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High-Order-Modes Damping in Superconducting Harmonic Cavity for HALF storage ring

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A superconducting (SC) 1.5 GHz (3rd harmonic) cavity is being developed for lengthening bunch and improving beam lifetime in the Hefei Advanced Light Facility (HALF) storage ring. This SC cavity is excited by an electron beam with 350 mA current, 1 nC charge, and ~6.7 ps length and requires strong damping of higher-order-modes (HOMs) in order to meet beam instability requirements. Two fluted beam tubes are employed to allow HOMs to escape from the cavity and to be damped by a pair of silicon carbide (SiC) rings which are located outside the cryomodule. This contribution presents optimizations on both SiC dampers in detail. The high damping requirements for both longitudinal and transverse modes can be achieved with these dampers. In addition, the engineering design of cooling system for HOM dampers is also presented in this contribution.

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Footnotes

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Yes

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