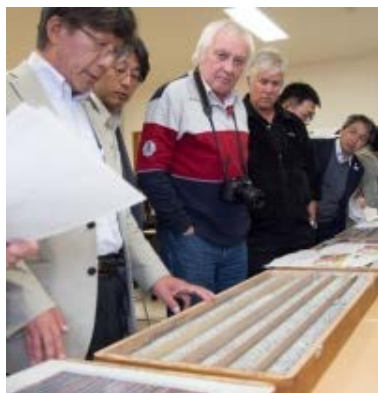


LC NEWSLINE

THE NEWSLETTER OF THE LINEAR COLLIDER COMMUNITY

FEATURE



Bubble wrap made of granite: the ILC and seismic activity

Why are we confident the ILC can be built in a seismic country?

by Daisy Yuhas

Isn't it a bad idea to build a high-tech high-precision particle accelerators machine in a country that is regularly shaken by earthquakes? Won't the machine have to be rebuilt from scratch when it all starts to move? LC NewsLine investigates what the various teams are doing to prepare the machine for a big shake and finds that granite can also serve as a kind of bubble wrap. "Shaken as one, restored as one" is the catchphrase.

IMAGE OF THE WEEK

Senior vice-minister of science of Japan visits CERN

Image: CERN



One hundred metres under Swiss roads and fields, Yoshitaka Sakurada, Senior Vice Minister of Education, Culture, Sports, Science and Technology of Japan, was pleased to discover the Japanese flag proudly displayed on an inner triplet magnet, one of the Japanese contributions to the Large Hadron Collider LHC at CERN. Guided in the LHC by LCC Director Lyn Evans and Asian Regional Director Akira Yamamoto, Sakurada and his team visited the tunnel and the ATLAS experiment, two examples of how international collaborations can achieve great things for science.

DIRECTOR'S CORNER

Japanese government makes a move

by Hitoshi Murayama



We were all holding our breaths to see the Japanese government making an official move towards hosting the ILC. A small but significant move happened as a Christmas present with the release of the government budget proposal for the Japanese Fiscal Year 2014 which includes an official budget line for the ILC.

IN THE NEWS

from *Kahoku Shinpo*

19 January 2014

まちづくりの視点重要 千葉・柏市関係者ら盛岡で 講演会

「国際リニアコライダー」の建設実現に向け、岩手県は 日、盛岡市で講演会「公民学連携によるまちづくり」を開いた。(Iwate prefecture organized the lecture on 17 January about the city development by the cooperation between government, public and academia toward the invitation of the ILC)

from *The Financial*

17 January 2014

Next generation particle detectors in development

"If successful, the sensors we will develop may find application in planned upgrades of the innermost parts of the experiments at the LHC or at the International Linear Collider project, proposed in Japan. We are also very keen to exploit this new technology to drive a wide range of applications beyond our field," said Dr Joost Vossebeld, Project lead.

from *CERN*

15 January 2014

CERN to admit Israel as first new Member State since 1999

At a ceremony today at CERN, the Israeli flag was hoisted for the first time to join the other 20 flags of the organization's Member States, after UNESCO officially recorded Israel's accession as a new CERN Member State.

from *Kahoku Shinpo*

14 January 2014

東北放射光施設 人知集め復興を側面支援

月末の 年度政府予算で文部科学省が要求していた調査費 千万円が盛り込まれ、国も前向きな姿勢を鮮明にするなど環境は整ってきた。 とともに復興を速める両輪として実現を急ぎたい。(The budget for the photon source facility in Tohoku area was delivered in the JFY 2014 national budget. Together with the ILC, the photon source will be the core facilities for the area toward the promotion of the recovery act)

from *Iwate Nippo*

10 January 2013

経済界 誘致へ一丸 岩手同友会が新年交歓会

岩手経済同友会の新年祝賀交歓会は 日、盛岡市内のホテルで開かれ、出席した県内企業のトップらは、東日本大震災からの復興推進と国際リニアコライダー の誘致実現に向けた力の結集を誓い合った。(Members of Japan Association of Corporate Executives of Iwate met on 9 January and decided to cooperate to promote the region's recovery and invitation of the ILC)

CALENDAR

Upcoming events

CLIC Workshop 2014

CERN

03- 07 February 2014

Workshop on Top physics at the LC

LPNHE, Paris

05- 06 March 2014

Upcoming schools

Joint Universities Accelerator School (JUAS)

Archamps, France

06 January- 14 March 2014

[View complete calendar](#)

PREPRINTS

ARXIV PREPRINTS

ANNOUNCEMENTS

Deadline: European School of High-Energy Physics

The 2014 European School of High-Energy Physics will be held in Garderen in the Netherlands from 18 June to 1 July 2014. Visit the [website](#) for more details. The deadline for applications is 14 February.

The lectures will cover a broad range of HEP topics at a level suitable for students working for a PhD in experimental particle physics. One or two students from developing countries could be considered for financial support.

1401.4841

Observability of Triple Higgs Production in a General Two Higgs Doublet Model at an e^+e^- Linear Collider

1401.3748

Future Prospects for Stau in Higgs Coupling to Di-photon

1401.3594

Associated production of the Z boson with a pair of top quarks in the left-right twin Higgs model

1401.2158

Jet Shapes with the Broadening Axis

1401.2077

8D Likelihood Effective Higgs Couplings Extraction Framework in the Golden Channel

1401.1827

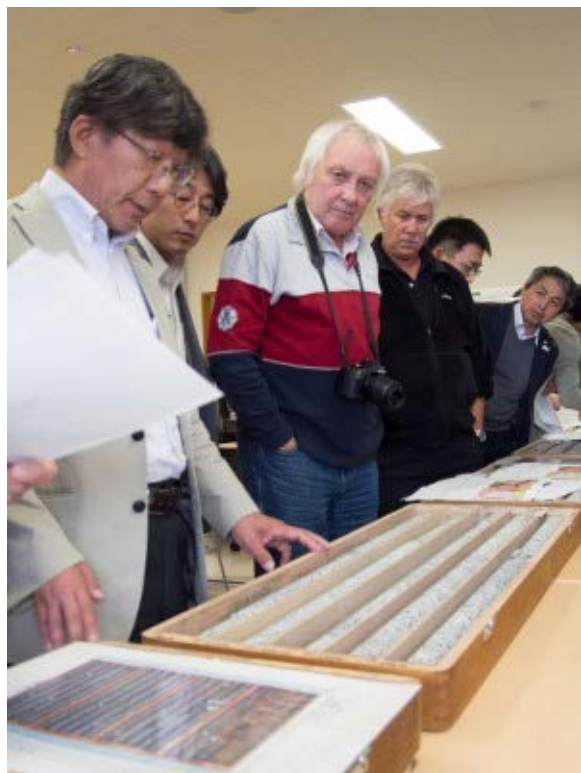
Higgs Couplings and Electroweak Phase Transition

FEATURE

Bubble wrap made of granite: the ILC and seismic activity

Why are we confident the ILC can be built in a seismic country?

Daisy Yuhas | [23 January 2014](#)



LCC delegation checking the boring core sample of the granite bedrock in Kitakami area. Image: Nobuko Kobayashi

In August 2013, the International Linear Collider site evaluation committee of Japan announced that they evaluated a site in Kitakami as the best candidate location in Japan for the ILC. The exciting news came after meticulous preparation and study to ensure that the site was suitable for the 31-kilometre linear collider. Among the most important criteria in the evaluation was whether or not an earthquake, such as the one that affected Japan in 2011, could cause damage to the ILC.

First and foremost, therefore, was an evaluation of the site's geology. "No active fault around the Kitakami site has been found so far, and the possibility for the site to have any active faults would be very low," says Akira Yamamoto, regional director for Asia of the Linear Collider Collaboration. Although some natural fractures in the rock occur in the area, careful study suggests that none would affect construction and installation, the most delicate period for machinery. Once underground, the equipment is actually far safer than at the surface level, since the seismic damage of underground works are generally much less than that of ground buildings.

Crucially, the collider is engineered to remain stable in the event of any disruption. John Osborne, a civil engineer from CERN, explains that safety would not be a critical concern. "If the machine is rattled it will simply abort the beam," Osborne says. "It's really just an issue of protecting the equipment."

At most, an earthquake might do enough damage to cause a crack in the cryogenics system, releasing liquid helium. To prepare for this possibility, ILC

scientists are learning from studies at the Large Hadron Collider, where physicists and engineers intentionally leaked liquid helium for safety studies. This is one of several lessons that ILC scientists can learn from other colliders. In the United States, the SLAC National Accelerator Laboratory in California has to be prepared for small but common quakes, for example. ITER, a fusion facility in Southern France, makes use of special pads to absorb shocks from seismic activities.

But an example even closer to the Kitakami site makes ILC leaders feel confident in their preparedness and selection. Akira Yamamoto points to Japan's Esashi Earth Tides Station as another important case study. There, he explains, the tunnel was held within a single rock mass of granite bedrock, allowing it to experience the earth's movement as a single block. "It was shaken as one, then restored as one," says Yamamoto. "This experienced proved that the ILC's design [also within a single block of rock] can be safely done."

[ACCELERATOR R&D](#) | [EARTHQUAKE](#) | [ILC SITE](#) | [JAPAN](#)

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NEWSLINE

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IMAGE OF THE WEEK

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Image: CERN | [23 January 2014](#)

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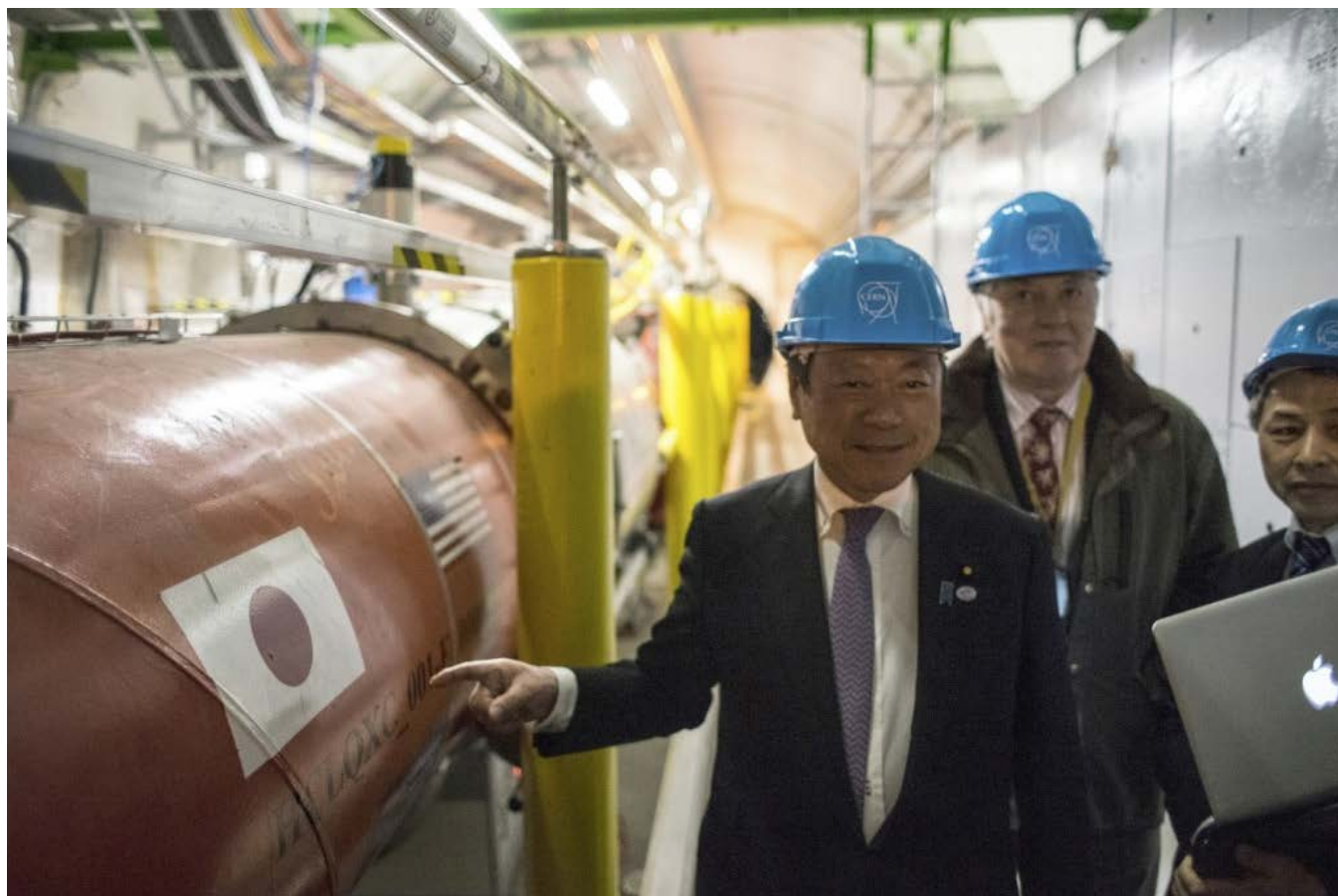


Image: CERN

[CERN](#) | [INTERNATIONAL COLLABORATION](#) | [JAPAN](#) | [LHC](#)

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DIRECTOR'S CORNER

Japanese government makes a move

Hitoshi Murayama | [23 January 2014](#)



Japan's House of Representatives room.

We were all holding our breaths to see the Japanese government making an official move towards hosting the ILC. A small but significant move happened as a Christmas present.

On 24 December 2013, the Japanese cabinet released the government budget proposal for the Japanese Fiscal Year 2014 that will be voted on in the Diet early this year. It includes an official budget line for the ILC. This is highly important as it represents a qualitative change in the status of the ILC in the Japanese government and indicates that it is now a recognised project. Given the majority of the ruling coalition in both Houses, it is virtually guaranteed that the budget proposal will pass.

It is a part of the budget for MEXT (Ministry for Education, Culture, Sports, Science, and Technology) under the category: "**Promotion of innovation in science and technology for the realization of the economic growth**

strategy 2. Strengthening the basic science research potential and building the world's highest level research headquarters ([see page 30](#))"

"The economic growth strategy" is a reference to Abenomics, a proactive economic policy by Prime Minister Shinzo Abe. The budget for the ILC is listed together with the research grants from MEXT.

The amount itself is small: 50 million Yen (about US \$500K). However, this is highly significant symbolically, as the ILC is recognised as a project of the Japanese government. Note that this is not an R&D budget. The R&D budget is supported through KEK. It is rather a specific budget for the Japanese government to seriously study the feasibility of an international framework for the ILC as a global project, as mandated by the recent report from the Science Council.

We look forward to even bigger movements this year!

[BUDGET](#) | [GOVERNMENT](#) | [ILC SITE](#) | [INTERNATIONAL COLLABORATION](#) | [JAPAN](#) | [R&D](#)

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