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Reconstruction of b - and c - jets at e^+e^- Higgs Factories with ParticleFlow detectors

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The Higgs boson decay modes to heavy b and c quarks are crucial for the Higgs physics studies. The presence of semileptonic decays in the jets originating from b and c quarks causes missing energy due to the undetectable neutrinos. A correction for the missing neutrino momenta can be derived from the decay kinematics up to a two-fold ambiguity. The correct solution can be identified by a kinematic fit, which exploits the well-known initial state at an e^-e^+ collider by adjusting the measured quantities within their uncertainties to fulfill the kinematic constraints. The ParticleFlow concept, based on the reconstruction of individual particles in a jet allows understanding the individual jet-level uncertainties at an unprecedented level. The modeling of the jet uncertainties and the resulting fit performance will be discussed for the example of the ILD detector. Applied to $H \rightarrow b\bar{b}/c\bar{c}$ events, the combination of the neutrino correction with the kinematic fit improves the Higgs mass reconstruction significantly, both in terms of resolution and peak position.

Time Zone

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