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Investigation of the fabrication method for the 3rd harmonic superconducting double-cell cavity

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The 3rd harmonic cavity is a key component for the 4th generation storage ring. A bunch lengthening by the harmonic cavity increases the Touschek lifetime, which can reduce the emittance in the storage ring. The resonant frequency is selected as 1500 MHz due to the resonant frequency of the main RF cavities being 500 MHz. The prototype cavity is an elliptical double-cell geometry to reduce power losses. Based on this design, three niobium cavities are fabricated. Deep drowned half-cells are welded by the electron beam welding machine after trimming at the edge of the equator and iris. The surface treatments are performed to increase the quality factor such as buffered chemical polishing, high-pressure rinsing, and annealing. In this paper, we presented the fabrication method of the 3rd harmonic superconducting cavity from niobium sheets to an elliptical double-cell cavity.

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Footnotes

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