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PID Performance of CEPC ToF and Outer Tracker

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In order to fulfill the requirements for precision physics analysis in CEPC, good particle identification and trajectory measurements are essential. In the CEPC preTDR detector, a dedicated tracking system, including Vertex Detector, Silicon Inner Tracker, Time Projection Chamber, and Time of Flight (ToF) Outer Tracker, is proposed to perform excellent track position, momentum, and flight time measurements. The ToF Outer Tracker is designed to achieve a few tens picoseconds timing resolution for tracks which could benefit the particle identification (PID) of the CEPC. Besides, due to a novel silicon timing sensor called AC-LGAD will be used for the Outer Tracker, the ToF Outer Tracker could also perform a few micrometer position resolution measurements for tracking hits. This information can be used to improve the momentum resolution for high momentum tracks. This talk will present the performance of the ToF Outer tracker with the simulated data from the CEPCSW. The performance study includes two parts: the impact on PID and the effect on tracking momentum measurement. Based on that, this talk will also show the physics potential for some benchmark physics channels with such a good ToF Outer Tracker performance.

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