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A technique to improve the energy leakage of TM020-mode cavity for Super Tau Charm Facility

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TM020-mode cavity with a higher quality factor and a lower R/Q as compared to TM010 cavity is an attractive candidate for RF system of Super Tau-Charm Facility. However, the symmetrical electromagnetic field distribution at radial nodes is diluted by the introduction of a high-power input port and cavity frequency tuners. This results in the leakage of the accelerating mode and a weak damping of harmful modes. In order to address these issues, this paper proposes elliptic coaxial slots and tuning bumps on the inner wall to optimize the performance of the accelerating mode and harmful modes. Simulation results demonstrate that the energy leakage of the accelerating mode can be reduced below 1% during operation and all of harmful modes can be strongly damped.

Footnotes

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