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Beam dynamics study of the bimodal RF cavity for advanced light source

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Beam lengthening is significant for improving the beamlife of storage rings. Based on the previously proposed design of a room temperature conducting bimodal RF cavity, we conducted relevant dynamic simulations. The results showed that in a simulated storage ring lattice with the beam energy of 2 GeV and the synchronous radiation energy of 0.0356 MeV, the bimodal cavity realizes a same bunch-lengthening performance that is comparable to the double RF system composed of a main high-frequency cavity and a third harmonic cavity. This works provides reference materials for the design of bimodal cavities and provides strong support for application.

Footnotes

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