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Nailing Higgs Couplings at Future Colliders

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LEP precision on electroweak measurements was sufficient not to hamper the extraction of Higgs couplings at the LHC. But the foreseen permille-level Higgs measurements at future lepton colliders might suffer from parametric electroweak uncertainties in the absence of a dedicated electroweak program. We perform a joint, complete and consistent effective-field-theory analysis of Higgs and electroweak processes. The full electroweak-sector dependence of the $e^+e^- \rightarrow WW$ production process is notably accounted for, using statistically optimal observables. Up-to-date HL-LHC projections are combined with CEPC, FCC-ee, ILC and CLIC ones. For circular colliders, our results demonstrate the importance of a new Z -pole program for the robust extraction of Higgs couplings. At linear colliders, we show how exploiting multiple polarizations and centre-of-mass energies is crucial to mitigate contaminations from electroweak parameter uncertainties on the Higgs physics program. We also investigate the potential of alternative electroweak measurements to compensate for the lack of direct Z -pole run, considering, for instance, radiative return to these energies. Conversely, we find that Higgs measurements at linear colliders could improve our knowledge of the Z couplings to electrons. Our results can be found at: [arXiv:1907.04311](https://arxiv.org/abs/1907.04311)

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