

Review and Potential of 16 T (or more) Common Coil Dipole

Wednesday, 13 April 2016 11:00 (30 minutes)

High field and lower cost dipoles are desired for future high energy hadron colliders. This presentation will discuss the progress in the design of a 50 mm aperture, 16 T, 2-in-1 dipole based on the common coil geometry using Nb₃Sn superconductor.

The common coil design is a conductor friendly design based on simple racetrack (mostly flat) coils with large bend radii. The common coil design is attractive for high field magnets as the coil modules move as a whole under large Lorentz forces, causing much smaller stress/strain on the conductor in the end region. Therefore, there is the potential to significantly reduce the amount of expensive support structure as the common coil design may be able to tolerate much larger deflections than those acceptable in conventional designs. One major goal of the high field magnet R&D program is to develop designs that can produce lower cost magnets in industry. The common coil design is expected to produce lower cost high field magnets since the number of coils required is half (because they are shared between two apertures), since it requires less structure (because large deflections may be allowed) and since it allows lower cost production techniques (because of simpler geometry). The common coil design is also expected to produce magnets with better performance due to less strain on the conductor.

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