

A crystal-based positron source for lepton colliders

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Positron source yield is crucial for achieving the required luminosity in future lepton colliders. The conventional approach involves an e-beam impinging a high-density solid target to initiate an electromagnetic shower and capture positrons afterwards. But, this scheme is limited by the Peak Energy Deposited Density (PEDD) on the target before its structural failure.

We can utilize the large photon emission in axial channeling within a high-Z crystal to increase positron yield and/or decrease target thickness, thus lowering the PEDD^[*]. Together with the conventional scheme, the crystal-based one is under study for the FCC-ee injector design^[*].

We carried out experiments at DESY and CERN PS with high-Z crystal and e-beam with energy useful for FCC-ee. The results were used to validate a new simulation model implemented in Geant4 that will be included in the injector design^[@].

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