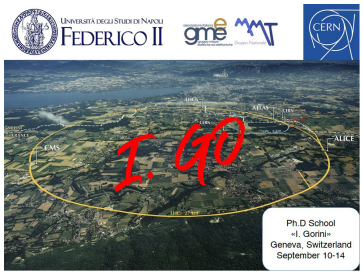

Contribution ID: **4** Type: **not specified**

S. Russenschuck

Tuesday 11 September 2018 11:00 (1h 30m)

Mathematical foundations of field computation and magnetic measurements for accelerator magnets

Magnetic measurements are required in magnet projects for accelerators at three stages: To validate the design options and the used software packages (numerical field computation), to follow up the magnet production and to provide feedback for machine operation. Unfortunately no universal measurement method exists that can be traced to first principles (SI Base units). The reduction of measurement uncertainty therefore relies on stable mechanics and precise positioning, a low level environment, the reparameterization to arc-length, the compensation of the main signals (bucking) and oversampling, among others. Systematic errors must be reduced by calibration and cross-calibration.

Fortunately, the fields in accelerator magnets "live"on trivial domains, that is, the bore of the magnet (simply connected) is free of any current sources and magnetic material. Therefore, the regularity conditions of the magnetic fields can be used for post-processing the results and for developing application specific transducers for the tasks. These methods require a solid basis of the underlying mathematical foundations; these are the subject of the lecture.

Presenter: RUSSENSCHUCK, Stephan (CERN)