Wigglers and Single-Particle Dynamics in the NLC Damping Rings*

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In order to achieve the required beam cooling the damping rings of the Next Linear Collider (NLC) will make use of a substantial number of wiggler insertions. An accurate modeling of the wigglers is desirable to assess the impact of the resulting nonlinearities on the beam dynamics, in particular on the dynamic aperture which is important for good injection efficiency. We will illustrate a method for representing magnetic fields that uses the data from numerical codes that are customarily used in magnet design. In particular, we show how the full 3D "multipole" field expansion can be reconstructed starting from the radial component of the magnetic field on the surface of a cylinder coaxial to the wiggler. Such an expansion is particularly suitable for a fast evaluation of the single particle dynamics by means of symplectic transfer maps. A discussion of the impact of the wigglers nonlinearities on the NLC Main Damping Ring using this technique will be presented.

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