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Alternating Phase Focusing Beam Dynamics for Drift Tube Linacs

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The Helmholtz Lienar Accelerator has reached the next project milestone with the commissioning of the superconducting Advanced Demonstrator cryomodule, comprising four superconducting crossbar H-mode (CH) cavities and superconducting steerer magnets. Parallel to the commissioning of the superconducting main accelerator, the injector linac is revised for integration into the standalone linac tunnel under construction. An Electron Cyclotron Resonance Ion Source (ECRIS) together with an Radio Frequency Quadrupole (RFQ) will supply beam to a normal conducting Interdigital H-mode (IH) pre-accelerator unit, providing for beam energy gain from 300 to 1400 keV/u. The revision of the injector Linac allows to re-design the IH cavity using an Alternating Phase Focusing (APF) beam dynamics scheme in order to yield two quadrupole-lens free cavities and to extend the injector with further beam diagnostics and beam steerers. Thus, the HELIAC-injector layout applying APF for continuous wave heavy ion acceleration is presented.

Summary

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