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Pulsed solenoid as an optical matching device at the ILC undulator-based positron source

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To ensure high luminosity for high energy physics experiments at the International Linear Collider (ILC), a source of sufficient amounts of positrons is required. One approach for this is to produce positrons by generating electron-positron pairs from high energy photons impinging on a high-Z target material and capturing these particles with a magnetic focusing device. This beam-optics element matches the phase space of the high-divergence, large-energy-spread positron beam into the acceptance of the downstream accelerating section's beam optics. As commonly used matching devices show unstable focusing for the required pulse duration or insufficient positron capture efficiencies (yields), a pulsed solenoid was proposed and shown in simulation to outperform other proposed devices. In this contribution we discuss the current status of the design of this pulsed solenoid with respect to positron capture efficiency, cooling, mechanical stability, and other critical performance aspects.

Collaboration / Activity

ILC

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