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Attempt to include beam loading effects in finite element method RF simulations for B-cell cryomodules

Thursday 25 September 2025 14:30 (3 hours)

In this work a method to include the effects of beam loading in FEM solvers for electromagnetic problems, such as CST and HFSS, is considered. The method involves using transmission line models of a beam-loaded and beamless resonant cavity to determine an effective surface resistance and tuning angle for the beamless cavity to produce the same reflection as the beam-loaded case. The cavity, its coupler, and the relevant waveguide sections are then simulated with the desired surface resistance and shift from resonance. This allows for detailed understanding of the fields in regions of interest, such as transformers and RF windows, as a function of relevant parameters, such as beam current, cavity voltage, and tuning angle.

I have read and accept the Privacy Policy Statement

Yes

Footnotes

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Author: OSEROFF, Thomas (Cornell University)

Co-author: LIEPE, Matthias (Cornell University)

Presenter: OSEROFF, Thomas (Cornell University)

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