

# **EIRO-forum School on Instrumentation 2011.**

## ***Subject: Electronics***

Lecturer: Patrick Van Esch

## ***Title: Overview of detector front end electronics.***

### ***Abstract***

The basic particle detection electronics chain will be exposed. We will limit ourselves to an overview of the most common read out chains the students might come across in their work:

The first part of the lecture will concentrate on the analogue part: the “front end”.

- The detector as a signal source,
- the preamplifier, noise considerations
- the shaping of the signal

The second part will concentrate on different read-out techniques of detectors:

- resistive charge-division
- delay-line
- X-Y (-Z) coincidence

A third part will touch upon more sophisticated numerical techniques in FPGA settings, like clusterisation, center-of-gravity, ToT, but also digital shaping.

The course will be an introductory course where the principles of “nuclear electronics” are explained for people with limited experience in the domain. I suppose experts won't learn much, but it is our hope that for young people not particularly involved in the electronics of detector readout, but confronted with it in their activities, this course will “break the ice” for them. Prerequisites are some elementary electrical engineering (simple network solving, transfer functions, frequency spectrum, impedance, logical functions in digital electronics).