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Wakefield Calculation in Dielectrically Lined Rectangular Waveguides Based on a Semi-Analytical Eigenmode Expansion

Tuesday 23 August 2016 10:00 (30 minutes)

Dielectrically lined waveguides are planned to be used as a passive wakefield dechirper for the electron beam at the ELBE facility of the Helmholtz-Zentrum Dresden Rossendorf. In this work we introduce the design of such a passive wakefield dechirper based on the analysis of dielectrically lined rectangular waveguides with a semi-analytical model developed at the University of Rostock. The model uses an eigenmode expansion of the electric field, which is possible since a closed analytic formulation for the eigenmodes of the dielectrically lined rectangular waveguide is available. The generality of the developed model allows for a quick calculation of the wakefields of numerous different beam types via the Green's function method.
We also present the dechirped phase-spaces of a variety of beam distributions, as well as the theoretically possible dechirping for the ELBE beam. The author would like to thank the BMBF under contract number 05K13HR2 for funding.

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