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Radiation damage study of the FCC-ee crystal-based positron source

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The design of the FCC-ee positron source based on the conversion of bremsstrahlung photons into e^-/e^+ pairs in the tungsten target has been carried out and integrated into the FCC Feasibility Study report. An alternative scheme exploiting lattice coherent effects in oriented crystals has been proposed. This contribution presents the conceptual design of this approach and preliminary results from a crystal irradiation study performed at the MAInz Microtron (MAMI) facility. The test aimed to identify the fluence threshold for degradation of the crystalline structure. The irradiated crystal showed no signs of structural damage after about 33 hours of irradiation, corresponding to a fluence of $1.13 \times 10^{19} \text{ e}^-/\text{mm}^2$

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