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Investigations on a Hybrid Positron Source with a Granular Converter

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Promising results obtained with crystal targets for positron production led to the elaboration of a hybrid source made of an axially oriented tungsten crystal, as a radiator, and an amorphous tungsten converter. If the converter is granular, made of small spheres, the heat dissipation is greatly enhanced allowing the consideration of such device for the future linear colliders. A positron source of this kind is investigated. Previous simulations have shown very promising results for the yield as for the energy deposition and the PEDD (Peak Energy Deposition Density). Here, we present detailed simulations made in this granular converter with emphasis on the energy deposition density, which is a critical parameter as learned from the breakdown of the SLC target. A test on the KEKB linac is foreseen; it will allow a determination of the energy deposited in the converter through temperature measurements. Four granular converters, made of W spheres of mm radius have been built at LAL-Orsay; they will be installed at KEK and compared to compact converters. A description of the experimental lay-out at KEK is provided. Applications to future linear colliders as CLIC and ILC are considered.

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