

The background of the slide is a light blue color with a complex pattern of white and yellow lines. These lines represent particle tracks from a detector, showing various paths, some straight and some curved, with some points highlighted in yellow. The tracks are scattered across the entire slide, creating a technical and scientific atmosphere.

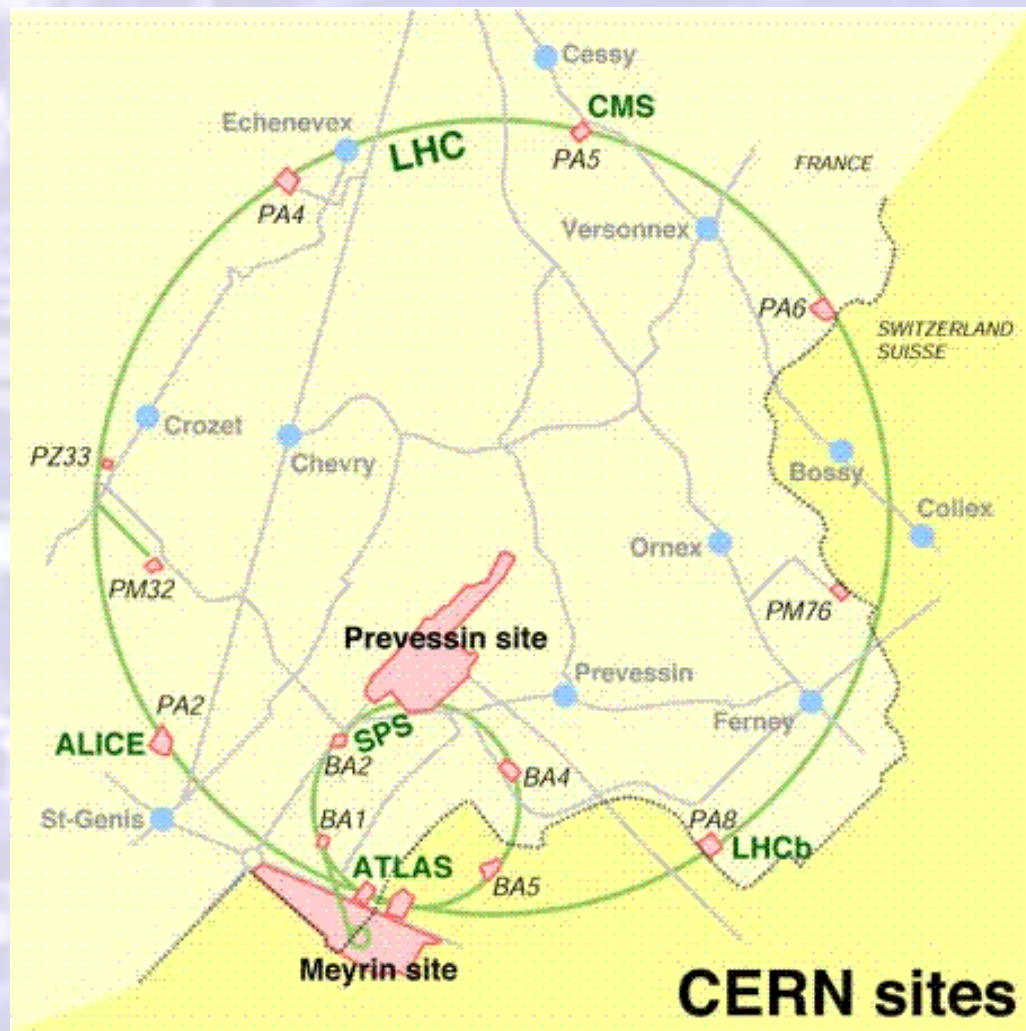
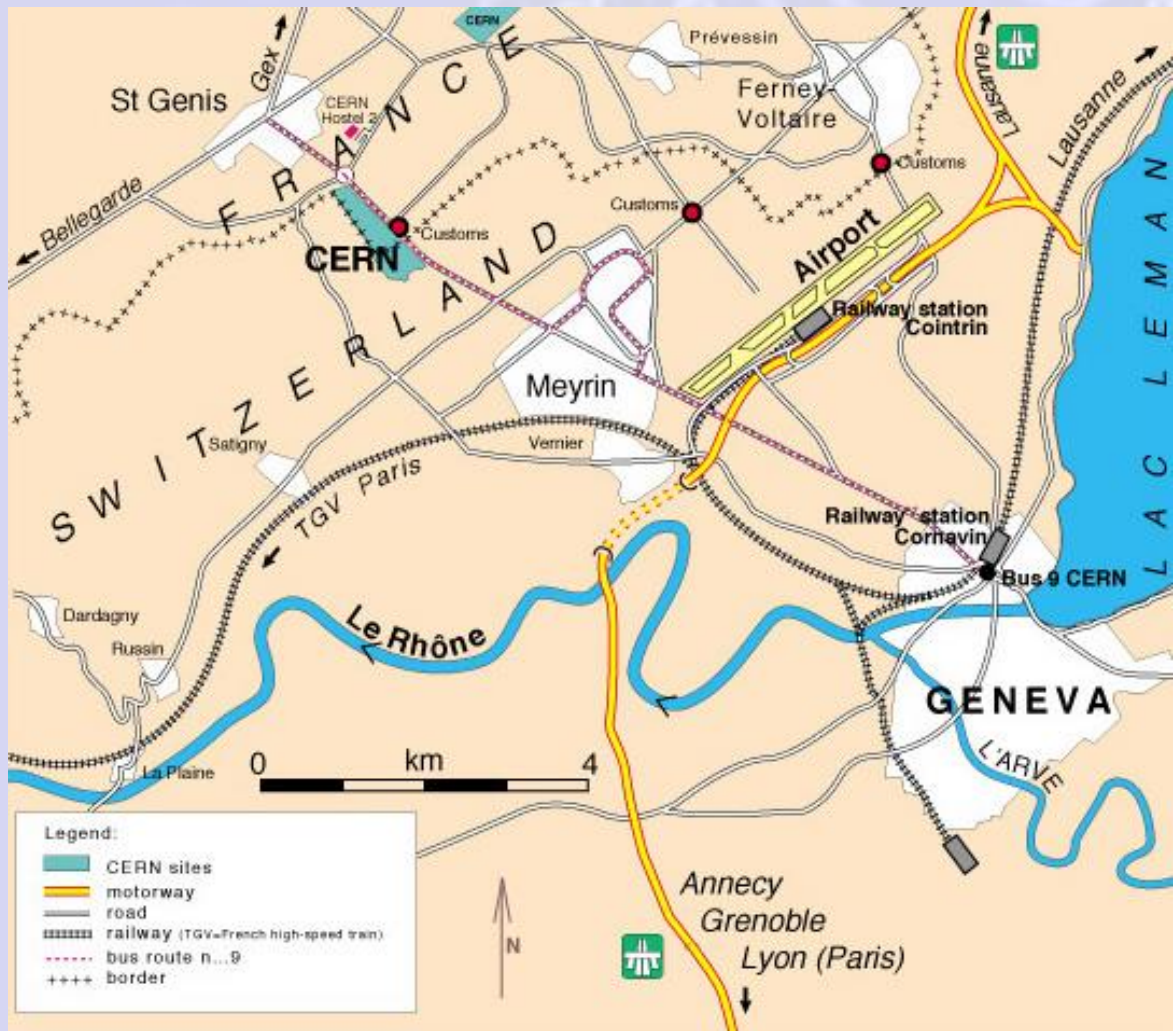
# What I did at CERN this summer

Kevin Martz

Johns Hopkins University QuarkNet

# What is CERN and why is this year special?

- CERN is the 'Council European for Research Nuclear' and straddles the border between Switzerland and France, near Geneva Switzerland.
- It is home to the Large Hadron Collider as well as many additional particle physics experiments (ATLAS, CMS, LHCb, etc.)
- 2014 marks the 60<sup>th</sup> anniversary of CERN. Various celebrations are taking place all year long.



**CERN sites**

# HST 2014

- I was selected to take part in the High School Teachers Program for 2014.
- 54 teachers from 32 countries were invited for a three week session where were introduced to CERN and its mission, and study particle physics with experts.
- Most importantly, CERN was founded as a place where scientists from across Europe (and the world) could study physics in peace (more on that later).

# HST 2014

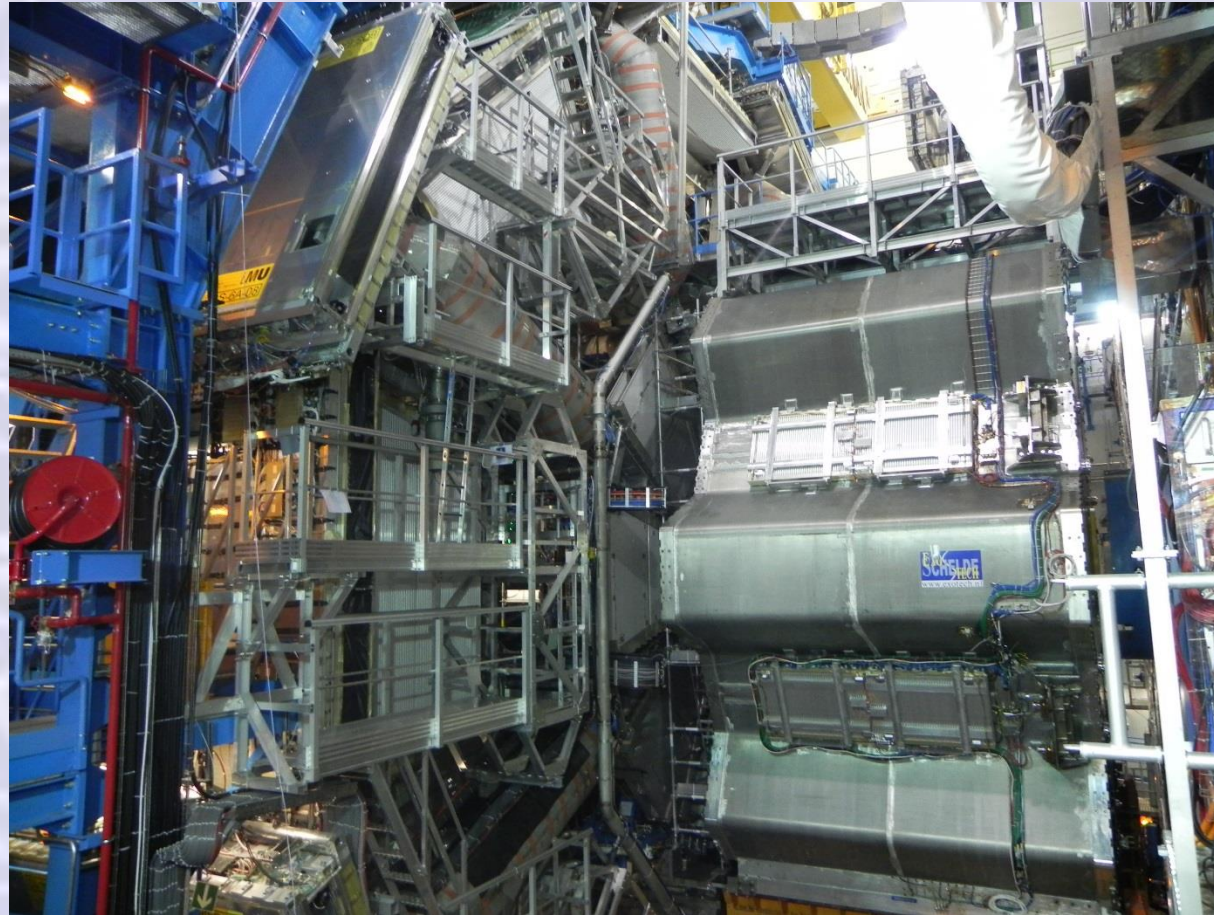
- Our three week visit was quite busy and included the following:
- Regular lectures from scientists and researchers
- Tours of the facility (including ATLAS, ALICE, CMS, LHCb, COMPASS and ALPHA)
- Question and answer sessions with various physicists
- Group work (committees) to develop teaching materials or other resources for teachers. (I participated in the Cosmic Ray working group).
- A visit from the Director General, Rolf Heuer  
<http://home.web.cern.ch/students-educators/updates/2014/07/inspiring-science-education-middle-east>
- Optional trips to Montreux or Mont Blanc

No longer Mick's show, it's Konrad's now



# ATLAS

ATLAS helped  
find the Higgs  
boson.



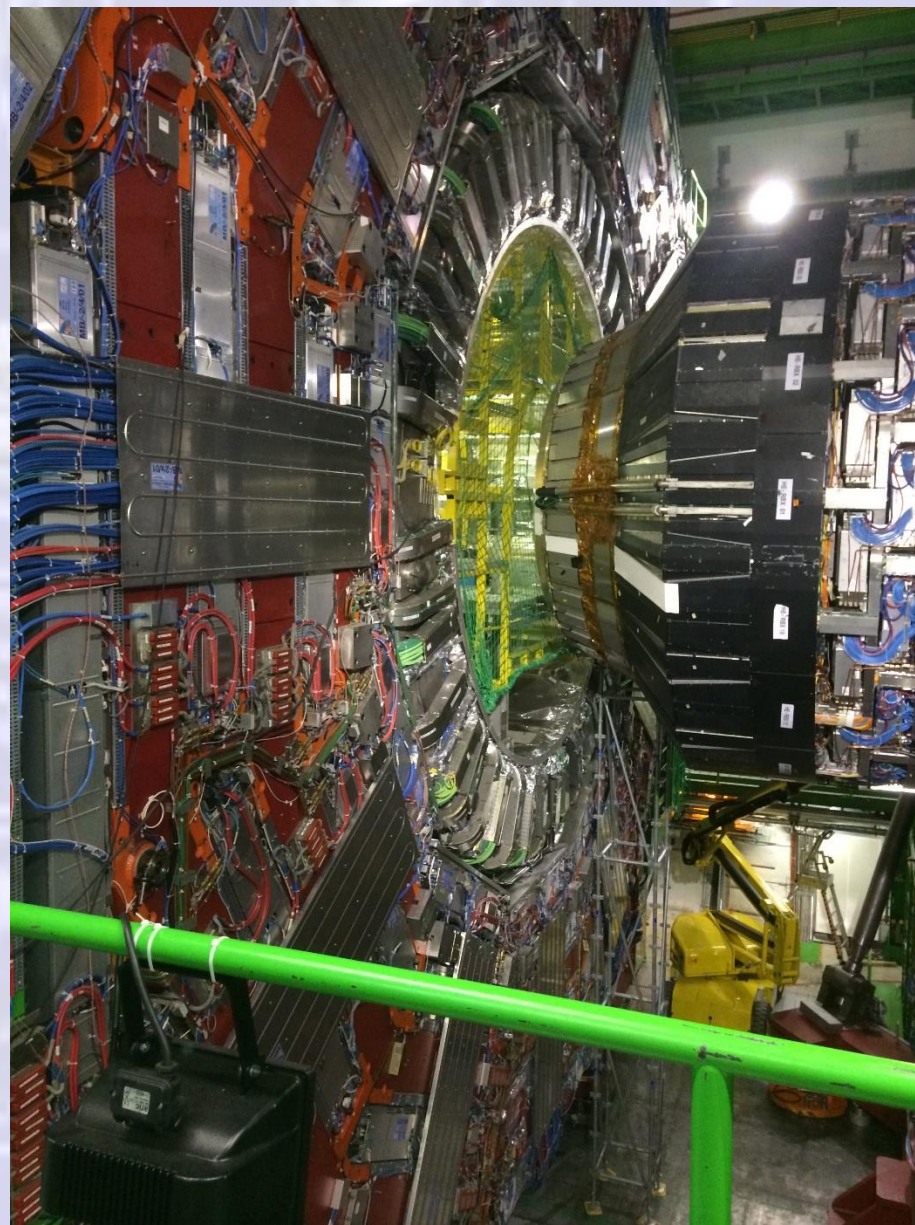
# CMS (Compact Muon Solenoid)



CMS also worked to find the Higgs boson.  
This was taken in the toroid shaped CMS building.



CMS



@CMS



# ALPHA

Here they study the differences between Hydrogen and anti Hydrogen.



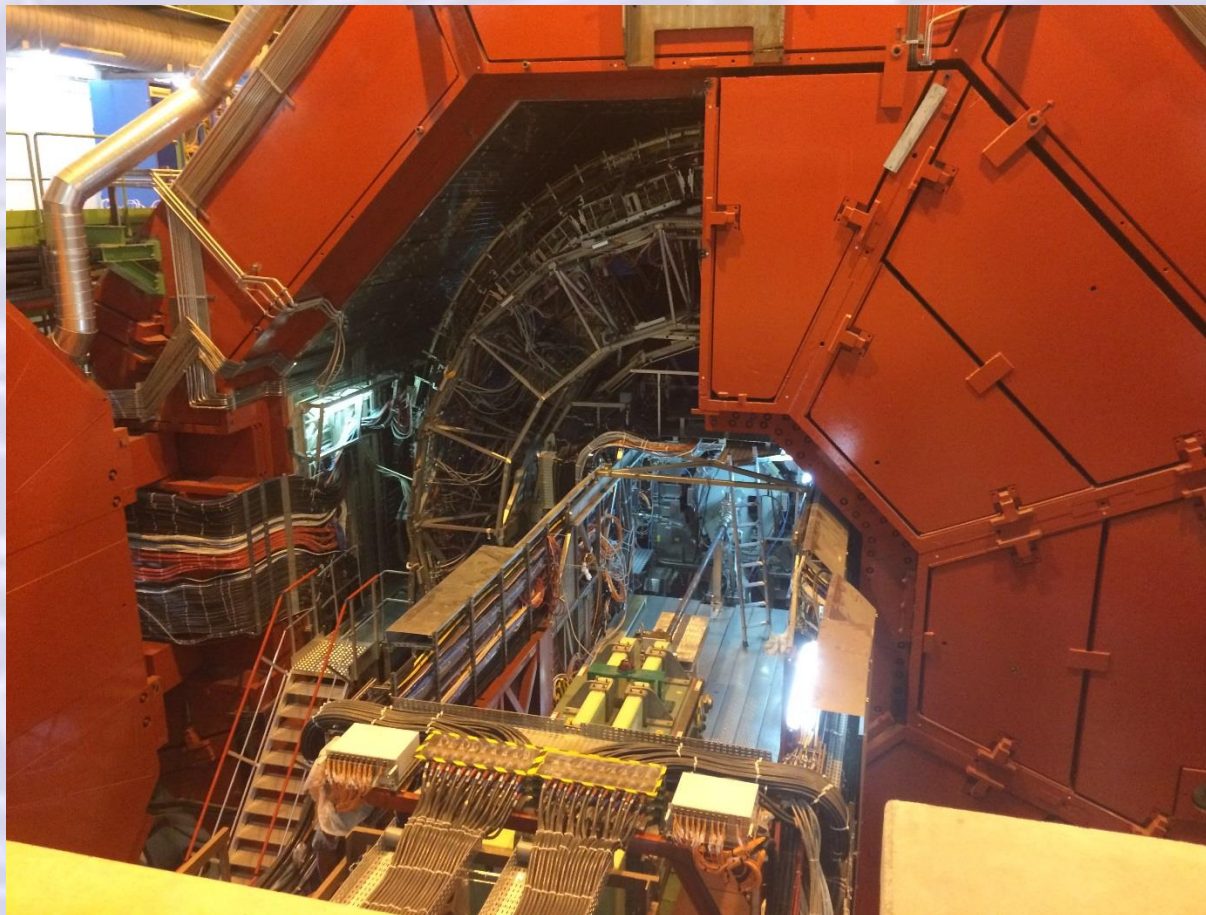
# LHCb (Large Hadron Collider beauty)

Why is the universe made of so much matter and so little antimatter?



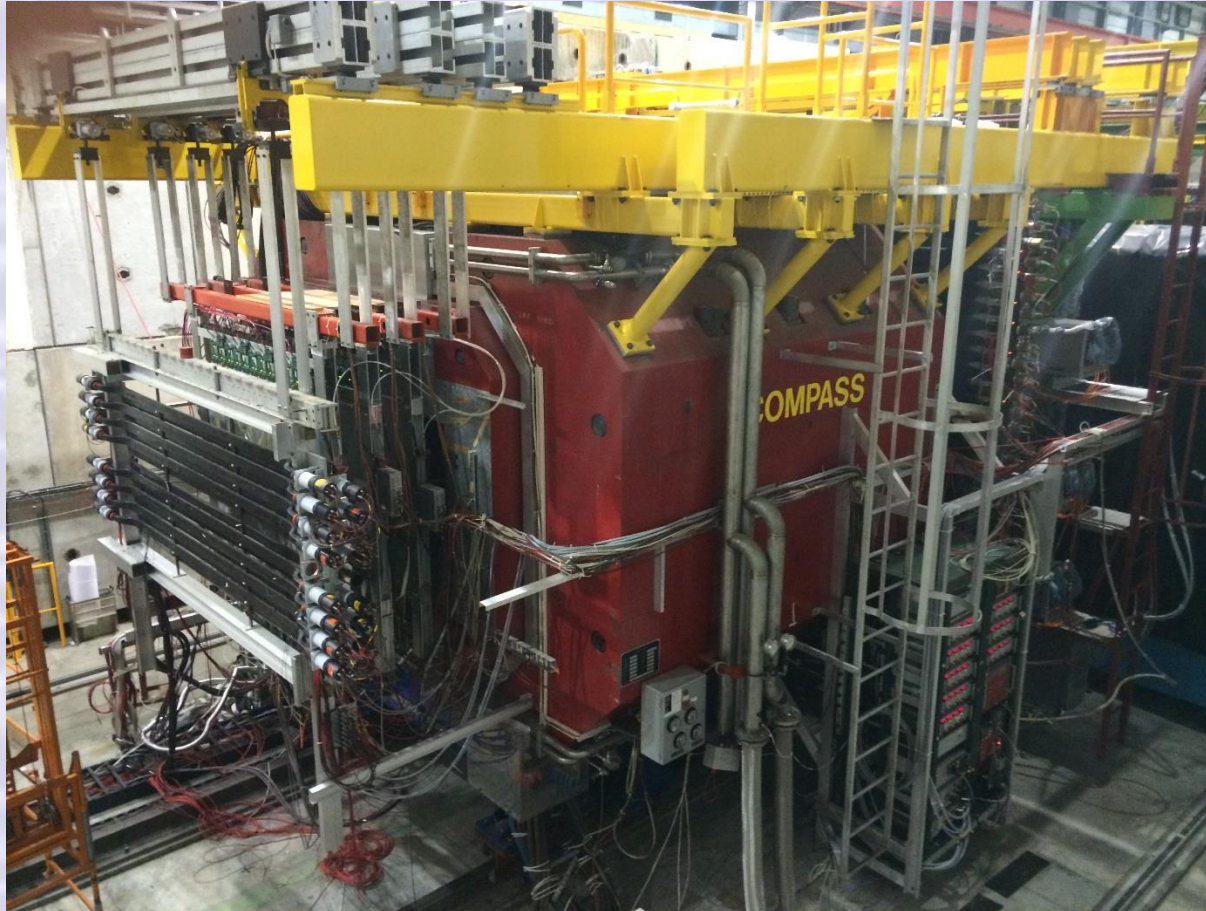
# ALICE (A Large Ion Collider Experiment)

ALICE investigates the nature of quark-gluon plasmas.



# COMPASS (Common Muon and Proton Apparatus for Structure and Spectroscopy)

COMPASS investigates the nature of hadrons.



Magnet facility (they made 1200 of these for the LHC)



# Magnet facility





# But it's not all about tours of detectors

- The Perimeter Institute (<https://www.perimeterinstitute.ca/>) visited and ran a workshop. They are a theoretical institute in Canada. Their educational outreach program focuses on helping teachers teach about quantum physics in the classroom. They focus on wave-particle duality and its implications.





# CERN, Physics and music

- As part of the 60<sup>th</sup> anniversary, several musicians performed their compositions at the Montreux jazz festival on July 12<sup>th</sup>.
- <http://home.web.cern.ch/about/updates/2014/07/jamming-cosmos-cern-and-music-physics>

# A mini CERN in Jordan

- CERN was envisioned as a place where scientists could work in peace.
- An institution known as SESAME was founded in Jordan in 1997 as a place where scientists from the Middle East could do the same.
- SESAME stands for Synchrotron-Light for Experimental Science and Applications in the Middle East.
- Plans are in place for it to be operational by 2015.



# TED at CERN

- On September 28, 2014, CERN will host a TEDx event.
- <http://tedxcern.web.cern.ch/>

# You have to go!

- CERN is one of the most fantastic places I have ever visited.
- Beyond the science and technology that they conceive of and develop, some of the most intelligent and captivating scientists in the world work there.
- The machines are great, but the people are better.
- Finis