

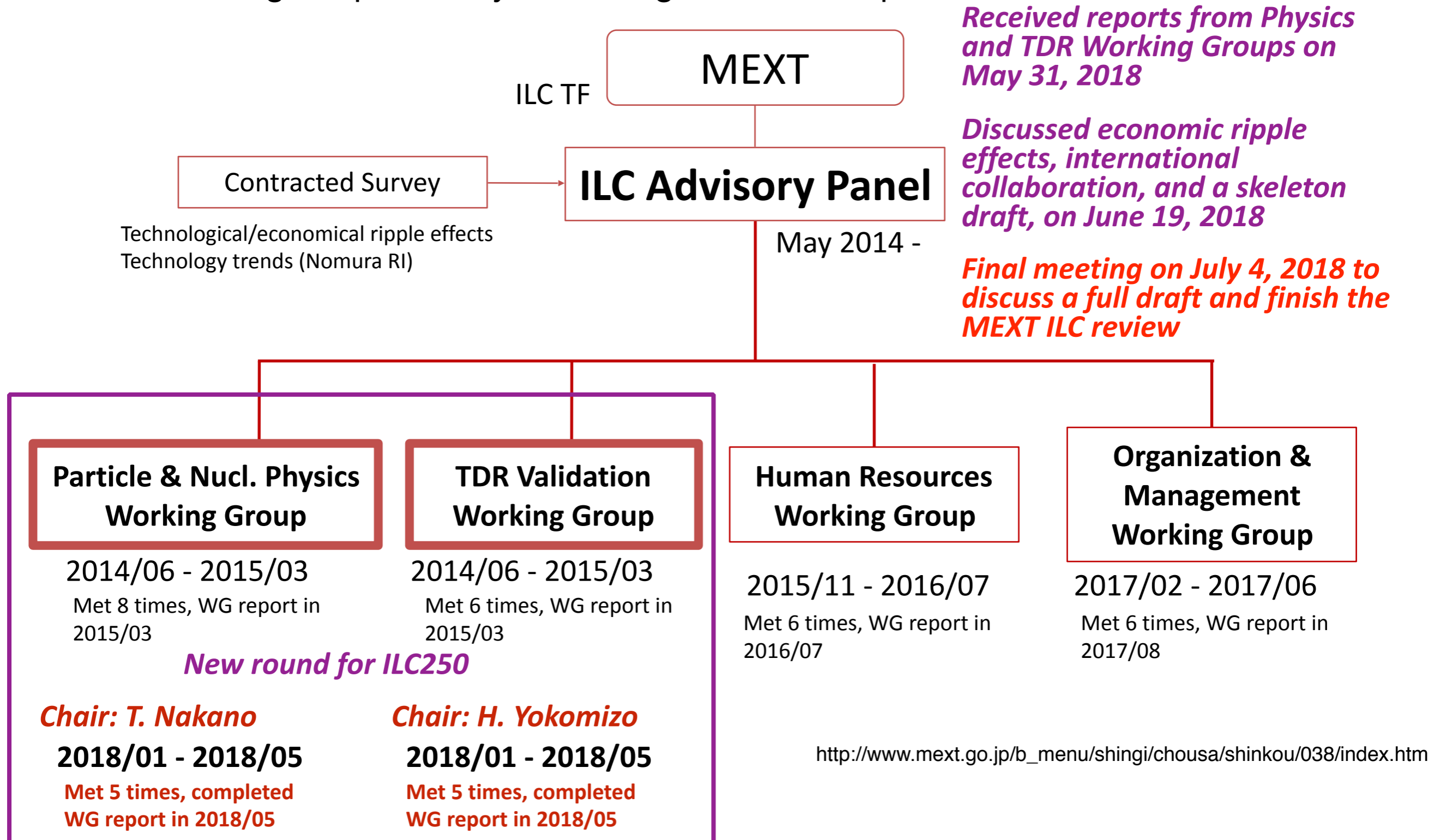
# **ILC Situation in Japan**

Keisuke Fujii  
January 9, 2019

# **MEXT Review**

# 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



# SCJ Review

# **SCJ Review Committee for ILC250**

## **Charge**

***For the 250 GeV ILC, review (i) physics case in HEP, (ii) scientific significance including other fields, (iii) merits for people and society, and (iv) various conditions regarding construction and operation of the facility***

## **Members**

1. Tadashi Kobayashi : Philosophy
2. Tatsuyoshi Saijo : Economy
3. Takaaki Kajita : Cosmic Ray
4. Hirokazu Tamura: Nuclear Physics
5. Masako Yoneda (**deputy chair**) : Civil Engineering
6. **Yasuhiro Iye (chair)** : Material Science
7. Mitsuru Uesaka : Accelerator Physics
8. Nanshi Sugiyama : Astronomy
9. Tomofumi Nagae : Nuclear Physics
10. Toshio Hirano : Biology

# ***SCJ Technical Subcommittee for ILC250***

## **Charge**

***For the 250 GeV ILC, review (i) technical feasibility, (ii) cost estimate, (iii) economic ripple effects, and (iv) potential environmental effects***

## **Members**

1. Tatsuyoshi Saijo : Economy
2. Masako Yoneda (**chair**) : Civil Engineering
3. Yasuhiro Iye : Material Science
4. Masashi Kamon : Civil Engineering
5. Tohru Nakashizuka : Environmentology
6. Muneyoshi Mochizuki : Civil Engineering

# ***SCJ Review Committee for ILC250***

## ***1st meeting on Aug. 10 (Joint Upper&Subcommittees Mtg.)***

- **ILC 250 Physics Case: KF**
- **ILC 250 Machine: Shin Michizono**
- **LCB: Tatsuya Nakada**
  - **MEXT ILC Physics WG: Takashi Nakano**
- **MEXT ILC TDR Validation WG: Hideaki Yokomizo**
- **MEXT ILC HR WG: Takashi Nakano**

## ***2nd meeting on Aug. 21***

- **PIP: Masa Yamauchi (KEK DG)**
- **MEXT ILC Organization & Management WG: Shoken Miyama**
- **MEXT Due Process for Project Prioritization : Yoshiyuki Chihara from MEXT**

## ***3rd meeting on Aug. 29:***

- **KEK's future plan and ILC: Masa Yamauchi (KEK DG)**
- **JAHEP's consensus on ILC: Hiroaki Aihara (JAHEP chair)**
- **Particle Accelerator Society of Japan and ILC: Ryoichi Hajima (PASJ chair)**

## ***4th meeting on Sep. 11: closed***

## ***5th meeting on Sep. 18 (joint with the subcommittee): list of main issues***

***→ KEK ILC Planning Office submitted written answers to all of them***

**6th meeting on Oct. 1 (13:00-16:00):**

- **Significance of Higgs studies and communities consensus: Shoji Asai (Asai Committee Chair)**
- **KEK's mission and ILC, international cooperation, cooperation in Asia: Masa Yamauchi (KEK DG)**

**7th meeting on Oct. 10 (13:00-16:00) : joint with the subcommittee**

- **Particle Physics and ILC: Yutaka Hosotani (theory)**
- **Closed discussions** on points to be addressed in the final report  
→ **KEK ILC Planning Office submitted**  
a) **written answers to additional questions from the committee,**  
b) **a supplementary document to clarify issues discussed in the meeting.**

**8th meeting on Oct. 16 (13:00-16:00) : joint with the subcommittee**

- **ILC in Particle Physics: Tsuyoshi Nakaya (neutrino)**
- **Closed discussions** on points to be addressed in the final report

-----< LCWS 2018 >-----

→ **Lyn sent the TEXAS statement to the chairman..**

**9th meeting on Oct. 31 (10:00-12:00) : joint with the subcommittee**

- **Closed discussions** on draft report?
- → **People are sending letters to the chairman now.**



## **10th meeting on Nov. 14 (15:00-17:00) : joint with the subcommittee**

- **1st draft report shown in the 1-hour open session**
- **Further discussions** on the draft report in the closed session
- Letters have been uploaded to the SCJ web site.
  - On Nov. 19, KEK ILC Planning Office submitted a document in order to clarify points they misunderstood or misinterpreted. Tohoku ILC Promotion Committee also submitted a similar document.
  - — — — — < Press Conference in Tokyo on Nov. 20 > — — — — —
  - to explain the contents of the submitted documents. *Atsuro Suzuki* (former KEK DG) and *Kunihisa Yamura* (chair of Tohoku chamber of commerce and industry) were there and each gave a very nice speech.

## **11th meeting on Nov. 21 (10:00-12:00) : joint with the subcommittee**

- **Closed discussions** on inputs from proponents
- The two documents sent from us have been uploaded to the SCJ web site.
- This meeting turned out to be the last one and the remaining discussions were supposed to be done via e-mail exchanges. The final draft to be checked by three referees, which usually takes at least 2 weeks.
- **Expecting an EOI from Japanese government within 2018 became unrealistic.**

# ***LCB's Reaction***

Given the situation, ***the LCB met on Dec. 5*** to discuss the impact of such an eventuality and revisit its plan.

The LCB reached the following conclusions.

***It would be crucial to have a statement from the Japanese government***, expressing its strong interest to host the ILC in Japan and intention to initiate international discussion, together with an indication of possible Japanese contribution, ***in time for the LCB/ICFA meeting on March 7.***

***The ESU entities are to be informed that there will be a delay of 2 months or so in the anticipated statement but there is no change in the LCB plan*** toward the preparation for the Granada Open Symposium on May 13-16, including the schedule for the Lausanne LC town meeting on April 8-9.

# ***Politicians' Reaction***

***The federation of diet members for the ILC had a joint general meeting with the LDP's liaison council for the ILC on Dec. 7, where Lyn Evans and Hitoshi Murayama were invited.***

Lyn informed them of the LCB's conclusions, while Hitoshi explained the situation of the worldwide HEP community.

***The politicians decided to send a letter explaining the situation and expressing their conviction to promote the ILC project to European and American counter parts.***



# ***KEK's Reaction***

***KEK also decided to send a letter*** explaining the situation and expressing their conviction to promote the ILC project ***to European and American counter parts.***

# ***MEXT's Reaction***

***MEXT also decided to send a letter*** to explain the situation and the expectation towards an official statement from the Japanese government ***to European counter parts.***

# ***SCJ's Report on ILC***

## ***SCJ EB Meeting on Dec. 19 (10:00-12:00)***

- ***As expected the SCJ EB endorsed the report from the SCJ's ILC committee. The report was sent back to MEXT immediately after that.***
- ***The ILC part of the meeting ended in 15 minutes and **Mr. Iye** commented that the decision belongs to the government. He also confirmed that the scientific significance of the ILC.***

# LC Newsline

## **SPECIAL ISSUE: SCIENCE COUNCIL OF JAPAN PUBLISHES REPORT ON ILC**

On 19 December 2018, the Science Council of Japan (SCJ) published its report on the ILC. What does this report mean to the ILC project? What will happen next? LC NewsLine features the response to the report by the KEK lab in Japan, the executive summary of the SCJ's recommendations, as well as political messages.

<http://newsline.linearcollider.org/2018/12/21/>



# ***Executive Summary of the Science Council of Japan's Report***

## **BACKGROUND**

The International Linear Collider (ILC) is an international project in the field of elementary particle physics to construct a straight accelerator (linear accelerator) to perform high-energy electron-positron collision experiments, and thereby advance research on the Higgs particle.

In response to the receipt of “Regarding Deliberations on International Linear Collider (Requests)” by the President of the Science Council of Japan from the Ministry of Education, Culture, Sports, Science and Technology on July 20, 2018, the “Review Committee on the Revised Version of the International Linear Collider Project” and “Technical Verification Subcommittee” were established. Since the ILC is a major international project requiring huge long-term investment and international cooperation, the committees deliberated on the project itself, including its academic significance and technical feasibility, as well as the status of preparations for the organization and management systems at relevant research institutions both in Japan and abroad, and for international cost-sharing.

## RESPONSE

- **Regarding the academic significance of research at the ILC project (revised plan), and the position of the ILC project (revised plan) in elementary particle physics**

In the current view of elementary particle physics, there is no doubt that the search for “new physics beyond the Standard Model” is the most important task. There are various experimental approaches using both accelerator- and non-accelerator-based methods to search for “new physics beyond the standard model”. **In the high-energy particle physics community, consensus has been reached that the research topic of precise measurement of Higgs couplings is extremely important.** However, the community has not yet reached the stage of discussing how to allocate personnel and budget to various research projects in the particle physics field.

**Emphasis in red by KF**

- **On the position of the ILC project (revised plan) in academia as a whole**

The ILC project is far more expensive than the large number of big research facilities which have until now been proposed and examined for the Science Council of Japan’s master plan formulation, and will span a period of 30 years from the start of construction to the end of research. It is a long-term ultra-large-scale project. Before proposing such a project to the public, the committee considers that it is necessary to have broad understanding and support within academia. More extensive discussion is necessary regarding the position of the ILC in a broader perspective, including not only the elementary particle physics field but also large research projects in other disciplines.



- **On the significance to the public and society of implementing the ILC project (revised plan) in Japan**

As with much other purely academic research, the ILC project arouses the public's intellectual interest in the sense of knowledge exploration. In addition, **if it develops into a hub at which advanced researchers, who will later spread out across the world, develop in an environment where top-class scientists from around the world are working hard and competing, then the project's significance is substantial.**

On the other hand, with regard to the technical and economic ripple effects other than its pure academic significance, the effects of the ILC are unclear at the moment and are considered to be limited. More in-depth dialogue with the general public, and residents in the vicinity of the potential site in particular, is needed to communicate not only the scientific significance of the ILC project but also its potential merits, advertised in the context of regional development, and potential environmental impacts from civil construction and the production of radioactive material, based on accurate information provided by the scientific community.

**Emphasis in red by KF**

- **Status of preparations for implementing the ILC project (revised plan) and various conditions such as the securing of budget and human resources necessary for construction and operation**

Considering the scale of the budget and human resources necessary for the implementation of the ILC project, it is obvious that it is not feasible unless it is based on unprecedentedly strong international cooperation. At present, there is no clear prospect for appropriate international cost-sharing. Moreover, the prospect of securing the human resources required for the construction of the ILC accelerator facilities is unclear. In Japan there is presently a lack of researchers and engineers associated with accelerators in particular. Although it has been explained that this issue will be addressed by developing new human resources and participation from overseas, the related uncertainties are large.

Unofficial Translation by KEK

## OVERALL ASSESSMENT

The 250-GeV ILC project will require a large budget both for construction and operation over a long period of time. On the other hand, **the major expected outcome is that it has the potential to suggest the future direction of elementary particle physics if a deviation from the Standard Model is found in the precision measurements of the Higgs coupling constants.** This review committee, however, did not reach a recognition that the expected scientific achievements, which are to suggest the future direction, are sufficient to justify the major part of the huge project cost that Japan is expected to bear. Regarding the technical feasibility of the 250 GeV ILC, various issues still need to be resolved. Although project proponents claim that these issues can be addressed during the preparation period, the committee cannot help but point out that there are still some concerns regarding the project's implementation. A further concern is that the prospects for appropriate international sharing of the huge investment required to implement the project over the long 30-year period are not clear.

**Judging from the information so far presented regarding the current state of the project and its preparation,** the Science Council of Japan cannot reach a consensus to support hosting the 250-GeV ILC project in Japan. **The committee considers that the government should be cautious regarding a decision to announce its commitment to host the ILC in Japan.**

Elementary particle physics has until now been exploring the basic composition of the natural world, and has produced excellent results by means of a collaboration between theoretical research and experiments using accelerators, resulting in the pillar known as the “Standard Model.” At present, an important issue is the quest for “physics beyond the Standard Model,” which the ILC project also aims to address. It is considered that a desirable way to proceed with accelerator-based high-energy elementary particle experiments in the near future is to realize, somewhere in the world, both a hadron collider pursuing the energy frontier (currently the LHC and its future upgrade), and a complementary high luminosity lepton collider. On the other hand, in view of the limited resources of mankind, it is thought that not only high-energy physics but also other research fields whose approach requires huge experimental facilities will eventually reach a limit of sustainability. The future path for big science is an issue that should be considered by the academic world as a whole.

### ***KF's assessment of the report***

**Significant improvement from the Nov. 14 draft.**

**Misunderstandings of facts have been corrected.**

**Some good points are also made.**

**The report appreciates the ILC's academic significance.**

**It is not vetoing EoI from the government.**

# ***Clarifications on the report from the Science Council of Japan regarding the ILC***

The purpose of this note is to provide clarifications on the report from the Science Council of Japan (SCJ) regarding the International Linear Collider (ILC), which was released on December 19, 2018.

The Ministry of Education, Culture, Sports, Science and Technology (MEXT) examined the ILC project through the ILC Advisory Panel, and subsequently called for an external evaluation from the SCJ in July 2018. The SCJ is an organization consisting of Japanese scientists, and it conducted a detailed review of the ILC proposal by establishing a special panel. The report was submitted to the MEXT and published after a review in the executive meeting of the SCJ. **While acknowledging the scientific case for the ILC, the panel concluded that it did not support at this time that Japan host the ILC due to issues yet to be resolved. One of the reasons pointed out is that the international negotiation on cost-sharing has not been proven to be successful.**

It should be noted that, in the decision-making process by the Japanese government, the SCJ report will be taken into account along with other factors such as merit to the society. We strongly hope that **an official statement by the Japanese government on its position towards the ILC will be available in a timely manner for full consideration in the European strategy process. KEK, in collaboration with many Japanese and international associates, is working diligently in maintaining the progress and making the ILC a reality in Japan.** Therefore, your continual support is highly appreciated and solicited.

21 December 2018

***Planning Office for the ILC at KEK***

**Emphasis in red by KF**

# ***From KEK: Regarding the “Assessment of the revised International Linear Collider Project”***

We would like to express our gratitude to the review committee of the revised International Linear Collider (ILC) project of the Science Council of Japan (SCJ) for their prompt and detailed evaluation. We here present our opinions in response to **the final report published by the Science Council of Japan.**

**The SCJ appreciated the scientific significance of the ILC project, the “pursuit of new physics beyond the standard model,” but also pointed out issues concerning the hosting of the ILC project in Japan, in particular the cost-sharing as an international project and the international project organization and management. To address these issues, we ask the Japanese government to promptly convey a forward-looking position regarding the implementation of international discussions toward the realization of the ILC.**

Humankind has so far revealed the extreme microscopic world by studies using accelerators. However, there remain big questions regarding the natural world that remain unanswered, and it is the greatest challenge of modern physics to elucidate them. There is broad consensus among particle physicists that the Higgs particle holds the key. Precision studies of the Higgs particle have the potential to expand the horizon of humankind’s understanding of nature. The Linear Collider is an important project that can be a major turning point in deciding the “direction of physics” for the next 50 to 100 years.

The scientific significance of the ILC project is widely accepted, but the significance and consequences of Japan taking on a major part of the ILC project should be discussed not only from the academic but also societal points of view. Investigations of the project by researchers have now reached the stage at which further progress requires international discussions by the government. If, in the course of these discussions, it becomes clear that international and domestic conditions are not satisfied, the project will be canceled. **We will advance the ILC project, establishing worldwide consensus, including on its budget, while gaining support from both academic circles and society at large.**

As for the identified technical issues, the global community will cooperate, combining resources to resolve them. Based on our experience and achievements at LHC, KEKB, European XFEL, and other research facilities, we are convinced that we can solve them.

— *this article has been previously released on the KEK website in Japanese.*

**Emphasis in red by KF**

# ***Message from politicians in response to Science Council of Japan's final report***

We wish to express our sincere gratitude for the intensive discussions conducted at the Science Council of Japan. It is extremely important that the scientific merits of the ILC and the significance of Japan contributing to international collaborative research have been recognized.

The ILC has a far-reaching impact on a wide range of national policies, such as science and technology innovation, diplomacy and national security, industrial development and growth, and regional revitalization and post-disaster reconstruction. **We believe that it is our political mission to push forward the ILC project as a national priority.**

Japan has been and will remain a science and technology-oriented nation. We will continue to seek public understanding for the ILC project and will work to address the issues raised by the Science Council of Japan.

**The Federation of Diet Members for the ILC and the Liaison Committee for Realizing the ILC will be working at full strength to ensure that the Japanese government reaches a positive decision to realize the ILC project in Japan.**

***Takeo KAWAMURA***

Chairperson, Federation of Diet Members for the ILC

Chairperson, Liaison Committee for Realizing the ILC, Liberal Democratic Party\*

\*In September 2018, the Liberal Democratic Party, created a new organization, called the Liaison Committee for Realizing the ILC. The Liaison Committee brings together various strategic groups involved in making important policies, such as science technology and innovation, regional revitalization, reconstruction from natural disasters, and national resilience.

**Emphasis in red by KF**

**MEXT Minister's  
Press Conference  
on Dec. 21**



## MEXT Minister's Press Conference (Dec. 21, 2018)

### - Regarding the ILC Report of the Science Council of Japan -

#### ◆Journalist

Recently, the Science Council of Japan delivered a report on the International Linear Collider (ILC) to the Ministry of Education, Culture, Sports, Science, and Technology (MEXT). The report states “the Science Council of Japan cannot reach a consensus to support hosting the ILC.” How will MEXT respond to this report and what are its next steps?

#### ■MEXT Minister

We asked the Science Council of Japan (SCJ) to consider the International Linear Collider following the issue of a report in July by MEXT's ILC Advisory Panel. On December 19th, we received the SCJ's response to our request. The project was thoroughly discussed in the SCJ by researchers from diverse academic fields. I am grateful to those researchers for their work. Now MEXT will consider government's response, taking into account the SCJ's report. **The SCJ's summary acknowledges the scientific significance of the ILC in the field of elementary particle physics, but also expresses concerns. The main concerns are the prospects for international cost sharing and the availability of human resources. We would like next for the government to proceed with careful consideration of the ILC, while paying attention to these concerns.** Regarding the schedule, the key international research organization acknowledged on December 5th that it is unrealistic to expect the Japanese government's expression of its position on the ILC in 2018. They requested a statement from the Japanese government by the beginning of March, 2019. While carefully monitoring such international developments, we will consider how the government should respond, after carefully reviewing the contents of the SCJ's report.

**Emphasis in red by KF**

#### ◆Journalist

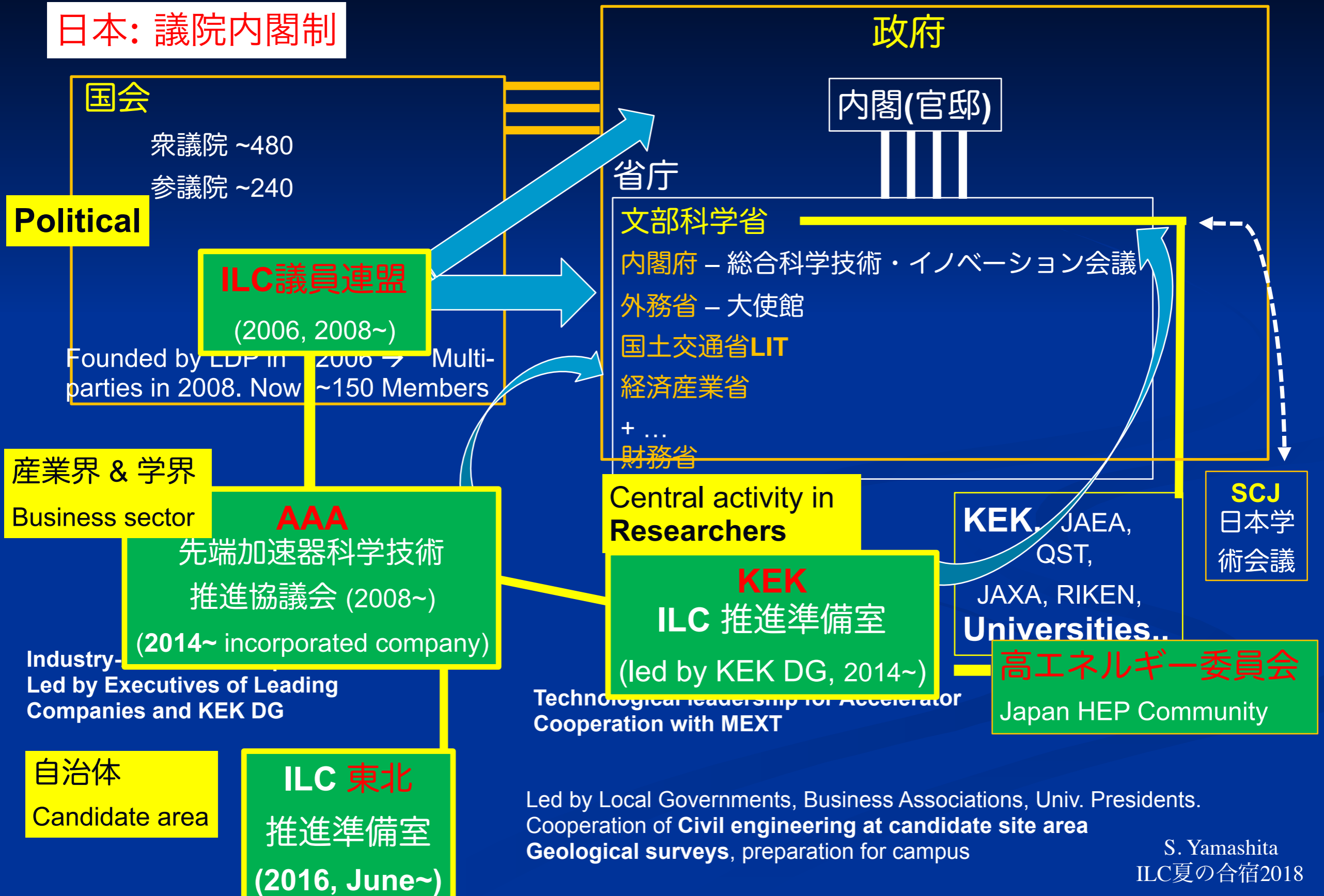
Today, the governors of the Miyagi Prefecture and the Iwate Prefecture said the government should consider societal significance as it makes a decision on the ILC. What do you think of this?

#### ■MEXT Minister

I think **a comprehensive examination taking into account such viewpoints is necessary. We will consider more factors now, including intra-government coordination.**

# 日本におけるILCの推進母体

日本: 議院内閣制



# Realizing the ILC as National Project with Cross-Cutting Policies

**Established on Sep. 18**



## The Committee made a resolution on September 18, 2018

- ✓ To position ILC as a cross-policy “national project”, covering not only science, technology and innovation but also many challenges faced by the national government;
- ✓ To secure the financial resources for the realization of ILC (beyond the Olympic Games) outside the ordinary science and technology, academic or university budgets; and in addition,
- ✓ To make sure that, as for the international agreement of ILC, certain critical decisions, such as the share of overseas investments be roughly half, be satisfied before the international agreement necessary for the start of construction of ILC is reached.

From deliberations in the academic sector to the political decision-making process.

We will make all possible efforts to help the Japanese government so that it can give the statement in time for the LCB/ICFA meeting on March 2019, in Tokyo.