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Trilogy of event reconstruction for the future electron positron Higgs factory

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Hadronic events are the bulk part of physics events at future electron-positron Higgs factories. For instance, 97% of ZH signal decays into the final state with jets, while the majority are actually full hadronic events. Therefore, an efficient reconstruction of those hadronic events is critical for the physics exploration at the future Higgs factory, and, actually the entire high-energy frontier.

Using Artificial Intelligence, we propose and realize a trilogy for the hadronic event reconstruction: firstly, jet origin identification that distinguishes jets originating from 11 different kinds of colored particles; second, one-one correspondence reconstruction that aims at efficiently reconstructing and identifying all the visible particles; and thirdly, color singlet identification that aims at distinguish the color singlet origin of each re-constructed particles, for example to identify from Z or Higgs boson a final state particle is generated at full hadronic Z events. We will present the current status of relevant performance studies, and discuss its impact on the physics measurements at future collider experiments. We'd also emphasize its impact on high-precision QCD measurements and studies.

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