

Comprehensive PID for Future HTE Factories

The particle physics community has concluded that the next collider should be an e+ e- Higgs, top and electroweak (HTE) factory, however a number of options are being proposed for the accelerator and yet more for the corresponding detectors. In the ongoing discussions it has become increasingly clear that particle identification (PID) including charged hadron ID is a key feature that enables a number of analyses and improves many. Different PID technologies - from Cherenkov angle imaging to gaseous dE/dx and dN/dx to calorimeter shower shapes and time of flight (and more) - are being envisioned for the proposed future HTE factory detector concepts, however the choices of technologies, their implementation in detector concepts and their physics impact are open questions under study.

This talk discusses Comprehensive PID (CPID), a software platform that provides assessment and in particular combination of PID information in collider detectors, and its impact on analyses. CPID works in a common framework (Key4HEP) across HTE factory proposals with explicit cross-collider collaboration and allows to provide PID for analyses in a coherent way, optimise detector layouts and even compare different detector concepts at the same collider. The talk highlights the available PID modules so far, their performance and the impact PID has on selected physics analyses.

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