

A way forward

-I wish I knew it...-

LCWS2024 at University of Tokyo

Tokyo, Japan, 8-11 July 2024

Tatsuya Nakada

EPFL, Switzerland

Chair of the IDT Executive Board

After hearing the talks by Hitoshi and Jenny

(I guess) we share a common view that a linear collider is very attractive as the next HEP collider since:

- It can be made as a staged machine to start as a “moderately” costing Higgs factory at 250 GeV without investing in large civil construction, which will provide improved/complementary information on the Higgs properties vis-a-vis LHC/HL-LHC
- It can be upgraded in energy, lower down to Z-pole and up to a TeV region and in luminosity as much as $O(10^{36})$ in phases, reflecting on the progress in our understanding of physics and technology development.

NB:

I assume that accessing physics at a 10 TeV energy scale directly would be the chapter after this effort, with different ideas: pp, $\mu^+\mu^-$, $\gamma\gamma$ even e^+e^- (?) with plasma acceleration, etc.

To realise this vision

we better agree on a LC roadmap with a baseline machine and a possible upgrade scenario, together with various R&D programme: an example...

- Baseline machine: 250 GeV Higgs factory based on the SRF technology so that it is technically ready to move fast and to be with a “moderate” starting cost.
- Energy range of the baseline machine, i.e. 250, up to 350 or as much as 500 GeV could be a part of “global discussion” once a positive decision on constructing an LC is made (see the last slide).
- Staged upgrade scenario for energies and luminosities, and R&D programme compatible with this scenario: thoughts to be made, e.g.
 - SRF: towards cw-mode travelling wave acceleration with energy/positron recovery could be a possible ultimate goal?
 - How CLIC, C³ and Plasma R&D will fit?

Various information needed to be provided for the European Strategy Update process

- 1) **A common physic motivation**
- 2) **A common LC vision and roadmap**
- 3) Separate descriptions by the individual project groups, CLIC, ILC, etc.
- 4) Separate descriptions by the individual detector groups

3) and 4) must be aligned with 1) and 2).

Further discussion will define the actual documents to be produced, where some of them will be submitted to the call of inputs by the European Strategy group.

- e.g. for the ILC, IDT will provide ITN activities, ILC cost update, status of the international discussion, including that in Japan achieved by the effort of the Japanese HEP community and the future plan.

In practice

We need to converge urgently on

- the definition of the baseline machine and a upgrade path
- the R&D programme consistent with the upgrade of the baseline programme

which must be coherent.

Jenny and Steinar have started to gather people willing to participate in this activities. But it would need some more organisation. We have to see whether the existing organisation could be utilised, or something more will be required.

Just a dream, ...

If the Japanese government becomes proactive, as a result of effort by the Japanese colleagues, in promoting the ILC as a global project (even without touching the issue of the site),

and

favourable reaction from some ILC potential partner countries to such a Japanese initiative (and/or European Strategy sees the ILC, or even just LC, as a serious option for CERN), a real “global” discussion on the baseline LC machine might be triggered...

This could be beneficial to everybody.

Before finishing my presentation as a privilege of the last speaker

Many thanks to

- Local Organising committee and Programme Committee, in particular the chairs, Taikan and Daniel, respectively.
- Supporting work by the ICEP staff and young scientists.

for this successful workshop!