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Design of a two-cell C-band accelerator cavity with higher-order mode damping

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Higher-order mode (HOM) damping is essential for building large-scale facility linear accelerators, such as a linear collider, because of the need to reduce the wakefield strength inside the accelerating structure. We designed a C-band accelerator cavity with distributed coupling and thin HOM-damping waveguides oriented in the radial direction. It was proposed that nickel-chrome (NiCr) coating deposited on the surface of the thin waveguides will be used to increase the surface resistivity and to damp the HOMs. Recently, we designed a two-cell cavity to conduct a concise high power test that will help us understand the fabrication challenges for the cavity with NiCr HOM absorbers, and examine the performance of the NiCr coating under high-power conditioning. This presentation will report the detailed electromagnetic and engineering design of the cavity, the theoretical prediction of the cavity high-gradient performance, the status of fabrication, and plans for high-gradient testing.

Footnotes

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