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Higgsstrahlung and double Higgs production at high-energy CLIC operation

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The Compact Linear Collider (CLIC) is a mature option for a future electron-positron collider operating at centre-of-mass energies of up to 3 TeV. CLIC would be built and operated in a staged approach with three centre-of-mass energy stages currently assumed to be 380 GeV, 1.5 TeV, and 3 TeV. This presentation focusses on unique opportunities at the multi-TeV stages in the area of Higgs physics. Two physics studies based on full detector simulations will be discussed: Higgsstrahlung (e+e- -> ZH) and the extraction of the Higgs self-coupling from double Higgs production. The first is particularly interesting as contributions from BSM effects to the Higgsstrahlung process grow with energy. Substructure information can be used to identify fully hadronic ZH events at 3 TeV to maximise the statistical precision. B-tagging in boosted Higgs boson decays was studied for the first time for CLIC. New projections for the ZH event rate and angular distributions will be shown. The Higgs self-coupling is of particular interest: for determining the shape of the Higgs potential, and due to its sensitivity to a variety of BSM physics scenarios. At the higher-energy stages CLIC will produce Higgs boson pairs both via double Higgsstrahlung and via vector-boson fusion. Measurements of these processes lead to a determination of the Higgs self-coupling with a precision around 10%.

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Secondary track (number)

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