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Precise Measurement of Higgs Hadronic Decay at CEPC

We conduct a detailed Monte Carlo study of the process $e^+e^- \rightarrow ZH$ at the CEPC. The analysis focuses on final states where the Z boson decays invisibly, while the Higgs boson decays hadronically through $H \rightarrow b\bar{b}$, $c\bar{c}$, gg and $s\bar{s}$. To distinguish among hadronic final states, we apply advanced jet-tagging methods based on ParticleNet, Particle Transformer, and the More-Interaction Particle Transformer, which make use of low-level particle information for more accurate classification. In addition, we develop a machine-learning-based event selection strategy to strengthen signal–background separation, leading to improved sensitivity in Higgs property measurements and stringent tests of Standard Model predictions at the CEPC.

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