Electron Dynamics in the Wigglers of CESR-TA

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Simulations of electron cloud buildup in the CESR-TA wigglers have been performed using the 3D code WARP-POSINST. The beam field is modeled using the Bassetti-Erskine electric field and does not evolve in time. The electron cloud distribution during the passage of a 45-bunch train has been examined with particular attention to the difference in dynamics at the z locations of the maximum and minimum vertical magnetic field, By. Near the z locations of the zeroes of By electrons near the chamber midplane cross field lines, driven by the gradient and curvature of the magnetic field, eventually reaching the vicinity of the beam. Near the maxima of By the cloud buildup is like that in a dipole, and this cloud spatial distribution occurs through much of the length of the wiggler period. This report will discuss these findings, delineate the areas of the wiggler in which each of these different behaviors occurs, and give results for the tune shift caused by the cloud in each area and for the whole wiggler period.

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