Italo Gorini 2018
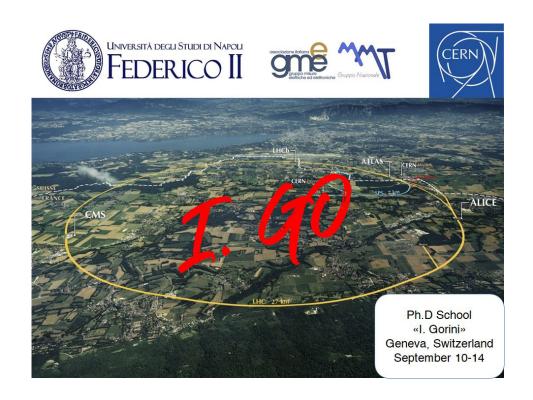

Ph.D School
«I. Gorini»
Geneva, Switzerland
September 10-14

Report of Contributions

Contribution ID: **1** Type: **not specified**

L. Rossi

Monday 10 September 2018 14:00 (1h 30m)

Perspectives of Instrumentation and Measurements in New CERN Accelerators

Presenter: ROSSI, Lucio (CERN)

Contribution ID: 2   Type: **not specified**

C. Iacobucci

Monday 10 September 2018 16:00 (1h 30m)

Silicon sensors in collider experiments for Science and Health

Presenter: IACOBUCCI, Giuseppe (Universite de Geneve (CH))

Contribution ID: **3**   Type: **not specified**

G. Rumolo

Tuesday 11 September 2018 09:00 (1h 30m)

Beam dynamics, instrumentation and measurement techniques for LHC and its High Luminosity Upgrade

Presenter: RUMOLO, Giovanni (CERN)

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)

Contribution ID: **5**   Type: **not specified**

Visits to the magnet facility and to the mechanical and magnetic measurement laboratories

Tuesday 11 September 2018 14:00 (2 hours)

Contribution ID: **6** Type: **not specified**

M.C. Bastos / M. Martino

Wednesday 12 September 2018 09:00 (1h 30m)

Measurement and Acquisition for High Precision Power Converter Current Regulation for Particles Accelerators

Particle accelerators use magnetic fields produced by electro-magnets to control the trajectory of particles beams. The magnets are supplied by electrical power converters, which can be seen as current sources employing digital control to accurately follow a given current reference function. Since the current delivered by the power converters has a direct impact on the trajectory of the particle beams, it needs to be controlled with extremely high precision. The key elements determining the precision performance of power converters are: the analog measurement chain of the current (sensors, transducers, conditioning electronics), the Analog to Digital Converters, and the digital control (algorithm) itself. With a focus on these three key elements this presentation will discuss the challenges faced and the technologies used to control electrical currents with part per million level uncertainty.

Presenters: MARTINO, Michele (CERN); CERQUEIRA BASTOS, Miguel (CERN)

Contribution ID: **7**   Type: **not specified**

F. Roncarolo

Wednesday 12 September 2018 11:00 (1h 30m)

State of the art of research on beam instrumentation

Presenter: RONCAROLO, Federico (CERN)

Contribution ID: **8**   Type: **not specified**

A. Ballarino

Wednesday 12 September 2018 14:00 (1h 30m)

High-Temperature Superconducting Cable Testing: State of the Art and Perspectives

Presenter: Dr BALLARINO, Amalia (CERN)

Contribution ID: **9**   Type: **not specified**

M. Pezzetti

Wednesday 12 September 2018 16:00 (1h 30m)

State of the art of research on cryogenics monitoring

Presenter: PEZZETTI, Marco (CERN)

Contribution ID: **10**   Type: **not specified**

L. Bottura

Thursday 13 September 2018 09:00 (1h 30m)

Instrumentation and Measurement for Magnets, Superconductors, and Cryostats

Presenter: BOTTURA, Luca (CERN)

Contribution ID: **11**   Type: **not specified**

M. Di Castro

Thursday 13 September 2018 11:00 (1h 30m)

Real-time Monitoring Systems for Augmented Reality and Robotics in Particle Accelerators

Presenter: DI CASTRO, Mario (CERN)

Contribution ID: **12**   Type: **not specified**

L. De Vito

Friday 14 September 2018 09:00 (1h 30m)

Monitoring the magnetic axis misalignment in particle accelerator solenoids.

Presenter: Prof. DE VITO, Luca (Unisannio)

Contribution ID: **13**   Type: **not specified**

Final Examination

Friday 14 September 2018 11:10 (1h 30m)

Contribution ID: **14** Type: **not specified**

F. Iaccarino

Monday 10 September 2018 11:00 (1h 30m)

Tutorial STMicroelectronics

The LSM6DSR is the new inertial 6-axis sensor from STMicroelectronics, addressing new, growing applications that require measurements with high precision and stability in all conditions. During the presentation, it will be explained how to approach the choice of an inertial sensor, given an application, and which are the most crucial sensor parameters for each selected application.
The LSM6DSR offers new some digital features, embedded into the device itself, that will be described. They are a built-in Finite State Machine and a Decision Tree. These features are very useful to integrate an inertial sensor, as a motion detector, into more complex systems without overloading the main processor with unnecessary computation. During the presentation it will also be explained how these advanced digital features work and what results can be achieved.

The digital features are easily programmed using a development systems using of one STM32 microcontrollers. During the presentation, it will be used a Nucleo development Board based on the STM2L4 series, which is a an ultra-low-power MCU based on ARM® Cortex®-M4. In addition to being very power efficient, the MCU offers 100DMIPS, a Floating Point Unit and DSP instructions, useful to implement more complex algorithms, and 12-bit 5Msps ADC, 12-bit DAC channels for control of other plant devices.

Presenter: Mr IACCARINO, Federico (STMicroelectronics)

Contribution ID: **15**   Type: **not specified**

POSTER SESSION

Tuesday 11 September 2018 16:00 (1h 30m)

Contribution ID: **16**   Type: **not specified**

Visits to the Antiproton Decelerator (AD) hall and to the Cryolab

Thursday 13 September 2018 14:00 (2 hours)

Contribution ID: **17**   Type: **not specified**

P. Arpaia, S. Russenschuck - Closing Ceremony

Friday 14 September 2018 10:30 (10 minutes)

Presenter: ARPAIA, Pasquale (Universita e INFN, Napoli (IT))