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Design of A 500 MHz Normal-Conducting Cavity for Main Rings of Super Tau-Charm Facility

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A 500 MHz normal-conducting (NC) cavity is being developed for Super Tau-Charm Main Rings which have a current of 2 A and a synchronous radiation energy loss of 410 keV per turn. This NC cavity operates in a higher order mode of TM₀₂₀. Through optimizations, it results in a high quality factor and a low R/Q. This feature is beneficial to reduce the required detuning frequency so that the coupled bunch instabilities (CBIs) driven by the accelerating mode are greatly suppressed. It employs ferrite absorbers inside coaxial slots located at the node of the TM₀₂₀ mode to heavily damp all of dangerous HOMs other than the TM₀₂₀ mode.

Footnotes

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