



A short introduction to the

2010 Summer Student Hardware Labs

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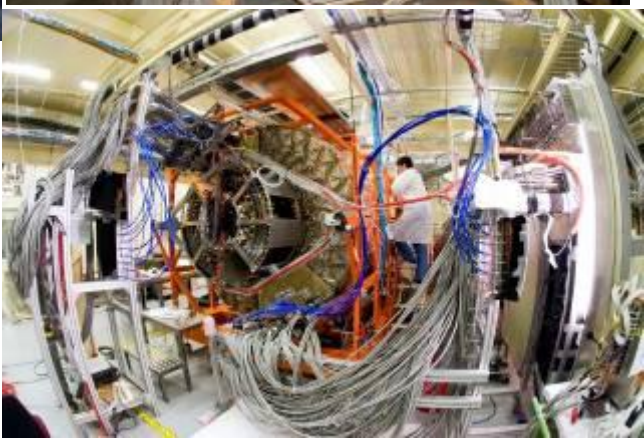
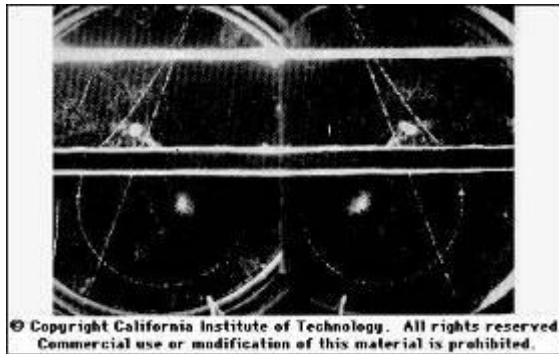
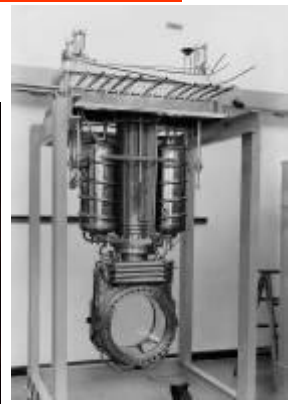
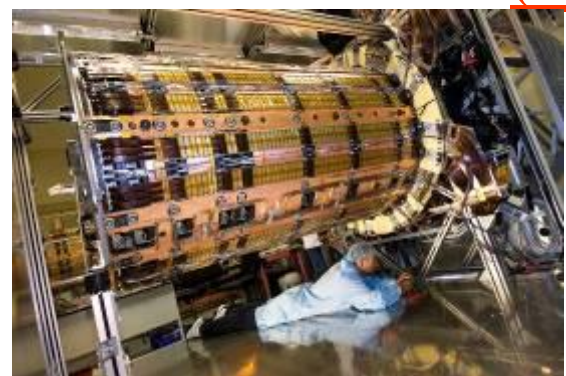
Niko Neufeld & Carmelo d'Ambrosio, CERN-PH / 7 July 2010
special thanks to Olav Ullaland



The Summer Student Hardware Labs



(even in software and physics!)



With the size of the experimental tools in high energy physics getting larger and more complicated, it is very hard in some short summer months to get a feeling of the different aspects of an experiment.

We would therefore like to invite you into some of our labs and try to show you in a few hours what we are doing there and why we are doing it.



Who are "we" :

Johan Alwall
Andre Braem
Carmelo D'Ambrosio
Irena Dolenc
Ilias Efthimiopoulos
Lau Gatignon
Edda Gschwendtner
Sune Jakobsen
Christian Joram
Beat Jost



Simon Mataguez
Michael Moll
Niko Neufeld
Nicola Pacifico
Thomas Schneider
Tim Stelzer

As a Menu*, we can offer:

Accelerator Technology

Inorganic Scintillator Detectors

Organic Scintillator Detectors

Silicon Detectors

Data Acquisition

High Energy Physics Monte-Carlo Techniques

* Coffee is included!

Beam Lines

4 afternoons with optimisation of a beam line by using collimators, bending magnets and targets. Particle identification with Cherenkov counters and absorbers.



Contact persons : Simon Mataguez,
Ilias Efthymiopoulos, Lau Gatignon and
Edda Gschwendtner

4 groups of 5 students

When: 17, 18, 19, 20 Aug

Where: H6

+ Introduction to beam lines: 16 August



X- and Gamma- rays detection with a Hybrid Photon Detector

Contact person: Carmelo D'Ambrosio

Requirements: a film badge

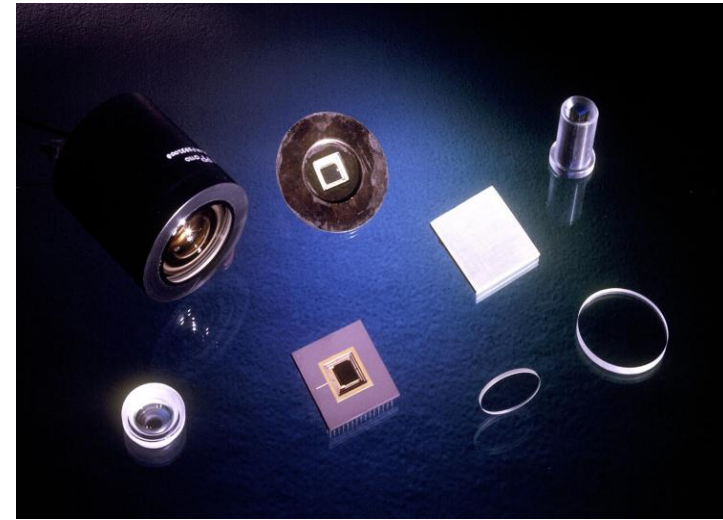
Time : one afternoon, 14:00 - 17:30

3 groups of 3 students

Dates : 4, 6 and 9 August

Place : 29-1-021

Please note that gamma sources and high voltages are present on the set-up.



New Scintillating Crystals are being developed for bio-medical applications, which were first developed for high energy physics or material science. With a new generation of photodetectors being made available for the same applications (HPDs, APDs, SDCs, etc.), these gamma detectors (crystal + photodetector) represent an important contribution in the evolution of instrumentation for physics and non-physics applications.



Measurements with scintillating fibres.

Contact Persons :

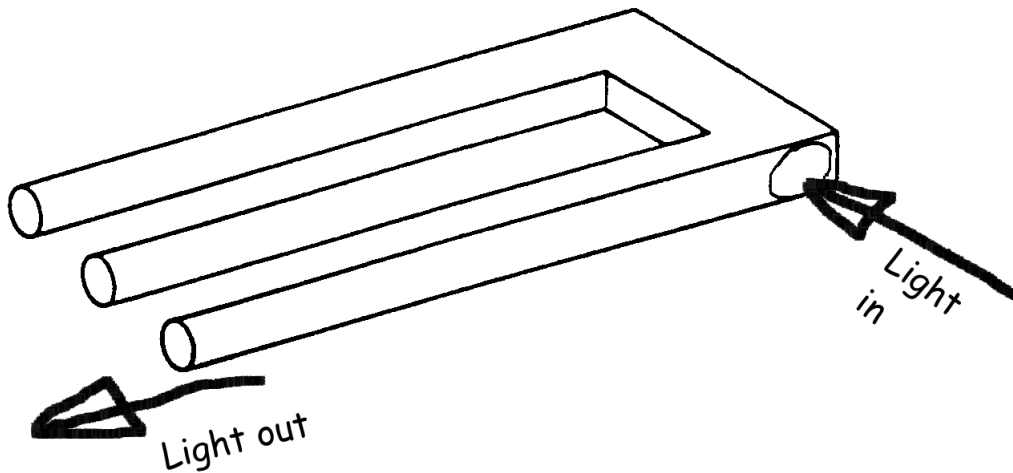
Andre Braem, Sune Jakobsen, Christian Joram and Thomas Schneider

3 afternoons with 3 students.

When: 2, 4, 6 August 14:00 to 18:00

Where: Meeting room: 3-R-020.

What: Scintillation emission spectrum, light absorption length, reflective coating, photodetectors.



CERN photo CERN-EX-9201043

End part of the scintillating fibre detector of the CHORUS experiment. There are 1 million fibres and each fibre has a diameter of 500 .micron.m.

Characterization of irradiated silicon sensors.

Contacts: Irena Dolenc, Michael Moll and Nicola Pacifico

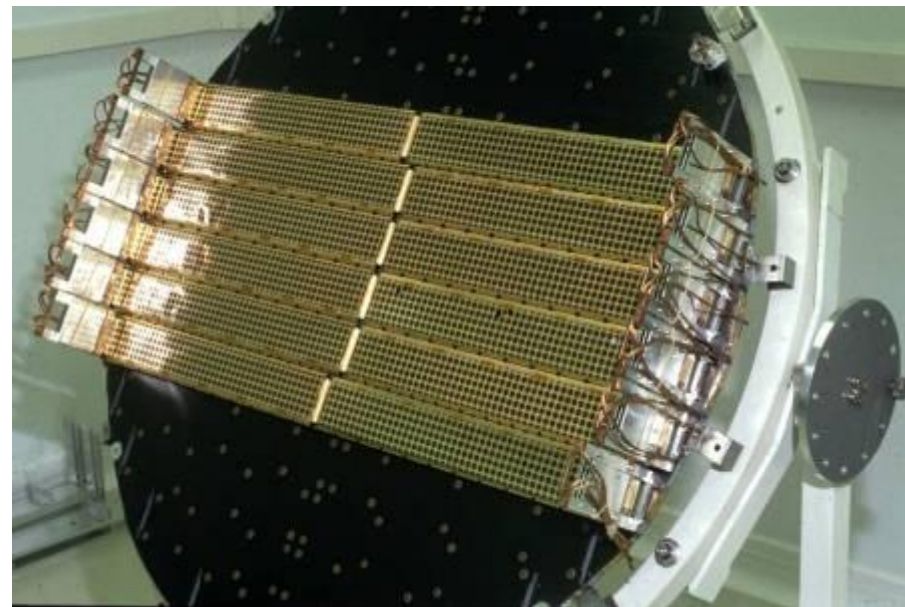
3 afternoons with 3 students.

When: 15, 19 and 26 July at 14:00

+ common visit to the Si facility, after the 3 workshops

Where: Meeting room: 28-2-015

What: We will investigate how radiation damage is influencing the silicon tracking detectors in the LHC experiments. The following properties of irradiated and non-irradiated silicon detectors will be measured: Reverse current, detector capacitance, depletion voltage and charge collection efficiency. This will give you an impression on how much detectors in the LHC will suffer from radiation damage. In a concluding discussion we will look at some possibilities on how to make detectors radiation harder.



Data Acquisition (and fun with bits lost and found).

Contact persons:

Niko Neufeld and Guoming Liu

Requirements: Some basic programming experiences would be good - but that should not deter anyone.

4 sessions with 4 students

Time : one afternoon, 14:00 – 17:00

Dates : 12, 13, 14 and 16 July

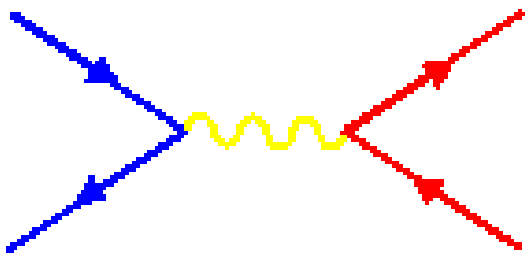
Place : Point 8

(transport arranged via email)

Real data acquisition at 1 MHz.
Follow the data through LHCb
and try not to lose a single bit!
From the front-end
electronics, through the
readout boards, the network,
the farm to tape - and not
back.



*and at this point we notice
that if we consider the trigger
with 92 free dimensions in space
and time, we get a beautifully
simplified solution!*



MadGraph

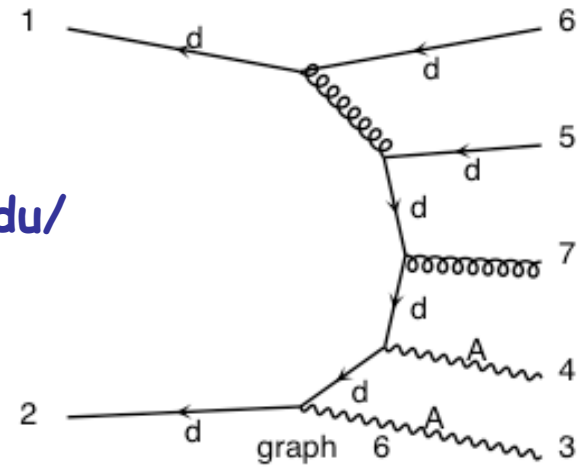
<http://madgraph.hep.uiuc.edu/>

Contact Persons: Tim Stelzer
Johan Alwall

3 afternoons with up to 18 students each time.

Training Centre (bgs. 572), rooms 23 and 24 at 14:00.

3, 4 and 5 August.

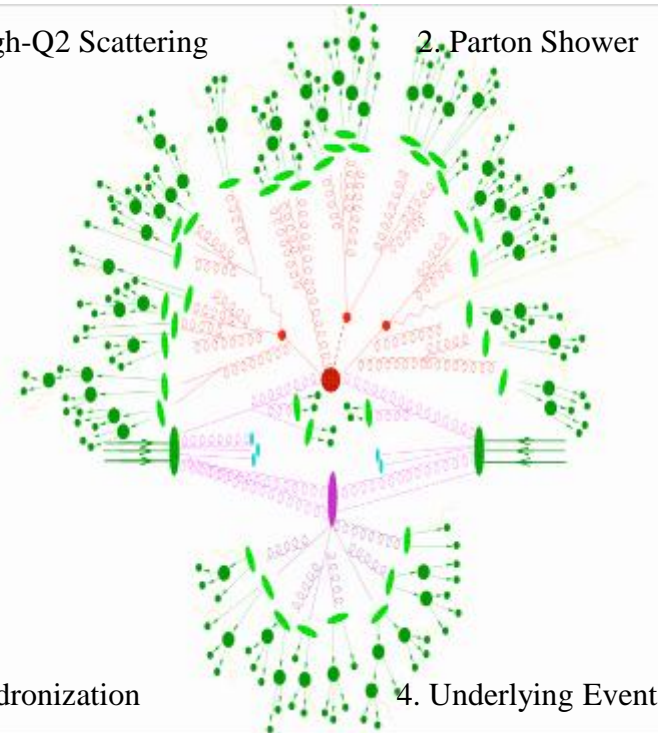


In this workshop we will

- 1) Discuss the various aspects of a hard-hadronic collision using a FLASH simulation.
- 2) Develop cutting edge Monte Carlo techniques necessary for simulating these collisions.
- 3) Use MadEvent's new web-based capabilities to produce event simulations for processes important to LHC physics.

1. High-Q² Scattering

2. Parton Shower



3. Hadronization

4. Underlying Event

What you have to do:

- ① Do what Sharon and Laura will tell you to do by e-mail

②

Try not to forget your rendez-vous...



③

Have fun!