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An Asymmetric B-Factory Based on PEP

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An Asymmetric B-Factory Based on PEP*, M.S. ZISMAN, Lawrence Berkeley Laboratory, for the B-Factory Collider Group†—The study of rare and CP-violating B-meson decays is well suited to a high-luminosity e+e- collider. For studying certain decay processes there are also substantial benefits associated with asymmetric beam energies, which give a moving center of mass for the B-mesons. We describe a design for a 9 GeV x 3.1 GeV B-factory in the PEP tunnel that would operate initially at a luminosity of 3 x 10^{33} cm^{-2}s^{-1}. Technical problems include issues related to high currents (e.g., beam instabilities, feedback systems, lifetime degradation, and synchrotron radiation power dissipation) and those related to the heteroenergetic beams (e.g., beam separation, beam-beam interaction, and detector requirements). Issues requiring R&D effort are identified. With state-of-the-art storage ring technology, careful engineering, and a design philosophy stressing flexibility, construction of a high-luminosity asymmetric B-factory is entirely feasible.

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