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Design and Optimization of a 3 GHz SCDTL for Carbon Ion Acceleration in a Medical Injector

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Linear accelerators offer key advantages over circular machines in hadron therapy, such as rapid energy modulation and reduced activation. In this work, we optimized a 3˜GHz Side-Coupled Drift Tube Linac (SCDTL) in terms of energy efficiency and the maximum achievable acceleration voltage. Comparative analyses were performed with alternative optimized configurations in TE and TM modes for ions with $\beta = 0.15 - 0.40$. The optimized structures were subsequently implemented in beam dynamics simulations for the energy upgrade of a carbon ion injector to be installed at the Instituto de Física Corpuscular in Valencia, Spain, achieving full transmission.

Footnotes

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