

LC NEWSLINE

THE NEWSLETTER OF THE LINEAR COLLIDER COMMUNITY

ANNOUNCEMENTS



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by Rika Takahashi

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AROUND THE WORLD

See you, summer students

by Barbara Warmbein



Summer is drawing to a close, and with it ends another season that often turns lab life on its head and has changed many people's lives: summer student season. As the students from around the world finish off their projects, present their work to their fellow students and stock up on lab t-shirts, some leave with the certainty that they will return to do particle physics one day.

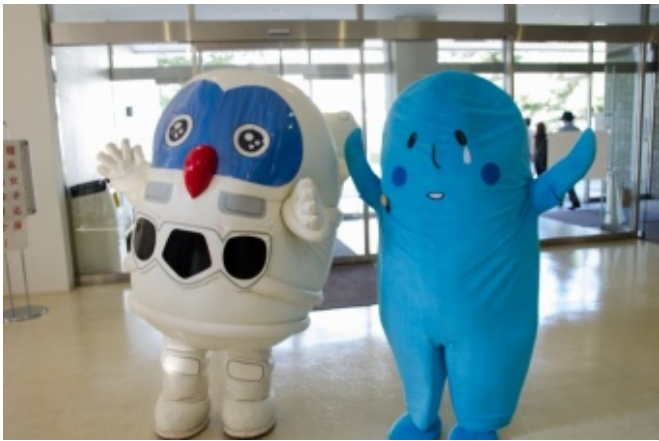
DIRECTOR'S CORNER

After many a summer – and corner...

by Brian Foster



Among the LCC collaboration changes that will be put in place as of January 2017 will be the abolition of the Regional Directors. In this week's corner, Brian Foster, soon-to-be former-European Director, explains what he has learned in 14 years of dedication towards managing the linear collider project, and gives some advice for the future.



ILC introduced with fun at KEK Open House

by Rika Takahashi

Many ILC related fun events were offered to the visitors of KEK open house held on 4 September. They must have learned that the ILC is a fun stuff!

IN THE NEWS

from *Iwate Nichinichi*

4 September 2016

Shaping the future with state-of-the-art science: Dr. Suzuki presents in Ichinoseki

Kaito Ando, a second-grade student at Ichinoseki Daiichi Senior High, said: "I understood details about the make-up of elementary particles, and want to continue learning about elementary particle physics and the International Linear Collider."

Read full translation provided by *Iwate & the ILC* website [here](#).

from *The Kitakami Times*

31 August 2016

A celebration of science in Tohoku

July 2016 saw two science festivals held back-to-back in Japan's northeastern region of Tohoku. July 17th 2016 was Science Day in Sendai City, Miyagi Prefecture, where organizations gathered at Tohoku University to share the joy of science with visitors both young and old (and all in between). In Morioka City, Iwate Prefecture then hosted the Iwate Science Symposium on July 18th.

(**Japanese translation** available at the end of the article)

from *Focus*

30 August 2016

Cina, Giappone, Svizzera... Dove sarà il prossimo LHC?

Tra giochi di potere e finanziamenti giganteschi, la comunità scientifica cerca di capire di quale tipo di nuovo LHC avrà bisogno in futuro. Quale Paese l'ospiterà?

from *Kahoku Shinpo*

27 August 2017

< I L C > 誘致盛り上げバスツアー (ILC Bus tour to foster momentum)

岩手県の一関観光協会は I L C 誘致の機運を盛り上げようと、9月8日、国内の有力候補地となっている北上高地の地質や金山開発の歴史を学ぶ日帰りバスツアーを実施する。(Ichinoseki Tourism Association will conduct a one-day bus tour to foster momentum to invite the ILC to the region on 8 September. Participants will learn the geological character of the candidate site, and history of gold mine development)

from *Ichinoseki ILC Promotion Website*

25 August 2016

Ichinoseki Linear Collider Bulletin "ILC News" Vol. 18

Table of content:

Learning about the importance of experiments at junior high – First Science Café for this fiscal year – ILC Symposium in Oshu City – Summer camp in ILC accelerator and physics/detectors 2016 – Summaries of other news
Ichinoseki Lives Cosmopolitan (introduction of international residents) – Notices – Enquiries

from *Iwate Nichinichi*

25 August 2016

高度製造技術を解説 I L C 県立大 産学官集いセミナー (A seminar on ILC's advanced manufacturing technology for industry, academia, and government officials (at Iwate Pref. University))

加速器関連産業への参入を目指す企業などに加速器の技術に触れてもらおうと開催したもので、県内外から参加した産学官関係者が国際リニアコライダー (I L C) の最重要装置である超伝導加速空洞の技術などに理解を深め、参入の可能性を探った。

(These seminars are about the technology used in accelerators and are aimed at businesses that would like to get involved with the accelerator industry. At this seminar, officials from industry, academia, and government learned more about SRF cavities, the key piece of technology within the ILC. They also looked for ways to get involved.)

Read full translation provided by *Iwate & the ILC* website [here](#).

from *The Kitakami Times*

24 August 2016

The Iwate Industry Promotion Center (いわて産業振興センター)

At the opening ceremony for the office, Vice-governor of Iwate, Mr. Shigeki Chiba, said, "This office will start as a hub of cooperation for all those involved with the ILC in Iwate. Eventually we'd like to make the office into a center for the ILC project as a whole, to play a role in the project coming to fruition."

(**Japanese translation** available at the end of the article)

from *El Confidencial*

23 August 2016

Tras el LHC: Japón y China compiten con Europa por el trono en la física de partículas

ILC son las siglas del International Linear Collider, "la próximas gran aventura en la física de partículas", según los impulsores del proyecto. Su idea es construir un experimento que complementaría al LHC, aunque con algunas diferencias.

from Iwate Nichinichi

23 August 2016

被災港湾、早期復旧へ 大船渡港物流強化促進協総会 ILC誘致活動も (A quick restoration to damaged ports – and striving to bring about the ILC)

内陸部と沿岸部を結ぶ幹線道路網の整備促進活動、国際リニアコライダー（ILC）誘致活動など今年度事業計画を決めた。
(They established their project plan for the current fiscal year, which includes improving the infrastructure of the highway network that links the inland region of Iwate to the coast, as well as working to realize the International Linear Collider (ILC).)

Read full translation provided by *Iwate & the ILC website* [here](#).

from Xinhua

21 August 2016

What will succeed LHC to continue Higgs study?

The Asian country has expressed the willingness to host the International Linear Collider (ILC), which is designed to have a 31-kilometer-long track and can better provide cleaner collisions for precision measurements.

from Nature

19 August 2016

China, Japan, CERN: Who will host the next LHC?

Labs are vying to build ever-bigger colliders against a backdrop of uncertainty about how particle physicists will make the next big discoveries.

from Physik Journal

15 August 2016

Collider auf Kurs

Das International Committee for Future Accelerators unterstützt auch weiterhin den International Linear Collider.

from Iwate Nichinichi

10 August 2016

「最先端」欧州研修に充実感 ILCクラブが帰国 (Five Iwate junior high students return from a fulfilling study trip abroad)

5人は同日夜、東京駅で解団式を行い東北新幹線で帰県しそれぞれ帰宅。12月に盛岡市で開くILCワークショップで成果を発表する。

(The five students held a goodbye ceremony at Tokyo Station on the same day, and then took the Tohoku Shinkansen train back to Iwate where they returned home. They will present on their trip during the ILC workshop held in Morioka City in December.)

Read full translation provided by *Iwate & the ILC website* [here](#).

from Iwate Nippo

28 July 2016

宇宙の謎キティと一緒に ILCとコラボグッズ (Riddles of the Universe and Hello Kitty: Collaborative Goods with the ILC)

The event unveiled t-shirts, keychains, ballpoint pens and other goods with Hello Kitty sitting on an ILC cryomodule, which contains the cavity where electrons and positrons accelerate. The goods will be sold first in the Tohoku region starting on August 15th. A portion of proceeds will be donated to efforts to bring the ILC to Japan.

Read full translation provided by *Iwate & the ILC website* [here](#).

from Iwate Nippo

27 July 2016

加速器産業参入探る 北上市 ILCセミナー (Kitakami City ILC Seminar: Searching for Ways to Participate in Accelerator Industry)

ILC誘致を契機に何をしたいかイメージを明確にしてほしい」と強調。関連施設の建設に関わることで「世界に向けた絶好のショーウインドーになる」と参入を呼び掛けた。

(“You need to have a clear vision of what you want to do, using the ILC as an opportunity.” He called for businesses to get involved in the construction of related facilities, saying “This will become a great ‘show window’ to showcase [local businesses] internationally.”)

Read full translation provided by *Iwate & the ILC website* [here](#).

from Iwate Nippo

24 July 2016

ILC誘致の夢胸に茨城研修へ 一関と平泉の中学生 (Hope for the ILC: Ichinoseki and Hiraizumi Students to Field Trip in Ibaraki)

会場の同市大手町の一関文化センターに、一関・平泉地域の中学3年生65人が集合。一関市の勝部修市長が「大人になったとき、ILC誘致が実現した一関がどう変わるか想像しよう。心に感動を覚えて帰って来てほしい」と激励した。

(65 middle school students from Hiraizumi and Ichinoseki gathered for the ceremony at the Ichinoseki Cultural Center in Daito.

Ichinoseki Mayor Osamu Katsube passionately encouraged the students, saying “Imagine how Ichinoseki will change when you are adults and the ILC has been made a reality. Be inspired during your trip.”)

Read full translation provided by *Iwate & the ILC website* [here](#).

from *Iwate Nippo*

19 July 2016

ILC学び科学の力身近に 盛岡でシンポジウムや講演 (Feeling the Power of ILC and Science Up Close: Symposium and Talks in Morioka)

中高生や市民ら約100人が参加。藤本氏は実験の意義を「全てが解明されていない宇宙、自然の法則を見つけることだ」と強調。渡部氏は「宇宙の大部分を占める暗黒物質と暗黒エネルギーの正体を解明してほしい」と期待を寄せた。

(About 100 people including middle and high school students and residents. Dr. Fujimoto emphasized that significance of the ILC was to “discover new laws of nature and space that have not been totally explained.” Mr. Watanabe expressed hopes that the ILC could “bring to light the true identity of dark matter and energy, which take up most of the universe.”)

Read full translation provided by *Iwate & the ILC* website [here](#) .

CALENDAR

Upcoming events

[Corfu Summer Institute](#)

Corfu, Greece

31 August- 23 September 2016

[ALERT 2016 2nd Advanced Low Emittance Rings' Technology](#)

Trieste, Italy

14- 16 September 2016

[11th International Positron Source Workshop \(POSIPOL 2016\)](#)

Orsay, France

14- 16 September 2016

[6th Low Emittance Rings Workshop \(LOWeRING 2016\)](#)

SOLEIL, Gif-sur-Yvette, France

28 October 2016

[View complete calendar](#)

PREPRINTS

ARXIV PREPRINTS

[1608.08279](#)

Thermal and Tensile Strength Testing of Thermally-Conductive Adhesives and Carbon Foam

[1608.07538](#)

Higgs Physics at the CLIC Electron-Positron Linear Collider

[1608.07537](#)

Updated baseline for a staged Compact Linear Collider

[1608.06619](#)

Probing the Electroweak Phase Transition with Higgs Factories and Gravitational Waves

[1608.06534](#)

The Conversion of CESR to Operate as the Test Accelerator, CEsrTA, Part 4: Superconducting Wiggler Diagnostics

[1608.06231](#)

NLO QCD Corrections for $J/\psi+c+c^-$ Production in Photon-Photon Collision

[1608.03062](#)

SUSY Dark Matter in Universal and Nonuniversal Gaugino Mass Models

[1608.02498](#)

Luminosity Limitations in Linear Colliders Based on Plasma Acceleration

[1608.02190](#)

FCC Based Lepton-Hadron and Photon-Hadron Colliders: Luminosity and Physics

[1608.01509](#)

Electroweak precision observables and Higgs-boson signal strengths in the Standard Model and beyond: present and future

NEWSLINE

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Registration now open for LCWS2016

| [8 September 2016](#)

The local organising committee for the International Workshop on Future Linear Colliders (LCWS2016) is pleased to announce that the [registration is now open!](#)

LCWS2016 will take place at the [Aina Center](#) & [MALIOS](#) in Morioka city, Iwate prefecture in Japan from 5 to 9 December 2016.

The workshop will be devoted to the study of the physics cases for future high energy linear electron positron colliders, taking into account the recent results from the Large Hadron Collider (LHC), and to review the progress in the detector and accelerator design for both the ILC and CLIC projects.

Because the workshop will be held close to the candidate ILC construction site, there will be an excursion trip to drive around the site. Those who have never visited the candidate site, please take this great opportunity!

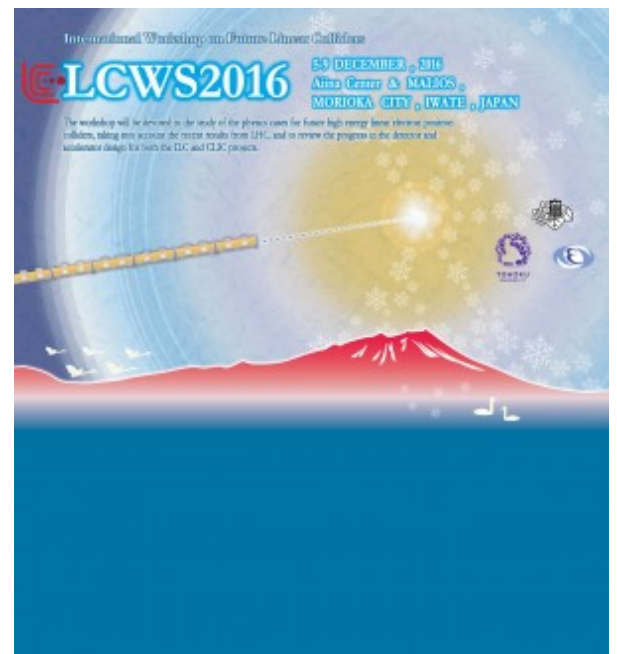
Early registration deadline is 31 October. If you need to obtain visa to visit Japan, please contact the LOC (lcws2016@iwate-u.ac.jp) as soon as possible. The deadline for visa application is Friday 30 September.

For further details of the event, including on how to register, please visit [conference website](#).

[CLIC](#) | [ILC](#) | [ILC SITE](#) | [JAPAN](#)

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AROUND THE WORLD

See you, summer students

Barbara Warmbein | [8 September 2016](#)



Summer students Torben and Manuel adjust the setup of the beam telescope. Image: DESY, Nina Laskowski

Summer is drawing to a close, and with it ends another season that often turns lab life on its head and has changed many people's lives: summer student season. As the students from around the world finish off their projects, present their work to their fellow students and stock up on lab t-shirts, some leave with the certainty that they will return to do particle physics one day.

One small group out of a total of 104 summer students at the German lab DESY has spent their summer improving a core tool for many particle physics test: the [beam telescope](#). The beam telescope is an array of spaced detector layers that can hold the test objects (prototypes for new detectors mostly). It provides reference measurements using its own data acquisition system." It was developed for the EUDET project and has been built for seven different labs and projects since, most recently for the AIDA-2020 project.

The telescope experts based at DESY wanted to push the functionality of their tool further and had identified three areas that would fit neatly into the schedule of three summer students. So in came Darya Shirokova, Manuel Morgado and Torben Lange from Russia, Venezuela and Germany. Darya, an IT student from Novosibirsk State University, made modifications to the existing data acquisition software. Manuel, who studies physics at Simon Bolivar University in Caracas, worked on a new feature that measures the ambient temperature and humidity to make environmental data available to telescope users and thus make it more user friendly. And Torben, in his second semester towards a master in physics at Hamburg University, worked on better characterisation of the incoming particle beam by measuring the particles' energy. Together with their supervisors they spent weeks in the test beam control room, tweaking, comparing and checking results.

Manuel is the only DESY summer student from South America and one of his ambitions in life is to give particle physics a wider base in his country. He applied for the programme and took a 30-hour flight because he wanted to gather experience with real experiments. He is clearly enjoying both his project and his time as a summer student. "It's my first time to Germany and Hamburg is a great place with just the right number of people and all kinds of places to go to have fun with the other summer students," he says. But the fun is only one part of the once-in-a-lifetime experience of being a summer student, learning what life is like as a scientist is the other. "I definitely want to stay in particle physics," Manuel says.

"I wanted to get my hands on real hardware," says Torben, who used the existing telescope in a new set-up to study the particles sent to the test area by DESY's workhorse accelerator called DESY II. His supervisor Paul Schütze confirms that you can develop detectors anywhere, but for a real test beam experience you need to be at a lab. He should know: three years earlier he was a summer student at DESY himself...

NEWSLINE

THE NEWSLETTER OF THE LINEAR COLLIDER COMMUNITY

DIRECTOR'S CORNER

After many a summer – and corner...

Brian Foster | [8 September 2016](#)



A bit of history: in 2004 the decision was taken to make the ILC cold.

In the [last Director's Corner](#), Harry Weerts told us about the changes to the Linear Collider Collaboration (LCC) that had been agreed by the International Committee for Future Accelerators (ICFA) at its meeting in Chicago last month. I fully support these changes; indeed I recommended many of them in a [previous Director's Corner](#). One of the changes is the abolition of the Regional Directors within the LCC. As Regional Director for

Europe therefore, it is time for me to emulate Harry in writing my last Director's Corner.

This is a bittersweet task. I have been involved in Linear Collider activities since my term as Chair of the European Committee for Future Accelerators (ECFA), which was from 2002 – 2005, and have been writing Director's Corners since the start of the Global Design Effort (GDE) in 2005. It has therefore become a challenge to come up with a topic I haven't addressed before. On the other hand, it marks the end of more than ten years of my

involvement with the coordination of world-wide ILC activities, a major fraction of my work in particle physics and therefore, for me, the end of an era.

I don't intend to use this column to wallow in reminiscence, but rather hope to point the way ahead. I remember quoting George Santayana once before in these columns – "Those who don't learn from history are doomed to repeat it". Our [more than ten years of activity](#) has not after all, so far, resulted in the approval of ILC construction. Did we make mistakes, and could we have done things differently? Well, we surely did make mistakes, but I find it difficult to think of any ones that really made a difference. One thing I am certain of is that I am very proud of the work we did, particularly in the GDE. The production of the *Reference Design Report* in 2007 and the *Technical Design Report* in 2013 were major milestones towards the realisation of the ILC project. They required an enormous amount of work from everyone involved, but I want to pay tribute particularly to our leader, Barry Barish, and to the three project managers, Marc Ross, Nick Walker and Akira Yamamoto. Their incredible capacity for hard work and inspiring others was the major reason that both of the Design Reports have stood the test of time. The costing of the project has also stood that test and is the firm foundation on which further progress can be made. We have had a tougher time in the LCC, as resources dwindled away to almost nothing, but Lyn Evans has ensured that the *camaraderie* and *esprit de corps* of the old GDE carried through to the LCC. It has been a real pleasure and an honour to serve with such a group of outstanding scientists.



Some meetings are held at rather spectacular locations... I am standing at the furthest right.

I mentioned the TDR costing. In retrospect, it was probably the RDR costing that was the crucial event in the last decade. It was done as carefully as we could, given the resources available, and further costing exercises have shown it was pretty accurate. Unfortunately, it was the “wrong” answer. For whatever reason, funding authorities, particularly the Department of Energy in the USA, were expecting a smaller number and the publication of the RDR cost marked a rapid retreat of interest from many countries. Perhaps we could have somehow managed expectations better than we did but the facts of the cost are what they are. We know from many years of effort that there is no “silver bullet” that will make a major reduction in the cost. One thing that hasn’t changed over the years is my conviction that the cost is worth it. Indeed the discovery of the Higgs and the current status of LHC results has strengthened my conviction that an electron-positron collider up to around 1 TeV is the right future machine for our field and that the ILC is the best machine that is currently practicable.



Dinner in Granada.

Let me close with a few reminiscences – yes, I couldn’t resist it – and some advice and warnings for the future. The hard work on both GDE and LCC was always lightened by the many friends that I have made along the way and the extraordinary places that we have visited to think about the ILC. It is always invidious to pick examples, but who could forget the night visit to the Alhambra and another of Juan’s famous conference dinners? It was quite difficult to convince my family I was working when we had the IEEE meeting in Disneyland and the DESY crowd stayed in a house right on Laguna Beach – “Just another day in Paradise” (see picture above). How could I ever forget our expeditions trying to follow Mike Harrison’s Google Map? This photograph was taken in Prague, but Lyn has been teasing Mike for years on how he navigated us from our Tokyo hotel to the University but we ended up in the Botanical Gardens.



Navigating a huge collaboration through stressful times can sometimes be easier than navigating in a strange city.

As to the warnings, I counsel against thinking that there are major cost reductions to be made in the ILC by further R&D. In fact, as Mike Harrison pointed out recently at the Linear Collider Board meeting in Chicago, the great success of the European X-ray Free Electron Laser (XFEL) cavity production gives us a significant saving simply by upgrading the specifications for cavity voltage to be in line with the results from XFEL. By this warning I don’t mean that we should stop R&D – far from it. One of my ILC activities that will continue when I step down as Regional Director is cavity R&D with my colleagues at DESY to improve performance and reliability. However, further R&D is not a reason to delay starting construction. I think it is highly unlikely, based on the work we did for the TDR costing, that further R&D can produce cost reduction that can even keep up with inflation over the years the R&D takes.

As to advice, a couple of things occur to me. One of my recommendations in my last column was that the job of the Regional Directors of interfacing with funding authorities should be in future delegated down to country representatives. In Europe in particular, in the current status of the ILC in Japan, this is extremely important. Secondly, there must be an ongoing central activity to refine and update the ILC design as new developments occur in both the civil engineering plans at the Kitakami site and elsewhere in accelerator R&D. No accelerator design can be frozen and if we do not invest a minimum effort now then we will have to pay tenfold in the future when, as we all hope, the ILC is finally approved.

It is time to end by wishing all involved with the ILC, in particular the new management, success for the future. I will continue to watch and to work for the ILC “in the trenches”, fortified by my conviction that the ILC is still the best

next machine for particle physics, just as it was all those years ago when I first heard the acronym “ILC”.

NEWSLINE

THE NEWSLETTER OF THE LINEAR COLLIDER COMMUNITY

IMAGE OF THE WEEK

ILC introduced with fun at KEK Open House

Rika Takahashi | [8 September 2016](#)

Despite of the severe lingering summer heat, some 3800 visitors enjoyed KEK's open house held on 4 September.

Many ILC-related fun events were offered to the visitors: facility tours of two ILC test facilities, the Advanced Accelerator Test Facility (ATF) and the Superconducting RF test facility (STF), an "ILC experiment game" for kids, a lecture about the ILC superconducting RF cavity production by Masashi Yamanaka, Head of the Mechanical Engineering Center, and a Science café.

Mysterious Higgs-kun was discovered again following the last year's [KEK open house](#) and [DESY Day](#), and this year, he (she?) collaborated with Tsukuba city's official character, Captain Fukkun. Also many visitors became Higgs-kun thanks to custom-made selfie frame!

Of course, [Science X Hello Kitty](#) welcomed the visitors at the souvenir store and on the T-shirts of the ILC exhibition staff.

Kids who participated in the experiment game wrote their own papers, and were given one of three prizes; Elephant Zobel prize (Zo meaning elephant in Japanese), Chicken Peep-bel prize, or Cat Mew-bel prize, from the "Great Professors," the senior scientists. This game was planned to explain how scientists find new particles or new phenomena by the accelerator experiments, using real simulated events and analysed plots. "I was always wondering how new particles are discovered. I finally got the idea of how the particle physics experiments work," said a mother of participated kids.

Many people must have learned that the ILC is fun stuff!

More pictures are shown at [ILC Tsushin](#) [Facebook](#).



Masashi Yamanaka explained how to produce the superconducting RF cavity with a Niobium disc on his hand.
Image: Nobuko Kobayashi



You can become Higgs-kun thanks to a Higgs selfie frame!
Image: Tomiko Shirakata



Higgs-kun collaborating with Captain Fukkun were huge attractions for the kids.
Image: Nobuko Kobayashi



For the experiment game, kids first took a short lesson about how to look for new particles or phenomena. Image: Tomiko Shirakata



Many visitors are curious to take a close look at a real superconducting RF cavity, carefully listening the explanation from Shin-ichiro Michizono. Image: Tomiko Shirakata



"Great Professor" Yokoya accepted the paper, and awarded Mew-bel prize to a future ILC scientist. Image: Tomiko Shirakata



Visitors to the STF facility got a feel of the ILC, looking at ILC-type cryomodule. Image: Takayuki Saeki



"Peep-bel prize" medal, one of the three awards given at KEK open house. Image: Nobuko Kobayashi



Visitors made long line along ATF's injector. Image: Sakae Araki

[HIGGS MASCOT](#) | [NEIGHBOURS](#) | [OUTREACH](#) | [SCIENCE X HELLO KITTY](#)

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