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Simulation of Beam-Beam Effects in e^+e^- Storage Rings*

Yunhai Cai
Stanford Linear Accelerator Center, Stanford University, Stanford, CA 94309

Abstract

The beam-beam effects of the PEP-II as an asymmetric collider are studied with strong-strong simulations using a newly developed particle-in-cell (PIC) code. The simulated luminosity agrees with the measured one within 10% in a large range of the beam currents. The spectra of coherent dipole oscillation are simulated with and without the transparency symmetry. The simulated tune shift of the coherent π mode agrees with the linearized Vlasov theory even at large beam-beam parameters. The Poicare map of coherent dipole is used to identify the beam-beam resonances.

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