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Advanced basic layout of the Helmholtz LInear Accelerator for cw heavy ion beams at GSI

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The design and construction of continuous wave (cw) superconducting (sc) high intensity linacs is a crucial goal of worldwide accelerator technology development. The standalone sc cw heavy ion HElmholtz LInear ACcelerator (HELIAC) is a common project of GSI Helmholtz Centre for Heavy Ion Research and Helmholtz Institute Mainz (HIM) under key support of Goethe University Frankfurt (IAP). In 2017 the first section of the linac has been successfully commissioned and extensively tested with heavy ion beam at GSI, featuring the capability of 216.816 MHz multi-gap Crossbar H-mode (CH) DTL-structures. At present, the first fully equipped cryomodule of the HELIAC is under construction. Six further superconducting CH cavities are being procured. The HELIAC beam dynamics concept foresees a total of twelve CH-cavities in order to accelerate ions with a mass-to-charge ratio of 6 up to a smoothly variable energy in the range 3.5 - 7.5 MeV/u. In this paper, an advanced compact and less complex layout is presented, where the same number of accelerating cavities can be accommodated in three instead of four cryomodules, thus also reducing the number of solenoids and rebunchers, required for beam focusing. In addition, the integration and linking of the HELIAC to the GSI accelerator facility will be outlined.

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Footnotes

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