



Report from Physics WG (Part 1)

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on behalf of the Physics WG
December 6, 2017

(Breaking) News

MEXT ILC Advisory Pannel

8th meeting

happened yesterday on Dec. 5 (Tue.) 15:00-17:00 JST

Agenda

1. What happened since the last panel meeting on July 28 (MEXT)
2. Recent revision of the ILC project (T. Nakada)
3. Development of experiments at CERN (E. Elsen)
4. Plan for further review and reactivation of some WGs
5. AOB

References distributed with Japanese translations

- Reports from LCC (physics case, machine)
- LCB/ICFA statements

What happened since the last meeting on July 28

1. **Aug.:** Report on the Organization and Management of ILC was published.
2. **Oct.:** US-J (DoE-MEXT) discussion group meeting: R&D for cost reduction, O&M report (feedback expected from DoE), ***DoE considers ILC250 as a project different from the one discussed in the last P5 → ILC250 will be a subject of the next P5.***
3. **Nov.:** LCC's proposal of ILC250 and LCB/ICFA statements. ***MEXT considers the LCB statement very important, in particular.***

Presentation by Tatsuya

1. Tatsuya explained the main points made in LCC's reports on ILC 250 physics case and machine aspects:
 - compelling physics case as a Higgs factory
 - up to 40% cost reduction compared to the original ILC500.
 - technology is mature, thanks to XFEL (10% prototype).
 - future E-upgrade possibility.
2. Major Questions asked:
 - What do you mean by “XFEL being a 10 % prototype of ILC”?
\$XFEL x 10 is a huge amount!
 - Paragraph 3 of the LCB statement quotes XFEL and FAIR as projects similar to ILC. In what sense are they similar? Their sizes are quite different. Their organizational scheme is different (Limited Liability Companies). Moreover, the ILC proposed here seems to be conceptually different from the original ILC, which was defined to be a truly international project in every respect.

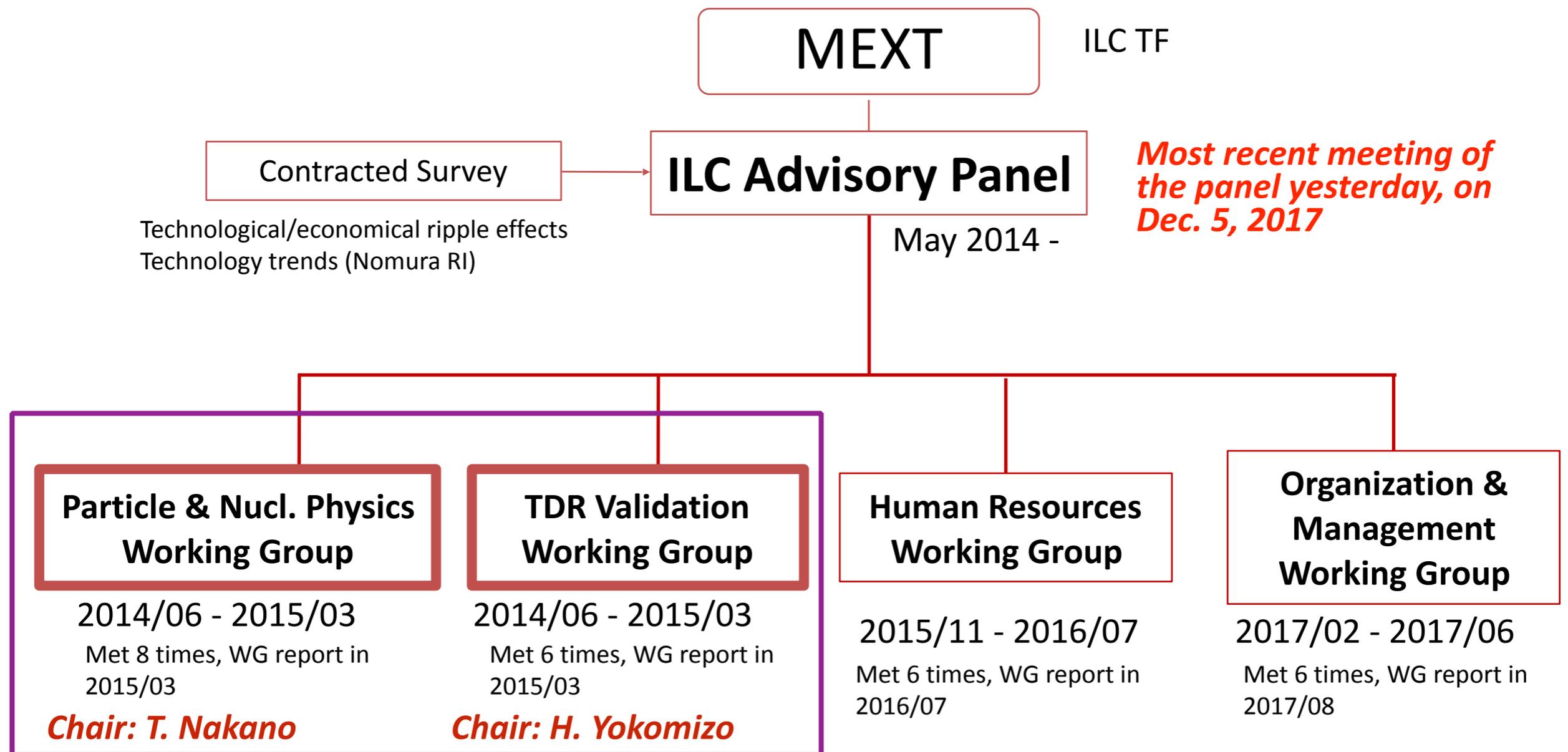
Presentation by Eckhard

1. Eckhard explained the main achievements of LHC run 1 and run2 and prospects for the future together with the schedule for the next European Strategy process:
 - extremely rich physics program
 - exploring the highest energies
 - precision measurements (Higgs and highly sensitive rare decays), but LHC measurements are model-dependent. For model-independent measurements, we need ILC.
 - We know there is new physics - so far Nature has been hiding well.
 - The next ESPP needs input about ILC from Japan by the end of 2018.
2. Major Questions asked: (no serious questions, Eckhard's talk was quite successful in my opinion.)
 - What are the main targets of HL-LHC? Why is it important to measure $H \rightarrow \mu\mu$?

***Plan for Further Review
and Reactivation of
Some Working Groups***

ILC Advisory Panel

Set up in May 2014 under MEXT ILC Task Force to investigate various issues concerning the possibility of hosting the ILC in Japan



New round will start from January 2018.

ILD Physics WG

It is not yet clear what kind of questions will be asked by the MEXT physics WG, but judging from what was asked yesterday, at least the following is expected:

- Range of validity of EFT and what would we do if EFT is not valid?***
- What would be lost by lowering the energy to 250 GeV?***

We are now updating the list of on-going or planned analyses and manpower situation in order to formulate our strategy.

We had a physics conveners' meeting on Nov. 24. → Jenny.

Physics focus schedule

Dec. 6: Higgs/EW (Akiya)

Dec. 20: BSM/NP (KF)

Jan. 10: Top/QCD (Jenny)

Jan. 24: Higgs/EW (Frank)

Conveners' ML:

ild-physics-conveners@desy.de

Use this mailing list to send your talk request.

Backup

LCB Statement

on November 8

***Conclusions on the 250 GeV ILC as a Higgs Factory
proposed by the Japanese HEP community***

- Short Summary -

Linear Collider Board

8 November 2017, Rev 1

Physics studies by the Linear Collider Collaboration Physics and Detector Group [1], and the Japanese Association of High Energy Physicists (JAHEP) [2] show a compelling physics case for constructing an ILC at 250 GeV centre of mass energy as a Higgs factory. The cost of such a machine is estimated to be lower by up to 40% compared to the originally proposed ILC at 500 GeV [3]. The acceleration technology of the ILC is now well established thanks to the experience gained from the successful construction of the European XFEL in Hamburg. One of the unique features of a linear collider is the capability to increase the operating energy by improving the acceleration technology and/or extending the tunnel length. For these reasons, the Linear Collider Board strongly supports the JAHEP proposal [4] to construct the ILC at 250 GeV in Japan and encourages the Japanese government to give the proposal serious consideration for a timely decision.

In recent ***examples of similar international projects¹, the host country made the majority contribution.*** A natural expectation would be that the cost for the civil construction and other infrastructure is the responsibility of the host country, while the accelerator construction should be shared appropriately. ***A clear expression of interest to host the machine under these principles*** would enable Japan to start negotiations with international partners. It would also allow members of the international community to initiate meaningful discussions with their own governments on possible contributions.

¹Recent examples in the field close to the ILC are European ***XFEL and FAIR*** in Germany.

ICFA Statement

Ottawa, November 2017

The discovery of a Higgs boson in 2012 at the Large Hadron Collider (LHC) at CERN is one of the most significant recent breakthroughs in science and marks a major step forward in fundamental physics. Precision studies of the Higgs boson will further deepen our understanding of the most fundamental laws of matter and its interactions.

The International Linear Collider (ILC) operating at 250 GeV center-of-mass energy will provide excellent science from precision studies of the Higgs boson. Therefore, ICFA considers the ILC a key science project complementary to the LHC and its upgrade.

ICFA welcomes the efforts by the Linear Collider Collaboration on cost reductions for the ILC, which indicate that up to 40% cost reduction relative to the 2013 Technical Design Report (500 GeV ILC) is possible for a 250 GeV collider.

ICFA emphasizes the extendibility of the ILC to higher energies and notes that there is large discovery potential with important additional measurements accessible at energies beyond 250 GeV.

ICFA thus supports the conclusions of the Linear Collider Board (LCB) in their report presented at this meeting and *very strongly encourages Japan to realize the ILC in a timely fashion as a Higgs boson factory with a center-of-mass energy of 250 GeV as an international project¹, led by Japanese initiative.*

In the LCB report the European XFEL and FAIR are mentioned as recent examples for international projects.

Ottawa, November 2017