

# FE Analysis of the Winding of a High Curvature Superconducting Dipole Using a Novel Technique

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In collaboration with CERN and CNAO, INFN is developing a demonstrator of a curved dipole as a key element of a superconducting gantry for hadron-therapy cancer treatments. The baseline project includes a cos-theta NbTi 4 T dipole with a radius of curvature of 1.65 m, an aperture of 80 mm and ramp rates up to 0.4 T/s. Considering the inherent difficulty of winding a curved coil, in parallel we are developing an alternative method, which consists of winding the coils on a fully convex shape that is then pushed to the final concave configuration. Since the conductor is a standard Rutherford cable, this winding option involves switching the magnet to a block coil configuration. In this contribution we report the preliminary finite element analysis that we carried out to set up the parameters of this innovative winding system.

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