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NC Modelling & measurement of non-linear effects

Tuesday 28 November 2023 12:00 (1 hour)

This lecture concerns the techniques to measure and model mathematically non-linear effects in iron-dominated magnets, with the aim to control the magnetic field with a high precision, 100 ppm or better, as typically required in particle accelerators. The topics covered include a review of the physical phenomenology of magnetic saturation, hysteresis and eddy currents in material samples and accelerator magnets, as well of the most popular models to represent them; a discussion on the available instrumentation and measurement techniques; and a survey of open-loop and closed-loop (feedback-based) magnetic field control methods, with a critical comparison about their cost and effectiveness.

Presenter: BUZIO, Marco (CERN)