

Study and Design of a New Overdamped Cavity Kicker for the PEP II Longitudinal Feedback System

Fabio Marcellini
INFN-LNF, Via E.Fermi 40, 00044 Frascati (Rome) Italy

M. Tobiyama, P. MacIntosh, J. Fox, H. Schwarz, D. Teytelman, A. Young
Stanford Linear Accelerator Center, 2575 Sand Hill Road - Menlo Park Ca 94025 USA

Abstract

ABSTRACT - PEP-II has been running for several years using drift-tube style longitudinal kickers. They have functioned well at the design current in the HER and LER. Machine upgrade plans for PEP-II have encouraged the analysis and design of cavity kickers for the longitudinal feedback systems in PEP-II. The cavity kicker design is based on the use of an extremely low Q cavity, where the Q of the system is determined primarily by ridged waveguides coupling to external loads. This kicker design has originally developed at LNF-INFN, and is attractive for use at PEP-II to reduce the kicker impedance at frequencies outside the working bandwidth and consequently reduce the strong beam-heating of the structure and the feedthroughs. The cavity-style kicker is also better suited to external cooling, as it is without internal elements which must be cooled through either radiation or conduction out through some path. The design options, including the choice of operating frequency ($9/4 \cdot RF$ vs. $13/4 \cdot RF$), the kicker shunt impedance, the number of external coupling ports (4 vs. 8) and the selection of the kicker bandwidth, are briefly described and three different solutions are proposed. Results are presented estimating the shunt impedance, bandwidth and HOM impedances via the use of the Ansoft HFSS code.

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