

Analysis of the Panofsky-Wenzel Theorem in pillbox cavities with a beam pipe

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In this paper, we derive the multipolar form of the change in transverse and longitudinal momenta of an ultra-relativistic charged particle that traverses a harmonic TM_{mn0} mode in a pillbox cavity with a beam pipe. The relevant equations are first formalised before presenting results from the numerical integration of RF cavity field maps. In particular, we show that the radial dependence of the change in transverse and longitudinal momenta through a TM_{mn0} mode has polynomial, and not Bessel, dependence.

Footnotes

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