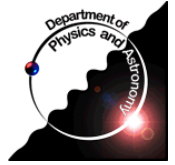




Particle Physics at UVic

Research directions and initiatives



High Energy Particle Physics

Ministry of Advanced
Education/UVic Round Table

Friday 27 February 2004

M. Lefebvre

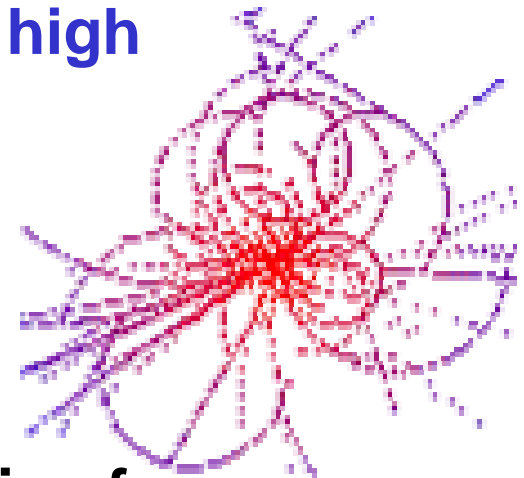
Physics and Astronomy

The study of the ultimate constituents of matter and the nature of the interactions between them through high energy particle collisions

probe physics at the
0.00000000000000000001 m scale

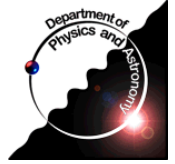
Discover the origin of mass

Discover new properties of the fabric of the universe, possibly extra dimensions, new forces, ?





Particle Physics at UVic Research Environment



International Collaborative Efforts

This research requires large international collaborations to construct facilities and analyze data.

UVic group is internationally recognized

UVic is a well known name in particle physics

Group of 10 faculty, 18 graduate students and 15 research personnel from 9 countries currently operating mainly at CERN (Geneva) and SLAC (Stanford).

23 graduate degrees since 1995

3 Governor General's Gold Medals

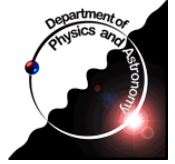
4 in faculty positions & 1 IPP Research scientist

Responsible for major components of large international projects
TRIUMF plays essential infrastructure role.



Particle Physics at UVic

The ATLAS experiment



ATLAS at the Large Hadron Collider (CERN)

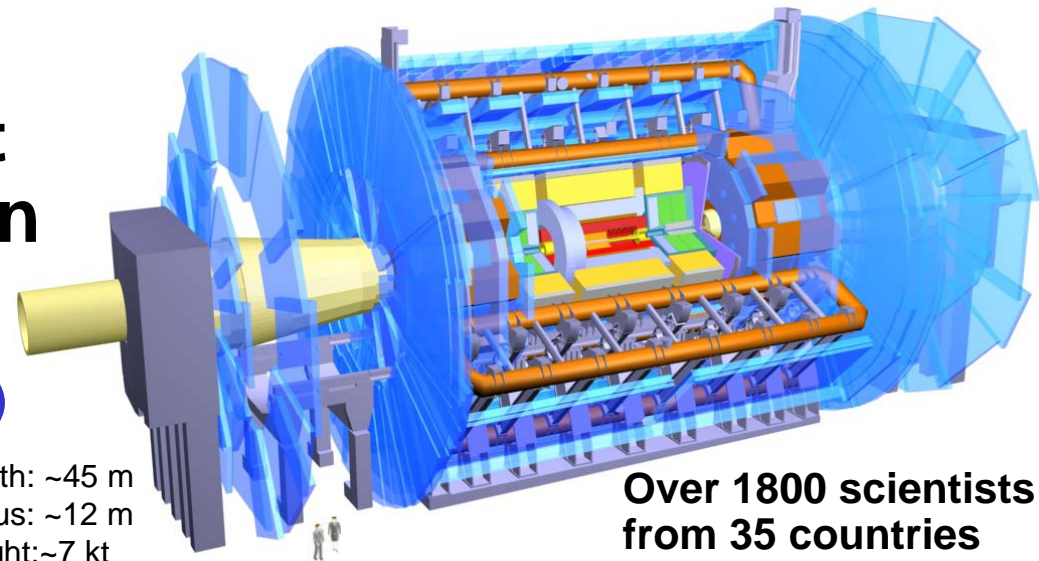
LHC: world's highest energy collider, to start in 2007 and then to operate for at least 15 years

ATLAS: experiment to harvest LHC data and look where no one has looked before. Over 1800 scientists from 35 countries

UVic: founded the ATLAS-Canada Collaboration in 1992

Strong and important Canadian contribution to ATLAS

\$30M to LHC (via TRIUMF)
\$15M NSERC MIG



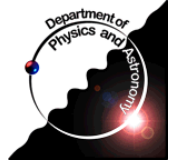
length: ~45 m
radius: ~12 m
weight: ~7 kt

Over 1800 scientists from 35 countries



Particle Physics at UVic

Computing



Particle physics: area of innovative computing

The WWW was developed at CERN to facilitate communication between researchers

ATLAS will collect 1 million Gigabytes of data per year for 20 years

Distribution of researchers around the world

The GRID: distributed computing

Need for a new computing paradigm

UVic at the leading edge

Our group has spearheaded the establishment of one of the largest research computing centres in BC and Canada

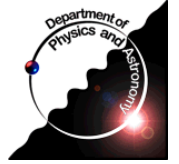
Facility used by many research fields, and is the only CFI-funded facility in Canada to be GRID-enabled

Funded in part by a \$3M grant from BCKDF



Particle Physics at UVic

Research directions



B Physics at BaBar, Stanford (1999-2010?)

Charge and mirror symmetry in nature

ATLAS at the Large Hadron Collider (2007-)

Probing nature at the energy frontier

The Linear Collider (2015?-)

Precision measurement at the energy frontier

Neutrino Physics

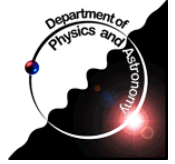
Exciting new neutrino oscillation experiment

Theoretical Investigations

Computing in Particle Physics



Particle Physics at UVic



Enormous benefits for BC

Graduate students and research personnel internationally connected

First rate training in world class science

Scientists from afar come to Victoria for workshops, conferences

More generally, science is a MAJOR success story at UVic

Good place to increase investment

Stable long term support essential

Useful link:

<http://particle.phys.uvic.ca/>

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