

NEWSLINE

THE NEWSLETTER OF THE LINEAR COLLIDER COMMUNITY

DIRECTOR'S CORNER



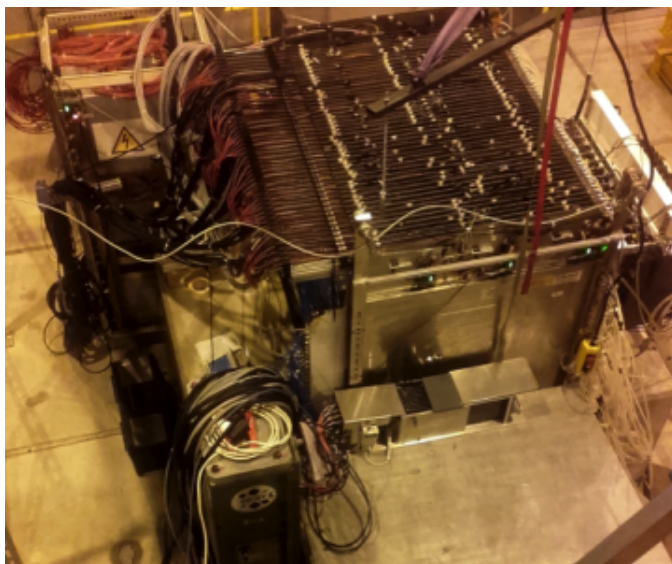
Brexit and Linear Colliders

by Philip Burrows

The British voted to leave the European Union. What does that mean for science? Phil Burrows, professor at Oxford University and acting Associate Director for the Compact Linear Collider Study in the Linear Collider Collaboration discusses the likely effects the “Brexit” will have for linear collider projects.

FEATURE

Practi-Cal

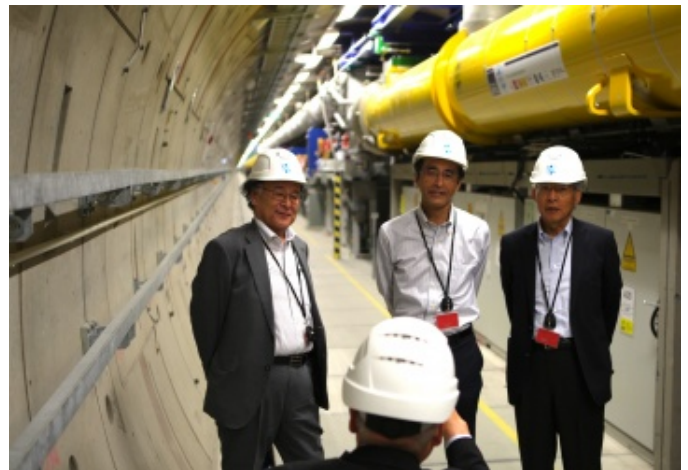


Better together: For the first time two technological prototypes of the high-granularity calorimeters for a future ILC detector tested together with particle beams at CERN in a combined mode.

AROUND THE WORLD

Tunnel visions for civil engineers

by Barbara Warmbein



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IMAGE OF THE WEEK



Higgs anniversary pizza

The anniversary of the announcement of the Higgs discovery (which happened on 4 July 2012) was hard to miss at CERN this year. People braced waiting times of more than 30 minutes to have a taste of discovery: the specially created Higgs pizza! Two shoots of asparagus (proton beams) collide in the middle of the pizza to create a Higgs boson that then decays. For carnivores, the chorizo Higgs decays into two two high-energy photons made of salami alongside some charged ham and neutral olive particles; vegetarians ate the decay of a tomato Higgs into four pepper muons.

IN THE NEWS

from *Le Temps*

5 July 2016

[Le projet AWAKE du CERN accusé d'ouvrir une porte vers l'Enfer](#)

Des adeptes religieux américains de la théorie du complot avancent que le CERN, en testant une nouvelle expérience, dérègle la météo. C'est donc l'été, moins riche en actualités, et les médias de boulevard s'en donnent à cœur joie. Le projet en question, AWAKE, est lui bien réel et testé actuellement. Et surtout révolutionnaire!

from *Kitakami Times*

30 June 2016

[Introducing the Iwate Industrial Research Institute](#)

The Iwate Industrial Research Institute(IIRI), an independent administrative agency that researches manufacturing technology for companies in the prefecture. The IIRI also offers consulting services, experiments by request, worker skills development, and rental of 3D printers and other advanced equipment. It is also a player in Iwate's plan for the ILC: the IIRC is using its research to help local companies get involved with the construction of the facility.

from *Europa Presse*

24 June 2016

[El sustituto del LHC podría ser un túnel de 44 kilómetros y lineal](#)

CLIC mediría 44 kilómetros y será una línea recta. La decisión de si construirlo o no se tomará hacia 2020 y hasta 2025 el CERN estará ocupado con el proyecto de mejora del LHC, así que el esfuerzo para desarrollar CLIC -de ser aprobado el proyecto- no empezaría hasta después de 2025. CLIC podría estar situado cerca del CERN, aunque la decisión está por tomar.

from *Ichinoseki ILC Promotion Website*

22 June 2016

[Ichinoseki Linear Collider Bulletin "ILC News" Vol. 17](#)

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Enquiries

from *Iwate Nippo*

14 June 2016

[沿岸小中学校でILC特別授業 独マイイツ大齋藤教授 \(Special ILC Talks at Coastal Elementary and Middle Schools with Professor Saito of JGU\)](#)

齋藤教授は「ILCは科学が発展する施設。岩手が科学の最先端となり、人類を救う技術が生まれるかもしれない」と訴えた。

(Professor Saito said, “The ILC is a place where science will progress. Iwate could be on the cutting edge of science, and technology that could save humanity might be developed.”)

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

CALENDAR

Upcoming events

[38th International Conference on High Energy Physics \(ICHEP2016\)](#)
Chicago, IL, USA
03- 10 August 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

Upcoming schools

[Linear Collider Physics School](#)
Frauenchiemsee, Germany
20- 27 July 2016

[View complete calendar](#)

PREPRINTS

ARXIV PREPRINTS

[1607.00202](#)
The International Linear Collider – Physics and Perspectives

[1606.08597](#)
Higgs boson form factor effects in $t\bar{t}$ production by W^-W^+ and ZZ fusion

[1606.07689](#)
Probing Higgs-radion mixing in warped models through complementary searches at the LHC and the ILC

[1606.06981](#)
Charged Higgs Boson Production at e^+e^- Colliders in the Complex MSSM: A Full One-Loop Analysis

[1606.04093](#)
Search for resonant production of high-mass photon pairs in proton-proton collisions at $\sqrt{s} = 8$ and 13 TeV

[1606.03833](#)
Search for resonances in diphoton events at $\sqrt{s}=13$ TeV with the ATLAS detector

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Brexit and Linear Colliders

Philip Burrows | [7 July 2016](#)



*What will the UK referendum mean for European science?
Image: [Designed by Freepik](#)*

By now you are probably tired of hearing about the fall-out from the outcome of the recent UK referendum in which, of the 72% of electors who voted, 52% expressed a preference for the UK to quit the European Union (EU): the "Brexit" option. But I cannot resist the opportunity afforded by this editorial to discuss ramifications of Brexit for our Linear Collider endeavours.

I am far too young to remember the veto of the UK's original application to join the 'EEC' (the old name for the EU) by the French President Charles de Gaulle in 1963. Many historians think that this notorious act laid the foundations for the difficult relationship that the UK has had with the EU for the ensuing 53 years, though history is hardly an exact science. However I do recall the eventual entry of the UK to the EEC in 1973, so I am just old enough to remember life 'outside the EU'. In fact 22 of the current 28 EU states were 'outside' before 1973, and the number of EU states has grown beyond 15 only since 2004.

The UK is a founding member of CERN, which is a separate international treaty organisation whose formation pre-dates the start of the EEC/EU by three years. So the UK's membership of, and collaboration with, [CERN](#) should be unaffected by Brexit. Interestingly, a number of EU states are not currently

members of CERN, and several non-EU states are full CERN members. Long may CERN serve as the flagship of European (and increasingly, global) collaboration in particle physics, and long may the UK be a CERN member! And of course the UK also collaborates on particle physics with many countries outside Europe, notably the USA and Japan.

UK researchers have benefitted considerably from grants won competitively from the EU via the Framework and Horizon2020 R&D funding schemes as well as from the European Research Council. Estimates are that a nett £300M is currently received per annum by the UK research community. Particle physics has been successful in this regard – my own research has benefitted from participation in the EU projects ELAN, EuroTeV, HiGRADE, EUCARD, TIARA, AIDA2020 and EJADE for support of R&D relevant to ILC and CLIC. We hope that other projects in the pipeline (RANDALF, ARIES) will be successful and benefit the LC and wider particle physics community. It remains an open question whether, if Brexit goes ahead, the UK will be able to benefit from future EU research funding. Of course Brexit supporters argue that the UK Government could better use the money that it sends to the EU (currently a nett £8.5B annually) for direct investment at home. That is certainly a logical possibility, but governments are often tempted simply not to spend the money; and there are anyway many other proposals (eg. healthcare) for how to use any 'savings'. However, non-EU states Norway and Switzerland have negotiated (and pay for) access to the EU research area, so if one is optimistic there would be a sensible path forward for the UK also.

So while there is no doubt that the UK research community is unlikely to be any better off with Brexit, there is still a vigorous, internationally collaborative UK particle physics programme that can continue, with good will and common sense, to make major contributions to our field. And that includes contributions to Linear Colliders.

[AIDA2020](#) | [BREXIT](#) | [EJADE](#) | [ELAN](#) | [EUCARD](#) | [EUROPEAN UNION](#) | [EUROTEV](#) | [TIARA](#) | [UNITED KINGDOM](#)

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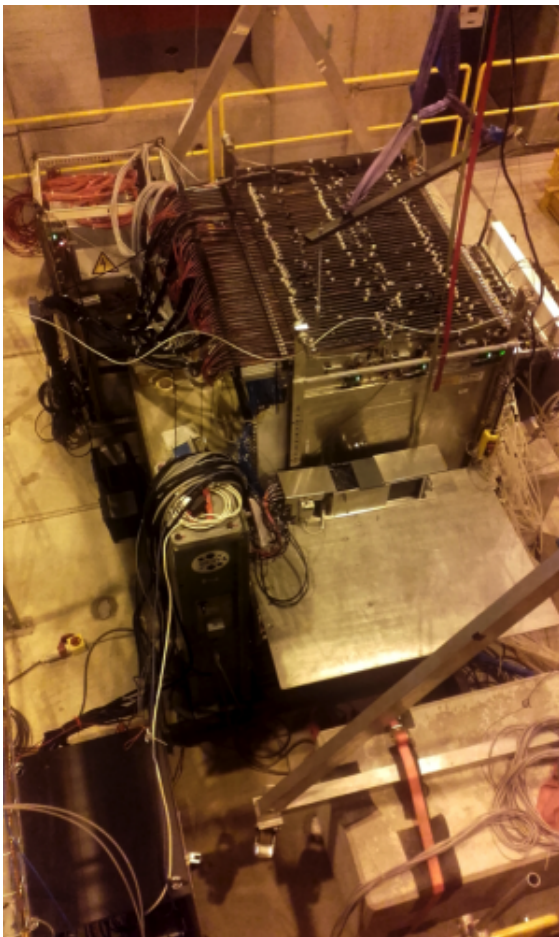
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FEATURE

Practi-Cal

7 July 2016



Testing, testing... calorimeters in the test beam at CERN.

Better together: two technological prototypes of the high-granularity calorimeters for a future ILC detector have been tested together with particle beams at CERN in a combined mode. The Semi-Digital Hadronic CALorimeter (SDHCAL) prototype with its 48 layers and the Silicon Electromagnetic CALorimeter (SiECAL) with its 10 units, both part of the CALICE collaboration, spent two weeks taking data on the “H2” beam line at CERN’s SPS. The principal goal of this beam test was to validate their combined data acquisition (DAQ) system developed by the teams working on the two calorimeters. After the fixing of a few problems that appeared during the data taking, the DAQ system ran smoothly and both prototypes took common data. This is what they will have to do in the future to register electron-positron collisions at the ILC.

Physicists and engineers from six countries participated in this beam test: Belgium, China, France, Japan, Korea and Spain. Future tests will focus on studying the common response of these two calorimeters to the different kinds of particles. “The success of this combined test will certainly encourage other detectors proposed for the tracking system (Silicon and TPC detectors) to join the adventure...,” Imad Laktineh, professor at IN2P3’s Institut de Physique Nucléaire de Lyon, who supervised the combined beam test, hopes.

More about calorimeter test beams [here](#) and [here](#).

[CALICE](#) | [CALORIMETER](#) | [CERN](#) | [DAQ](#) | [SDHCAL](#) | [SIECAL](#) | [TEST BEAM](#)

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AROUND THE WORLD

Tunnel visions for civil engineers

Barbara Warmbein | [7 July 2016](#)



On their visit to CERN and DESY, the civil engineers from Japan also visited the tunnel of the European XFEL. Image: DESY

A delegation from the Japan Society of Civil Engineers including its president took to Europe last month to have a look at civil engineering project for large science facilities. They visited CERN and DESY to look at past and current building projects, which they would use as a reference in case ILC is constructed in Japan.

The [Japan Society of Civil Engineers](#) (JSCE) is a society with more than 100 years of tradition and some 39,000 members. Its president is Noriaki Hirose, who was accompanied by four experts on from different companies whose specialities include tunnel engineering, water management and civil consulting and whose have been and are involved in many very different civil construction projects all around the world. KEK's civil engineering expert Masanobu Miyahara and KEK visiting professor Katsuji Akita, an expert on Shinkansen construction in Japan, travelled with them.

At CERN, the group visited the two major experiment facilities of the LHC, ATLAS and CMS, and at DESY they saw the tunnel and injector building of

the European XFEL as well as the tunnel of the decommissioned HERA accelerator and one of its experimental halls. "I think the visit gave them a better understanding about the similarities and differences between accelerator, railway and road tunnels," Miyahara summarises. "I expect that it's very meaningful for our coming ILC project that Japanese experts of civil engineering works understand the real state of large-scale accelerator project by this first-hand visit."

The delegation noted the consideration for environmental issues during the construction of large accelerators at both CERN and DESY. They also realized the importance of the "human environment:" I would like to express my respect to that it is an effort to build good relations with local residents," Hirose said. "We learned many things and received a lot of suggestions that should be used as a reference."

Akira Yamamoto, who welcomed the delegation at CERN together with CERN and ILC civil engineer John Osborne, said: "I was very pleased to assist their visiting CERN and DESY and to help them see real experiences of "design to realisation" from the LHC accelerator construction and the European XFEL SRF accelerator. I believe it has been a real "one look tells you more than a thousand words" experience. I would thank my colleagues at CERN and DESY for their kindest cooperation to have received them."

Miyahara adds that it transpired in discussions that the delegation saw the accelerators as the extremely sophisticated machines they are. "We talked about the fact that the interface between the civil designer and the accelerator researchers is so important above all from the plan stage."



The JSCE has been very interested in the realisation of ILC project and very closely working with KEK to integrate the ILC civil engineering study for about 10 years.

*The group also visited the CMS experiment at CERN.
Image: Akira Yamamoto*

[CERN](#) | [CIVIL ENGINEERING](#) | [DESY](#) | [EUROPEAN XFEL](#) | [JAPAN SOCIETY OF CIVIL ENGINEERS](#)

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IMAGE OF THE WEEK

Higgs anniversary pizza

7 July 2016



The anniversary of the announcement of the Higgs discovery (which happened on 4 July 2012) was hard to miss at CERN this year. People braced waiting times of more than 30 minutes to have a taste of discovery: the specially created [Higgs pizza](#) !

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You don't believe this? Below is the animation to prove it.



Would a future ILC restaurant feature a permanent buffet of cavity tree cake? We hope so. In the meantime, remember [the days when the Higgs was discovered?](#)

[CERN](#) | [HIGGS](#) | [PIZZA](#)

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