ILD report from LCWS2017

Ties Behnke

07.11.2017

ILD at LCWS

- Plenary report on ILD: Ties Behnke
- “close to ILD”: 250 GeV physics report by Jenny List

- Numerous talks and contributions to parallel sessions

Clear progress on many fronts is visible,
Both scientifically on confirming the physics case,
And ILD focussed in optimization and ILD development

The ILC situation

We were reminded from Okada:

Report from ILC advisory panel, June 2015:

- Recommendation 1: **Share the cost internationally** and **Find a clear vision on the discovery potential of new particles.**
- Recommendation 2: **Closely monitor and analyze the development of the LHC experiments** and **Mitigate cost risk.**
- Recommendation 3: **Obtain general understanding by the public and science communities.**

JHEP on ILC

After intense deliberations and disucsions with the national and international community, JHEP issued a strong supporting statement for the 250 GeV ILC:

The scientific significance and importance of ILC has been further clarified considering the current LHC outcomes. ILC250 should play an essential role in precision measurement of the Higgs boson and, with HL-LHC and SuperKEKB, in determining the future path of new physics. Based on ILC250's outcomes, a future plan of energy upgrade will be determined so that the facility can provide the optimum experimental environment by considering requirements in particle physics and by taking advantage of the advancement of accelerator technologies. It is expected that ILC will lead particle physics well into the 21st century.

To conclude, in light of the recent outcomes of LHC Run 2, JAHEP proposes to promptly construct ILC as a Higgs factory with the center-of-mass energy of 250 GeV in Japan.

Action Plan

- At the 7th ILC Advisory Panel in July 2017, items to be considered were listed.

✓ CERN experiment status

✓ The updated plan by the international researchers' community

✓ Results of external survey researches in FY2017 (regulations/risks concerning ILC, Cost reduction of large international accelerator projects)

- If ICFA endorses the plan of ILC 250, these considerations by the Panel can be concluded in half a year timescale.
- If the Panel's conclusion is favorable for pursuing the ILC in Japan, then the next year becomes a real critical time for realization of the ILC.
- In parallel, we would like to facilitate discussions between the Japanese Government and foreign partners beyond US-Japan.
- Serous discussions need to be started before the next round of future planning of HEP in various regions (ex. Update of the European strategy for particle physics) .

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ICFA meeting takes place this week in Ottawa!

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My personal take

Things are coming to a decision point in Japan

We can seriously expect a statement from Japan next year

Things seem to be moving in the right direction.

ILD matters@LCWS2017

Report from the IA

- Marc initiated a vote on the extension of the mandate of the management:
  - Approval for extension until the end of 2018 (48 yes votes, no no votes)
  - Decision to launch re-election of management until May 2018, to maximise overlap

- IA is asked to approve the following things:

  - Iwate University as a new member
  - Ryo Yonamine as new top convener
  - Tomohiko Tanabe as new BSM convener
  - Remi Ete as new reconstruction convener
  - Final approval of the ILD logo

Since no quorum was reached in the meeting, an electronic vote will be launched soon.

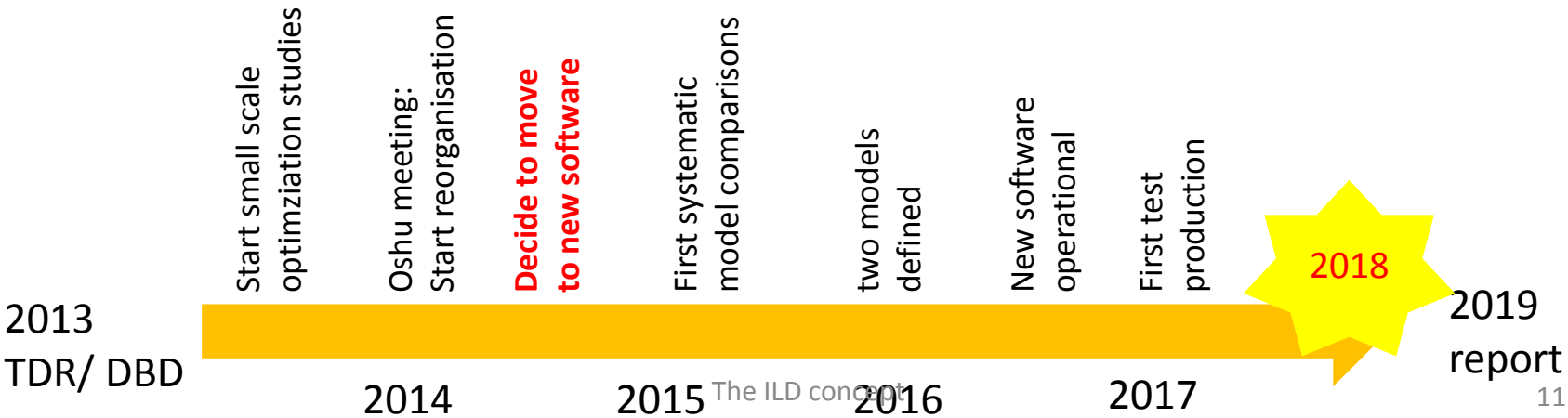
(27 members were present, quorum would be 36)

ILD since 2013

Re-optimize ILD for optimal performance and cost/ performance ratio

Prepare the group to quickly move to a real collaboration once the start is given.

Provide a basis for realistic physics studies to make and improve the science case for the ILC. Most recently, strong push to make 250 GeV case



Our Goal

1. Make the science case for ILC as strong as possible

2. Define a performance/ cost optimized ILD detector

3. Demonstrate the performance of the ILD concept

4. Develop a realistic implementation of the ILD detector

5. Document the
    1. Design
    2. Engineering
    3. Performance

    of the ILD detector model

Making the physics case

- Demonstrate the scientific capabilities
- Deliver key results for key analyses
- Do this in a well tested and as realistic as possible detector model
- Do it now!

- Most important goals:
  - Firm up the 250 GeV physics case
  - Connect to latest developments (example EFT for higgs couplings)
  - Show the complementarity to the LHC and other projects

Deliverables physics case

Together with the LCC physics groups

- Publish the physics case for the ILC
    - Recent papers on Higgs physics
    - Paper on ILC discovery potential
    - Paper on 250 GeV running of the ILC
    - …

ILD makes important contributions, in many cases is driving the work.

Studies and publications done in the LCC context, not primarily in the ILD context.

For ILD

- Show the potential of the ILD detector
- Demonstrate the validity of the optimized detector model

We want to show that ILD is the right detector to do the physics, and that we can an excellent job on the physics.

This can only be done fully once we have agreed on an optimized ILD detector.

Optimize the ILD detector

Single particle Studies

- Response studies focussed on one sub-detector
- “easy”, low resource needs, fast

High Level performance studies

- Tracking, vertexing, particle flow
- Based on dedicated, maybe even unphysical samples
- Based on multiple subdetectors

Physics Performance

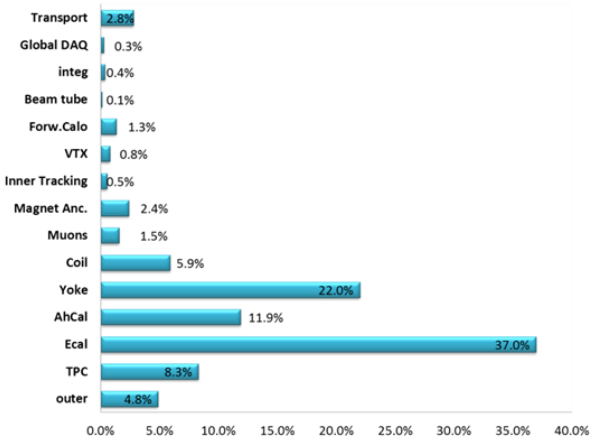
- Selected physics channels to study performance for key measurements
- Need full samples, including backgrounds

Increasing complexity
Increasing demands on samples

Goal: define a cost/ performance optimized detector baseline.

Things to be done

- Finalise the move to the new software (see presentation by Frank)
- Finalise the choice of benchmarks for the different steps in the optimization
- Re-instate a costing group to re-evaluate ILD costs



Last cost estimate is from DBD times,
About 5 years ago!

The Deliverable

Document the work in a comprehensive (set of) ILD document(s)

- ILD philosophy and thinking
- ILD overall design
- ILD subdetector choices and options
- ILD engineering design
- ILD integration with ILC and into the Kitakami site

- ILD performance

- ILD physics performance

ILD Report (tbd)

Anticipated early 2019

The ILD Detector Document

- ILD detector concept, its philosphy
- ILD subdetectors, including options where applicable
- ILD detector integration
- ILD integration into the Kitakami site

- Describe the optimization process and results
- Describe the ILD detector performance

See presentation by Claude for more details

Goal: a coherent, “complete” description of the ILD detector and its performance

Goal: report, and concise version of this as journal paper

The Physics Performance of ILD

- Physics with ILD at different ILC energies

- Comprehensive list of analyses
- Detailed descriptions, performance, etc
- Broad, based on the optimized ILD detector model presented in the previous part of the document.

Goal: report, plus concise version of this as a journal publication.

The next ILD meeting

February 20-22,

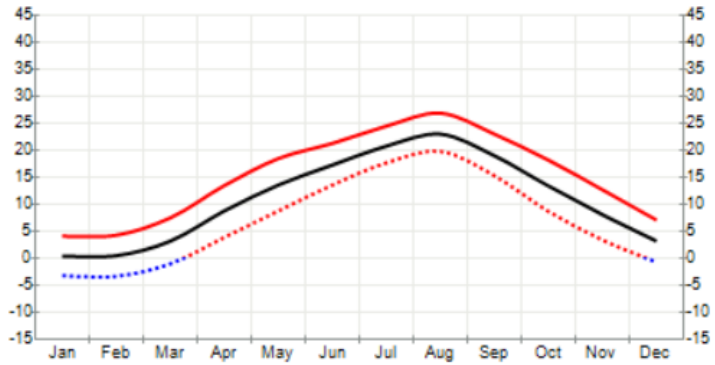
Ichinoseki, Japan

https://agenda.linearcollider.org/event/7760/

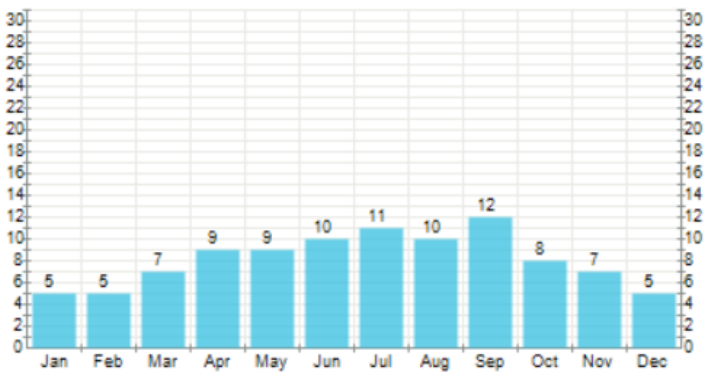
Easily reachable by Shinkansen
from Tokyo and Sendai,
Close to the proposed
ILC site in Kitakami

ILD meeting location

Average temperature per month



Average days with precipitation per month



Meeting room proposed for the meeting in Ichinoseki.

ILD meeting location

Tentative things to discuss

- Sub-detector status, R&D status, progress on R&D
- Reconstruction and Algorithms
- Status of ILD Detector integration and overall design
- Discussion of ILD costing
- ILD optimization
- ILD analyses

This meeting will be an important milestone towards our goal of documenting ILD at the end of 2018/ early 2019

Schedule

Currently negotiating details of local organisation, support, etc.

Mid-end November: will open registration together with tentative program

We hope for a lively and interesting discussion and participation from ILD in this meeting

Please block these dates in your calendars, try to make a broad participation possible!

Outlook

- We hope for a clear signal from Japan in 2018
- This will be needed to put ILC (and ILD) on national and international roadmaps
- In Europe, CERN Council strategy will be central element

- Optimization comes to fruition: see results next year
- Ambitious goal to prepare comprehensive documentation towards the end of 2018
- Many thanks for the continuing support and efforts even in the face of very small funding and difficult overall situation!