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Particle identification with fast timing detectors at future Higgs factories

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Future e^+e^- Higgs factory collider projects are designed for precision measurements of the Higgs boson and of electroweak observables, thereby utilizing every event to their full potential. The identification of the pions, kaons and protons plays a key role for precision measurements and event reconstruction, especially for the flavour tagging. To improve the identification of charged hadrons at low momentum we can use the time-of-flight method. It relies on current silicon sensor technologies with extremely good time resolution of 10 - 30 ps. This allows to measure the time-of-flight of particles and reconstruct their mass providing additional tool for identification of π^\pm , K^\pm and p . We study possible realistic implementation scenarios and potential physics applications of the fast timing silicon sensors into the future Higgs factory detectors using as an example the International Large Detector (ILD) at the International Linear Collider (ILC).

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