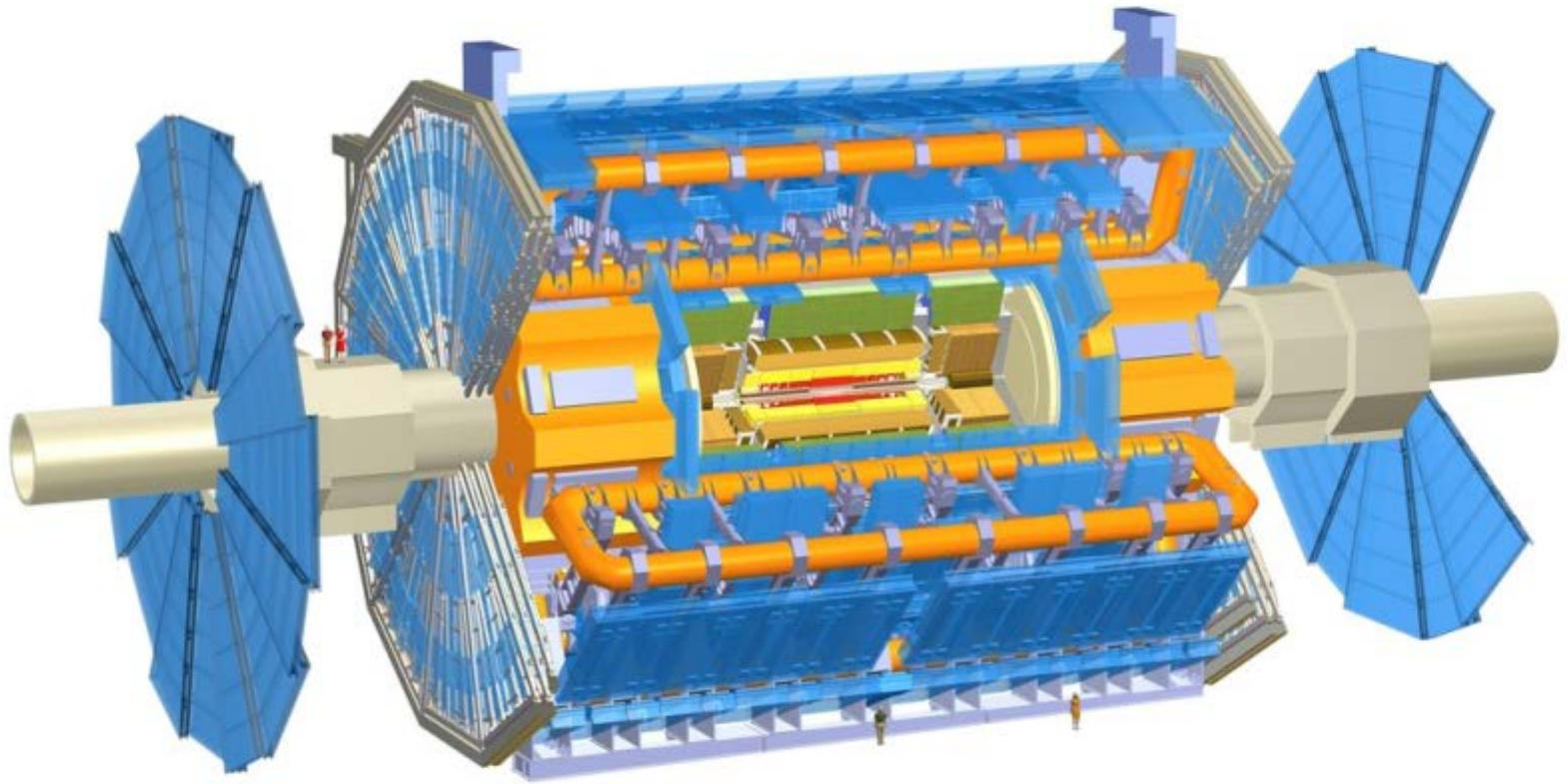
Today's trivia question

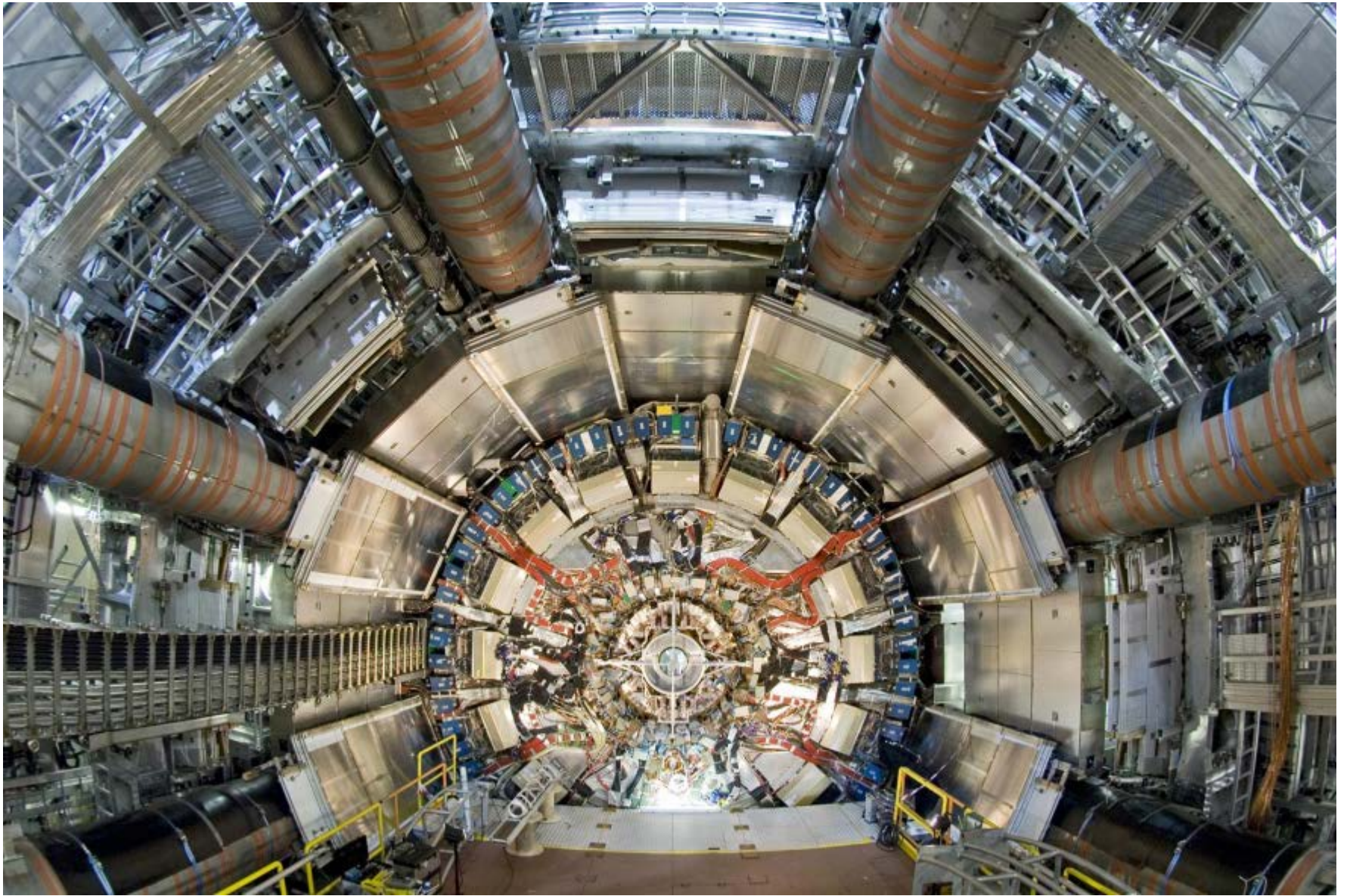
We're speaking about the TALENT project.

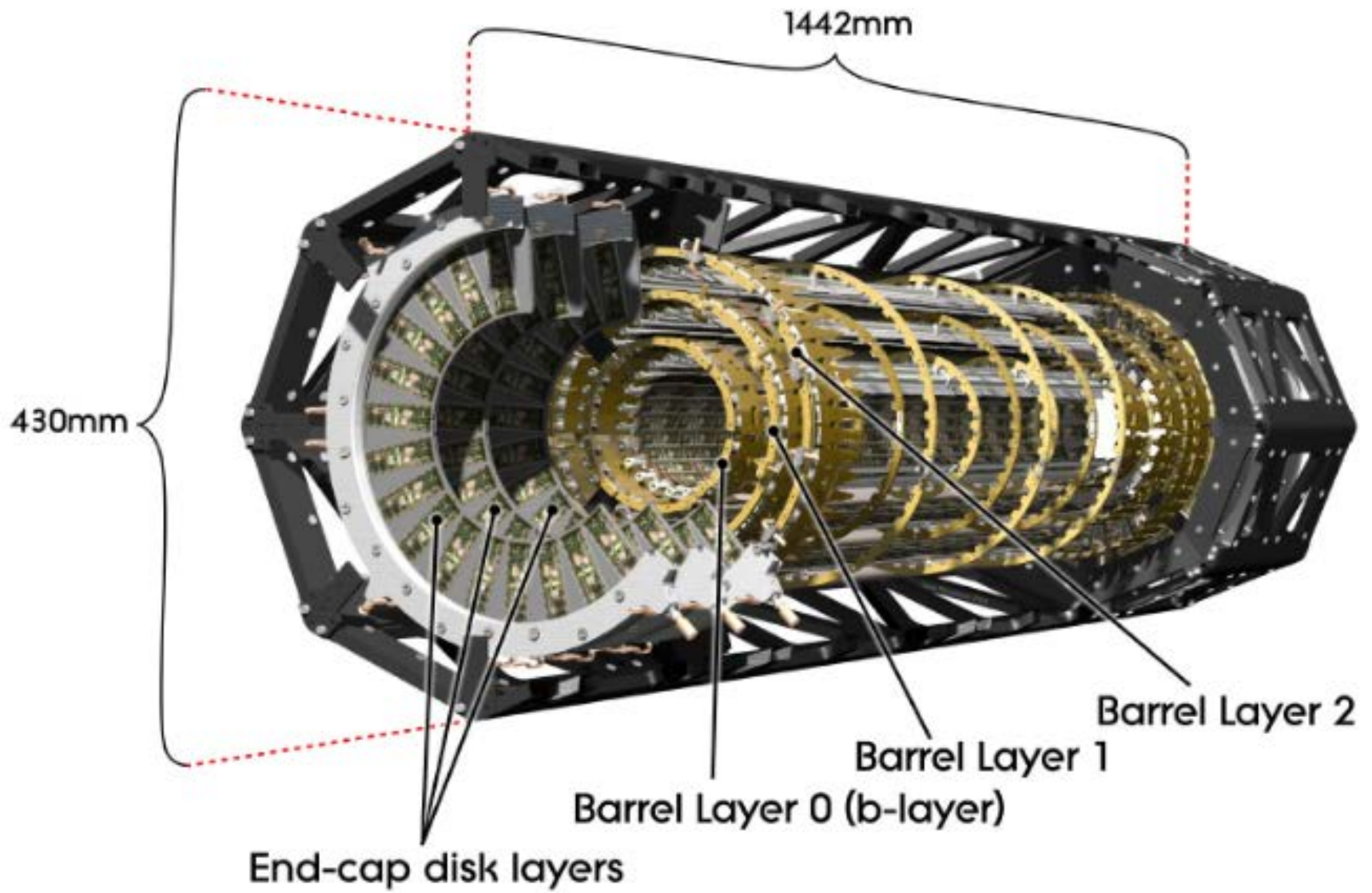
What does the acronym 'TALENT' stand for?











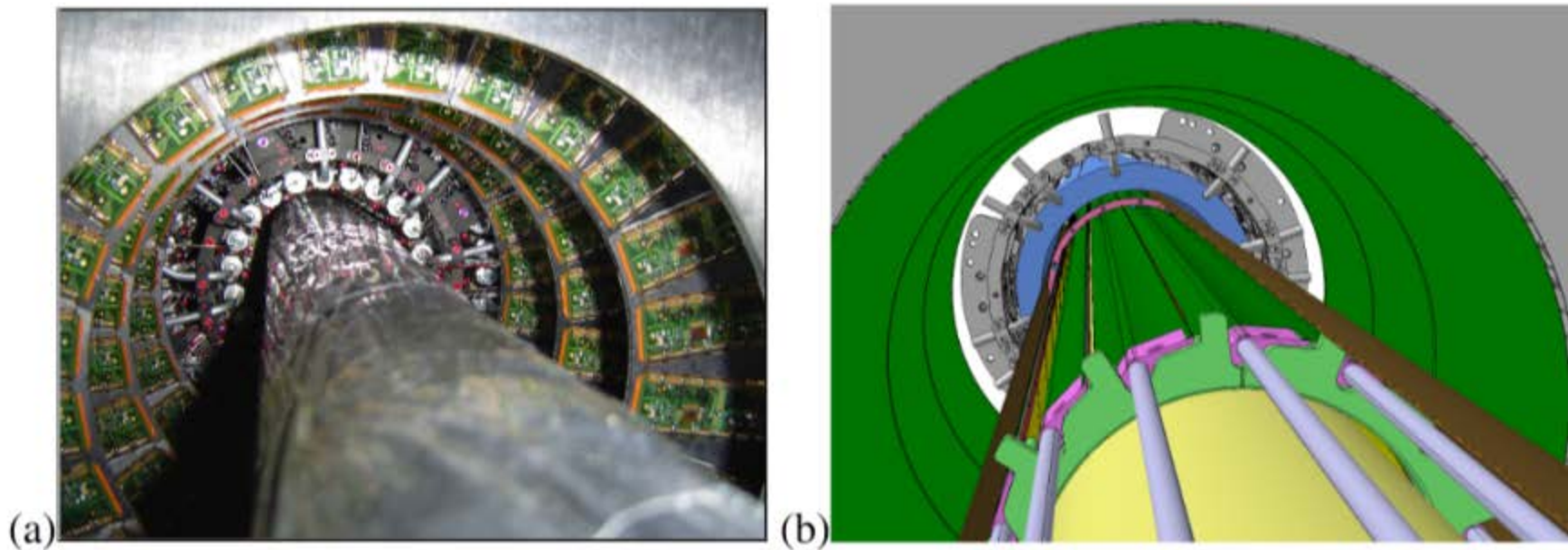


Figure 4. (a) Photo of the Pixel detector with the inserted beam pipe during the integration in SR1 building, and (b) rendering of the insertion of the IBL with the smaller beam pipe.

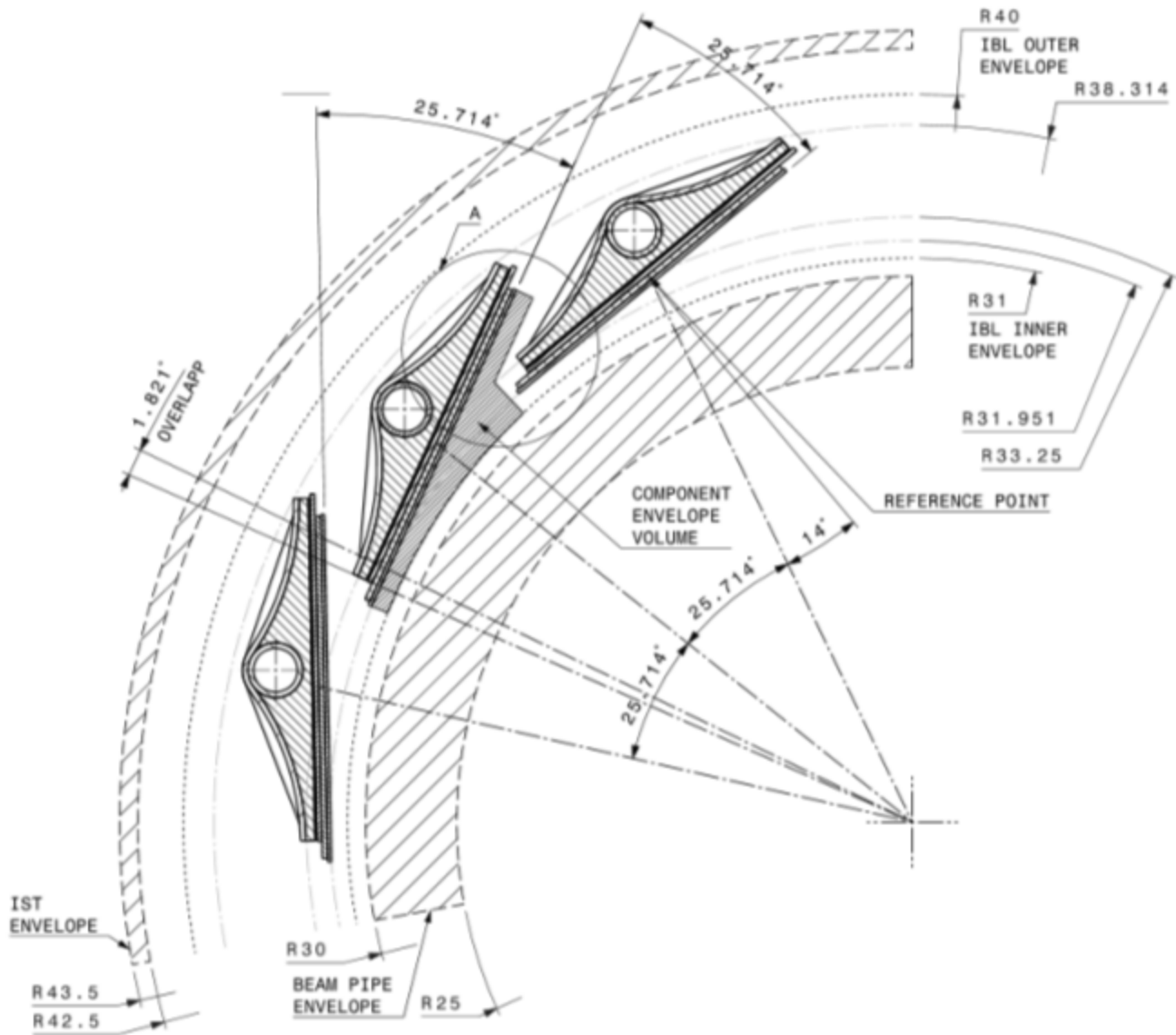
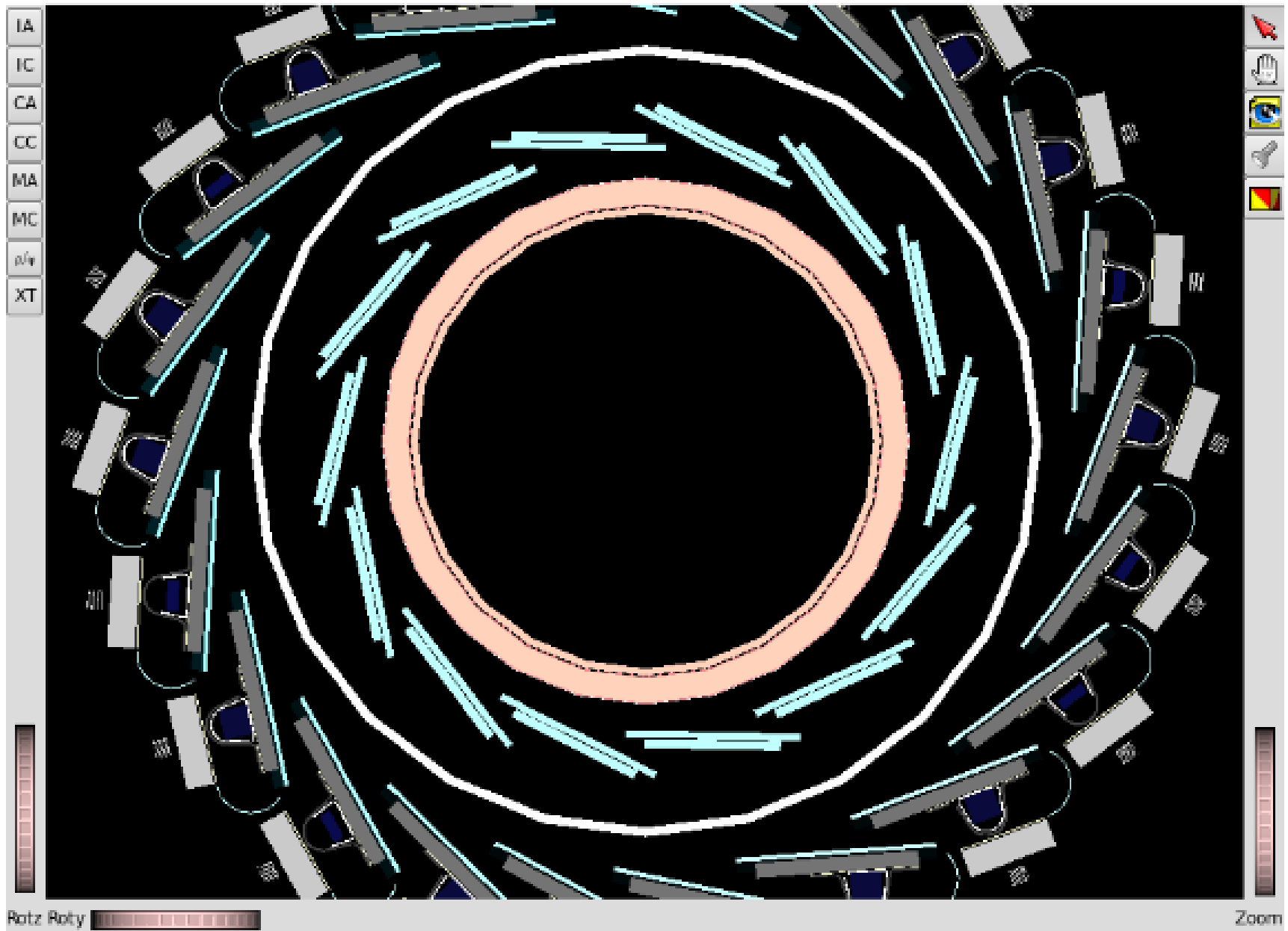
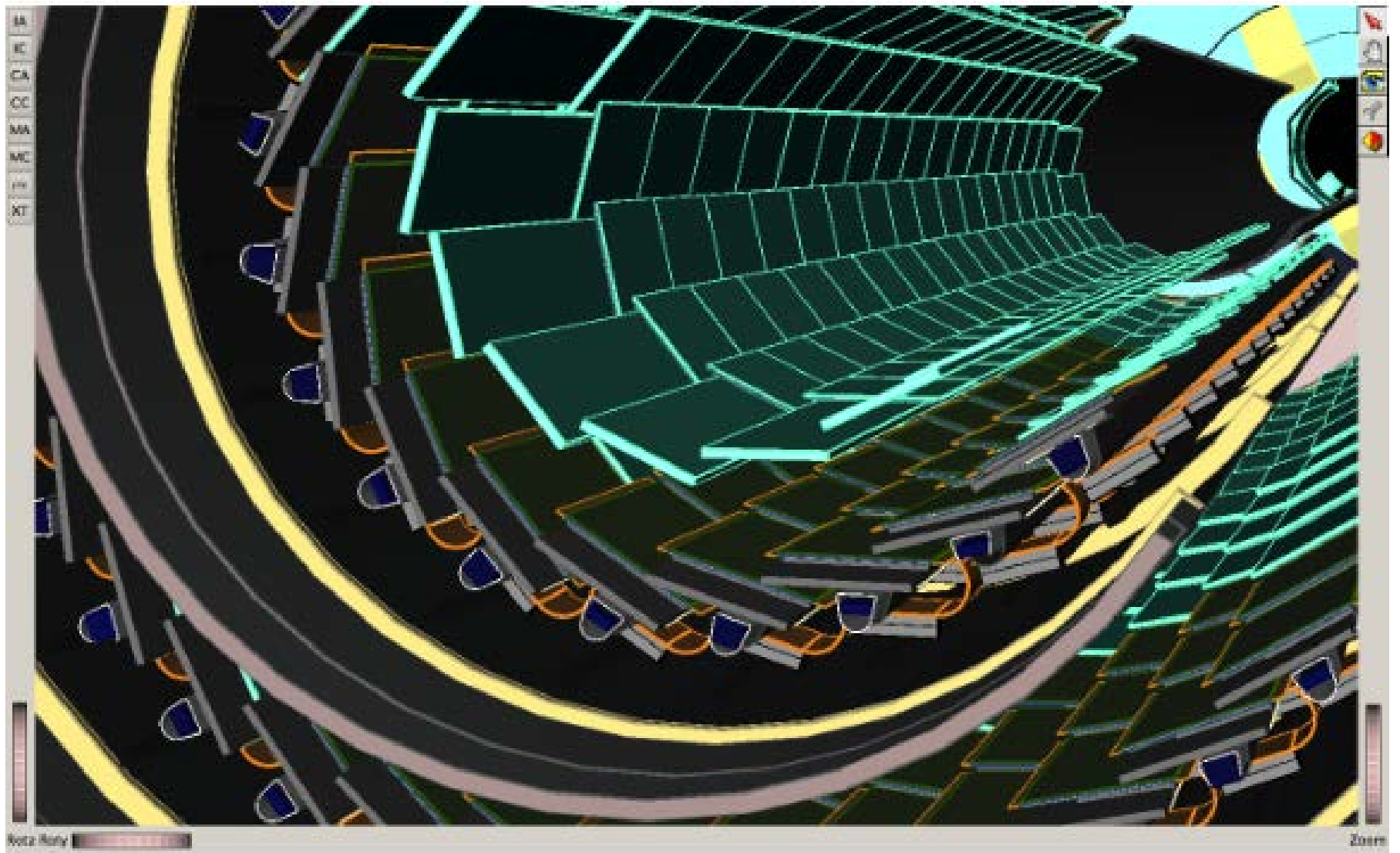


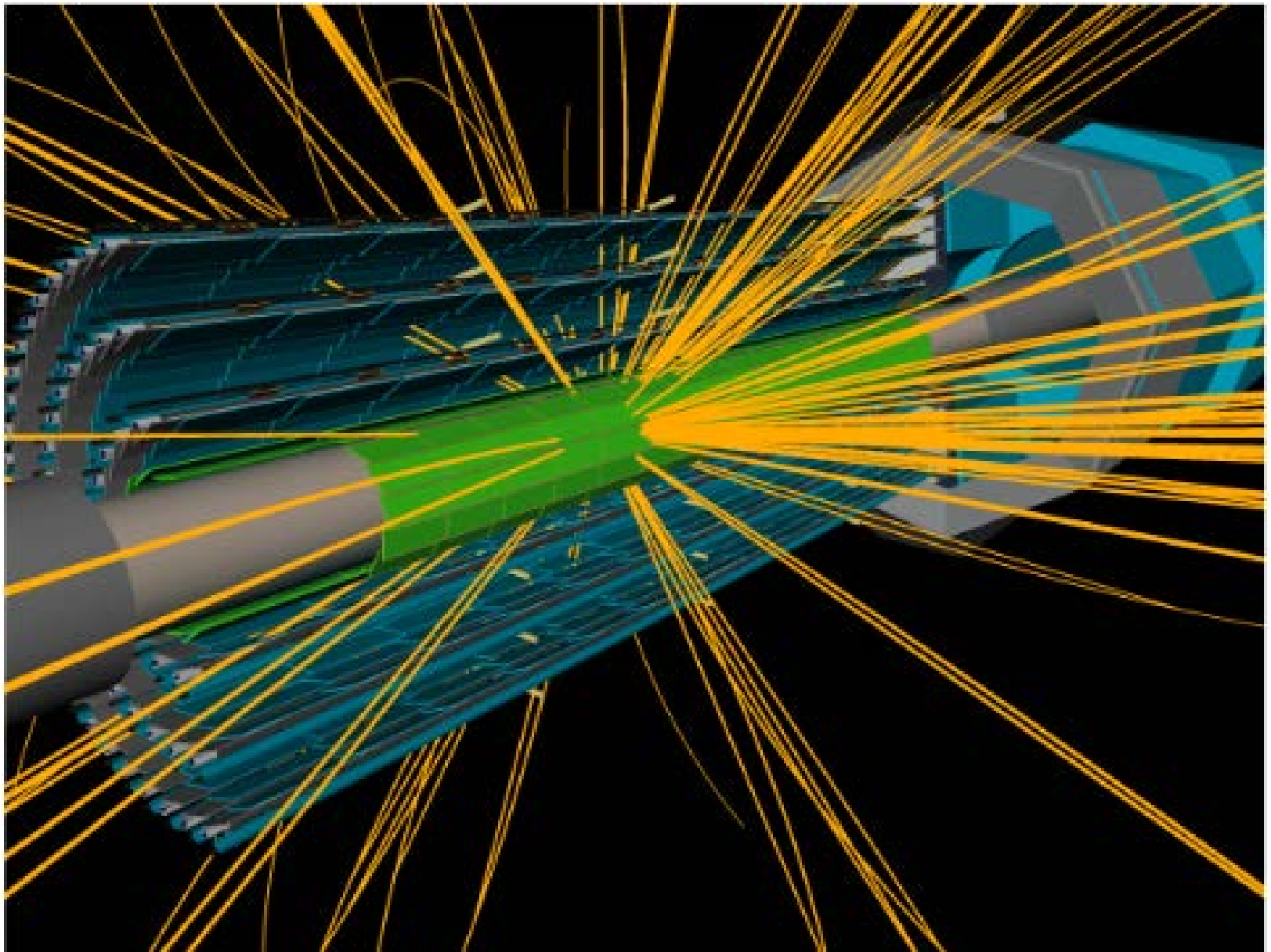
Figure 5. IBL layout: $r\phi$ view.

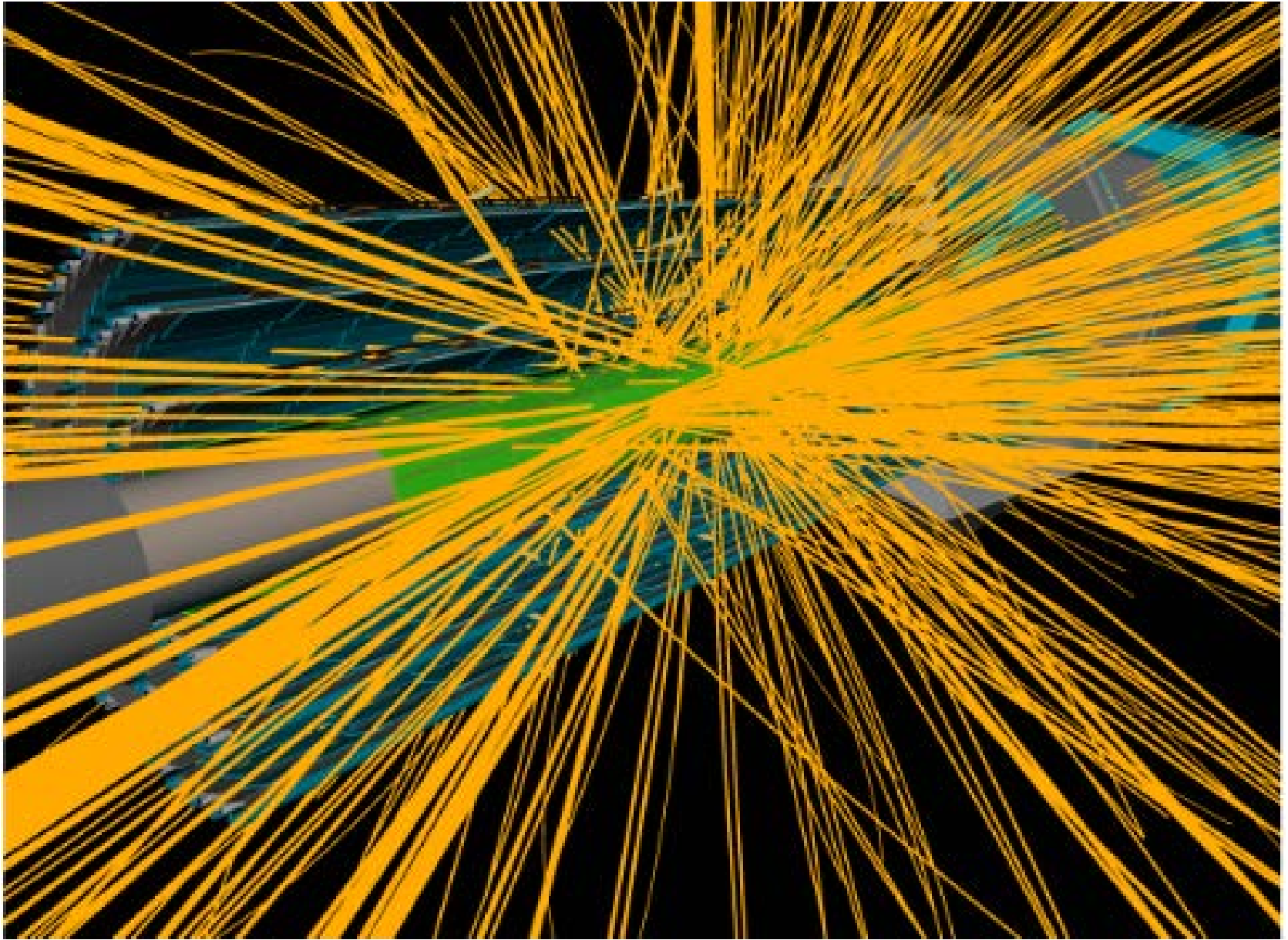


Rotz Roty

Zoom







 **ATLAS**
EXPERIMENT

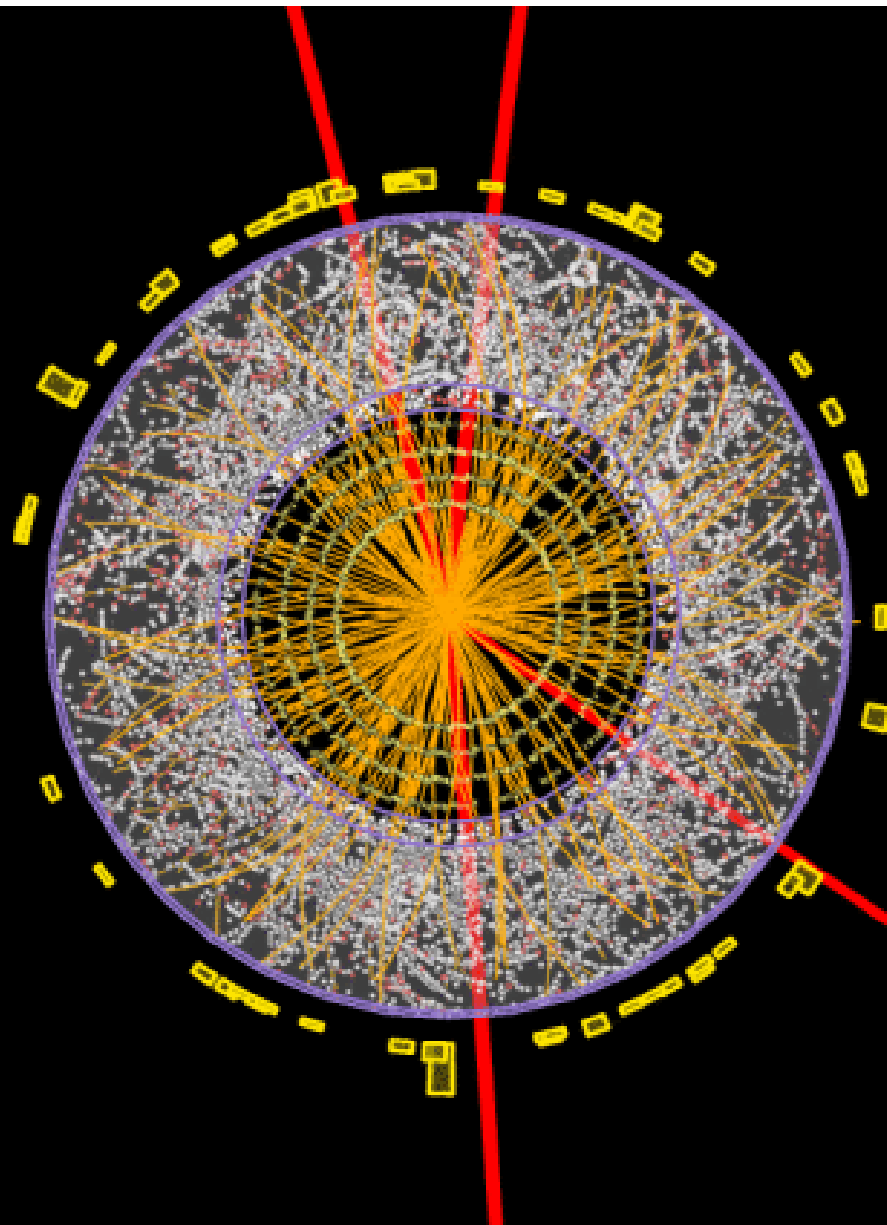
<http://atlas.ch>

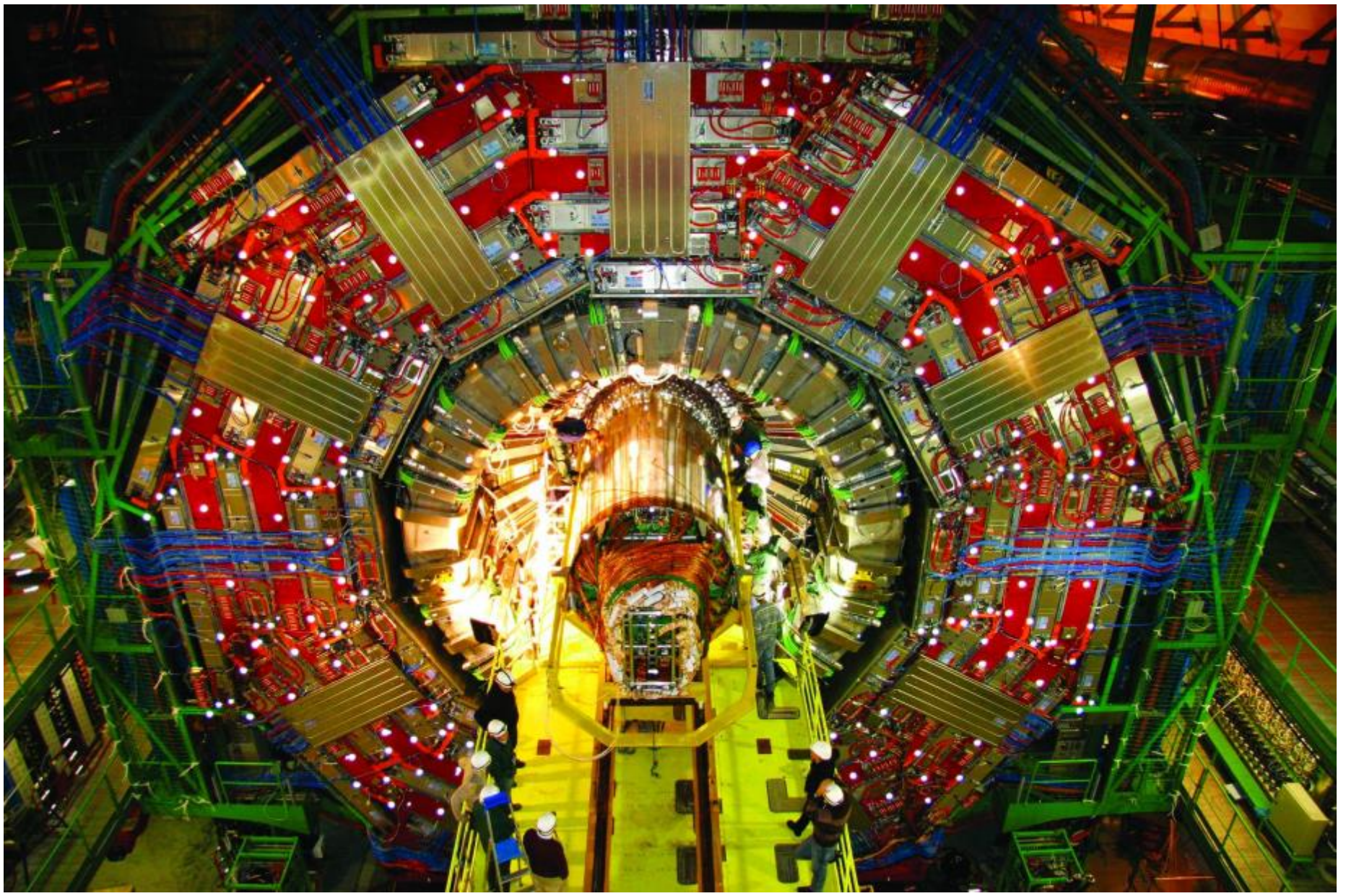
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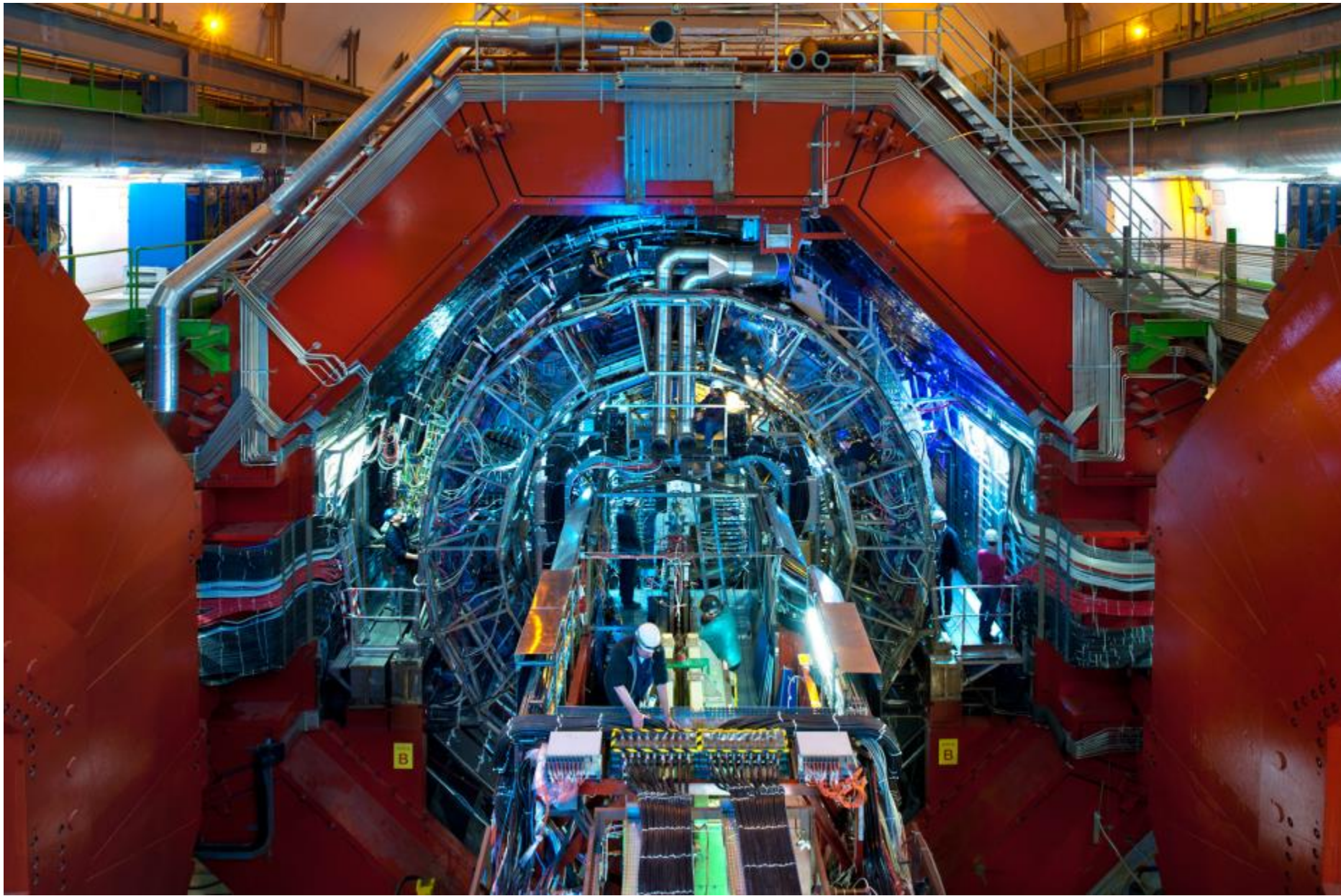
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Date: 2012-06-10

Time: 13:24:31 CEST









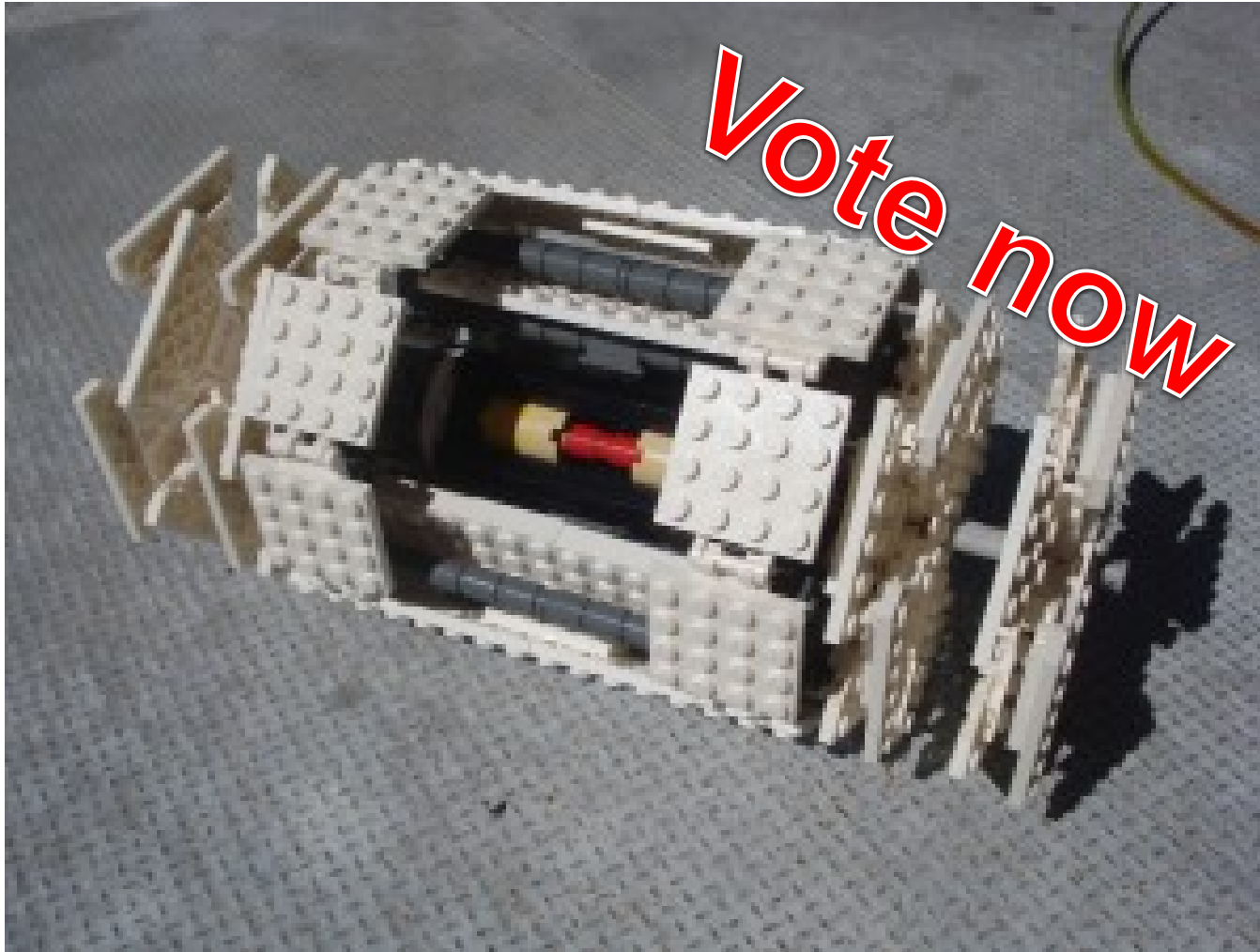
Today's trivia answer

Q. We're speaking about the TALENT project, what does the acronym 'TALENT' stand for?

A. **T**rainning for **cA**reer deve**L**opment in high-radiation **EN**vironment **T**echnologies


<http://cern.ch/talent/>

<http://atlas.ch/blog/?p=1839>



cern.ch/LHCathome


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LHC@home

LHC@home is a platform for volunteers to help physicists develop and exploit particle accelerators like CERN's [Large Hadron Collider](#), and to compare theory with experiment in the search for new fundamental particles.

By contributing spare processing capacity on their home and laptop computers, volunteers may run simulations of beam dynamics and particle collisions in the [LHC's giant detectors](#).




The Sixtrack project
Help us to study the LHC machine and its upgrade to understand the fundamental laws of the universe.

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The Test4Theory project
Help us on the research about the elusive Higgs particle with our virtual atom smasher.


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You can! Become a volunteer scientists donating some CPU cycles.

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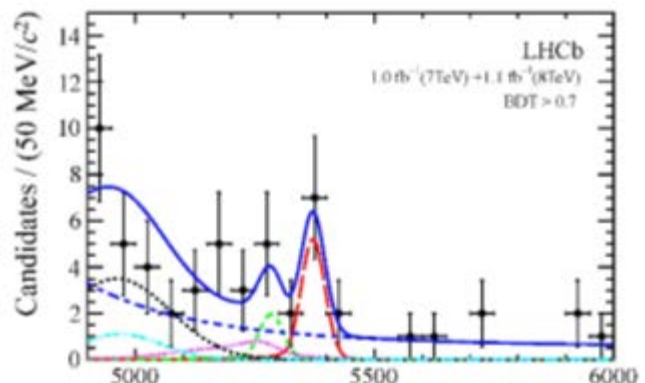


[Impact majeur pour une toute petite mesure](#) [Mémo 2.00](#)
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Huge impact from a tiny decay

The [Hadron Collider Physics Symposium](#) opened on November 12 in Kyoto on a grand note. For the first time, the [LHCb](#) collaboration operating at the [Large Hadron Collider](#) (LHC) at [CERN](#) showed evidence for an extremely rare type of events, namely the decay of a B_s meson into a pair of muons (a particle very similar to the electron but 200 times heavier). A meson is a composite class of particles formed from a quark and an antiquark. The B_s meson is made of a bottom quark b and a strange quark s . This particle is very unstable and decays in about a picosecond (a millionth of a millionth of a second) into lighter particles.

Decays into two muons are predicted by the theory, the [Standard Model of particle physics](#), that states it should occur only about 3 times in a billionth of decays. In scientific notation, we write $(3.54 \pm 0.30) \times 10^{-9}$ where the value of 0.30 represents the error margin on this theoretical calculation. Now, the LHCb collaboration proudly announced that they observed it at a rate of $(3.2^{+1.5}_{-1.2}) \times 10^{-9}$, a value very close to the theoretically predicted value, at least within the experimental error.



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[Mémo 2.00](#) [Le mystère plane toujours sur le boson de Higgs](#)
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The mystery remains on the Higgs boson

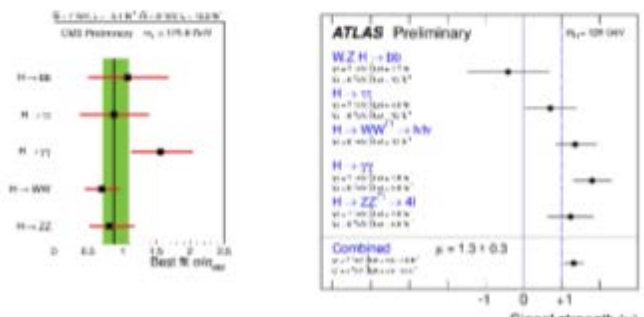
Ever since the discovery of what might be the [Higgs boson last July](#), physicists from the [CMS](#) and [ATLAS](#) experiments have been trying to pinpoint its true identity. Is this the Higgs boson expected by the [Standard Model of particle physics](#) or some 'Higgs-like boson' betting a different theoretical model?

To tell the difference, we must check all its properties, like how often this boson decays into different types of particles, and determine its spin and parity, two properties of fundamental particles.

Since the new boson has a short lifetime, it breaks apart immediately after being created. There are five ways a Standard Model Higgs boson should decay that we can study at the [Large Hadron Collider](#) (LHC): breaking into two photons, two W or two Z bosons, two b quarks or two tau leptons in well defined proportions. We must check both the presence of and the rate at which each decay mode occurs.

Last summer, just after the discovery of the new boson, both experiments reported unambiguous observations in only three channels. Unfortunately, the data sample was still too small to really be able to check if the new boson could decay into a pair of b quarks or tau leptons.

With more data available, the two experiments have just shown results for all channels today at a [conference](#) held in Kyoto as shown on the two figures below.



<http://opendays2013.web.cern.ch/>

CERN OPENDAYS

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CERN opens its doors September 28th - 29th



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CERN is the biggest particle physics laboratory in the world.

More than 10,000 physicists from all around the world come to CERN to carry out experiments whose aim is to advance the understanding of the fundamentals of matter and the nature of our universe.

To explore these new frontiers of knowledge, CERN has developed a chain of accelerators, culminating in the LHC, has installed enormous particle detectors, and has pushed technology to its limits.

News

Two full days for the general public!

03/05/2013

CERN will open its doors to the general public over two days and not just one as it was the case in 2004 and 2008.

There is a great deal of interest in what is happening at CERN so we expect a very large number of visitors.

As there are only a limited number of visit points, spreading the visits over two days will give many more people a chance to experience the fascinating things on show.

We have also extended the opening hours to 09:00-20:00 each day.

Next week's Hangout with CERN

- Thursday 20 June, same time 17:00 CEST
 - All about SUSY

Participants

Mar Capeans Garrido, CERN

Rafael Tedin Alvarez, Atostek Oy

Arno E. Kompatscher, CiS

Laura Franconi, University of Oslo

Credits

Steven Goldfarb — Host

Marzena Lapka — Q&A from Social Media

Kate Kahle and Achintya Rao — Production

Thank you for watching!



www.cern.ch