

## CLICdp meeting - LCWS, Tokyo - November 14, 2013

### Discussion minutes<sup>1</sup>

Participating in Discussions: L. Linssen (LL), H. Weerts (HW), Ph. Roloff (PhR), F. Simon (FrSi), F. Sefkow(FeSe). N. Sinev (NS), M. Demarteau (MD), M. Thomson (MT), S. Arfaoui (SA), J. Reuter (JR)

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Talk on detector optimization (LL)  
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Vertex detector (Slide 7):

HW: Are the optimizations done for one particular center-of-mass energy?

PhR: Conclusions do not depend on the energy.

LL: Optimization uses CLIC\_SiD detector. As the inner vertex radius is larger at CLIC than ILC, it's not fully relevant for ILC

MD: It would be best to perform the optimization for the whole detector instead of for single sub-detectors.

LL/MT: An optimization of the whole detector includes various parameters which makes it a very complex task. But we are open to this. Let's think about a strategy. Everybody is welcome to join.

ECAL (Slide 8):

HW: What are the criteria for the ECAL optimization?

LL: For example, jet energy resolution, photon and tau reconstruction capability

HW: None of the detectors works as a single unit.

LL: We used in this study the ILD detector using the same tracking. Tuning the entire calibration

FeSe: Re-optimizing the internal degrees of freedom of the calorimeter: inner radius, B-field. Then applicable to SiD.

HCAL (Slide 9):

MT: Same studies are planned for HCAL as for ECAL for ILD. Change of geometry. People at DESY would like to work on the simulation. Student of MT, and John will join the effort. Study should include a cost optimization.

LL: Require separate study for CLIC (tungsten). New CERN fellows will join. Change layout of detector, e.g., number of layers.

Occupancy (Slide 11, include granularity)

HW: Do you want to change CLIC\_ILD and SID?

LL: No, we want to optimise with the current detector models and then create the new detector model

LL: Change strips to pixels in some areas. TPC seems not a good option for CLIC

General

Tracking:

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<sup>1</sup> Minutes compiled by Andre Sailer and Eva Sicking

HW: What is "consistent design"?

LL: All detectors are connected. Optimisation has to be done on the whole tracking detectors

ToDo List:

Nick Sinev: Demonstrate performance with backgrounds, if OK, maybe don't need 10 ns time stamping. If not maybe 5 or 1 ns.

LL: Time stamping is needed to reject gg to hadron background. Time stamping also in calorimeter, which can be used to reject the out of time particles.

Less critical in vertex detector

CLICpix can achieve timing requirement.

LL: No need for better timing resolution as you can handle occupancy.

HW: What how will be optimised?

LL: No technology choice, no decision on Scintillator or RPCs for the calorimeter. But no TPC unless somebody wants to work on it. No decision for specific technology.

HW: Granularity might implicate choice of technology. What is being optimised?

LL: Performance. Jet energy resolution, flavour tagging.

MT: Not optimising for cost

FeSe: Re-optimize HCal (Ed.: for ILD ILC) similar to ECal studies (layers, cell sizes, variable cell sizes), also including costs

FrSi: Difficult to pick the best parameters. Have to chose a physics channel, which is sensitive to detector performance.

MT: Does ECal and HCal have to be separated?

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Physics benchmarks (PhR)  
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SA: Which detector model?

LL: Old models, new models once they become available.

HW: "Comprehensive" paper, why not include 250 GeV?

LL: CLIC studies started at 350 GeV, not including ILC results

FrSi: Including ILC would complicate the paper.

MT: Not competing with ILC

(Aside LL: 350 GeV is almost equal to 250 GeV for resolution and couplings

JR: 350 can include top physics.

LL: Better would be 360GeV in case ILC would like to make some studies too. ).

(Aside FeSe: Choice of center-of-mass energies:

FeSe: Question to running strategy at ILC. It was chosen to take most data at 250 GeV for a optimized Higgs measurement

FrSi: Model independent measurement best when using Z-recoil measurement at 250 GeV

PhR: Need to further study hadronic Z decays. Understand this before make final decisions on running strategy )