Contribution ID: **647** Contribution code: **TUE-PO1-720-04** Type: **Poster**

Fine tuning of the inner dipole design of MCBXF magnets

Tuesday, November 16, 2021 1:15 PM (20 minutes)

Two types of nested orbit combined correctors are necessary for LHC upgrade, so called MCBXFA and MCBXFB. They shared the same cross section, but feature different lengths, 2.5 and 1.5 m, respectively. The power tests performed on two prototypes showed an excellent performance when individually powered, but the training to reach nominal torque in combined operation was very long. Moreover, memory was lost after torque direction reversal.
A detailed analysis of the power test results concluded that the origin of the problem was an insufficient support for the torque at the inner dipole coil ends. A fine tuning of the inner dipole design is proposed to improve the performance of both types of magnets. This paper describes the analytical and numerical models developed to analyse the problem and their results.

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Session Classification: TUE-PO1-720 Design & Diagnostics