

AROUND THE WORLD



Rolf Heuer, global ILC cities and the role of Japan

by Rika Takahashi

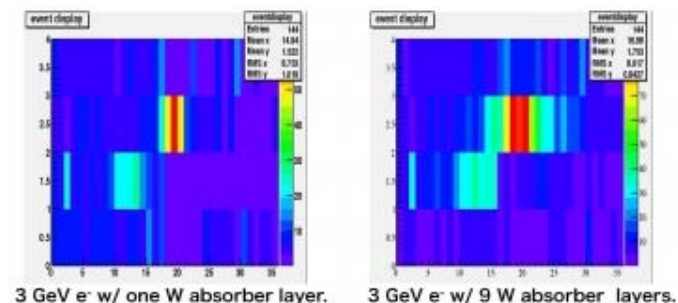
On 24 October, a symposium to boost activities to invite the ILC to Japan was held at Tokyo University, Tokyo, Japan. This event received great attention. One of the reasons was CERN's Director-General Rolf Heuer's talk, which was delivered for the first time in Japan since the discovery of Higgs-like particle in July.

IMAGE OF THE WEEK

Strip teaser

Technological prototype of scintillator-strip calorimeter in its first test beam

by Barbara Warmbein



A team of two scientists and four students from Shinshu University of Japan and Kyungpook National University of Korea have just packed up their cables, laptops and scintillator strips and left a test beam at DESY with many interesting results in their luggage. They tested the scintillator-strip-based electromagnetic calorimeter (ScECAL), one of the potential layers of a future ILC detector.

DIRECTOR'S CORNER

LCWS12 brings together CLIC and ILC communities

by Barry Barish

For several years, 2012 has been anticipated as the time when progress in the field of high energy physics would enable us to clarify the priorities for future planning. The interesting LCWS12 workshop at the University of Texas brought together the elements for such planning, if not a plan. There were reports on the discovery of the Higgs-like particle at the LHC and how that might be pursued in a linear collider; there were reports on the future planning processes that are underway in Europe, Japan and the U.S. and there were reports on the progress in developing the ILC Technical Design and CLIC Conceptual Design as well as how a staged approach might be responsive to the LHC discovery.



VIDEO OF THE WEEK



The Higgs, Who Cares? More than 1200 people did in Arlington...

...and for those who could not make it to the lecture "The Standard Model, Higgs Boson, Who cares?" by Nobel laureate Steven Weinberg at last week's LCWS12 meeting, the organisers have put it on YouTube. Well, the closing sentence and the question-and-answer session are there – there were sound problems for the lecture itself. However, even the Q&As are well worth watching. And should Weinberg be seen wearing an LCWS volunteer t-shirt and laser pointer any time soon, the video explains why.

IN THE NEWS

from **Arlington Citizen Journal**

29 October 2012

Notable and quotable

It wasn't your everyday science lecture at the University of Texas at Arlington. Organizers say about 1,200 people showed up at Texas Hall on Oct. 24 to hear Nobel laureate Steven Weinberg speak on the importance of continued particle physics research.

from **Sankei Shimbun**

28 October 2012

脊振山地でビッグバン再現 福岡、佐賀県など大型加速器誘致へ

宇宙の起源となった140億年前のビッグバンの謎を探ろうと、日米欧が共同で建設する次世代大型加速器「国際リニアコライダー」(ILC)を福岡、佐賀両県境の脊振山地に誘致する動きが活発になっている。

from **Yomiuri Online**

28 October 2012

次世代加速器誘致「地元の支援必要」

福岡、佐賀両県などが主催する先端加速器科学技術推進シンポジウムが27日、福岡市で開かれ、「ヒッグス粒子」とみられる新粒子を発見した欧州合同原子核研究機関(CERN、スイス)のロルフ・ホイヤー所長＝写真＝が講演した。直線型で全長約31キロになる見込みのILCについて、「新粒子の性質をより詳しく調べることができるだろう」と期待感を示した。

from **Science**

26 October 2012

For Once, Science Is an Issue in Race for a Seat in Congress

A physicist takes on a longtime friend of science in a tight Illinois race in which research matters.

from **New Scientist**

26 October 2012

Science and religion do not have to be at loggerheads

It's time that scientists learned to talk amicably to faith groups about research on the origins of the universe

from **Kahoku Shinpo**

25 October 2012

「日本にILC建設を」東京でフォーラム、CERN所長講演

日本創成会議」などは24日、国際プロジェクトで建設する超大型加速器「国際リニアコライダー(ILC)」を国内に誘致し、国際研究拠点づくりを目指すフォーラム「グローバル研究都市の創成」を、東京都文京区の東大本郷キャンパスで開いた。(Japan Policy Council hosted a symposium aiming to invite ILC to Japan at University of Tokyo)

from **Iwate Nippo**

25 October 2012

ILC日本立地に高い可能性 CERN所長が講演

終了後、報道陣に対し、本県の北上山地（北上高地）が候補地の一つとなっているILCについてホイヤー所長は「現状で日本に強力なライバルがあるようには見えない」と述べ、日本への立地可能性が高いことに言及した。(CERN's Director General Rolf Heuer said in the press interview after the symposium that there seems no strong competition to Japan)

from **Jiji News**

24 October 2012

「吹雪で結晶探す難しさ」＝ヒッグス粒子でホイヤー所長－東京

万物に質量を与える「ヒッグス粒子」とみられる素粒子を発見したと7月に発表した欧州合同原子核研究所（CERN、スイス）のロルフ・ホイヤー所長が24日、東京都内で開かれたシンポジウムで講演した。ホイヤー所長は「吹雪の中で、特別な雪の結晶を見つけるようなものだ」とヒッグス粒子探索の難しさを語った。(CERN's Director-General, Rolf Heuer gave a talk at the symposium held in Tokyo. He said finding Higgs is as difficult as finding a special snow flake in a snow storm)

from **NHK**

24 October 2012

巨大「加速器」日本に誘致を

未知の素粒子の解明に使われる「加速器」という巨大な実験施設を日本へ誘致するためのシンポジウムが24日、東京で開かれました。(The symposium to invite ILC to Japan was held on 24 October in Tokyo. ILC is the huge facility to unveil the mystery of fundamental particle)

CALENDAR

UPCOMING EVENTS

2012 IEEE Nuclear Science Symposium and Medical Imaging Conference

Disney Hotel, Anaheim, California

29 October- 03 November 2012

TESLA Technology Collaboration (TTC) Meeting

Thomas Jefferson National Accelerator Facility

05- 08 November 2012

Accelerators for a Higgs Factory: Linear vs. Circular (HF2012)

Fermilab

14- 16 November 2012

UPCOMING SCHOOLS

The first Asia-Europe-Pacific School of High-Energy Physics (AEPSHEP2012)

Fukuoka, Japan

14- 27 October 2012

CERN Accelerator School: Introduction to Accelerator Physics

University of Granada, Granada, Spain

28 October- 09 November 2012

Seventh International Accelerator School for Linear Colliders

Indore, India

27 November- 08 December 2012

[View complete calendar](#)

ANNOUNCEMENTS

ILC NewsLine to go on a biweekly schedule

From next week's issue (8 November) until the start of the new linear collider organisation in February 2013, *ILC NewsLine* will be published once every two weeks. With the completion of the ILC's *Technical Design Report* in full swing and preparations for the new organisation that unifies the ILC and CLIC underway, we will continue to keep you informed on progress in R&D, detector development, political news and fun facts from the linear collider world.

Apply now for CLASHEP2013

The 2013 **CERN-Latin-American School of High-Energy Physics** (CLASHEP2013)

will be held in Arequipa, Peru, from 6 to 19 March 2013. The deadline for applications is 16 November 2012.

PREPRINTS

ARXIV PREPRINTS

1210.6623

Hadron physics potential of future high-luminosity B-factories at the Upsilon(5S) and above

1210.6477

Radiative Production of Lightest Neutralinos in e^+e^- collisions in Supersymmetric Grand Unified Models

AROUND THE WORLD

Rolf Heuer, global ILC cities and the role of Japan

Rika Takahashi | 1 November 2012



Rolf Heuer giving a talk at the ILC symposium held at University of Tokyo

On 24 October, a symposium to boost activities to invite the ILC to Japan was held at the University of Tokyo, Tokyo, Japan. This event was entitled “Forum on Advanced Accelerator Science & Industry – Creation of Global Project Cities.” Because this event’s date coincided with the height of the big ILC conference, LCWS12, held at University of Texas, Arlington, US, many Japanese scientists were unable to attend. Nonetheless, it attracted an audience of about 300 people – clearly not too many experts in the field as they were all in Arlington. The talk that received greatest attention was the one delivered by Rolf Heuer, Director-General of CERN.

The forum was jointly hosted by the Japan Policy Council (JPC) and the Advanced Accelerator Association promoting science and Technology (AAA). JPC was founded by business and labour leaders and scholars and aims to create a grand design for Japan and to develop a strategy

towards its realisation.

The AAA facilitates industry-government-academia collaboration in Japan, seeking various industrial applications of advanced accelerators and technologies derived from R&D on advanced accelerators and placing the ILC as a model case. The AAA has been organising symposiums to raise awareness of the ILC with respect to its physics case and technological progress. This time, with JPC, they widened the scope to social, political and educational aspects and discussed the significance of inviting ILC to Japan.

The event was opened with the welcome remarks from Takashi Nishioka, chairman of the AAA. Nishioka said in his speech that the ILC will be the project that could enable the creation of a true global city in Japan, and he expects the ILC to provide the spark for innovation.

Following Nishioka, two prominent politicians, Yoshiaki Takaki and Takeo Kawamura, both former Ministers of Education, Culture, Sports, Science & Technology (MEXT), gave opening speeches.

Takaki said that the ILC is a project that needs the collective wisdom of mankind and a lot of money to realise. He recognised that this kind of forum has profound significance since the ILC definitely needs understanding and support from the public. Kawamura said that ILC will become a core of exchange of the brightest brains, and voiced his support for preparing the national budget and lawmaking needed to realise the ILC in Japan.

The forum included two talks and a panel discussion. The first talk was given by Hiroya Masuda, chair of JPC, entitled “Challenges for enabling Japan to become one of the world leaders in science and technology.” Masuda explained the contents of the [recommendation](#) recently issued by JPC on inviting ILC to Japan. To write up the recommendation, Masuda visited CERN and

met with DG Rolf Heuer, discussing the needs and issues on managing a global city. He introduced some issues pointed out by Heuer, such as the establishment of a global governance system, an appropriate infrastructure including hospitals and schools, and job opportunities for spouses.

The second talk, the highlight of the day, was entitled “Current state of the particle physics studies and Japan’s position in the world.” Heuer introduced the physics being done at the Large Hadron Collider. He explained the degree of the difficulty to find the Higgs particle by likening it to “finding a special snowflake in a snow storm.” This expression was most quoted in Japanese newspapers next day. Heuer said that the discovery of the Higgs-like particle was “only the beginning” and scientists need to find out how it interacts with all the particles with precision. “The world is about to change. This discovery will show the road beyond the Standard Model, and guide the way at the energy frontier for at least 20 years.” Then what’s next? Heuer introduced the potential tools for future study such as LHC upgrades, the Large Hadron Electron Collider (LHeC) and linear colliders. “This will be very interesting times,” he said.

The forum was ended with a panel discussion with specialists from a wide range of fields. In addition to Masuda and Nishioka, Kan Suzuki, visiting professor at Osaka University and University of Tsukuba, Yukako Uchinaga, Chairman of the Board, CEO and President of Berlitz Corporation, Koichi Morimoto from MEXT, and Atsuto Suzuki, Director-General of KEK, joined the panel. Satoru Yamashita of the University of Tokyo acted as a moderator.

In the panel discussion, Atsuto Suzuki pointed out the weakness of Japanese laboratory’s system that lacks the in-house engineers. Masuda emphasised the importance of preparing the favorable environment for people to live in new global city.

Nishioka said that Japan used to have an advantage in the manufacturing technology as a core of industry. “But now, we need to seek our advantage in more creative area. We can expect the accelerator science to drive new industry model.” Uchinaga, who runs a global leadership training and education company, said that language is not a biggest issue to have global city in Japan. She analyzed that Japanese people, in general, are not very good at taking a global leadership. “ILC will be a big chance for Japanese to diversify themselves, and contribute to the world.”

Kan Suzuki mentioned the recent Nobel Prize awarded to Japanese scientist Shinya Yamanaka jointly with John Gurdon of Britain for the development of induced pluripotent stem cells (iPS cells). His comment that “Japan can now go with double ‘i’s – iPS and ILC,” drew laughter from audience. He also said Japan should seek a way to establish a Japan brand on accelerators, and panelists agreed on it.

Morimoto said “Current situation on global competition to secure talent is pretty tough. Japan should provide attractive infrastructure to invite such talents, and ILC will serve as a test.”

The discussion was closed with a comment from commentators: Heuer, Hideaki Shiroyama, professor at Graduate school of public policy, the University of Tokyo, Sadayuki Tsuchiya, Chief of science and technology policy bureau at MEXT and Ryu Shionoya, Japanese diet member and also former minister of MEXT.

Shiroyama commented that not only from the pure science point of view, the social significance of the ILC also need to be considered. Tsuchiya said that science and technology is like a lifeline for Japan, and “ILC will be the true international contribution to challenge panhuman issues.”

Shionoya concluded the discussion saying, “Promoting science and technology is the highest priority issue of Japan. ILC has now reached a point where we need to drive forward with more concrete vision. We will do our best to promote the project further.”

The video of the forum is available on [JPC’s website](#).

AAA | JAPAN | JPC

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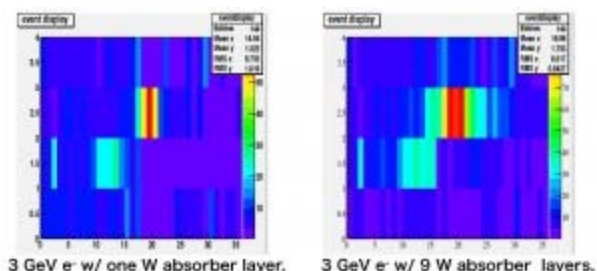
IMAGE OF THE WEEK

Strip teaser

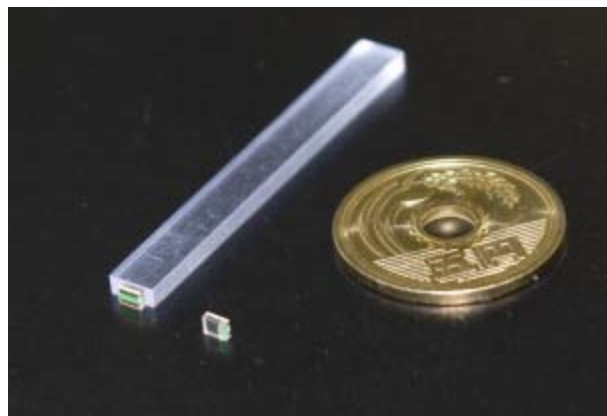
Technological prototype of scintillator-strip calorimeter in its first test beam

Barbara Warmbein | 1 November 2012

A team of two scientists and four students from Shinshu University of Japan and Kyungpook National University of Korea have just packed up their cables, laptops and scintillator strips and left a test beam at DESY with many interesting results in their luggage. They tested the scintillator-strip-based electromagnetic calorimeter (ScECAL), one of the potential layers of a future ILC detector. The electromagnetic calorimeter measures the energy of electromagnetic particles – photons, electrons and positrons –, and ILC calorimeters have the added challenge of particle flow – the complete reconstruction of trajectory, type and energy of every primary particle and the shower particles it produces passing through the detectors.



These plots from the test of a one-layer ScECAL still need calibration of each channel, but a beam shower is already clearly visible.



A scintillator strip with a multi-pixel photon counter (and a coin for size comparison).

The (ScECAL) is one of the concepts to achieve this particle flow algorithm. It uses 5-by-45-millimetre scintillator strips whose layers are arranged orthogonally in order to have an effective lateral segmentation of 5 by 5 millimetres. Each strip is read out by a multi-pixel photon counter (MPPC), a kind of pixelated photon detector.

The ScECAL in the test beam at DESY was the first step of the technological prototype, so it didn't have multiple layers. Instead, the team changed the number of absorber layers to make "pseudo multi-layers", and the plots show energy deposits by electron showers in the pseudo first layer and the pseudo ninth layer. The CALICE group has already tested and confirmed good performance of the ScECAL with a physics prototype, so as the next stage, the ScECAL group is developing a technological prototype, where the readout electronics is squeezed in between each layer to build a realistic ECAL for the ILC. "We have learned many things from this test beam to go to the next step," says Katsushige Kotera from the CALICE ScECAL group. After initial difficulties, the team had decided to extend data taking by a week, and then everything fell into place – their understanding of the detector as well as handling the beam properties. It's not only the success, but also those difficult days in the beginning that are a valuable experience, says Kotera. "The students struggled hard with me from the beginning until the end. I believe that they succeeded to get one grade higher through this experience."

The technological prototype of the ScECAL is developed by not only the ScECAL group but in close collaboration with the Analog HCAL group and the Silicon-tungsten ECAL group together as a collaboration from all over the world.

[DESY](#) | [DETECTOR R&D](#) | [ELECTROMAGNETIC CALORIMETER](#) | [JAPAN](#) | [KOREA](#) | [TEST BEAM](#)

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DIRECTOR'S CORNER

LCWS12 brings together CLIC and ILC communities

Barry Barish | 1 November 2012

The third joint ILC and CLIC Study Workshop was held at the University of Texas, Arlington from 22 to 26 October 2012. This interesting meeting brought together a convergence between the exciting new LHC results on the discovery of a Higgs-like particle, the nearing completion of the ILC *Technical Design Report* and *Detector Baseline Design* report, and the processes in place to develop strategic plans for the future of the field in Europe, Japan and the U.S.



For the ILC, LCWS12 marks the near-completion of the TDR process. The TDR is the primary deliverable and final milestone for the ILC-GDE and is being submitted for an extensive upcoming review process before being finalised and officially submitted to the International Committee for Future Accelerators in June 2013. At LCWS12, we held TDR wrap-up sessions among authors, contributors and editors to discuss remaining issues with the content, figures, bibliography, consistency, completeness, and supplemental documentation and design documents for EDMS. Of course, of paramount importance is the final agreement and consensus on critical technical content. The final stage in preparation for submission to the Project Advisory Committee for technical review in December will be a 'sign-off' meeting by the GDE Executive Committee at Fermilab on 14 November.

The LCWS series of workshops have had the special feature of bringing the ILC and CLIC communities together, and most of the meeting consisted of joint sessions organised around topics applying to both projects. This enabled in-depth discussions of areas of mutual interest such as schedules, costs and technical items. At a working level, the CLIC and ILC communities come together in joint working groups, serve on each other's executive and steering committees, have joint activities in detector development and civil construction planning, etc. Soon, the two R&D and design programmes will further be brought together within the new combined linear collider organisation, under Lyn Evans, who will be the new director of what will be called Linear Collider Collaboration.

At Arlington, there were several workshop sessions related to the discovery of a Higgs-like particle of a mass of around 125 GeV at the LHC at CERN. Both CLIC and ILC presented possible staged scenarios, beginning with a Higgs factory at relatively low energy, then upgrading to higher energy at a later time. Within this busy workshop, physics opportunities were explored in several physics sessions, initial project cost savings in accelerator sessions and Steven Weinberg, Nobel Prize winner, gave a public lecture entitled, "The Standard Model, Higgs Boson: Who Cares?"

There was a special session on the implications and future opportunities involving the Higgs-like particle discovery. Various approaches to a Higgs factory were discussed, including circular machines and staged linear colliders. In particular, the Japanese Association of High Energy Physicists (JAHEP) has endorsed Japan building an upgradable Higgs factory, beginning at 250 GeV, upgradeable to 500 GeV and ultimately expandable to 1 TeV. The following is the English translation of the JAHEP statement as presented at LCWS12 by Toshi Mori, University of Tokyo:



Nobel Prize physicist Steven Weinberg, University of Texas, Austin, giving his public lecture

JAHEP proposes that ILC shall be constructed in Japan as a global project based on the agreement and participation by the international community in the following scenario:

(1) Physics studies shall start with precision study of the “Higgs Boson” and will evolve into studies on top quark, “dark matter” particles, and Higgs self-couplings, by upgrading the accelerator. A more specific scenario is as follows:

(A) A Higgs factory with a centre-of-mass energy of approximately 250 GeV shall be constructed as a first phase.

(B) The machine shall be upgraded in stages up to a center-of-mass energy of ~500 GeV, which is the baseline energy of the overall project.

(C) Technical extendibility to a 1 TeV region shall be secured.

(2) A guideline for shares of the construction costs is that Japan covers 50% of the expenses (construction) of the overall project of a 500 GeV machine. The actual shares, however, should be left to negotiations among the governments.

Finally, the main center of the focus of the Arlington meeting was on completion of the ILC accelerator *Technical Design Report* and the *Detector Baseline Design* report for the physics and detectors. Both of these reports are being edited and completed to be submitted for technical review by the Project Advisory Committee in December at KEK Laboratory in Japan. The reports for the PAC will be completed and submitted to the PAC over the coming few weeks.



Jaehoon Yu (above) along with Andrew White of University of Texas, Arlington very capably hosted LCWS12

[CLIC](#) | [ILC](#) | [LCWS12](#) | [ORGANISATION](#) | [TECHNICAL DESIGN REPORT](#)

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