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Prototyping of a disk-loaded structure for muon acceleration

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The muon linear accelerator is under development at J-PARC for precise measurement of muon anomalous magnetic moment and electric dipole moment. Four 2592 MHz disk-loaded structures (DLSs) operating in the TM01-2pi/3 mode take charge of the acceleration of high-velocity muon from 70% to 94% of the speed of light. They have disk-iris apertures tapered to generate a quasi-constant gradient of 20 MV/m. Gradual variation in disk space at each cell is one of the structural features of the DLS for muon to synchronize the accelerating phase with the changing speed of muon. Therefore, the dimensions of both end cells are significantly different. Two prototypes of RF couplers and two 9-cell reference cavities with shapes of the end cells of the DLS at the first stage have been fabricated and tested. We validate our design RF parameters and establish a method for tuning the DLS in this paper.

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Footnotes

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