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Fri-Mo-Po.07-03: Design of the main magnet of a 300MeV separated sector cyclotron

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High intensity cyclotrons play a significant role in radionuclide production. Our institute has formulated a plan to design and build a 300 MeV proton cyclotron and has already initiated preliminary research. Among all the subsystems, the main magnet stands out as one of the most critical and challenging components.When compared with low beam current cyclotrons, the main magnet system of a high beam current cyclotron has a more demanding requirement. It must generate a substantially strong vertical focusing force. This is essential for preventing beam expansion, which can be triggered by perilous resonances and space charge effects.Within the scope of this paper, the three dimensional modeling and optimization efforts dedicated to this large scale magnet system are presented in comprehensive detail.

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