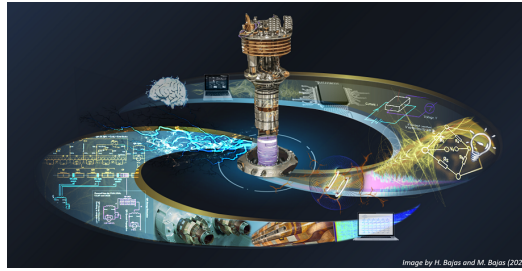


Lectures on Superconducting Magnet Test Stands, Magnet Protections and Diagnostics (as integral part of SMTF & IDSM Workshops)



Contribution ID: 14

Type: **not specified**

Mechanical measurements in superconducting magnets: practice and theory

Wednesday 7 June 2023 17:40 (1 hour)

About the lecture:

High-energy accelerator or detector projects demands a sustained R&D effort to implement advanced technologies for the development of a new generation of superconducting magnets, high-energy proton beam dumps, powerful particle physics detectors and cryogenic radio-frequency cavities. During the research and developments phases, mechanical measurements is paramount to validate Finite Element Analysis (FEA) and confirm the mechanical response of complex structures in harsh environments such as cryogenic temperatures, high magnetic and electric fields, high radiation level or the vicinity of high energy proton beams.

This course will provide an overview of the mechanical measurement techniques performed under harsh environmental conditions. Furthermore the seminar will focus on the experimental stress analysis based on standard electrical strain gauges and optical fibre strain measurements. Disturbances on the measurements will be also carefully treated with some corrective solutions and compensation techniques. The measurement of the dynamic behaviour of structure will also be discussed with some examples.

About the speaker:

Michael Guinchard graduated Engineering studies in the instrumentation –measurement field at the Conservatoire National des Arts et Métiers at Strasbourg in France. He worked for General Motors in the Noise and Vibration Laboratory of the European Technical Centre during 6 years before to join CERN in 2005 to develop and lead the Mechanical Measurements Laboratory in the Engineering Department.

The lab is composed by 10 persons, it is specialized in measurement of mechanical stresses and strains, displacements, pressures and vibrations applicable to a wide range of components and devices for present and future high energy physics projects. The measurements are carried out in a large variety of environments, including cryogenic and high temperatures, high radiation environment and high magnetic fields. The laboratory is also equipped with a full set of equipment to perform thermo-mechanical analysis from cryogenic.

Presenter: GUINCHARD, Michael (CERN)