

NEWSLINE

THE NEWSLETTER OF THE LINEAR COLLIDER COMMUNITY

AROUND THE WORLD

Japanese industry getting ready for the ILC

by Rika Takahashi



Japanese businesspeople and scientists gathered in Tokyo last week to attend the general meeting of the Advanced Accelerator Association Promoting Science and Technology, which is now a general incorporated association. At this occasion, three special lectures were given Lyn Evans, Hitoshi Murayama and Sachio Komamiya from the Linear Collider Collaboration and Board. The Japanese science community will closely collaborate with the association in the future towards the realisation of the ILC.

AROUND THE WORLD

Back to the future

Technology transfer between FCC and ILC

by Barbara Warmbein



The Future Circular Collider (FCC) study, though even further in the future than the ILC, might be feeding technology back to its linear

cousin. An interactive tunnel-planning tool developed by a civil engineering design company for planning the future circular colliders in the CERN vicinity could prove to be useful for detailed planning and design optimisation of the ILC in the designated Kitakami site.

DIRECTOR'S CORNER

Return to Dubna

by Brian Foster



Russia's Joint Institute for Nuclear Research (JINR) is an international organisation with a long and wide scientific programme, embracing both nuclear and particle physics. Brian Foster, European Director in the Linear Collider Collaboration embracing both nuclear and particle physics. Brian Foster, European Director in the Linear Collider Collaboration visited the lab for the third time and met with the directorate, addressing options for exploring Russian engagement in possible future ILC construction, for which the lab has a lively interest.

VIDEO OF THE WEEK



Why we need the ILC now #mylinearcollider

by Perrine Royole-Degieux

This week we're featuring one of the 435 videos posted on the ILC Youtube channel to support the ILC project. Hasan Padamsee is a physicist at Fermilab, USA. Watch him explain why he thinks we should build the ILC now! You too can contribute by participating in the #mylinearcollider video campaign.

IN THE NEWS

from **CERN news**

9 December 2014

One LHC sector up to full energy

Target energy achieved ! On Tuesday 9 December at 2.18 p.m., a key milestone in the restart of the world's largest and most powerful particle accelerator was passed. Sector 6-7 of the Large Hadron Collider has been commissioned to a beam energy of 6.5 TeV. (...) It's at this unprecedented beam energy that the LHC will restart next spring with the aim of producing collisions with a total energy of 13 TeV.

from **Fermilab Today**

4 December 2014

Hasan Padamsee earns APS Wilson Prize

Specifically, the citation acknowledges his "leadership and pioneering world-renowned research in superconducting radio-frequency physics, materials science and technology, which contributed to remarkable advances in the capability of particle accelerators."

from **Iwate Nippo**

4 December 2014

ILC誘致「日本政府を動かして」LCCトップが東京で講演

について「日本にリーダーシップを取ってほしいと提案している。夢から現実にしたい」と述べた。(Lyn Evans said "I would like Japan to take a leadership on the ILC project. Let's bring ILC from dream to reality.")

from **The New York Times**

1 December 2014

New Images Refine View of Infant Universe

The added value of the new Planck data is a map showing how the microwaves are polarized, information that could shed light on what was going on when the universe was a trillionth of a trillionth of a trillionth of a second old, and in the grip of forces about which physicists can only speculate.

from **Iwate Nippo**

27 November 2014

県立大学長に鈴木氏 KEK機構長、ILC計画をけん引

県立大の次期学長に、機構長の鈴木厚人氏が内定したことが 日、分かった。任期は 年 月から 年間。鈴木氏は素粒子物理学の世界的権威で、本県などが誘致を目指す国際リニアコライダー 計画をけん引している。学長として大学の教育研究の発展とともに、 の誘致実現への手腕が期待される。(KEK's Director General, Atsuto Suzuki will be the next President of Iwate Prefectural University. The term of the office will be four years. He is a world expert on particle physics, and leading the ILC project. He is expected to contribute academic development of the University, and also a realisation of the ILC in Tohoku area.)

from **Iwate Nippo**

27 November 2014

集中復興期間後も力入れる 安倍首相本社インタビュー

安倍晋三首相 自民党総裁 は、 の誘致については「世界から科学者が集まってまちをつくることは日本にとっても大きなブ

ラス」とした上で、「予算面で可能かが一番のポイントになる」と財源が課題であることに言及した。(Prime Minister Shinzo Abe said about the inviting the ILC to Japan, "It is a big advantage for Japan to build a city where scientists around the world will gather." He also said that "the important point is if we can afford it.")

ANNOUNCEMENTS

LC NewsLine holiday schedule

LC NewsLine is taking a break. Our next issue will be on 8 January 2015. Happy holidays to our readers!

CALENDAR

Upcoming events

SiD Workshop

SLAC, California, USA
12- 14 January 2015

CLIC Workshop

CERN, Switzerland
26- 30 January 2015

[View complete calendar](#)

PREPRINTS

ARXIV PREPRINTS

[1412.2498](#)

Photon collimator system for the ILC Positron Source

[1412.2094](#)

Improved bounds on the dipole moments of the tau-neutrino at high-energy γe^- and $\gamma \gamma$ collisions: ILC and CLIC

[1412.0375](#)

Radiative corrections to Higgs coupling constants in two Higgs doublet models

[1412.0109](#)

Complete One-Loop Corrections to $e+e^- \rightarrow \chi \sim 01 \chi \sim 01 h0$ for Different Scenarios

[1412.0018](#)

Illuminating Dark Photons with High-Energy Colliders

[1411.7841](#)

Higgs Phenomenology of the Supersymmetric Grand Unification with the Hosotani Mechanism

[1411.7517](#)

Perspectives for Top Quark Physics at the (I)LC

[1411.7394](#)

Collider limits on leptophilic interactions

[1411.7362](#)

Higgs Boson Yukawa Form Factors from Supersymmetric Radiative Fermion Masses

[1411.7318](#)

Top pair threshold production at a linear collider with WHIZARD

NEWSLINE

THE NEWSLETTER OF THE LINEAR COLLIDER COMMUNITY

AROUND THE WORLD

Japanese industry getting ready for the ILC

Rika Takahashi | [11 December 2014](#)



*Lyn Evans giving a talk at AAA's special lecture in Tokyo.
Image: AAA*

On 3 December, about 200 Japanese businesspeople and scientists gathered in Tokyo to attend the general meeting of the Advanced Accelerator Association Promoting Science and Technology (AAA). This was the last general meeting for the AAA and also the first meeting for the newly incorporated AAA.

AAA, Japan's industry and academia collaboration, was established in 2008 as a voluntary association gathering about 100 companies, laboratories and universities. AAA has served as a forum for issues on R&D, intellectual property rights and other related areas concerning the ILC as a model project. AAA has also been actively conducting public outreach on the ILC, organising 21 ILC symposiums.

On 7 November, AAA made a fresh start as a general incorporated association.

"Now we can expand our activities and take advantage of the change of our legal status to an incorporated association," said Takashi Nishioka, chair of AAA and senior corporate adviser of Mitsubishi Heavy Industries. Nishioka will continue to carry out his role as chair of the new AAA.

After the general meeting, three special lectures were given by executives of the Linear Collider Board (LCB) and the Linear Collider Collaboration (LCC): LCC Director Lyn Evans, LCC Deputy Director Hitoshi Murayama and LCB Director Sachio Komamiya.

Sadayuki Tsuchiya, Japan's deputy minister of the Ministry of Education, Culture, Sports, Science and Technology (MEXT) gave the opening address. He acknowledged that accelerator research is a driving force for scientific progress in 21st century and will take on increasing importance in the future.

"There is the momentum towards the realisation of the ILC in Japan," he said.

In May, an expert panel was formed under MEXT to discuss whether to invite the ILC to Japan. "MEXT is conducting a comprehensive examination on various aspects of the ILC project, such as the international framework or the science merits," Tsuchiya said.

Evans explained the status of the LCC's study and effort in garnering support for the ILC's construction.

"We are working hard now to try to convince Japanese government to go ahead, they have responded in forming the committees, and we are giving these committees all the information they request in order to allow the government to make a final decision," he said. He also expressed his appreciation of Japanese government's efforts and noted the need to bring together a consortium of countries and regions in order to build the ILC.

"We did that for LHC, and so there is no reason not to do it for the ILC," he said. "So, let's bring the ILC from dream to reality."

Referring to the new AAA, Masanori Matsuoka, secretary general of AAA said, "This change of legal status allows us to reinforce our activities. Now we can accept outsourcing businesses or collect contributions. Such activities could not be managed as a voluntary association."

The Japanese science community and AAA will co-host a symposium to be held during the next global linear collider workshop, ALCW2015, an international conference to be held in Tsukuba, Japan, in April 2015. Local organisers will announce symposium details soon.

[AAA](#) | [JAPAN](#) | [MEXT](#)

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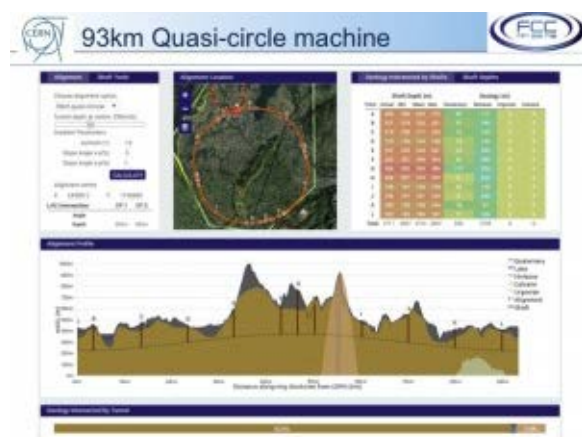
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Barbara Warmbein | [11 December 2014](#)



A screen shot of the tool developed for FCC civil engineering studies.

This tool offers a (very large) set of parameters and geological data such as soil composition, hydrography, environmental and sociological constraints and programmable risk factors data. You play with them – key in a tilt of, say, one percent or move points north or south or put the whole thing deeper underground – and the tool gives you a detailed profile of tunnels, shafts, access points and their respective location in the rock. It was commissioned by the [Future Circular Collider \(FCC\) study](#) to assess the feasibility, cost and realisation risks associated with different tunnel layouts of a large, circular collider with a perimeter in the order of 100 kilometres, be it proton-proton, electron-positron or electron-proton collider. It was developed over a few months by engineering design company [Arup](#) and it could come in handy for the ILC as well.

The tool is a so-called Building Information Modelling (BIM) tool with a web-based user interface for interactive adjustments. Before it reached its current stage, lots of data had to be fed in, with geological data coming from French

and Swiss sources, satellite imagery, topographical and street map information as well as details from geothermal drillings and environmentally sensitive areas like water reserves in a designated area some 100 kilometres around CERN. Once the moraine, molasse, limestone depths as well as of Lake Geneva were fed in, details about the different collider configurations were added.

“For FCC, we have already looked at around 20 different possible layouts for the collider, each with pre-defined shafts and injection points from LHC. When you move one thing, everything else shifts as well, and we can see at a glance whether the configuration would work or not,” explains John Osborne, civil engineer and head of the civil engineering side of [Future Accelerators Studies](#) at CERN. “A shaft with an access point on top of a mountain and the shaft going 500 metres down to the collider location is not the preferred option, for example!” Obviously, once a site deemed good by the tool is selected, a host of additional data information about the land, the underground and its use by man is needed before it can be classified as appropriate – but it’s a good first approach.

The ILC civil engineering team is now looking at adapting the tool for the linear collider. A lot of data about the geology of the possible Kitakami site already exists, though they’d have to study the compatibility of formats in detail.

The machine-detector interface and detector design groups recently suggested moving the planned interaction region (where electrons and positrons would collide) by 800 metres, which would allow vertical shafts that are easier for lowering high-tech detector equipment. That of course has consequences for the rest of the accelerator, which would have to shift by 800 metres as well. “The tool could make a scan around the shaft and tunnel points, we can give tunnels a maximum acceptable slope, and the tool lets us study different configurations for the access points,” says Osborne. It also highlights difficult areas, if for example caverns come dangerously close to rivers due to the changed layout. All ILC groups need to sit down and take a close look at the implications of any changes to the layout.

With the ILC being at a stage where R&D concentrates on site-specific designs, the tool from the circular cousin could prove to be key.

FCC Study Leader Michael Benedikt from CERN concludes: "This is a perfect example of industry and fundamental research partnership and demonstrates the many possible synergies between accelerator R&D activities worldwide."

[CIVIL ENGINEERING](#) | [FCC](#) | [ILC](#) | [LAYOUT](#) | [SITE-SPECIFIC DESIGN](#)

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DIRECTOR'S CORNER

Return to Dubna

Brian Foster | [11 December 2014](#)



Standing on accelerator history: during his recent trip to Dubna, Brian Foster also visited the Synchrophasotron.

One of the historical characteristics of particle physics is its ability to cross borders and geopolitical power blocks, irrespective of tensions and diplomatic relations. Throughout the Cold War, cordial relations existed between colleagues in the West and the East, with many Russian scientists working at CERN and some CERN scientists working at accelerators in the former Soviet Union. Indeed, this role of science in bringing peoples together was marked this year by the celebration of CERN's 60th Anniversary at the United Nations in New York, at which Linear Collider Collaboration Deputy Director Hitoshi Murayama gave one of the keynote addresses. Thus I felt entirely comfortably a few weeks ago in travelling to Dubna, 130 km northwest of Moscow, to visit colleagues for discussions about the ILC, despite the current tensions between the US, Europe and Russia.

Of course, in many respects going to the Joint Institute for Nuclear Research (JINR) is not visiting one country, but many. Like CERN, JINR is an international organisation with a large number of member states. It was founded in 1956 with eleven original members, a number which has now grown to 18. In addition there are six associated members, including Germany, Hungary, Italy and Serbia from Europe. The organisation has long had a wide scientific programme, embracing both nuclear and particle physics and has exciting new developments planned for the future, many of which I was able to see during my brief 24-hour visit.

This was my third trip to JINR; [the first was in 2006](#), when I also visited many of the other major accelerator laboratories in the Russian Federation. The entire [Global Design Effort also visited in 2008](#) for a full meeting, in which the

proposed Dubna site for the ILC was examined in detail. This included a helicopter ride along the proposed site, never to be forgotten by those who took part. Although these interesting plans for a Russian site have not so far been taken up by the appropriate political authorities, I was delighted to find that JINR still expresses a lively interest in matters relating to linear colliders in general and the ILC in particular.

My host in the morning was an old friend, Grigory Trubnikov, who is now Vice Director of JINR and in charge of the NICA – Nuclotron-based Ion Collider fAcility – project. This is an ambitious and flexible collider based on superconducting technology to study the quark-gluon plasma. It will be able to collide heavy ions in the range 4 – 11 GeV centre-of-mass energy and also produce extracted beams of protons, ions and polarised protons and deuterons. We visited the site, now cleared of the dense forest that surrounds most of Dubna and ready for the construction work to begin in earnest. I was also given a tour around the facility in which the superconducting magnets are being constructed. I was particularly interested to visit the Synchrophasotron. This weighs 36,000 tons and remarkably the iron remains intact almost 60 years after its construction. In perhaps the most remarkable example of the wisdom of “never throw anything

away, you will eventually need it", this iron will be used to shield the 660-MeV booster which will be the injector for the NICA collider. Since I was giving a lecture the following week in which I mentioned the Synchrotron as part of the history of accelerator physics – it was the last major “weak-focussing” machine – I was delighted when Grigory photographed me on top of the accelerator.

In the afternoon I was escorted by Dr Dimitry Kamanin, Head of the International Cooperation Department, to a variety of locations, including the enormous cyclotrons where many specialised commercial activities take place. In addition I was able to inspect the substantial progress in the refurbishment of the linear accelerator that I first visited in 2006 and the preparations for a new facility for the training of students from the JINR member states.



Brian Foster meeting Professor Victor Matveev, Director of JINR (nearest camera).

The main business of the visit was an hour-long discussion with the Director of JINR, Professor Victor Matveev. I summarised the current status of the ILC and the discussions going on related to a possible site in Japan. Professor Matveev reiterated the interest of JINR in continuing involvement in ILC despite the fact that the NICA project is absorbing a very substantial fraction of the Institute's resources. He saw the support of JINR for ILC in the framework of international large projects in particle physics and hoped also for growing involvement of other countries in NICA. We discussed options for exploring Russian engagement in possible future ILC construction. I was also very pleased to offer help and collaboration with the celebrations on the occasion of the 60th anniversary of JINR in 2016, for which plans are already

well advanced.

It was a great pleasure to be able to return to Dubna even though my visit was rather short. I am always impressed by the enthusiasm of the scientists, the extent of the facilities and the ambitious plans for the future. The coming 60th anniversary is indeed a major milestone in an organisation that is a long-standing and valued collaborator in ILC and has made major contributions to modern physics.

[DUBNA](#) | [GLOBAL COLLABORATION](#) | [NICA](#) | [RUSSIA](#)

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VIDEO OF THE WEEK

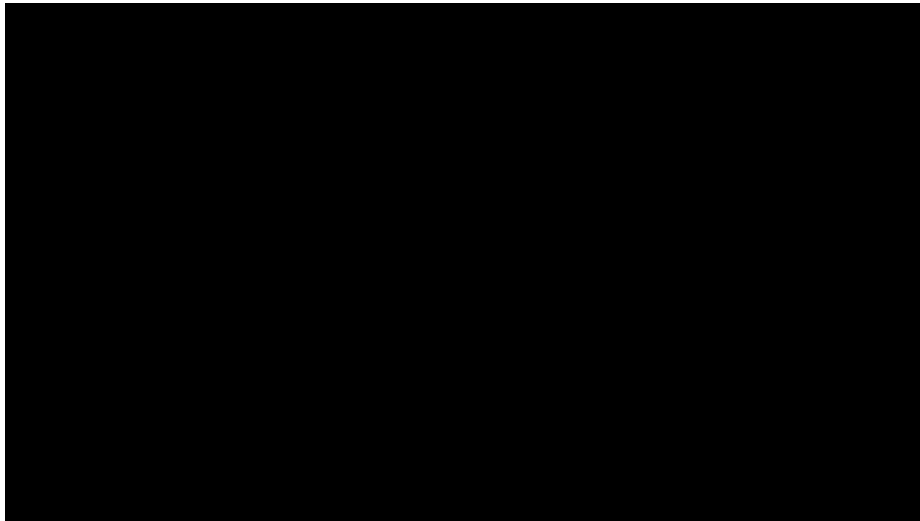
Why we need the ILC now #mylinearcollider

[Perrine Royole-Degieux](#) | [11 December 2014](#)

Hasan Padamsee is a physicist at Fermilab, USA. Watch him explain why he thinks we should build the ILC now!

The Linear Collider Collaboration is actively reaching out to its collaborators and supporters to participate in the #mylinearcollider video campaign. The series of short, informal videos ([435 posted online to date](#)) is posted on our [ILC Youtube channel](#) and will be shared with the relevant committees and organisations in Japan that are overseeing the evaluation process.

Your message really makes difference...[Participate in the #mylinearcollider video campaign](#), and ask your colleagues and friends to join, too!



[FERMILAB](#) | [MYLINEARCOLLIDER](#)

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