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Particle-in-Cell Calculations of the Ecloud in the ILC Positron Damping Ring Wigglers

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Due to copious synchrotron radiation from the beam, electron cloud effects are predicted to be important in the wiggler sections of the ILC positron damping ring. In this area of the ring, the physics is inherently 3D. Moreover, a self-consistent calculation of the physics of the electron cloud/beam system is necessary for examining such phenomena as emittance growth in the beam. We present the first calculations of this system with the self-consistent 3D particle-in-cell code WARP/POSINST. The code includes self-consistent space charge for both species, mesh refinement, and detailed models of primary and secondary electron production. Interaction with electrons is assumed to occur only in the wigglers in this model-- the beam is moved using maps between wiggler sections.