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## RF design of a new 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  $\sim 6.7$  ps length. This contribution presents optimizations on such a SC harmonic cavity in detail. It has a RF coupler to adjust the loaded quality factor and extract RF power out of the cavity from the beam. In combination with a frequency tuner, this permits adjustment of both the amplitude and phase of the harmonic voltage such that the cavity is able to operate at various beam currents. Higher-order-modes are strongly damped using a pair of room-temperature silicon carbide (SiC) rings to meet the requirement of beam instabilities.

### Footnotes

### Paper preparation format

### Region represented

Asia

### Funding Agency

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