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The Scanning Magnets for Proton Therapy Designed by SINAP

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A new proton therapy scanning system for the treatment of can-cer has been accomplished at the Shanghai Institute of Applied Physics (SINAP/China). It is mainly comprised of two separate dipole magnets, each controlling horizontal and vertical direc-tions scanning independently. According to the design require-ments, we have confirmed the dimensions of the magnets and op-timized the local and integrated field quality. The static electro-magnetic field analysis has been completed in OPERA 3D, in-cluding the spatial distribution and interference of the magnetic fields, the optimization of the pole, the verification of the scan-ning scope. The dynamic behaviors of the two dipole magnets were analyzed respectively and approaches to reduce the effects of the eddy currents were integrated into the design. In addition, the static and dynamic magnetic field measurements were fin-ished. Compared with the simulated magnetic fields, the meas-urement results indicate that the design of the scanning magnets reaches the design targets. All the specific design results of the scanning magnets are concluded in this paper.

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