Contribution ID: **167** Type: **Regular 15 minutes Oral Presentation**

Training Performance with Increased Coil Pre-stress of the 2-m Model Magnet of Beam Separation Dipole for the HL-LHC Upgrade

Monday, August 28, 2017 10:45 AM (15 minutes)

Large aperture beam separation dipole magnets (D1) need to be developed for the high-luminosity LHC upgrade. The important specifications of this magnet are a coil aperture of 150 mm and field integral of 35 T·m at 12.0 kA and 1.9 K. The coils in the D1 magnet have a single layer structure and are wound with Nb-Ti/Cu Rutherford cables with the width of 15.4 mm. In such a thin and large aperture coil, precise prediction of coil size change during fabrication, cooling and excitation has importance to maintain the coils under appropriate pre-stress and that is a key to realize superior quench performance. KEK is in charge of development of the D1 magnet. The first 2 m model magnet (MBXFS01) was fabricated and tested at cold in 2015 – 2016. Quench current of this magnet reached 105% of the nominal current, however, the ultimate current of 13 kA as an acceptance criteria was not achieved. Measurements of azimuthal coil stress at the pole during excitation suggested that coil stress was completely released at the current much lower than the nominal one and the insufficient pre-stress was thought to be the main reason of unsatisfactory quench performance. After the cold test, MBXFS01 was once disassembled and reassembled after inserting shims to the coil mid-plane to enhance azimuthal coil pre-stress by 40 MPa. In this paper, we will report reassembly of the first 2 m model magnet (MBXFS01b) and the results of the cold test. Influence of coil pre-stress on training performance will be discussed and other test results such as magnetic field measurements and heater tests will be also introduced.

Submitters Country

Japan

Primary author: SUGANO, Michinaka

Co-authors: MUSSO, Andrea (CERN); TODESCO, Ezio (CERN); Mr OHATA, Hirokatsu (KEK); Mr KAWAMATA, Hiroshi (KEK); SASAKI, Kenichi (KEK); Mr TANAKA, Kenichi (KEK); SUZUKI, Kento (High Energy Accelerator Research Organization); Mr IIDA, Masahisa (KEK); Mr OKADA, Naoki (KEK); Mr TAKAHASHI, Naoto (KEK); Dr KIMURA, Nobuhiro (HIGH ENERGY ACCELERATOR RESEARCH ORGANIZATION, KEK); Mr HIGASHI, Norio (KEK); Mr OKADA, Ryutaro (KEK); Mr ENOMOTO, Shun (KEK); Dr NAKAMOTO, Tatsushi; OGITSU, Toru; Ms IKEMOTO, Yukiko (KEK)

Presenter: SUGANO, Michinaka

Session Classification: Mon-Mo-Or1

Track Classification: A1 - Superconducting Accelerator Magnets