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A positron source demonstrator for future colliders

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Regarding high current e^+ sources, the almost universal usage of target-based production schemes combined with conventional capture technology has led to poor transmission efficiencies. This long-standing difficulty to handle the extreme e^+ transverse emittance and energy spread has been a major impediment for future, high luminosity lepton collider designs. The PSI Positron Production (P-cubed or P^3) experiment, framed in the FCC-ee study, is a demonstrator for a e^+ capture system with potential to improve the state-of-the-art e^+ yield by an order of magnitude. The experiment will be hosted at the SwissFEL facility at PSI as of 2025, where installation works are ongoing. This paper is an overview of P^3 , with a particular focus on the novel capture system and its effects on the beam dynamics. A concept for the experiment diagnostics is also introduced.

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