

8 - 6 IH-DTL for the Injector Linac for the HIRFL-CSR-Linac

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A heavy ion injector linac is now under development in the Institute of Modern Physics, Chinese Academy of Science. 11 Interdigital H-mode Drift Tube Linac (IH-DTL) are proposed to accelerate the heavy ions with a mass number to charge ratio (A/q) of up to 7 from 350 AkeV to an energy of around 17 AMeV, which corresponds to a total effective voltage of 119 MV, with a total length above 38 m. The first IH-DTL is designed to be operated at 81.25 MHz, which consists of three sections with a total of 37 acceleration gaps and two internal magnetic quadrupole triplets, that are housed in one tank with 4.2 m in length, as shown in Fig. 1. The other 10 IH-DTL are designed at 162.5 MHz, with the length ranging from 2 to 4 m, and connected with triplet outside the cavity tanks, as shown in Fig. 2. Cavity is built and optimized with CST MWS Studio, uniform on-axis electric field distribution is pursued during the optimization, which could be achieved by the adjusting of undercut length and lenses coupling, as shown in Fig. 3. The RF design and beam dynamics benchmark of the 81.25 MHz IH-DTL is completed, mechanical design and multi-physics analysis is on the way. This cavity is supposed to be commissioned with beam by the end of 2023 or in early 2024.

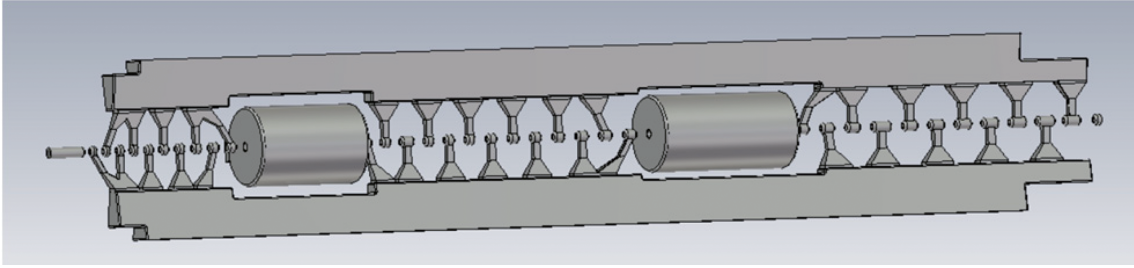


Fig. 1 (color online) 3D model of 81.25 MHz IH-DTL with internal magnetic quadrupole triplets.

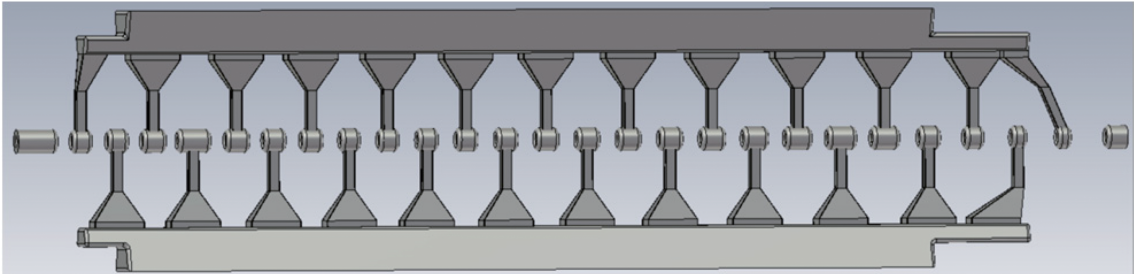


Fig. 2 (color online) 3D model of 162.5 MHz IH-DTL without internal lenses.

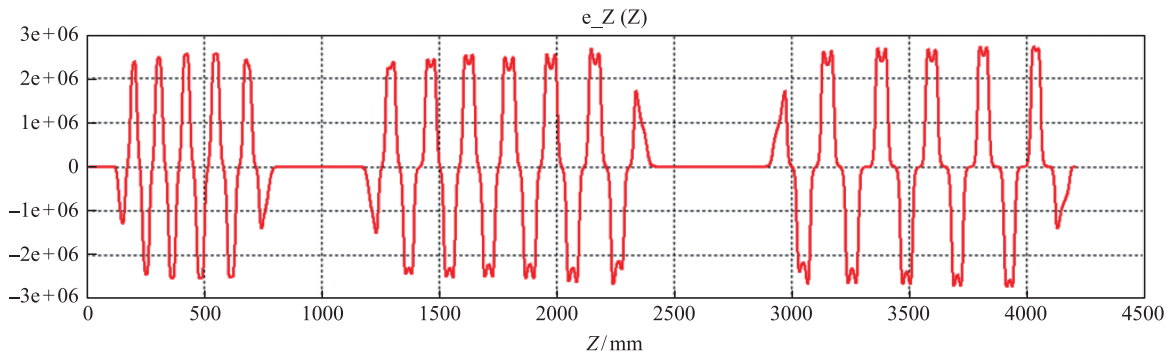


Fig. 3 (color online) E_z -field distribution on the beam axis normalized to 1 J stored energy for the 81.25 MHz DTL with internal magnetic quadrupole triplets.