CLICdp spokesperson report
June 2nd 2015

Outline

- Status of new CLIC staging baseline
- Status of CLIC Higgs paper
- Progress in with new CLIC detector model and upgrade of software suite
- CLIC report for ~2018 strategy update
- Next CLICdp meeting?
- AOB

CLIC re-baselining status

Assumptions for annual running:

- CDR => based on 200 days/year at 50% efficiency (accelerator + data taking combined) => 0.86×10^7 seconds per year
- New assumption => 250 days/year (8 months) at 50% efficiency (accelerator + data taking combined) => 1.08×10^7 seconds per year

=> => may require some scaling of our benchmarking results

(~0.6 ab^{-1}, ~1.6 ab^{-1}, 2.4 ab^{-1})

Editing of re-baselining document has started

- Expect a first full draft by end July 2015
- Physics part based on CDR, CLIC Snowmass paper and CLICdp Higgs paper

=> => hope to complement with more info on top couplings

CLIC Higgs publication

"Higgs Physics at the CLIC Electron-Positron Linear Collider"
Editors team: C. Grefe, S. Lukic, S. Redford, P. Roloff, F. Simon, M. Thomson

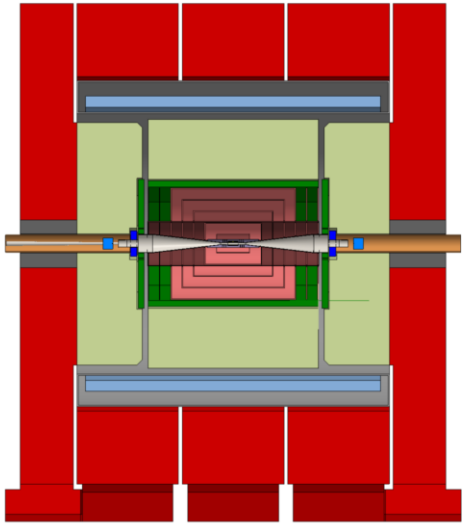
Nightly build of the draft paper:
http://proloff.web.cern.ch/proloff/clichiggspaper/

- A 3 analyses are still being completed
- Document is much improved since January CLIC workshop
- **Time scale?**

Progress with new CLIC detector model

Already agreed working hypotheses in 2014:

- Vertex: 0.2%X_0/layer
- Vertex: double layer geometry
- Vertex: spiraling disks
- Tracker: all silicon
- Tracker: radius 1.5 m, half-length 2.3 m
- ECAL: 25 layers, 5×5 mm^2 cell sizes
- HCAL: steel absorbers
- Solenoid field: 4 Tesla



Ongoing assessments:

- Tracker layout optimisation
- HCAL lateral cell sizes
- QD0 in detector or in tunnel?
- Yoke dimensions, end coils, stray field
- Need for anti-solenoid?
- Luminosity performance for L* = 6m
- Overall layout details (service routing, barrel/endcap transition, access scenario) in parametric drawing
- ……..

Further progress made in 2015:

- If Q0 outside detector => then L* = 6m
- 6 muon layers in yoke considered enough
- Enlarge HCAL forward coverage => R_{in} at ~24 cm
- Timing cuts in Pandora are better understood
- ……

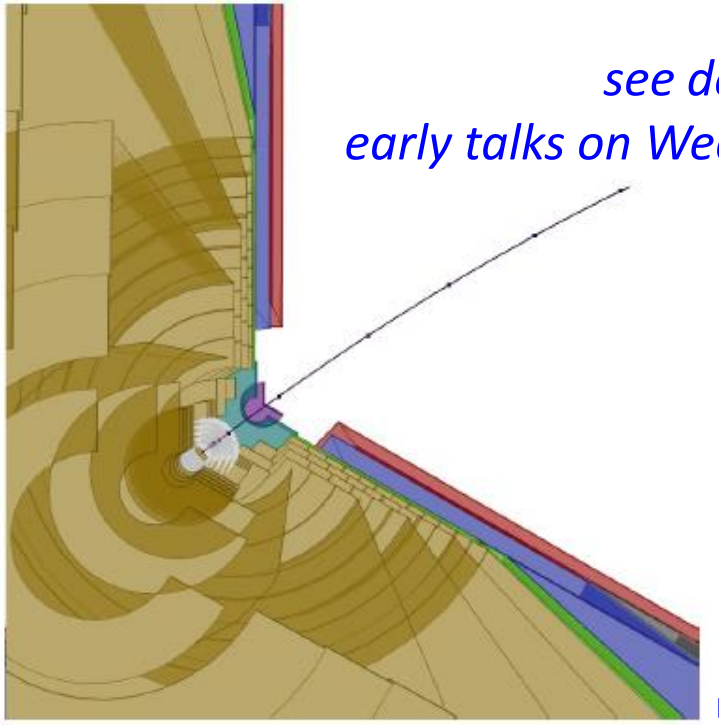
Software progress

Ongoing major improvements of simulation and reconstruction software

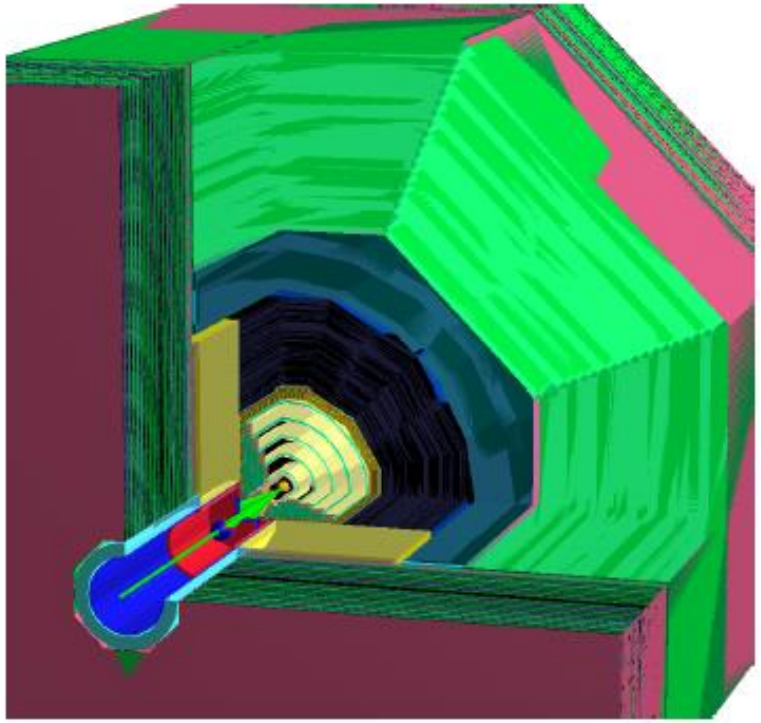
Most important new elements:

- New geometry description (DD4hep)
  - For simulation, reconstruction, event display, alignment….
  - Generic, developed under AIDA and AIDA-2020
- New/optimised track reconstruction for all-silicon tracker

this is our biggest bottleneck



see details
early talks on Wednesday morning



main 2015 objectives

CLIC Higgs paper

New CLICdp detector model

New software with DD4hep and all-silicon track reco

} main CLICdp objectives since ~2 years

Proposed deadlines:

CLIC Higgs paper

=> mid-August

New CLICdp detector model

=> fix most parameters for end-summer (needed for software validation)

=> complete freeze of new detector by mid-November

New software with DD4hep and full silicon track reconstruction

=> basic completion by end-summer

=> use 3 autumn months for validation

CLIC report for 2018 strategy update

We have to start thinking about scope of the 2018 report !

Some likely the ingredients will be:

- Update/extension of the 2015 CLIC re-baselining report
  - Similar scope as CDR volume 3 (principally accelerator)
- The 2015 CLIC detector model
  - Foresee write up + detailed notes on 2015 model
- The CLIC Higgs paper of 2015
- An overview of CLIC top physics
  - Foresee a CLIC top physics paper in 2016/2017?
- Extended BSM studies (hopefully motivated by LHC discoveries)
- R&D report => with main CLIC technology demonstrators
- A plan for the period ~2019-2025 in case CLIC would be supported by next strategy

Plans for next meetings?

Should CLICdp schedule a 2-day collaboration meeting in ~October?

Alternative: cluster working group meetings in a short time (1 day / 2 days)

AOB

Further feedback and questions ?

thank you

spare slides

CLIC re-baselining

Following the discussion at the January 2015 CLIC workshop:

- First stage: E_{cms}=380 GeV, $L=1.5\times10^{34}cm^{-2}s^{-1}$, $L_{0.01}/L>0.6$
- Second stage: E_{cms}=~1.5TeV,
- Final stage: E_{cms}=3 TeV, $L_{0.01}=2\times10^{34}cm^{-2}s^{-1}$, $L_{0.01}/L>0.3$

Optimised solution by Daniel Schulte et al.

- Optimised acc. structures for 380 GeV (which are also compatible with klystron powering) at 72 MV/m.
- 4 deceleration sectors for 380 GeV
- Add different structures when going to high energies => good solution exists close to the current R&D on "CLIC_G" structures (with small change in length and aperture) at 100 MV/m.
- Adding 21 sectors yields 3.01 TeV.

CLIC parameters at 380 GeV

parameter	unit	value
N	10^9	5.2
n_b		352
τ_{RF}	ns	244
f_{rep}	Hz	50
G	MV/m	72
$\varepsilon_x/\varepsilon_y$	μm/nm	0.95/30
σ_x/σ_y	nm/nm	149/2.9
σ_z	μm	70
L_{total}	$10^{34}cm^{-2}s^{-1}$	1.5
$L_{0.01}$	$10^{34}cm^{-2}s^{-1}$	0.9
n_γ		1.5

(emittances at the IP)