MODELING OF NON-LINEAR EFFECTS IN RF CAVITIES

D.T. Abell, G.I. Bell, Tech-X, Boulder, Colorado;

I. Ben-Zvi, BNL, Upton, Long Island, New York;

D.L. Bruhwiler, Tech-X, Boulder, Colorado;

J. Kewisch, BNL, Upton, Long Island, New York;

R.D. Ryne, LBNL, Berkeley, California

Abstract

Emerging accelerator applications require electron beam radii comparable to RF cavity apertures, placing more stringent demands on the modeling of particle motion in RF cavities using map-based techniques. High-gradient cavities and cavities with significant axial asymmetries also demand improvements in modeling capabilities. A new method has been developed for computing high-order nonlinear maps for arbitrary RF cavities*. It has been implemented through fifth order in MaryLie/IMPACT, so simulations can include the effects of space-charge. We describe this new approach and present comparisons with more traditional approaches.

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