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A Particle Identification Framework for Linear Colliders

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The particle physics community has concluded that the next collider should be an $e+e-$ Higgs factory. Such a collider would also enable many other precision measurements, e.g. of the top quark and in the electroweak sector, as well as searches for exotic particles. In the ongoing discussions it has become increasingly clear that particle identification including charged hadron ID is a key feature that enables a number of analyses and improves many. A number of different PID systems - from the simple muon ID to gaseous dE/dx and dN/dx to calorimeter shower shapes and time of flight (and more) - are being envisioned for the proposed future Higgs factory detector concepts. It is desirable to assess their impact and the effect of combining them in a common tool to enable fair comparisons.

This talk presents a new modular approach to a generic PID framework for the different possible future Higgs factories, embedded in the Key4HEP framework. It discusses implementation questions, performance measures and possible physics applications, exemplifying the International Large Detector (ILD) concept for the International Linear Collider (ILC).

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