C2: Beam Instrumentation and Diagnostics

The aim of this course is to bring the students closer to the concepts of beam instrumentation and diagnostics, covering the sensors, which produce measurable signals through an interaction with the particle beam, over electronics up to the data treatment and interpretation.

In the course we will treat the most common beam instruments and measurement principles, notably beam positions and intensity, tune measurements, transverse and longitudinal profile and beam losses (see booklet).

During the course time the students will be given a short explanation and then they will work through exercises supported by the course team.

As novelty this year the course part on beam position monitoring will use a tool developed at CERN, which will allow visualizing the electrical signals of a beam position monitor in a virtual particle accelerator, for which the students can vary the beam parameters. Displays in time and frequency domain will be available.

In addition to the time spent in the classes the students will be invited to design “a complete instrumentation concept” for a given accelerator; a complete set of beam parameters of various accelerators will be made available. For this they will be invited to form groups to prepare their concept during the duration of the school. In the last course every group will be given 20 minutes in order to expose their instrumentation concept.