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Development of the time-of-flight particle identification for future Higgs factories

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At the latest European strategy update in 2020 it has been highlighted that the next highest-priority collider should be an e^+e^- Higgs factory with a strong focus on precision physics. Particle identification will be an essential tool for such precision measurements to utilise clean event environment and push event reconstruction to its full potential. A recent development of the fast-timing Si sensors such as LGADs with a time resolution below 50 ps will allow to enhance precision measurements at the future Higgs factories with an additional separation of π^\pm , K^\pm , p using time-of-flight technique. In this study we present our latest developments of the time-of-flight particle identification algorithm with a brief overview of its potential physics applications, discuss its realistic design implementations inside the future Higgs factory detector using International Large Detector (ILD) as an example and highlight a key role and importance of the fast-timing detectors for π^\pm , K^\pm , p identification.

In-person participation

Yes

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