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A beam line design of transverse beam profile uniformization using octupole magnets

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The rational use of multipole magnets in a beam line is an effective method of transverse beam profile uniformization. This paper introduces an octupole magnet uniformization design of an about 2.1 MeV proton beam accelerated by a RFQ accelerator and the design is based on TraceWin. This design contains two octupole magnets, which are dedicated to uniformization of x and y directions respectively. To prevent the beam from colliding with the drift tube after passing octupole magnets, a quadrupole magnet is placed in front of each octupole magnet to adjust Twiss parameter α to nearly 0. In the phase advance matching section, the length of the beam line for a 30cmx30cm beam spot size is reduced by increasing phase advance π without changing the strength of octupole magnets. The final uniformization effect on the target surface is measured on the distance from the measured point to the beam center in x and y directions respectively.

Footnotes

Funding Agency

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Yes

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