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Comparison of different LINAC structures for injection into an ion therapy accelerator and parallel production of radioisotopes

In the scope of ongoing initiatives for the design of a new generation of synchrotron-based accelerators for cancer therapy with ion beams, an analysis of LINAC design has started. LINAC represents a critical element with a strong impact on the performance and cost of the accelerator complex. The goal is to identify alternatives at lower cost and a similar or possibly smaller footprint than the standard 217 MHz injector presently used in all carbon therapy facilities in Europe. As an additional feature, a new LINAC design can be tailored to produce radioisotopes for treatment and diagnostics in parallel with operation as a synchrotron injector. The possibility of moving to 352 MHz frequency has been studied. The design of Quasi-Alvarez Drift Tube LINAC (QA-DTL) as an injector LINAC for carbon ions at A/q=3 has been presented. At the same time, QA-DTL has been compared with Inter-Digital H-Mode DTL (IH-DTL) design. The option of a Separated-tank IH-DTL structure (S-IH-DTL) is also discussed, along with a standard IH-DTL, both at 352 MHz. Finally, a DTL design at 352 MHz for the injection of fully stripped helium ions into the synchrotron has been presented.

Type of contribution

Poster

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