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**ICHEP 2018 - CLICdp abstracts**

### Higgs physics at CLIC

- **Speaker:** Matthias Weber (CERN)
- **Session:** Higgs Physics
- **Status:** Accepted as oral presentation (#524)
- **Time:** 13+2 min
- **Abstract:** 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 will 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 contribution discusses the physics potential of CLIC in the area of Higgs physics based on benchmark analyses using full detector simulations [1]. The initial stage of operation allows study of Higgs production in Higgsstrahlung and WW-fusion, resulting in precise measurements of the production cross sections and the total Higgs-boson decay width. Operation at high energy will provide high-statistics samples of Higgs bosons produced in WW-fusion enabling tight constraints on Higgs couplings. High-energy operation also gives access to the ttH process and Higgs self-coupling, through the measurement of double Higgs production. Global fits to all possible measurements at CLIC are presented.


- **Slides**

### BSM searches at CLIC

- **Speaker:** Roberto Franceschini (Rome)
- **Session:** Beyond the Standard Model
- **Status:** Accepted as oral presentation (#525)
- **Time:** 13+2 min
- **Abstract:** 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 will 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 talk discusses the prospects for CLIC to make direct and indirect measurements, or limits, of physics beyond the Standard Model. New particles can be discovered in a model-independent way almost up to the kinematic limit. Compared with hadron colliders, the low background conditions at CLIC provide extended discovery potential, for example in the case of non-coloured TeV-scale SUSY particles. In addition to studying new particles directly, BSM models can be probed up to scales of tens of TeV through precision measurements. Beam polarisation allows to constrain the underlying theory further in many cases.

- **Slides**

### Top-quark physics at the first CLIC stage

- **Speaker:** Filip Zarnecki (University of Warsaw)
- **Session:** Top Quark and Electroweak Physics
- **Status:** Accepted as oral presentation (#526)
- **Time:** 13+2 min
- **Abstract:** 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 will 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 talk discusses the prospects for precision measurements of the top-quark properties at the first stage of CLIC operation based on benchmark analyses using full detector simulations. The top-quark mass can be determined with a precision of about 50 MeV in a theoretically well-defined manner by using a centre-of-mass energy scan around the top-quark pair production threshold. Other approaches to extract the top-quark mass at CLIC make use of ISR photons or the direct
reconstruction of the top quarks. Another key measurement at 380 GeV is the study of the top-quark couplings to electroweak gauge bosons. Expected precisions on Effective Field Theory (EFT) operator coefficients are shown. Finally, searches for Flavour Changing Neutral Current (FCNC) top quark decays, such as $t \rightarrow cH$, $t \rightarrow c +$ photon and $t \rightarrow c +$ missing energy, are discussed.

**Top-quark physics at high-energy CLIC operation**

- Speaker: Ulrike Schnoor (CERN)
- Session: Top Quark and Electroweak Physics
- Status: Accepted as oral presentation (#527)
- Time: 13+2 min
- Abstract: 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 will 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 talk discusses the prospects for top-quark physics at the two TeV-scale CLIC energy stages based on benchmark analyses using full detector simulations. New studies of top-quark pair production at high-energy CLIC operation make use of jet-substructure techniques originally developed for the LHC. Forward-backward and polarisation asymmetries, as well as so-called optimal observables, are studied. The top Yukawa coupling and the CP properties in the $ttH$ coupling are best probed in 1.5 TeV collisions. CLIC operation at 3 TeV also enables the study of top-quark pair production through Vector Boson Fusion. The BSM sensitivity provided by the top physics program at CLIC is illustrated using Effective Field Theory (EFT).

**The CLIC detector**

- Speaker: Eva Sicking (CERN)
- Session: Detector: R&D for present and future facilities
- Status: Accepted as oral presentation (#528)
- Time: 13+2 min
- Abstract: The proposed Compact Linear Collider (CLIC) will provide electron-positron collisions at centre-of-mass energies from a few hundred GeV up to 3 TeV. CLIC offers a rich precision physics program, and a high sensitivity to a wide range of possible new phenomena. The precision required for such measurements and the specific conditions imposed by the CLIC beam structure put strict requirements on the detector design and technology developments. This includes ultra-low mass vertexing and tracking systems with small cells, highly granular imaging calorimeters, and a precise hit-timing resolution for all subsystems. Ambitious R&D programs for silicon tracking detectors and calorimeters are pursued, addressing the challenging detector requirements with innovative new technologies. A variety of detector optimisation studies have been carried out to establish the overall detector performance and to assess the impact of different technology options. The resulting optimised detector model has been integrated in the CLIC full-detector simulation framework. This contribution reviews the optimisation studies performed for critical parameters of the CLIC detector, presents the detector performance achieved in full-detector simulations, and gives an overview of the ongoing hardware R&D.