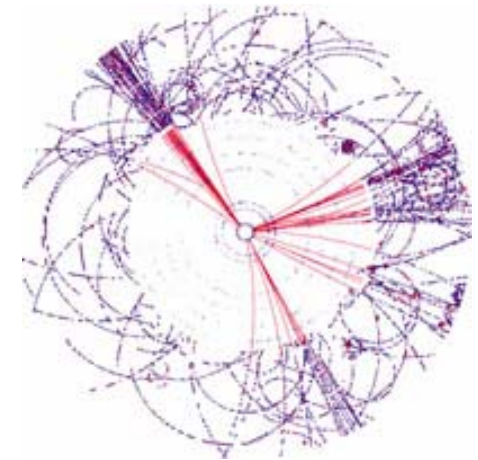
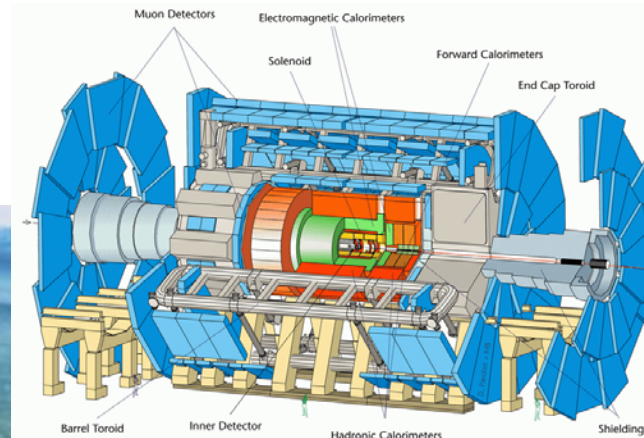
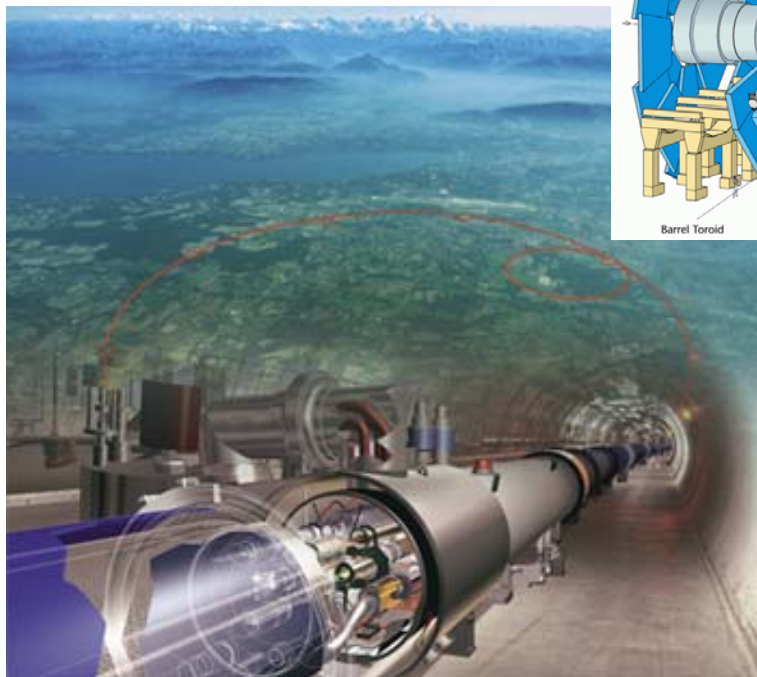
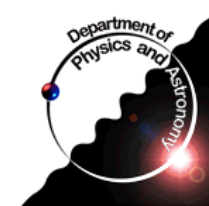


# The ATLAS Project: looking at the energy frontier

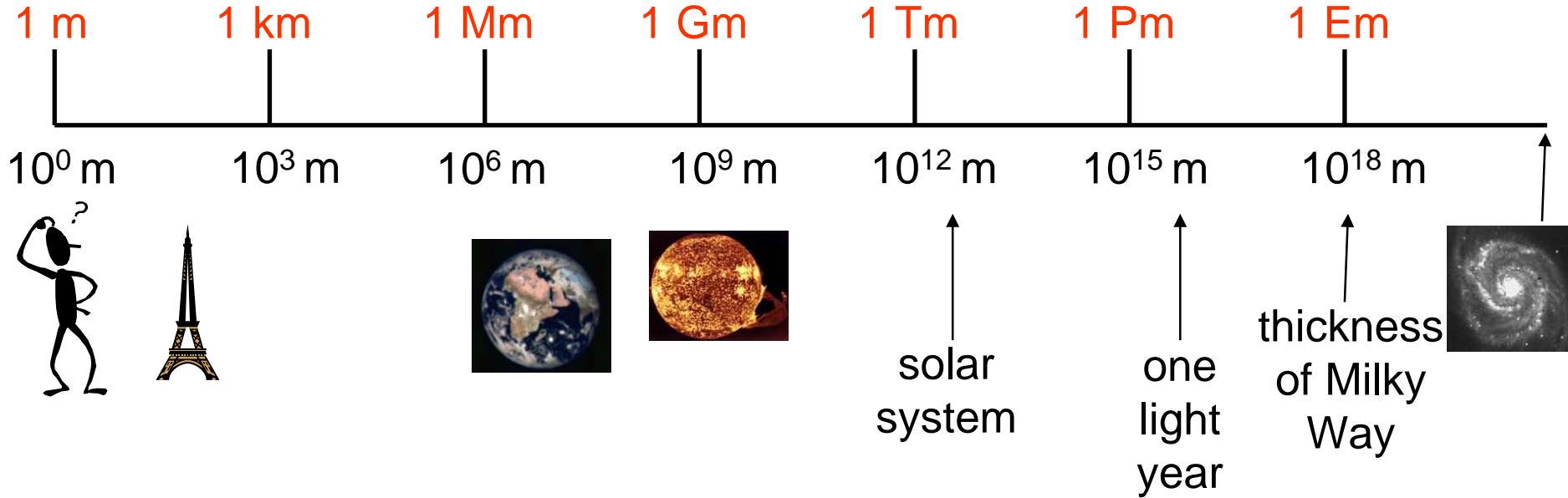
Board of Governors visit  
27 Nov 2007



Michel Lefebvre  
Physics and Astronomy  
University of Victoria



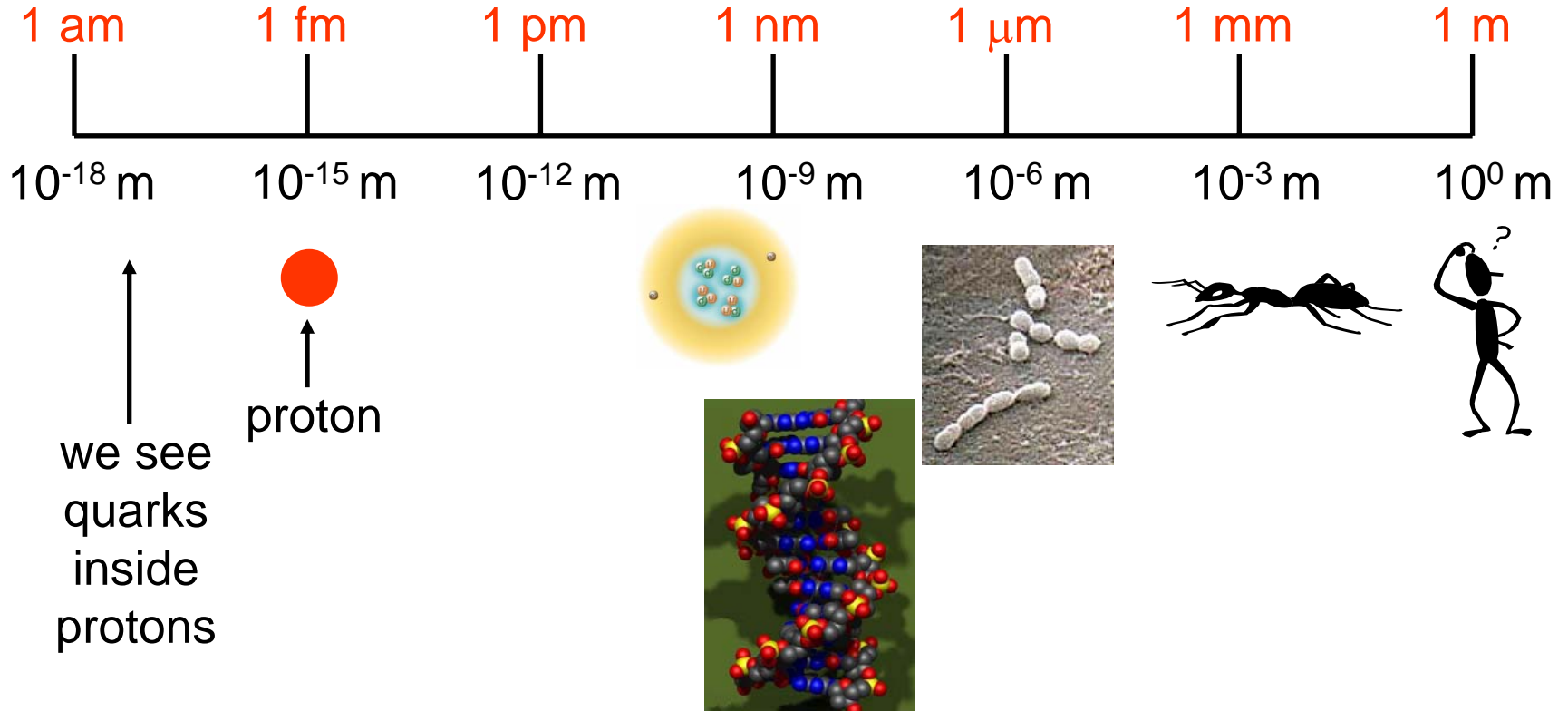
# Length Scales



**Notation:  $10^6 = 1000000$**

↖  
6 zeros!

# Length Scales



**Notation:  $10^{-6} = 0.000001$**

↙  
6<sup>th</sup> decimal place!

# Aerial View of CERN



# ATLAS Physics

The ATLAS physics program is very rich and includes searches for new phenomena that may exist in nature

What is the origin of mass?

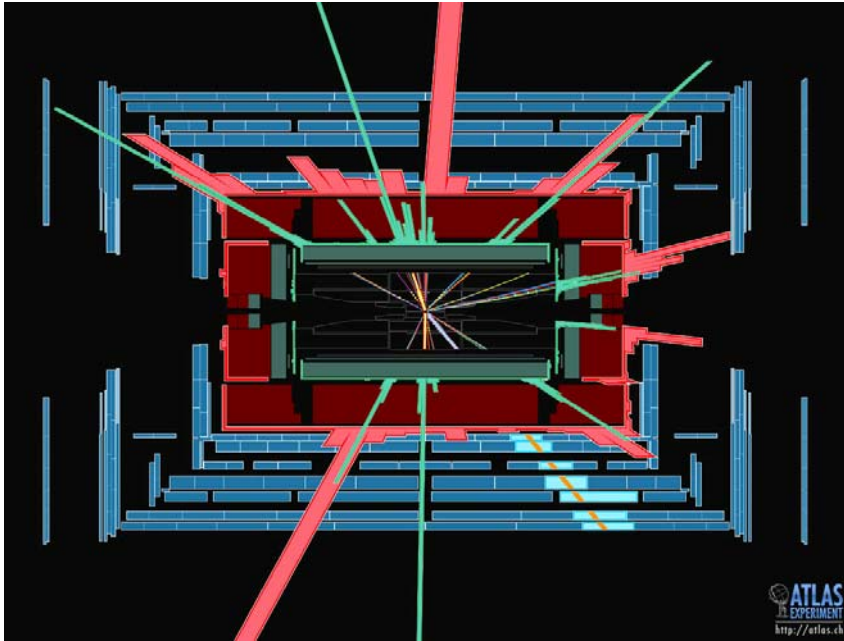
Is nature supersymmetric? Is **Dark Matter** such a particle?

Are there other dimensions of space?

Is there another layer of more fundamental particles inside electrons and quarks?

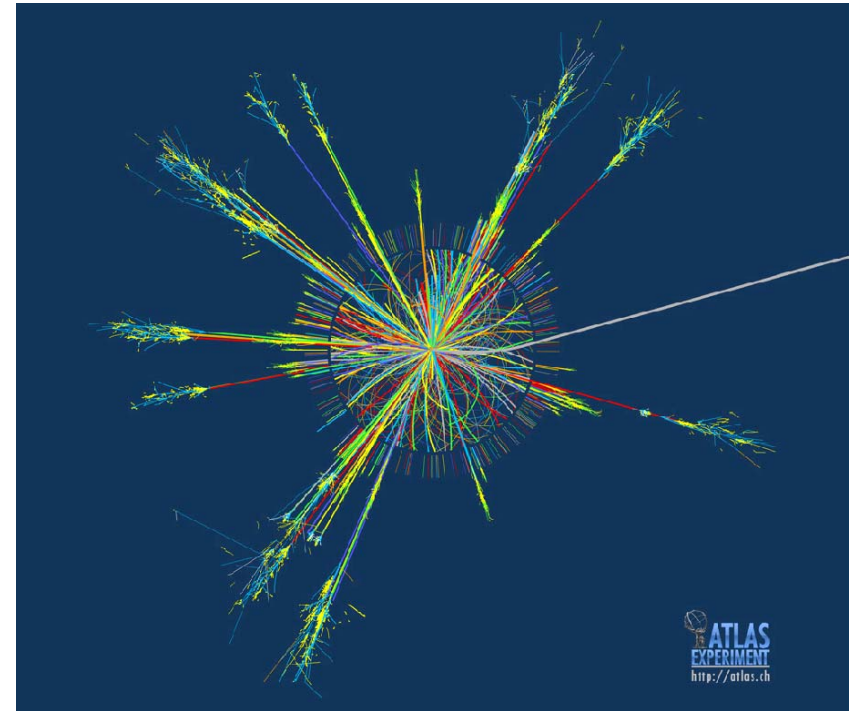
**...and many more questions!**

# ATLAS Physics: mini black holes



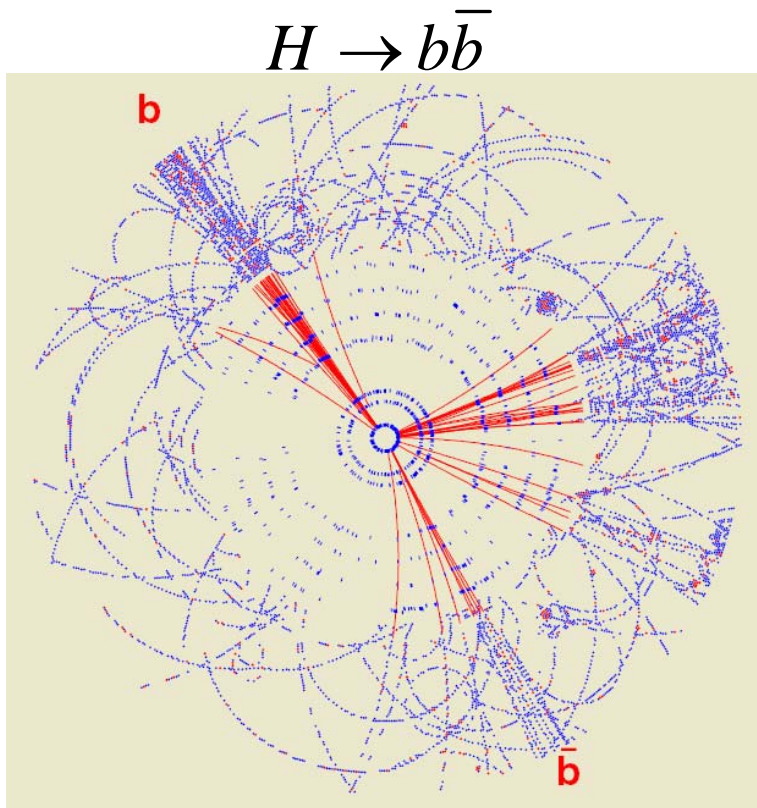
They would decay immediately into many particles. The colours of the tracks show different types of particles emerging from the collision

Microscopic black holes may be produced in the ATLAS detector (if they exist).

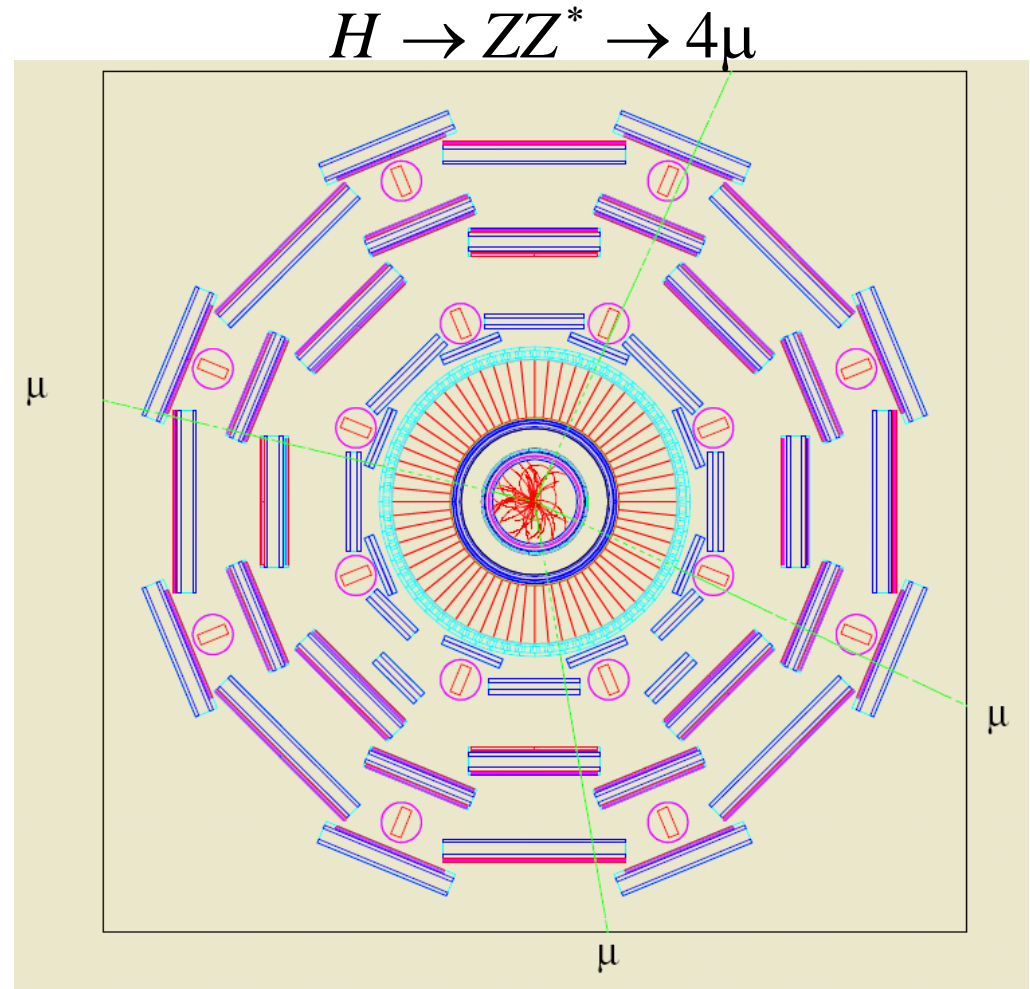


# ATLAS Physics: Higgs particle

The Higgs particle is predicted in relation to the origin of mass  
This is what such events may look like



Michel Lefebvre



The ATLAS Project

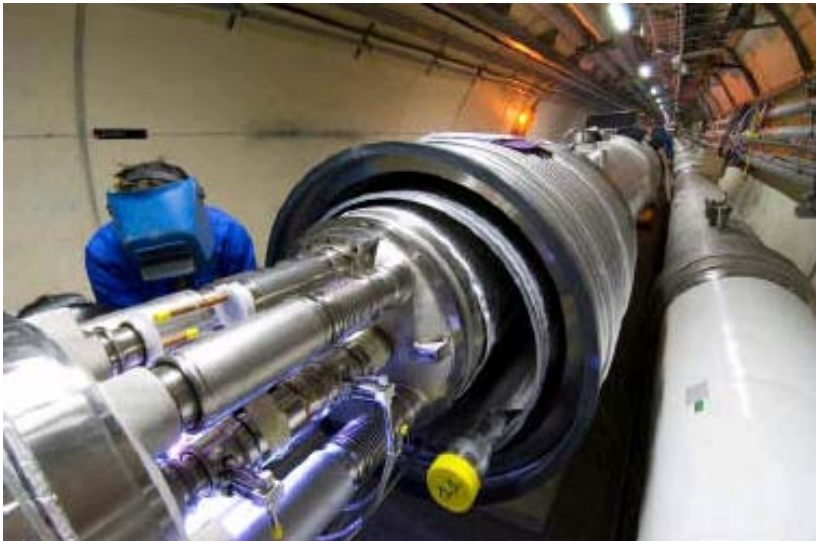
# Large Hadron Collider Tunnel



27 km long, on the  
French-Swiss border

**First collisions  
expected mid 2008**

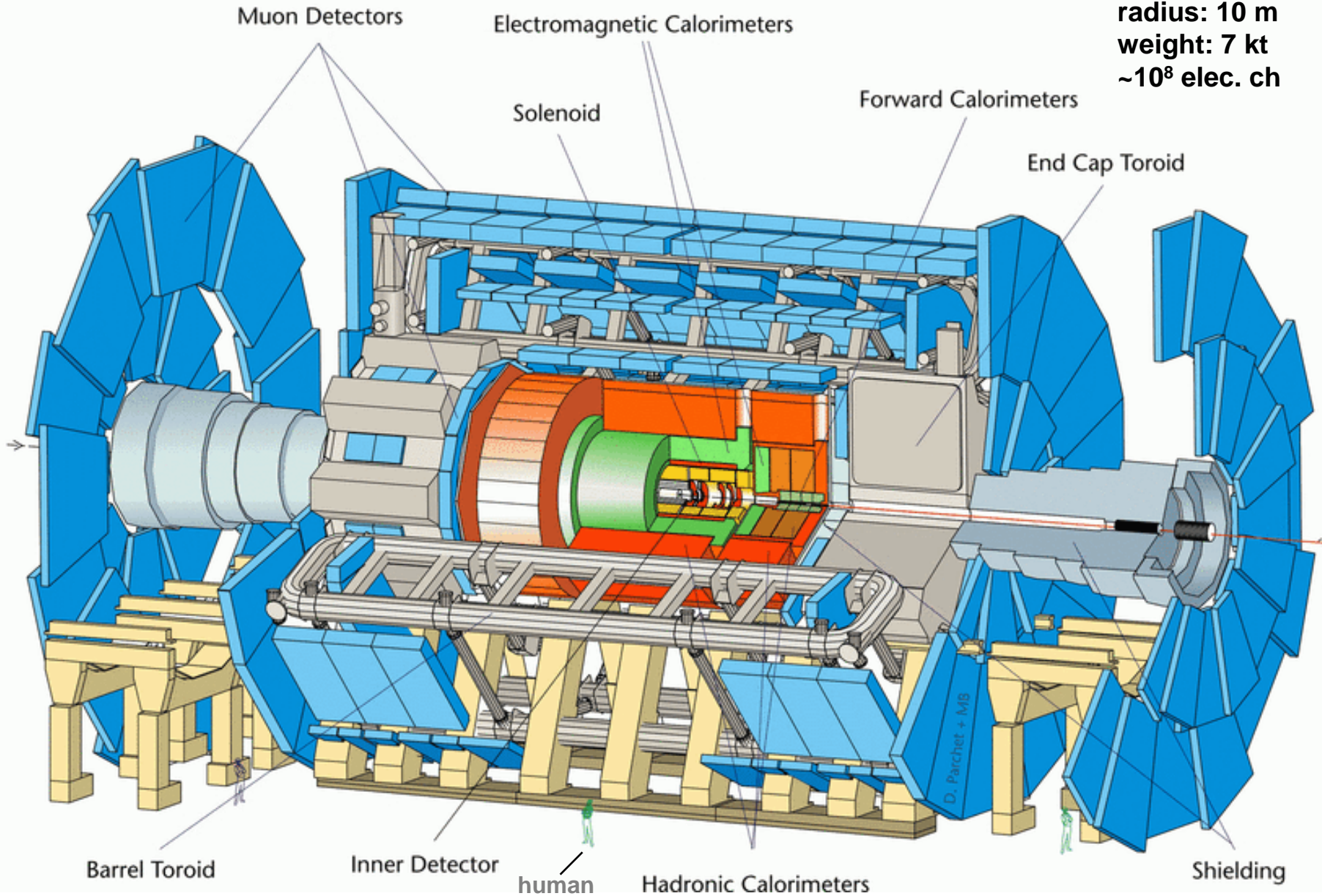
27 April 2007: lowering of the last dipole





# ATLAS Detector A Toroidal Lhc Apparatus

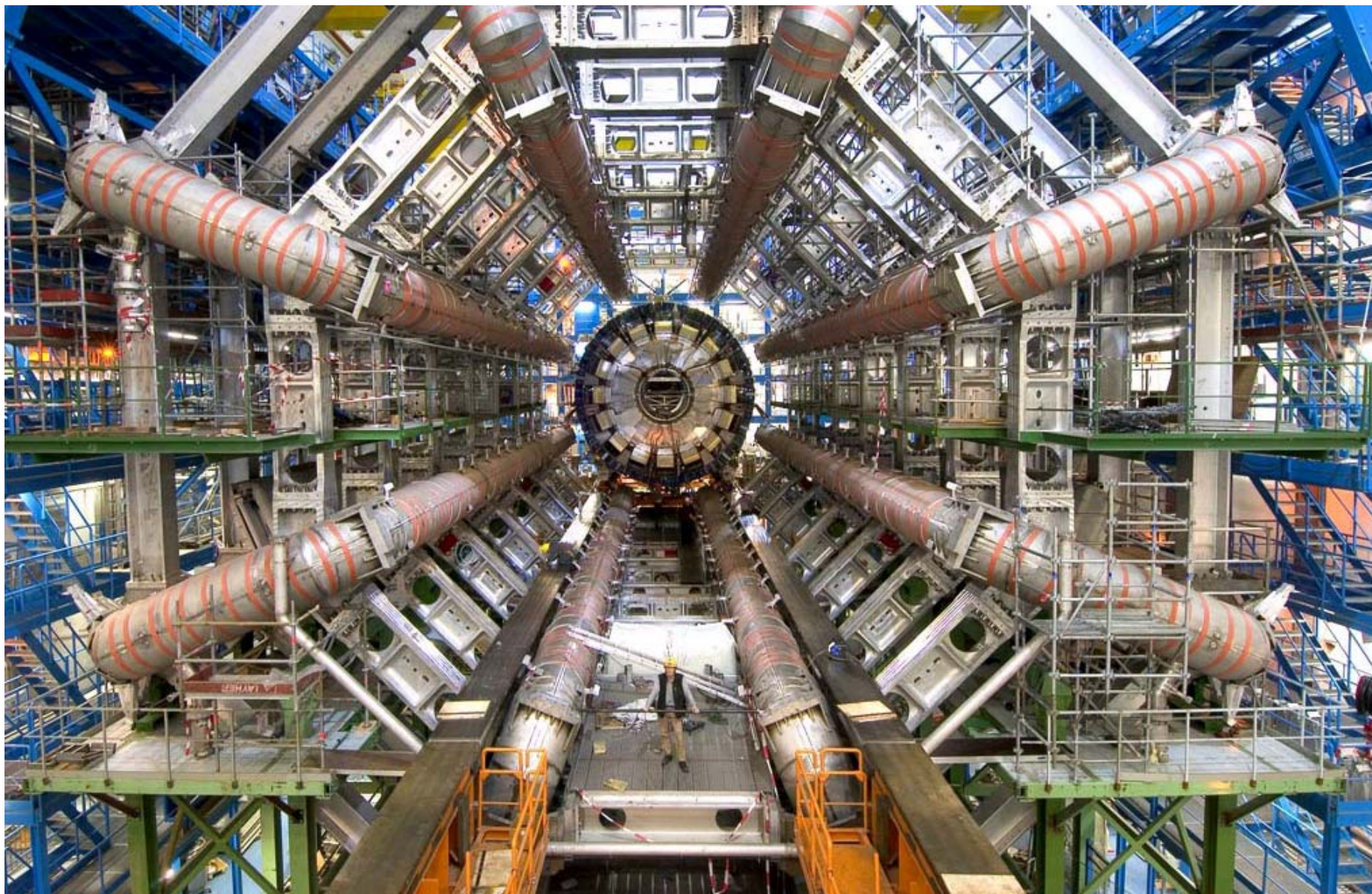
length: 40 m  
radius: 10 m  
weight: 7 kt  
~10<sup>8</sup> elec. ch



Michel Lefebvre

The ATLAS Project

# ATLAS Detector in October 2005



# ATLAS Detector Components



One ATLAS endcap cryostat, 282 tons, being transported to the ATLAS experimental area, 22 Sep 2005

Major Canadian contribution, many components constructed in Victoria and TRIUMF

# ATLAS Detector Components

**ATLAS lab at UVic during construction**



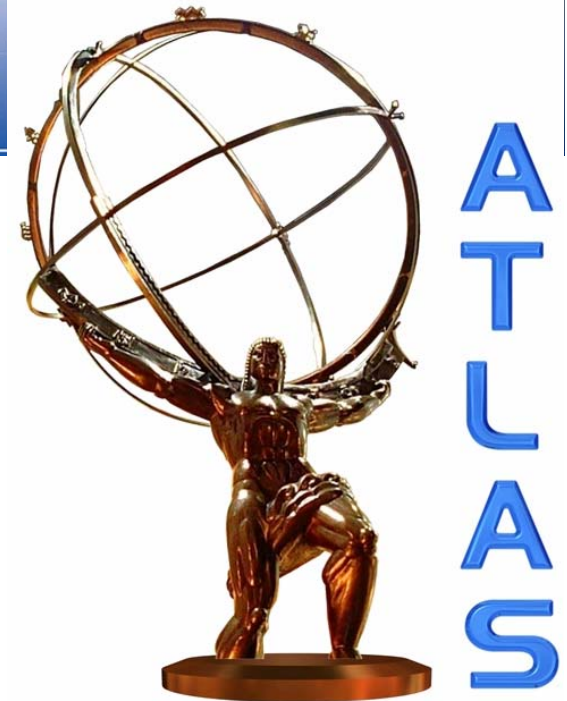
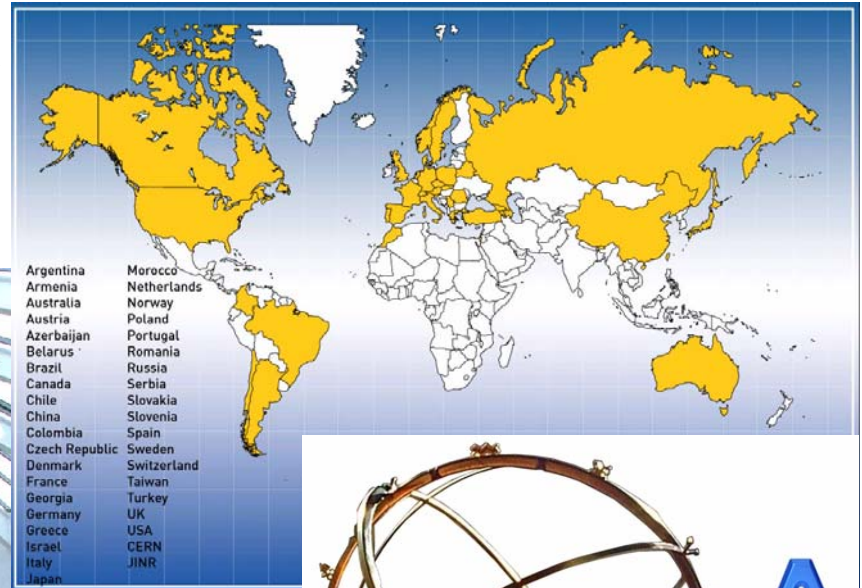
**UVic team member making tests in CERN**



# ATLAS Collaboration

Over 1800 scientists from 37 countries

UVic scientists continue to play important roles in the governance of ATLAS



# Canada and ATLAS



**Alberta  
Carleton  
McGill  
Montréal  
Regina  
SFU  
Toronto  
TRIUMF  
UBC  
Victoria  
York**

Over 100 Canadian scientists participate in the ATLAS experiment

- since 1992
- contributions to the ATLAS detector construction
- contributions to the Large Hadron Collider construction
- **TRIUMF**, Canada's nuclear and particle physics laboratory located in Vancouver, is playing an **important role**
  - **houses ATLAS-Canada Computing Centre**



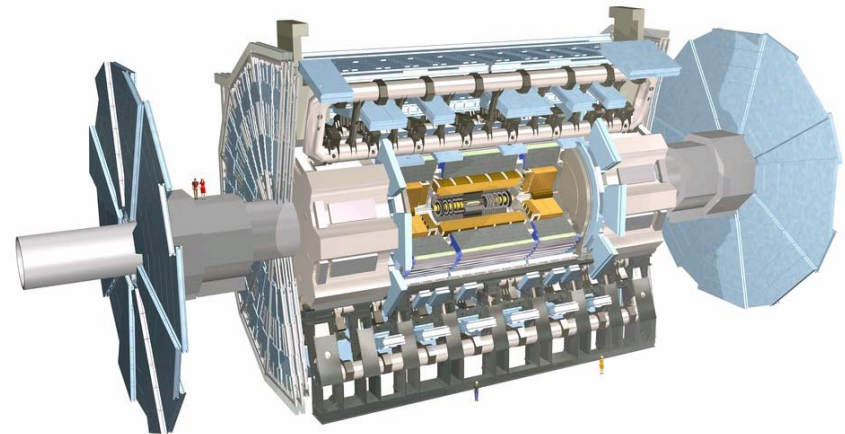
# UVic and ATLAS

- UVic founded the ATLAS effort in Canada
- ML founding spokesperson of ATLAS-Canada in 1992
- Important contribution to ATLAS
  - construction of components in UVic and TRIUMF
  - installation at CERN
  - getting ready for first collisions
- Dr Rob McPherson (UVic adjunct, IPP scientist) current spokesperson of ATLAS-Canada
- UVic group now composed of
  - 6 faculty (including 2 IPP scientists) + 1 emeritus
  - 3 research associates + computing support
  - 5+3 graduate students

# Outlook

## ATLAS and the Large Hadron Collider

- The highest priority experiment in our field in Canada
- On the threshold of discoveries that are likely to alter and improve our understanding of nature's most fundamental laws
- UVic continues to lead the Canadian effort in ATLAS
- Fantastic training opportunities for graduate students and Research Associates



**Expect discoveries in the near future!**