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Coil error analysis of a curved CCT magnet applied to a superconducting gantry

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A lightweight superconducting gantry with large momentum acceptance is under development at Huazhong University of Science and Technology (HUST), which is based on strong focusing and local achromatic technology. The essential component of this superconducting gantry is the curved alternating gradient canted-cosine-theta (AG-CCT) magnet. This paper introduces the study on coil error analysis of the curved CCT magnet. Based on single line model using Biot-Savart law, a coil model built with manufacturing error and coil winding error is developed. A comparative study on the different error levels is carried out to determine the limit of the magnet parameters. In addition, the influence on the proton beam is also discussed.

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