



# CLICdp European Strategy Preparation

- Document status and Editorial Teams
- Advisory Board

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CLIC Week, 26 January 2018

Aidan Robson

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# CLICdp documents for ESU

## *Ingredients for a CLIC summary report:*

- ◆ Updated Baseline for a Staged Compact Linear Collider  
CERN-2016-004, arXiv:1608.07537 ✓
- ◆ Higgs Physics at the CLIC Electron Positron Linear Collider  
Eur. Phys. J. C77 (2017) 475, arXiv:1608.07538 ✓
- ◆ Top Physics at the CLIC Electron Positron Linear Collider  
→ journal publication in preparation, spring/summer 2018 ✓
- ◆ BSM Physics at CLIC  
→ CERN Yellow Report planned for summer 2018 ✓

## The new optimized CLIC detector model CLICdet:

- ◆ Detector description note complete CLICdp-Note-2017-001 ✓
- ◆ Detector performance note in progress, spring/summer 2018 ✓
- ◆ CLIC detector R&D report  
→ CERN Yellow Report planned for summer 2018 ✓

**Editorial teams  
in place for all**

- ◆ Plan for the period 2020-2025



# ESU Input: Top Physics at CLIC

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Status report given by Philipp in physics session  
 Draft to be ready for Advisory Board (April)

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# ESU Input: CLICdet Detector Performance

Huge progress recently  
 Detector and reconstruction frozen  
 Results from first full test samples shown at this workshop  
 CLICdp note structure in place; most plots ready  
 Aim to complete in ~few months

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## *Editorial Team:*

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with support from  
 Konrad Elsener (CERN)



# ESU Input: CLIC Detector R&D

Intended as CERN Yellow Report  
Proposed structure in place  
Needs to be in good shape by the summer

*Editorial Team:*

Dominik Dannheim (CERN) [lead]  
Andreas Nürnberg (Karlsruhe)  
Aharon Levy (Tel Aviv)  
Katja Krüger (DESY)

## Contents

### 1. Introduction

### 2. CLIC detector overview and experimental conditions (5 p.)

- 2.1. Detector layout . . . . .
- 2.2. Beam-induced backgrounds . . . . .

### 3. Vertex and tracking detector (40 p.)

- 3.1. Requirements . . . . .
- 3.2. Detector concept . . . . .
- 3.3. Hybrid passive sensors and r/o ASICs . . . . .
  - 3.3.1. Readout ASICs and backend processing (TSV) . . . . .
  - 3.3.2. Active-edge sensor technology . . . . .
  - 3.3.3. Sensors with enhanced lateral drift (ELAD) . . . . .
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- 3.5. Cooling . . . . .
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- 3.7. Summary and outlook . . . . .

### 4. Calorimeters (10 p.)

- 4.1. Electromagnetic calorimeter . . . . .
  - 4.2. Hadronic calorimeter . . . . .
  - 4.3. Summary and outlook . . . . .
- } CALICE

### 5. Very forward calorimeters (10 p.)

- 5.1. Luminosity calorimeter (LumiCal) . . . . .
  - 5.2. Beam calorimeter (BeamCal) . . . . .
  - 5.3. Summary and outlook . . . . .
- } FCAL

### 6. Readout electronics and data acquisition system (10 p.)

- 6.1. Detector readout requirements . . . . .
- 6.2. Subdetector implementation schemes . . . . .
- 6.3. Power delivery and power pulsing . . . . .
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  - 6.3.2. Implementation example: calorimeters . . . . .
- 6.4. Summary and Outlook . . . . .

### 7. Conclusions and future developments

#### A. Caribou scalable readout system

#### B. Beam telescope infrastructure

#### C. Simulation tools



# ESU Input: BSM Physics at CLIC

## Chapter 1: The SM EFT

- 1.1 -- EFT Framework
- 1.2 -- Low-Energy probes:  
implications of Higgs/top couplings measurement,  
with new analysis of 3-linear Higgs
- 1.3 -- High-Energy probes (**unique to CLIC**)  
Comprehensive Drell-Yan analysis ( $l+l-$ ,  $qq$ ,  $tt$ )  
WW (using also polarised beams)  
ZH  
WW>tt (summary, as it also appears in Top Report)
- 1.4 -- BSM impact  
General Top and Higgs compositeness interpretation  
Composite Higgs  
Top Partners  
3-linear Higgs (plus direct searches) on EW baryo-genesis?

## Chapter 2: Direct Searches

- 2.1 -- Closing SUSY Holes:  
Summary of previous studies  
Compressed spectra
- 2.2 -- Dark Matter:  
Neutralino DM  
Minimal (milli-charged) DM
- 2.3 -- Feebly-interacting particles  
Long-lived/displaced vertices  
ALPs?
- 2.4 -- Extra Scalars  
Extra Singlet  
Twin-Higgs-motivated signatures?
- 2.5 New Neutrinos and see-saw
  - Gauge-Charged see-saw mediators
  - Singlet see-saw mediators

## Chapter 3: Flavour Physics

- 3.1 -- FCNC:  
probe FCNC operators directly, by high energy  $q q'$   
(including top, maybe also  $\mu$ -tau, e-tau) production.  
Exotic top decays and interplay with the above
- 3.2 -- BSM impact of Light quark Yukawa determinations.
- 3.3 -- LFUV anomaly (?)

Intended as CERN Yellow Report

Combination of theory contributions arising from Physics Potential WG, and full simulation studies (including summary of earlier studies to be comprehensive)

Needs to be in good shape by the summer

### *Editorial Team:*

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# ESU Input: Joint report with accelerator

Intended to resemble CDR volume 3.  
First thoughts on content (*to be refined*):

## ***From the accelerator:***

Accelerator technology: 380GeV drive beam and klystron options; 1.5 & 3TeV

Possible section on higher-energy (with novel technology)

Performance summary from CTF3

Implementation:  
schedule, cost, power

## ***From detector & physics:***

Physics case summary: Higgs, top, BSM

Detector concept and performance

Cost estimates

***From both:*** Plan for 2020–25

## *Editorial Team:*

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This will come later, relying on the other reports as input.  
Main effort likely to be in summer.



# CLICdp Advisory Board

17–18 April at CERN

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Pippa WELLS	CERN

Aim: ‘sounding board’ for CLIC ESU preparation

Give feedback and recommendations on ongoing activities and ESU presentation

Focus on CLIC detector & physics (but will inform on status of CLIC accelerator)

Stronger focus on the physics than on the detectors/technology





# ESU Process: National activities

There will be a lot of national activity for ESU preparation

We would like to gather information about national activities to consider whether/how to provide input

– better not to find out only afterwards!

Please keep us (Aidan/Steinar/Phil) informed.

