Contribution ID: **351** Type: **Contributed Oral Presentation**

Cryogenic test facility instrumentation with fiber optic and fiber optic sensors for testing superconducting accelerator magnets

Tuesday 11 July 2017 16:30 (15 minutes)

The magnets for the next step in accelerator physics, such as the High Luminosity upgrade of the LHC (HL-LHC) and the Future Circular Collider (FCC), require the development of new technologies for manufacturing and monitoring. To meet the HL-LHC new requirements, a large upgrade of the CERN SM18 cryogenic test facilities is ongoing with the implementation of new cryostats and cryogenic instrumentation.
The paper deals with the advances in the development and the calibration of fiber optic sensors (FOS) in the range 300 –4 K using a dedicated closed-cycle refrigerator system composed of a pulse tube and a cryogen-free cryostat. The calibrated FOS have been installed in three vertical cryostats used for testing superconducting magnets down to 1.9 K or 4.2 K and in the variable temperature test bench (100 - 4.2 K). The dedicated 20-m-long cryostat for testing the MgB2 superconducting link (10 - 30 K) has also been equipped.
In this paper, some examples of FOS measurements of cryostat temperature evolution are presented as well as measurements of strain and temperature performed on several Nb3Sn and High Temperature Superconducting magnets during their powering tests. Results and experiences on the use of FOS for cryogenics applications are discussed in more details to assess the reliability of the method.

Author: Dr CHIUCHIOLO, Antonella (CERN)

Co-authors: Dr BAJAS, Hugo (CERN); Ms BAJKO, Marta (CERN); Dr CONSALES, Marco (Univiersity of Sannio); Prof. CUSANO, Andrea (University of Sannio); Dr GIORDANO, Michele (CNR-IPCB); Mr GILOUX, Christian (CERN); Mr VIRET, Patrick (CERN); Mr PEREZ, Juan Carlos (CERN)

Presenter: Dr CHIUCHIOLO, Antonella (CERN)

Session Classification: C2OrE - Instrumentation, Visualization, and Controls II - sponsored by Scientific Instruments Inc.