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Conceptual RF design of 3 GHz SCDTL structures for low-energy ion beams in medical linear accelerators for hadrontherapyal Linear Accelerators for Hadrontherapy

Tuesday 3 June 2025 16:00 (2 hours)

Linear accelerators offer significant advantages over circular accelerators in hadrontherapy by enabling rapid energy modulation of the output beam, facilitating efficient treatments without scattering or activation. In this work, we investigated the key geometrical features of 3 GHz Side-Coupled Drift Tube Linac (SCDTL) structures to optimize energy efficiency and the maximum achievable acceleration voltage. Comparative analyses were performed with alternative optimized configurations in TE and TM modes for ions with $\beta = 0.15–0.40$. Finally, we analyze the beam dynamics using the optimized 3 GHz SCDTL structures for ions with $\beta > 0.15$, focusing on the transition from a 750 MHz Interdigital H-Mode (IH) linac to a 3 GHz SCDTL structure for ions at $\beta = 0.15$.

Footnotes

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