

Preliminary design of a 16T $\cos\theta$ dipole for the Future Circular Collider

Wednesday, 13 April 2016 09:00 (30 minutes)

After LHC will be turned off, a new machine will be needed in order to explore unknown high-energy physics regions. For this reason, the project FCC (Future Circular Collider) has started, with the target of studying the feasibility of a very large hadron collider with 50 TeV proton beams in a 100 km circumference.

The EuroCirCol project is part of the FCC study under European Community leadership. It has the goal of developing a conceptual design of the FCC within 2019. One of the main targets is designing the superconducting main dipole needed for the collider, able to reach 16 T in order to bend the beams, complying with tight dimensional and operational constraints and requirements. This magnetic field can be achieved using Nb3Sn conductors at their highest performances.

The Milan and Genova INFN groups are responsible to explore the $\cos\theta$ dipole configuration and here we present the preliminary conceptual designs. The configurations presented here have been designed in order to have 10 % margin on the load-line at 4.2 K, taking care of using less conductor as possible. Field quality, quench protection and mechanical properties have been studied in order to ensure the feasibility of the designs.

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Session Classification: 16T dipole development: Overview

Track Classification: Superconducting Magnets