Abstract Submitted
for the APR08 Meeting of
The American Physical Society

Computation of Transfer Maps from Surface Data with Applications to ILC Damping Ring Wigglers[1] CHAD MITCHELL, ALEX DRAGT, University of Maryland at College Park — Nonlinear wiggler effects are important for determining the dynamic aperture of electron/positron damping and storage rings. Wiggler transfer maps in general depend sensitively on nonlinear fringe-field and high-order-multipole effects. The inclusion of these effects requires a detailed and realistic model of the interior and fringe magnetic fields, including knowledge of high spatial derivatives. A collection of surface fitting methods have been developed for extracting this information directly from 3-dimensional magnetic field data on a grid, as provided by various 3-dimensional finite element field codes. The virtue of surface methods is that they exactly satisfy the Maxwell equations and are relatively insensitive to numerical noise in the data. These techniques are used to compute, in Lie-algebraic form, realistic transfer maps for the proposed ILC Damping Ring wigglers. The resulting transfer maps are then used to determine the effect of the proposed wigglers on the dynamic aperture of the ILC Damping Rings.

[1]Supported by the U.S. DOE under Grant DEFG02-96ER40949.

Chad Mitchell
University of Maryland at College Park

Date submitted: 08 Jan 2008 Electronic form version 1.4