

NEWSLINE

THE NEWSLETTER OF THE LINEAR COLLIDER COMMUNITY

DIRECTOR'S CORNER



A year in review

by Sachio Komamiya

With the Higgs boson safely bagged by the LHC and the TDR published the last months were eventful to say the least. Linear Collider Board chair Sachio Komamiya looks back at what happened, what was accomplished in 2013 and what still needs to be done to make the linear collider an operational project in Japan.

AROUND THE WORLD

From DESY inForm: Under one roof

New ILC cavity laboratory opens

by Gerrit Hörentrup (DESY)



One-stop (work)shopping for high-gradient cavities: in a new lab at DESY in Hamburg all inspection and treatment processes for cavities come together under one roof to make treatment faster and more reliable and prepare for serial production.

AROUND THE WORLD

Accelerating News: Synergies for testing Superconducting RF (SRF) cavities



CRISP, the "Cluster of Research Infrastructures for Synergies in Physics" is a European-funded project and one of its objectives is to upgrade and harmonise the SRF Accelerator Structures for ESS, ILC, LHC upgrade and the European XFEL. The activity supports an optimised surface treatment, the application of advanced test and preparation infrastructure as well as state-of-the-art diagnostics

tools. Significant focus is laid on the knowledge transfer between ESS, CERN and DESY.

Read more in [Accelerating News Winter 2013 issue](#)

IMAGE OF THE WEEK



Numbers of the year

A picture says more than a thousand words, the old saying goes. But what about a number? A total of 2400 people signed the ILC *Technical Design Report* this year. They come from 392 institutes in 48 countries. While not yet in the realm of authors of an active experiment - the author number for recently published papers of the ATLAS collaboration, for example, is 2939 - the long list of names and institutes demonstrate both the past and present commitment to the project and an interest in future commitment.

IN THE NEWS

from *Asahi Shimbun*

18 December 2013

建設備え教育の現場視察

の国内候補地が北上山地に決まったことを受けて、誘致をしている宮城、岩手両県内の自治体関係者らが、仙台市泉区の東北インターナショナルスクールを視察した。(Following the announcement of Kitakami as a candidate site for the ILC in Japan, officials from Iwate and Miyagi prefecture visited the Tohoku international school in Sendai.)

from *CERN*

12 December 2013

CERN to admit Israel as first new Member State since 1999

Israel contributes to the LHC and CLIC accelerators, and operates a tier-2 centre of the Worldwide LHC Computing Grid.

from *Science, blog de Libération*

11 December 2013

Le boson encore plus de Higgs

(..) Michel Spiro,(...) présente les alternatives (...) qui «sont discutées par la communauté. La première permettrait d'aller plus vite mais serait restreinte à un maximum de 500 GeV (milliards d'électronvolts): c'est une technologie appelée ILC (Collisionneur linéaire international), un accélérateur linéaire électron-positon basé sur des cavités supraconductrices comme celles qu'utilisent les Allemands à Hambourg pour faire du rayonnement synchrotron.(..) »

from *Kahoku Shinpo*

10 December 2013

一関市、学術研究都市形成へ役割や対応検討 庁内連絡会議

の国内候補地に北上山地が決まったことを受け、岩手県一関市は庁内連絡会議を設置し、第 回会合を 日、市役所で開いた。(Following the announcement of Kitakami mountain as a national candidate site for the ILC, Ichinoseki-city established the conference of the executives to discuss the city's role and share.)

from *CNN*

8 December 2013

Inside CERN's \$10 billion collider

It may take an even more powerful machine than the Large Hadron Collider to find out. Discussions are in the works about a next-generation accelerator, the International Linear Collider, which could make even more precise measurements about components of our universe we know little about.

from *Symmetry Magazine*

5 December 2013

First particle-antiparticle collider now historic site

"The idea that you could accelerate and collide a beam of particles and antiparticles in the same machine was completely

different. ADA proved that this idea was correct and opened the possibility for a long line of particle and antiparticle colliders.”

from *Symmetry Magazine*

5 December 2013

[10 journals to go open-access in 2014](#)

Thanks to a CERN-based publishing initiative called the Sponsoring Consortium for Open Access Publishing in Particle Physics, or SCOAP3, articles from 10 peer-reviewed journals will be available online; authors will retain their copyrights; and new licenses will enable wide re-use of content.

ANNOUNCEMENTS

LC NewsLine holiday schedule

LC NewsLine is taking a break. Our next issue will be on 9 January 2014. Happy holidays to our readers!

CALENDAR

Upcoming events

[ILC Tokusui Workshop 2013](#)

KEK

17- 19 December 2013

Upcoming schools

[Joint Universities Accelerator School \(JUAS\)](#)

Archamps, France

06 January- 14 March 2014

[View complete calendar](#)

PREPRINTS

ARXIV PREPRINTS

[1312.3868](#)

Recent DHCAL Developments

[1312.3377](#)

Discoverability of a Z' at a Future High Energy e+e- Collider

[1312.3324](#)

Higgs from the Top

[1312.3322](#)

A New Indirect Probe of the Higgs Self-Coupling

[1312.2467](#)

A Z-prime interpretation of $B_d \rightarrow K^* \mu^+ \mu^-$ data and consequences for high energy colliders

[1312.1596](#)

Tomography of exotic hadrons in high-energy exclusive processes

[1312.1586](#)

Impact of Detector Solenoid on the CLIC Luminosity Performance

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Sachio Komamiya | [19 December 2013](#)



Pier Oddone (then ICFA chair) and Barry Barish shaking hands over the handover of the Technical Design Report in June. Image: Fermilab

The discovery of the Higgs boson at the LHC in the last year has clarified the initial scientific objective of the Linear Collider projects. It tells us that a Higgs factory will be the first phase of the Linear Collider project. This changes the formerly mutually exclusive situation of the ILC and CLIC projects into peaceful coexistence. The two projects may proceed one after the other, depending on the science and resources in the future. Therefore, in February the International Committee for Future Accelerators (ICFA) smoothly combined the ILC and CLIC projects together to form a unified organisation of LCC (Linear Collider Collaboration) which is now led by Lyn Evans. The International Linear Collider Steering Committee (ILCSC) has also transformed to LCB, the Linear Collider Board.

In the year 2013, we have seen a lot of progress in the LC projects. At the end of 2012, the Global Design Effort (GDE) completed the ILC [Technical Design Report](#) (TDR) and the detector groups integrated their Detailed Baseline Design (DBD). Both documents went through the review processes, and they were published in June. We had a celebration for the publication of

the TDR on the "[ILC Day](#)" of 12 June, passing the ceremony from Tokyo, via Geneva and to Chicago.

I wish to thank the former GDE director, Barry Barish, and his team for the completion of the TDR based on their leadership, and also to thank former Research Director, Sakue Yamada, and the physics and detector groups for the completion of the DBD.

In Japan the Ministry of Education, Culture, Sports, Science and technology MEXT organised a Taskforce for ILC in February. MEXT asked the Science Council of Japan (SCJ) to evaluate the ILC, on scientific significance in the context of particle physics and in overall scientific activities, significance of hosting ILC for Japanese people and society, and status of the preparation and necessary conditions.

On 30 September the SCJ report on ILC was submitted to MEXT. SCJ appreciates the scientific significance. SCJ also recommends to set up a group including knowledgeable people outside of the project to intensively investigate within a few years towards the final judgement for Japan to be the host of the ILC project. The issues and concerns that SCJ raised are the cost of the overall project, international cost sharing scheme, human resources and management and organisation structure of the project.

All these issues have to be clarified in any case. MEXT is officially requesting from the Ministry of Finance a budget of about \$0.5M as investigation budget. Although the amount is not large, it is the first official budget request for ILC. The LCC Director Lyn Evans and his team have made several travels to Japan in this year. Lyn visited Prime Minister Shinzo Abe and the Federation of Diet Members in supporting ILC to further explain the international project. In the meanwhile, in August the Kitakami granite long bedrock area was selected as the ILC site in Japan by scientists so that the LCC can start the site-dependent design of the accelerator.

The ILC project is supported by international particle physics communities. In the spring the European Strategy Group issued the final

report that was approved by the CERN Council and EC. It says that Europe looks forward to discuss a possible participation. ILC was also strongly supported in the Snowmass meetings in the United States in the summer. The discussion is also continued in the P5 process. The High Energy Physics group of Asian Committee for Future Accelerators (ACFA-HEP) also supports ILC to be hosted in Japan.

The ECFA Linear Collider Workshop was held in DESY in May, and LCWS13 was held in the University of Tokyo in November. At LCWS13 Takeo Kawamura, the chair of the Federation of Diet Members of Japan, gave a speech and concluded saying "If physicists and politicians collaborate by using each other's area of expertise, it is certain that we accelerate the realisation of the ILC project".

The LC community in Japan including political and industrial groups are all working hard to win a positive move of the Japanese Government. In the same time, it is important to push them with clear a vision of the international community. Since the ILC is a truly international project, the whole community has to possess a common vision of the science and the project. Just waiting for a fortune may not secure the positive results.

[EUROPEAN STRATEGY FOR PARTICLE PHYSICS](#) | [HEPAP](#) | [JAPAN](#) | [SCIENCE COUNCIL OF JAPAN](#) | [SITE SELECTION](#) | [TDR](#)

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AROUND THE WORLD

From DESY inForm: Under one roof

New ILC cavity laboratory opens

[Gerrit Hörentrup \(DESY\)](#) | [19 December 2013](#)



One lab: high-gradient cavities are now checked and treated in one single workshop at DESY. Image: DESY, Dirk Nölle

Cavity experts always have one goal in mind: to reach a higher gradient for the superconducting accelerator structures – in serial production. The cavity production for the X-ray laser European XFEL runs at full speed. However, the precondition for industrial production of the cavities for the International Linear Collider is to reliably obtain the intended gradient of 31.5 megavolts per metre. In fact, some of the European XFEL cavities already reach this value, but the yield of ILC-compatible cavities is still too small.

As a step to reach higher gradients, scientists at DESY have brought together under one roof all inspection and processing machines in the newly opened ILC HiGradeLab. “We will pursue two approaches in the laboratory,” said Aliaksandr Navitski from the DESY linear collider group FLA. “For one thing, we want to understand where defects occur in the cavities’ production.” For this aim, the experts use various inspection techniques, including the OBACHT inspection robot (DESY inForm 5/11) or the replica method that

produces a copy of the cavity surface. Defects, for example imperfect welding seams, obstruct the optimal diffusion of the electromagnetic field in the cavity and inhibit the optimal gradient. “If we understand where problems occur during the production process we have a better chance of eliminating them,” explained Navitski.

The other approach is to optimise existing cavities. “For this purpose, we are testing two additional methods. One of these is a local grinding and the other a polishing process called centrifugal barrel polishing,” Navitski said. The latter submits the cavities to a polishing process in a centrifuge with different polishing agents, taking up to four steps over a period of up to 40 hours. “With the close interlocking of our inspection and processing tools, we expect a major progress in reliably reaching high gradients – first of all for the industrial production of ILC cavities,” Navitski summarised. One goal has already been achieved today: the inspection tools ensure high quality of the European XFEL cavities.

This story first appeared in [DESY inForm](#).

[DESY](#) | [ILC R&D](#) | [SUPERCONDUCTING CAVITY](#)

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AROUND THE WORLD

Accelerating News: Synergies for testing Superconducting RF (SRF) cavities

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Vertical test inserts equipped with XFEL superconducting accelerator series cavities. Image: DESY

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[EUROPE](#) | [EUROPEAN XFEL](#) | [FP7](#) | [LHC UPGRADE](#) | [SUPERCONDUCTING CAVITY](#) | [SUPERCONDUCTING RF TEST FACILITY](#)

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