

Abstract Submitted
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Harmonic Kicker RF Cavity for the Jefferson Lab Electron-Ion Collider EM Simulation, Modification, and Measurements SARAH OVERSTREET, HAIPENG WANG, Jefferson Lab — An important step in the conceptual design for the future Jefferson Lab Electron-Ion Collider (JLEIC) is the development of supporting technologies for the Energy Recovery Linac (ERL) Electron Cooling Facility. The Harmonic Radiofrequency (RF) kicker cavity is one such device that is responsible for switching electron bunches in and out of the Circulator Cooling Ring (CCR) from and to the ERL, which is a critical part of the ion cooling process. Last year, a half scale prototype of the JLEIC harmonic RF kicker model was designed with resonant frequencies to support the summation of 5 odd harmonics (95.26 MHz, 285.78 MHz, 476.30 MHz, 666.82 MHz, and 857.35 MHz); however, the asymmetry of the kicker cavity gives rise to multipole components of the electric field at the electron-beam axis of the cavity. Previous attempts to symmetrize the electric field of this asymmetrical RF cavity have been unsuccessful. The aim of this study is to modify the existing prototype for a uniform electric field across the beam pathway so that the electron bunches will experience nearly zero beam current loading. In addition to this, we have driven the unmodified cavity with the harmonic sum and used the wire stretching method for an analysis of the multipole electric field components.

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