

# IC NEWSLINE

THE NEWSLETTER OF THE LINEAR COLLIDER COMMUNITY

## DIRECTOR'S CORNER

### Political progress

by Mike Harrison



In a few weeks and for the first time, Japanese and US politicians will sit down together, in public, with the ILC a prominent topic of debate. Though the outcome of the forum may not be immediately visible, Mike Harrison, Associate Director for the International Linear Collider in the Linear Collider Collaboration, is looking forward to the event. Many things are in motion below the surface, he says, and it's one more step on the way to the realisation of a linear collider.

## AROUND THE WORLD

### From European XFEL: First electrons accelerated in European XFEL

Major milestone for international research facility



A crucial component of the European XFEL has taken up operation: The so-called injector, the 45-metre long first part of the superconducting particle accelerator, has accelerated its first electrons to nearly the speed of light. This is the first beam ever accelerated at the European XFEL and represents a major advancement toward the completion of the facility.

The X-ray laser European XFEL is an international research facility in northern Germany that will produce ultrabright X-ray laser flashes for unprecedented studies of the nanocosmos. It consists of a 2-kilometre long superconducting linear electron accelerator, followed by a series of highly precise magnets to produce the highly brilliant X-ray laser light.

## FEATURE

### Stamp of approval



We often get requests to use the ILC logo from companies and organisations who would like to show their support for the International Linear Collider project. We have a solution: here's the new "We support the ILC" logo, ready for use wherever you please.

## CLIC experts meet at CERN



Sometimes even linear-collider experts make semi circles, especially when you have to squeeze more than 200 participants into one picture (and it's raining). The CLIC workshop was held at CERN from 18 to 22 January. Get the latest on the Compact Linear Collider Study in a future issue of LC NewsLine.

### IN THE NEWS

from *Ingeniøren*  
25 January 2016

[Japanske fysikere er snart klar til at bygge ny super-collider](#)

Over de næste fire år vil Japan tredoble ingeniørstaben på det nationale acceleratorlaboratorium for at gøre klar til LHC's afløser. Nu mangler blot pengene.

from *Iwate Nichi Nichi*  
22 January 2016

[ILC見据え国際化提言 トール米領事 羽田地区訪れ意見交換](#)

在札幌米国総領事館のジャスティン・トール領事が21日、奥州市を訪れ、ILCの建設候補地になっている北上山地（北上高地）周辺に位置する同市水沢区羽田地区の住民と意見交換した。(Justin W. Tull, Consul of the United States Consulate General in Sapporo visited Oshu city, the candidate site of the ILC on 21 January, and had a discussion with the residents of Haneda-area in Mizusawa-ward about the internationalization of the area.)

from *Physik Journal*  
20 January 2016

[Wechsel an der CERN-Spitze](#)

Fabiola Gianotti ist seit Jahresbeginn neue Generaldirektorin, neuer Forschungsdirektor ist Eckhard Elsen.

from *21 CN*  
30 December 2015

[LHC是实验粒子物理学的尽头吗](#)

如果我们能够搭建一个制造这些粒子的“工厂”，那么我们就能够以任意精度测量它们的衰变率，一些科学家提议建造的高能正负电子对撞机——国际直线对撞机ILC (International Linear Collider) 就能完成这样的任务。(If we can build a “factory” machine which produce these particles, we will be able to measure their arbitrary precision decay rate, some scientists proposed the construction of high-energy electron-positron collider – the International Linear Collider ILC will be able to complete this task.)

## ANNOUNCEMENTS

### ECFA Linear Collider Workshop: registration is open

The next ECFA Linear Collider Workshop which will be held in Santander (Spain) from 30 May to 5 June 2016. It continues the international workshops devoted to accelerator, physics and detector aspects of future high-energy electron-positron linear colliders (ILC, CLIC). The workshop is co-hosted by ECFA and LCC and will consist of accelerator sessions, several mini-workshops of detector concept and R&D groups as well as physics and plenary sessions. [Find out more about the meeting and the programme](#) or register [here](#).

## CALENDAR

### Upcoming events

[ECFA Linear Collider Workshop](#)  
Santander, Spain  
30 May- 05 June 2016

### Upcoming schools

[Joint Universities Accelerator School](#)  
Archamps, Haute Savoie, France  
11 January- 18 March 2016

[View complete calendar](#)

## PREPRINTS

### ARXIV PREPRINTS

[1601.06640](#)

Physics case of FCC-ee

[1601.06481](#)

Model independence of the measurement of the  $e^+e^- \rightarrow ZH$  cross section using  $Z \rightarrow \mu^+\mu^-$  and  $Z \rightarrow e^+e^-$  at the ILC

[1601.05746](#)

Effects of Sfermion Mixing induced by RGE in the CMSSM

[1601.05742](#)

Generalised unitarity for dimensionally regulated amplitudes within FDF

[1601.05352](#)

Study of Higgsstrahlung Cross Section and Higgs Mass Measurement Precisions with ZH ( $Z \rightarrow \mu^+\mu^-$ ) events at CEPC

[1601.05087](#)

Probing The Atomic Higgs Force

[1601.04634](#)

Loop-tree duality and quantum field theory in four dimensions

[1601.03849](#)

Precision Electroweak measurements at the FCC-ee

[1601.03696](#)

Future Collider Signatures of the Possible 750 GeV State

[1601.03657](#)

Higher-order corrections to the splitting functions from differential equations in QCD

[1601.03604](#)

The 750 GeV diphoton LHC excess and Extra Z's in Heterotic-String Derived Models

[1512.05544](#)

Direct measurement of  $\alpha_{\text{QED}}(m_Z)$  at the FCC-ee

[1503.01325](#)

Top-quark electroweak couplings at the FCC-ee

DIRECTOR'S CORNER

## Political progress

[Mike Harrison](#) | [28 January 2016](#)

*Politics is the art of looking for trouble, finding it everywhere, diagnosing it incorrectly, and applying the wrong remedies – Groucho Marx*

Notwithstanding Groucho Marx's somewhat idiosyncratic sentiments concerning the profession of politics, a project as large as the ILC will inevitably create a political test that will be every bit as challenging as the technical one. Technical progress is easily quantified. Counting the pages in the *Technical Design Report* provides a measure of this sort. Technical reviews attempt to assess the quality of the design. However political progress is a slightly more ethereal concept. Indeed one can wonder what political progress even means. Can it be measured? Not in the accepted sense of the word, that much is clear. It is too diffuse and messy, though to paraphrase an oft-used metaphor some would claim to "know it when they see it". In this context one evident sign of the burgeoning political maturity of the ILC is the meeting which will take place in Washington D.C. in a few weeks' time. It is titled the US-Japan Forum on Science Technology strategy.

The meeting will be co-hosted by our old friends of the Advanced Accelerator Association Promoting Science and Technology of Japan (AAA) and the Hudson Institute, a Washington, -D.C.-based think tank. The meeting is scheduled for two days and will conclude with a press conference featuring some of the participants.



*Last year, Japanese politicians Takeo Kawamura, Ryu Shionoya and Shunichi Suzuki visited the American Association for the Advancement of Science (AAAS) in Washington D.C., meeting with CEO Rush Holt. They have been acquaintances since Rush was in Congress. Image: AAA*

What makes this particular meeting special? After all science and technology collaboration between the US and Japan has gone on for at least fifty years. On the first day, the forum will focus on large-scale international projects based on advanced science and technology and identifies: nuclear fusion, Space activities (International Space Station), advanced accelerator technology, notably the ILC, and high-speed computing. It will cover both the research goals and the technology spin-offs. What is special is that this will be the first time to my knowledge that both Japanese and US politicians (of different persuasions) will sit down together, in public, with the ILC a prominent topic of debate. A panel discussion between both sets of politicians will be a special feature of this first-day programme.

The second day of the meeting is more focused and nuts and bolts (i.e. no politicians, just their staff members) but (among other items) it envisages a session on planning for US-Japan cooperation in the ILC project with Japan's Ministry of Education, Culture, Sports, Science and Technology (MEXT,) some U.S. Department of Energy (DOE), Office of Science and Technology Policy of White House (OSTP), Embassy and Congressional staff members and a few representatives of the science community in the same room. Again another first for the ILC project.

So what can we expect from the forum? In the near term: not much. We can anticipate a short concluding statement in the traditional fashion emphasising mutual benefits from science and technology without many specifics. Since Japan itself has not yet (finally?) decided to pursue the project there is a limit to what can be envisaged. However, it would be misleading to think that that will be all there is to it. Much like an iceberg, 90% of the activity in these kinds of get-togethers is not terribly visible but it is real nonetheless. Building a political consensus is difficult, building an international political consensus is much more difficult yet. But it must start somewhere and semi-formal gatherings such as this one provide the environment to nurture such actions. Thus what we will see is one more step on the way to the realisation of a linear collider. Hopefully Groucho's view on politics doesn't apply to all circumstances.



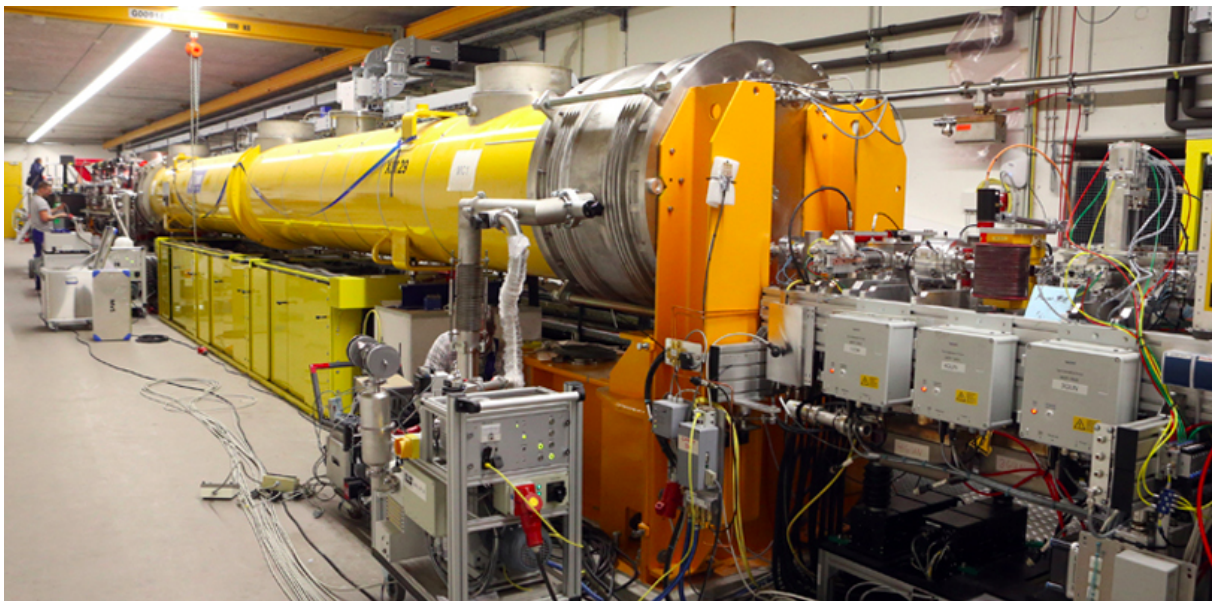
# First electrons accelerated in European XFEL

## Major milestone for international research facility

A crucial component of the European XFEL has taken up operation: The so-called injector, the 45-metre long first part of the superconducting particle accelerator, has accelerated its first electrons to nearly the speed of light. This is the first beam ever accelerated at the European XFEL and represents a major advancement toward the completion of the facility.

The X-ray laser European XFEL is an international research facility in northern Germany that will produce ultrabright X-ray laser flashes for unprecedented studies of the nanocosmos. It consists of a 2-kilometre long superconducting linear electron accelerator, followed by a series of highly precise magnets to produce the highly brilliant X-ray laser light.

The injector, which is located on the campus of the German research centre DESY in Hamburg and has been under construction since 2013, produced a series of tightly packed sets of electrons, or bunches, that passed through the 45-metre long injector beamline. The electrons made the full trip from start to end of the injector in 0.15 microseconds, achieving near light speed.



View into the injector area of European XFEL—The yellow tube is the first superconducting accelerator module.

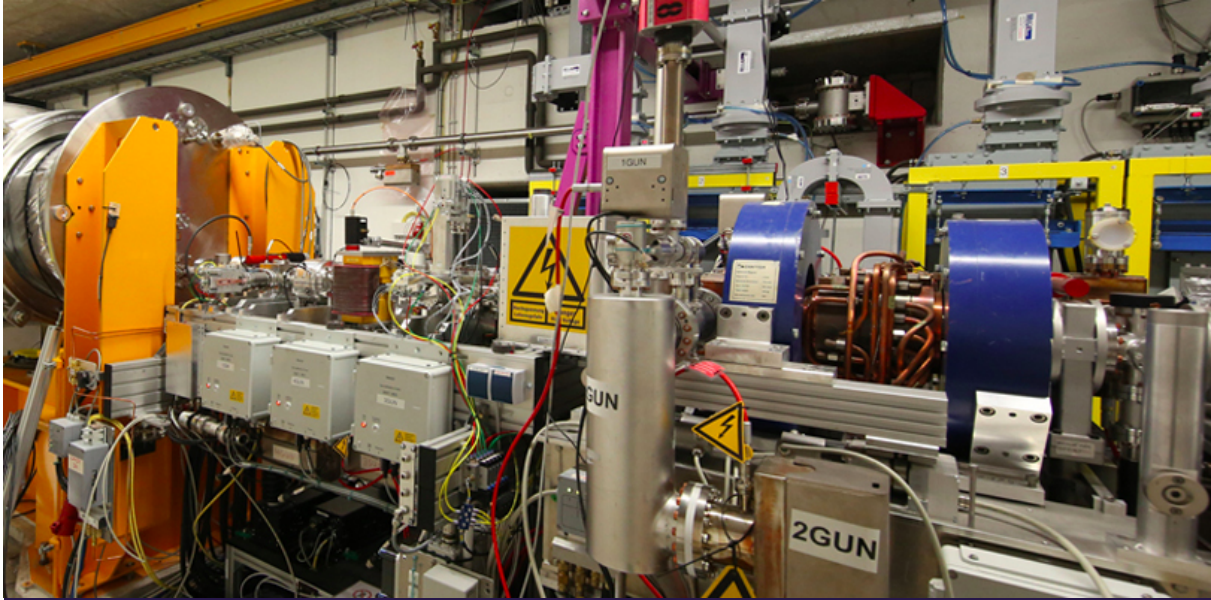
Dirk Nölle, DESY | [Click on the image to see it full size.](#)

The injector shapes the highly charged electron bunches and gives them their initial energy, which is gradually increased across a 2-kilometre long linear accelerator that is still being assembled. Once energized, the electrons will be ready to generate the facility's X-ray flashes, enabling scientists to perform studies that are expected to have large impacts on medicine, energy production and storage, materials research, and many other fields.

DESY, which is European XFEL's largest shareholder and close partner, is responsible for the construction and operation of the electron injector as well as the rest of the linear accelerator. Components for the injector were produced across Europe by the 17-institute European XFEL Accelerator Consortium, which is led by DESY. This includes work done by DESY as well as in-kind contributions from institutes in France, Italy, Poland, Russia, Spain, Sweden, and Switzerland.

"All members of the European XFEL Accelerator Consortium contributed to the

injector, and we appreciate their professionalism during design, construction, and installation,” says DESY leading scientist Hans Weise, who is coordinator for the Accelerator Consortium. “Their contributions now allow us to prepare the high-quality electron beam required for operation of the free-electron laser.”

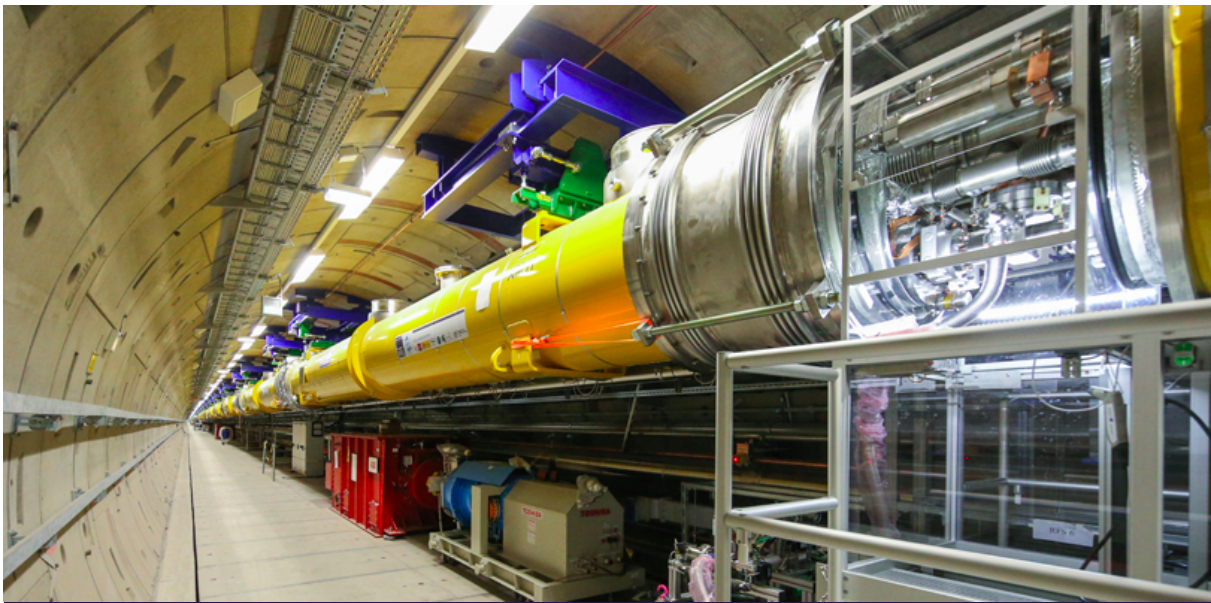


The "gun" releases the electrons and accelerates them shaped in bunches.

Dirk Nölle, DESY | [Click on the image to see it full size.](#)

The design of the injector is strongly based on the one found in DESY's X-ray free-electron laser FLASH, the prototype facility for the European XFEL that began operation as a user facility in 2005. Several billion electrons are released from an electrode of caesium telluride when it is struck by an intense ultraviolet laser flash. The electrons form a bunch which is accelerated by radio frequency and kept together by intense magnetic fields. The bunch is accelerated, first through a normal conducting cavity made of copper, then through a pair of superconducting accelerator cryomodules. The two latter devices are chilled to  $-271^{\circ}\text{C}$  by liquid helium to allow for highly efficient beam acceleration. These modules give the full electron beam the required characteristics needed for producing the X-ray flashes that will be used for researching matter at the atomic scale.

The injector will continue to go through rigorous testing while the rest of the linear accelerator is installed. The next major milestone will be accelerating electrons the for the full accelerator length to the European XFEL's Osdorfer Born site approximately 2.1 km away from the start of the injector. This is expected in late 2016, with user operation to follow in 2017.



View into the main accelerator tunnel of European XFEL, where 100 superconducting accelerator modules are being installed  
Dirk Nölle, DESY | Click on the image to see it full size.

“The first electrons in the injector mark a major milestone for this ambitious discovery machine – my congratulations go to the physicists and engineers who have constructed and installed the components with great dedication,” says Prof. Helmut Dosch, chairman of the DESY Board of Directors. “And with more than half of the superconducting modules of the main accelerator tested and installed, I am sure that the start of the commissioning of the European XFEL accelerator will follow soon.”

“I am glad to see the efforts with constructing the injector come to a successful completion, as we continue our focus on finishing the rest of the accelerator so we can provide researchers with the world’s brightest X-ray light,” says Prof. Massimo Altarelli, managing director of European XFEL. “I want to thank everyone involved in the construction and start-up of this starting point for our facility.”

High-resolution images: <https://media.xfel.eu/XFELmediabank/?l=de&c=12585>



FEATURE

## Stamp of approval

[28 January 2016](#)

The International Linear Collider has warm supporters around the world. Especially in its potential future home in the Kitakami region of northern Japan, banners, posters, flags, pennants and buntings show the region's enthusiasm for the project, from local government to corner shop. We are often asked for permission to use the ILC logo for such activities, and we have come up with a worry-free solution: a new stamp-like logo, ready for download on the [LCC images page](#).

This logo can be used on websites, business cards, banners, t-shirts, you name it. There are two versions: with a solid, ILC-logo-shaped background, which we recommend for use on backgrounds that are not white, and as text with transparent background (best on white). They come in ILC blue, ILC green and black resp. white.

Needless to say the use is not restricted to Kitakami: if you're a fan of the ILC and would like to see it built, make use of the logo! We are working on a stamp function for social media and we would be grateful if you could send us pictures or links of the logo in use!

We deeply value the interest our supporters provide that help us advance our mission. If you would like to use this new logo, please contact [communicators@linearcollider.org](mailto:communicators@linearcollider.org).

We look forward to see many supporting goods and materials you will make with these new logos!



[KITAKAMI](#) | [LOGO](#) | [SUPPORT](#)

Copyright © 2016 LCC

Printed from <http://newsline.linearcollider.org>





# NEWSLINE

THE NEWSLETTER OF THE LINEAR COLLIDER COMMUNITY

IMAGE OF THE WEEK

## CLIC experts meet at CERN

[28 January 2016](#)

Sometimes even linear-collider experts make semi circles, especially when you have to squeeze more than 200 participants into one picture (and it's raining). The CLIC workshop was held at CERN from 18 to 22 January. Get the latest on the Compact Linear Collider Study in a future issue of LC NewsLine.



*CLIC workshop participants. Image: CERN, CLIC*

[ACCELERATOR R&D](#) | [CERN](#) | [CLIC](#) | [DETECTOR R&D](#)

Copyright © 2016 LCC

Printed from <http://newsline.linearcollider.org>