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RF Measurements of the 3rd Harmonic Superconducting Cavity for a Bunch Lengthening

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The brightness can be increased by minimizing the emittance in the light source, but the reduced emittance also increases the number of collisions of electrons in the beam bunch. Therefore, the bunch lengthening by using the 3rd harmonic cavity reduces the collisions of electrons and increases the Touschek lifetime. Since the resonant frequency of the main RF cavity is 500 MHz, the resonant frequency of 3rd harmonic cavity is selected as 1500 MHz. The prototype cavity is a passive type in which a power coupler is not used, and power is supplied from the beam. The operating temperature is 4.5 K, which is a superconducting cavity. The elliptical double-cell geometry was selected to increase the accelerating voltage of the cavity and reduce power losses. Based on this design, three niobium cavities are fabricated and tested. In this paper, we presented the results of the RF measurement at room temperature to cryogenic temperature.

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Footnotes

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Yes

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