Contribution ID: **194** Type: **Invited Oral Presentation**

[Invited] Superconducting Detector Magnets for the proposed 100 TeV Future Circular Collider

Tuesday 30 June 2015 16:00 (30 minutes)

In February 2014 CERN launched a design study for a future 100 TeV circular proton-proton collider with collision energy 7 more than in the present Large Hadron Collider. A new 100 km circular tunnel for the collider is foreseen as well as at least two new general purpose detectors. The study will materialize as a conceptual design report is to be issued in 2018 and eventually leading to operation earliest medio 2040.
The increase in collision energy from 7 to 100 TeV enforces a scaling up of the detector magnets in size and magnetic field for maintaining particle detection resolution. Options for the new detector magnet systems are being explored. Following the present largest detectors ATLAS and CMS, the study covers scaling up of the ATLAS magnet system layout based on using toroids for muon tracking and a solenoid for the inner detector. Also two dipole magnets are incorporated for covering the low angle forward directions. In a similar way the second option features a scaled-up CMS solenoid but also in combination with two dipole magnets.
The outer dimensions of the magnet systems show a diameter of 20-30 m and an overall length of 40 to 50 m. The magnetic field in the bores of the large toroid and solenoid will go up to some 2.5 and 6 tesla, respectively, with peak magnetic fields in the 7-8 tesla range, still possible with NbTi technology. The magnetic stored energies are in the record range of 40-70 GJ.

Author: Prof. TEN KATE, Herman H. J. (CERN - Physics Department)

Co-authors: DUDAREV, Alexey (CERN - Physics Department); MENTINK, Matthias (CERN - Physics Department)

Presenter: Prof. TEN KATE, Herman H. J. (CERN - Physics Department)

Session Classification: C2OrF - Superconducting Magnets II

Track Classification: CEC-06 - Superconducting Magnet Systems