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Design study of HTS air-cored cyclotron coil system for medical RI production

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The high current density of HTS material allows electromagnet to induce sufficiently strong magnetic field without relying on any iron core. This permits the design of air-cored cyclotron, where the absence of iron core brings the properties of light-weight and high field reproducibility, making it an ideal medical cyclotron to be installed inside hospitals. However, the cyclotron coil system need to induce highly accurate field while satisfying the engineering restriction from the HTS coil. Compact size, small fringe field and minimum fabrication cost are also desirable at the same time.
A HTS coil system of air-cored cyclotron is designed with the above restrictions taken into consideration. Multiple beam type accelerations that are required for medical RI production are simulated, in order to verify the usefulness of this design. In this work, the coil system design, the magnetic field and the HTS coil properties are presented. The feasibility of actual fabrication and in-hospital installation is discussed.

Footnotes

Paper preparation format

LaTeX

Region represented

Asia

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