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Electroweak Couplings of the Higgs Boson at a Multi-TeV Muon Collider XING WANG, University of California, San Diego, TAO HAN, University of Pittsburgh, IAN LOW, Northwestern University, DA LIU, University of California, Davis — We estimate the expected precision at a multi-TeV muon collider for measuring the Higgs boson couplings with electroweak gauge bosons, HVV and $HHVV$ ($V = W^{\pm}, Z$), as well as the trilinear Higgs self-coupling HHH. At very high energies both single and double Higgs productions rely on the vector-boson fusion (VBF) topology. The outgoing remnant particles have a strong tendency to stay in the very forward region, leading to the configuration of the "inclusive process" and making it difficult to isolate ZZ fusion events from the WW fusion. In the single Higgs channel, we perform a maximum likelihood analysis on HWW and HZZ couplings using two categories: the inclusive Higgs production and the 1-muon exclusive signal. In the double Higgs channel, we consider the inclusive production and study the interplay of the trilinear HHH and the quartic $VVHH$ couplings, by utilizing kinematic information in the invariant mass spectrum. We find that at a centre-of-mass energy of 10 TeV (30 TeV) with an integrated luminosity of 10 ab^{-1} (90 ab^{-1}), one may reach a 95% confidence level sensitivity of 0.073% (0.023%) for WWH coupling, 0.61% (0.21%) for ZZH coupling, 0.6% (0.20%) for $WWHH$ coupling, and 5.6% (2.0%) for HHH coupling.

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