

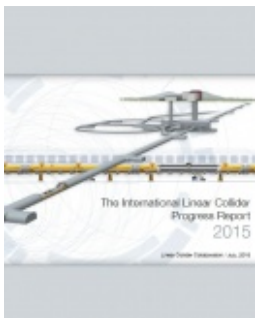
LC NEWSLINE

THE NEWSLETTER OF THE LINEAR COLLIDER COMMUNITY

FEATURE

Linear Collider Collaboration published Progress Report for the ILC

by Rika Takahashi



The ILC Progress Report is a document outlining the technical progress after the publication of the Technical Design Report (TDR) in 2013. It contains the information regarding the progress in civil engineering studies, accelerator hardware design/development updates, accelerator system layout updates, integration/test facilities to be

prepared for “hub-laboratory functioning, and updated project implementation plan, and further preparatory work.

DIRECTOR'S CORNER

Future colliders

by Harry Weerts



Frank words from the Americas Regional Director Harry Weerts: decisions about global science projects aren't taken by scientists. They are taken by politicians. The world's roadmaps for the future of particle physics may recommend a linear collider in Japan, but it also needs to find its way into the world's science budgets in order to proceed.

IMAGE OF THE WEEK



Mayor and mascot support

Live from Kitakami: the potential future host region of the ILC continues to show strong support for the project. Ichinoseki town ball boasts a new banner and an added I, and the Iwate mascots have also embraced the ILC.

IN THE NEWS

from *Kahoku Shinpo*

29 October 2015

< ILC > 宇宙の謎解明へ 設置意義を語る

「ILCによってもたらされるもの」をテーマに、高エネルギー加速器研究機構長の山内正則氏、先端加速器科学技術推進協議会大型プロジェクト研究部会長の山下了氏、日本創成会議座長の増田寛也氏の3人が講演した。(IL Symposium entitled “What ILC will bring” was held in Oshu city. Masanori Yamauchi, KEK Director general, Satoru Yamashita from the University of Tokyo, and Hiroya Masuda, Chair of Japan Policy Council gave talks.)

from *Diamond Online*

27 October 2015

東京大学が世界で劣っているものつて 結局は英語力だよね【ホリエモンの常識】

今回の受賞により、ハイパーカミオカンデやX-MASS、さらに日本に建設が予定されている国際リニアコライダーに対する世間の関心が高まり、予算が獲得しやすくなると思います。(I believe that the this year's Nobel prize will raise the interest from the public on the projects such as Hyper-Kamiokande, X-Mass, and the ILC, and it will have a positive impact for budget allocation.)

from *Iwate Nippo*

21 October 2015

北上山地、海外に発信 県が英語版広報紙

国際リニアコライダー (ILC) の北上山地 (北上高地) への誘致実現を目指す県は、英語版広報紙 THE KITAKAMI TIMES (ザ・キタカミ・タイムス) をインターネット上で創刊した。URL は <http://www.iwate-ilc.jp/eng/> (Iwate prefecture published new English web magazine for the promotion of the ILC project. <http://www.iwate-ilc.jp/eng/>)

from *Tanko Nichinichi*

18 October 2015

次世代も興味津々 ILC 誘致の意義 3氏説く (水沢でシンポ)

聴講した県立水沢高校1年の菅原志保さん(16)は「(素粒子の話は)少し難しかった。ILC実現で外国人がたくさん居住すると聞き、自分も英語を覚えなくてはいけないと思っていただけに、増田さんが『身構える必要はない』と言ってくださったのは新鮮だった」。県立前沢高校1年の鈴木脩矢君(16)は「宇宙の話とかに興味があった。可能ならILCで働いてみたい」と話していた。(Shiho Sugawara, 16, a high school student who attended the ILC symposium said “It was a little difficult to understand. I was feeling a need of mastering English skill because many foreign researchers will live around this area if the ILC becomes reality, so I was a sort of surprise to hear Mr. Masuda saying we don't need to square up.” Shuya Suzuki, 16, also a high school student said “I am interested in the study of the universe. I would like to work at the ILC if possible.”)

from *Iwate Nippo*

18 October 2015

ILC 建設計画「実現したい」 奥州で山内氏が講演

「宇宙の物理法則の研究を取りまとめ、答えを見いだすのがILCだ。誘致をぜひ実現し、宇宙の謎を解明したい」と建設の意義を強調した。(KEK's Director General Masanori Yamauchi said in the ILC symposium held in Oshu that “the ILC will bring together the research about the physics laws, and answer the mystery of the universe. I would like to realize the project to solve the mysteries.”)

from *nooz.gr*

17 October 2015

“Παγκόσμιος ο επόμενος μεγάλος επιταχυντής”

Ο τωρινός μεγάλος επιταχυντής του CERN θα έχει ζωή ακόμη 20 χρόνια και ο διάδοχός του πρέπει να αποτελεί όχι μόνο ευρωπαϊκό εγχείρημα, αλλά πραγματικά παγκόσμιο, λέει ο γενικός διευθυντής του Ευρωπαϊκού Κέντρου Πυρηνικών Ερευνών (CERN) Ρολφ-Ντίτερ Χόγιερ.

from *real.gr*

17 October 2015

Πείραμα για έναν μικρότερο και φθηνότερο διάδοχο του επιταχυντή του CERN

Σε ένα τέτοιο ενδεχόμενο, η σήραγγα του μηχανήματος δεν θα χρειάζεται να έχει μήκος παραπάνω από λίγα χιλιόμετρα, για να επιταχύνει τα σωματίδια στην ίδια περίπου ενέργεια με τον International Linear Collider, έναν επιταχυντή που έχει προταθεί για «διάδοχος» του LHC.

from *Die Welt*

16 October 2015

Absacker mit Astrophysiker

“Wissen vom Fass”: Wenn sich 30 Hamburger Wissenschaftler in Hamburger Bars tummeln, um mit den Gästen zu diskutieren

CALENDAR

Upcoming events

[International Workshop on Future Linear Colliders \(LCWS15\)](#)
Whistler, BC, Canada
02- 06 November 2015

Upcoming schools

[9th International Accelerator School for Linear Colliders](#)
Whistler, British Columbia, Canada
26 October- 06 November 2015

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

[View complete calendar](#)

PREPRINTS

ARXIV PREPRINTS

- [1510.07697](#)
Probing Higgs self-interactions in proton-proton collisions at a center-of-mass energy of 100 TeV
- [1510.07616](#)
Searching SUSY from below
- [1510.07501](#)
(Mainly) axion dark matter
- [1510.07007](#)
Inclusive Higgs Production at Large Transverse Momentum
- [1510.06753](#)
Prospects for Beyond the Standard Model Physics at the Start of the LHC13 era
- [1510.06297](#)
Phenomenology of the Georgi-Machacek model at future electron-positron colliders
- [1510.06204](#)
Prospects for Supersymmetry at the LHC & Beyond
- [1510.06065](#)
Compact Low-Voltage, High-Power, Multi-beam Klystron for ILC: Initial Test Results
- [1510.05900](#)
Monte Carlo event generation of photon-photon collisions at colliders
- [1510.05739](#)
500 GeV ILC Operating Scenarios
- [1510.05378](#)
Prospects for Higgs- and Z-resonant Neutralino Dark Matter
- [1510.05224](#)
Tau decay identification in ILD
- [1510.04859](#)
Colour Reconnection – Models and Tests
- [1510.04561](#)
Sensitivities of Prospective Future e+e- Colliders to Decoupled New Physics

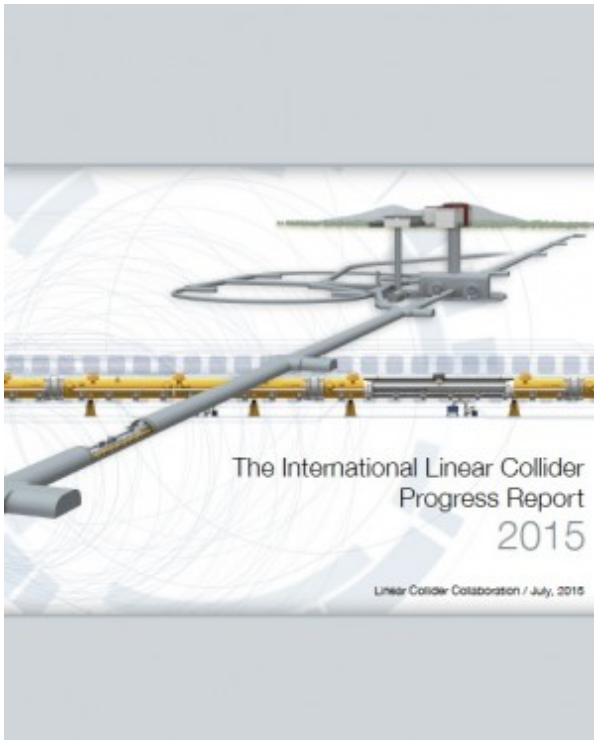
NEWSLINE

THE NEWSLETTER OF THE LINEAR COLLIDER COMMUNITY

FEATURE

Linear Collider Collaboration published Progress Report for the ILC

Rika Takahashi | [29 October 2015](#)



The Linear Collider Collaboration is pleased to announce the official release of the [International Linear Collider Progress Report](#).

The ILC Progress Report is a document outlining the technical progress after the publication of the Technical Design Report (TDR) in 2013. It contains the information regarding the progress in civil engineering studies, accelerator hardware design/development updates, accelerator system layout updates, integration/test facilities to be prepared for "hub-laboratory functioning, and updated project implementation plan, and further preparatory work.

This progress underlines the technical feasibility of the ILC, and the capability of producing the spectacular collisions to create an array of new particles that will answer some of the most fundamental questions about the nature of the universe, such as the origin of mass, dark matter, dark energy, extra dimensions and beyond.

"While we're preparing the ground for political decisions to be made, we also continue to improve the technical design and organization of the project. This report is proof of that," said Lyn Evans, LCC Director and one of the co-editor in chief of the report. This report will provide useful information as a reference document for any survey and/or evaluation on the ILC activities.

The highlights of the progress include the following:

Nano-beam technology:

The challenge of colliding nano-sized beams at the interaction point involves three distinct issues: 1) creating small emittance beams, 2) preserving the emittance during acceleration and transport, and 3) focusing the beams to nanometer before colliding them. The ATF2, the Accelerator Test Facility II at KEK, Japan is a final focus beamline which addresses the beam size issue. The goal of ATF2 is to achieve 37-nanometre (nm) vertical beam size at the interaction point, which corresponds to the 6 nm at the energy of the ILC (250 GeV/beam). ATF2 has reached a beam size of 44 nanometre (nm) at the final focus, which corresponds to 7 nm at the ILC energy.

Superconducting radio frequency technology:

For the ILC, 16000 superconducting RF cavities are required to be produced by vendors around the world. A global partnership between industry and laboratories is critical, and there has been a lot of progress.

At the European XFEL accelerator hosted at DESY, Germany, which uses the same SRF technology as the ILC, more than 90% of 800 SRF cavities have been manufactured by two European companies and tested at DESY. Also, more than 60 out of 100 cryomodules have been assembled and tested.

At the ASTA test facility at the U.S. laboratory Fermilab, a very important milestone was recently achieved. The full ILC type cryomodule was powered to the nominal gradient of 31.5 megavolt per meter, reaching the ILC specification. Another U.S laboratory, SLAC, started the Linear Coherent Light Source (LCLS) II project in consortium with the US SRF laboratories.

In Japan, KEK has completed the installation of ILC type cryomodules into the beamline, and preparation for the beam commissioning in progress.

Accelerator Design and Integration (ADI)

The Linear Collider Collaboration has been working on a post-TDR design update on the basis of assuming a model site. In this context, [a vertical access shaft to the detector hall](#) at the interaction point has been approved.

An extension of the main linac tunnel has been approved for optimising electron and positron collision timing and for providing sufficient redundancy of main linac cavity gradient integration.

LCC is continuing to seek for potential cost saving actors in balance to necessary increase.

“We are continuing to improve the ILC accelerator design with seeking for the best cost effective solutions and with keeping our scientific goal as proposed in TDR. We also anticipate to provide timely responses to various advices given by MEXT ILC Advisory Panel in Japan.” said Akira Yamamoto, another editor in chief of the report.

“We will make our best effort for further optimization of the ILC design, such as the ILC main-linac cross section, positron source redundancy, cryogenics layout, and the accelerator design parameter finalization, and for possible immediate start of the project once when ‘Green Signal’ will be given”, he said.

[ACCELERATOR R&D](#) | [ATF2](#) | [CAVITY GRADIENT](#) | [TDR](#) | [XFEL](#)

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NEWSLINE

THE NEWSLETTER OF THE LINEAR COLLIDER COMMUNITY

DIRECTOR'S CORNER

Future colliders

Harry Weerts | [29 October 2015](#)



Artist's impression of the proposed CEPC Image:
IHEP

This LC newsletter is a rather personal one for me and inspired by my experiences over the last decade and especially the last year or so. I have been and am a member of the Linear Collider Collaboration (LCC), have worked on ILC for the last ten years, have contributed to the CLIC Physics & Detector CDR and was one of its editors, am a member of the International Advisory Committee for the CEPC in China and last but not least have a day job, where I am responsible for the Physical Sciences and Engineering directorate at Argonne National Laboratory, which forces me to look at our field of particle physics in a broader physics perspective (still only physics). The opinions expressed here are my own, they are flavoured by my background and not everybody will agree with them.

Over the last few years the regions of the world have produced strategic roadmaps for Europe and the United States. There is no official roadmap for Asia, but there are ambitions in Japan to build the ILC and the Chinese

particle physics community is putting forward a proposal for a circular e+e- collider with an energy of about 240GeV in the center of mass, possibly followed by a proton-proton collider in the same tunnel. CERN has formed a study to look at Future Circular Colliders (FCC), one of which is a ~100TeV proton-proton collider. For the sake of simplicity I will call the possible Chinese proton-proton (CppC) machine also a “~100TeV class machine”, although its energy will most likely be less, but still several times above the current LHC energy of 14TeV. I will call such proton-proton colliders, which for now are FCC and CppC, “LHCx5” machines.

The strategic roadmaps in Europe and the US can be divided into two parts: one is the part that can and will be realised from HEP budgets available over the next 10 years or so and include the upgrades to the LHC and the LBNF/DUNE at Fermilab in the US. There are agreements either existing or being put in place to execute this programme, and there is close collaboration between CERN and Fermilab to do this. So this will happen. The other part of all strategic roadmaps (now including EU, US and Japan) encourage the realisation of the ILC in Japan as the next energy frontier machine, and as a natural follow-up to the LHC. However, there is one crucial difference: the realisation of the ILC is not in any of the HEP budgets in the world and substantial additional funds will be needed to construct it. The ILC has also been and is a global effort and supposed to be a global machine. However, what emerged in the last few years is that Japan will be the host, if it happens, and that the world expects Japan to make the first step. It is global, but hosted locally in Japan.

This is currently a point of contention in the sense that the world is waiting for Japan to make the first move and Japan is waiting for the world to say: “Let’s do it”. This is slightly different for the other potential energy frontier machines, which, although global, originate from a local host. One can write many pages of differences between the possible future energy frontier machines, but for my arguments I will keep it rather simple: they are all virtual, they are at different stages of readiness for construction, they all will require a host country (if you count Europe as a country) to make a decision whether to go forward. The host “country” will have to make a large investment and then high-level negotiations (not involving particle physicists) will be required with other partner countries about contributions and many other items.

It is this last part which is very different and has never been done for a truly global particle physics machine. All the potential future colliders (ILC, CLIC, CEPC, LHCx5) will have to go through this high-level political process, not involving particle physicists. The budgets required for all these machines make this necessary. Even though the ILC is still being considered by the Japanese government, there have been visits by members of the Japanese Diet to Washington to pave the way for future working groups between the Japanese Diet and US Congress and between the Department of Energy and MEXT. Concretely the [Advanced Accelerator Association Promoting Science and Technology AAA in Japan](#) has teamed up with the Hudson Institute in the US to identify ways to insert the ILC discussions into discussions about technology exchange between the two countries. This approach is necessary because of size of the budget involved and it is not something that we in HEP are familiar with. Basically the Hudson Institute have told us: “ We will take it from here and will contact you when we need you.”

It is the cost of future colliders that drives all this additional work,. Although budget estimates for all potential future colliders exist, they are not always public and in some cases (like China) the argument is made that it is cheaper. I have found it useful to use as a measure of relative cost in a country or region, not a currency, but facilities that are constructed for other sciences, e.g. a light source. On paper, a light source is substantially cheaper to build in China than the US for example. Advanced countries seem willing to build a light source on their own, so it is interesting to express future colliders in units of light sources (LS). In the US a light source costs about \$1B. When the ILC cost estimate was converted to US accounting in 2008, it came out to about 15 LS. It was immediately concluded that this was not possible and it ended any discussion about such a machine in the US. Several years before the P5 roadmap in the US, LBNE tried to suggest a project which was about 1.5 LS, and the feedback was: reduce to less than 1 LS. Looking at the ILC and for example CEPC, they are about 10-15 LS in each of those countries. Looking at it that way, indicates the size of the budget that HEP is asking for a future facility compared to other sciences and a light source has users from many different fields, not just physics.

In summary a future potential energy frontier collider for HEP will require a strong science case (which I have assumed here exists), a strong local host, be global and because of the size of the budget will require high-level political negotiations between countries, where “our future collider” is a small piece of a larger agreement or framework between countries. Decisions may be made for reasons that have nothing to do with science.

[AAA](#) | [CEPC](#) | [CPPC](#) | [EUROPEAN STRATEGY FOR PARTICLE PHYSICS](#) | [P5](#) | [SCIENCE POLICY](#)

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NEWSLINE

THE NEWSLETTER OF THE LINEAR COLLIDER COMMUNITY

IMAGE OF THE WEEK

Mayor and mascot support

29 October 2015



Live from Kitakami: the potential future host region of the ILC continues to show strong support for the project – we present two recent examples.

Ichinoseki City in the Tohoku region of Japan has made a new ILC banner for its city office. This photo is of Mayor Osamu Katsube with staff from the ILC Promotion Division, up on the roof from which the banner will be hung down the front wall of the building. The new colorful banner features an image of the ILC tunnel, “Let’s bring the ILC to Tohoku” and a similar message in Japanese, and on the left is Ichinoseki’s ILC logo, which has had a fourth “I” – for Innovation – added to it.



And one of the mascots of Iwate Prefecture is collaborating with the ILC this year! Many local governments create mascots to increase name recognition and thus promote tourism, and are a very popular PR technique in Japan. Usually, local animals or specialty products are used as a motif for the character. For Iwate, there are five mascots called Wanko Kyodai, the bowl brothers and sisters, inspired by traditional lacquerware, a specialty of Iwate.

Wanko means bowl, and Kyodai means brothers and sisters. Sobacchi is the one presenting the ILC. And yes, Sobacchi has brothers: Kokucchi, Tofucchi, Omocchi, and Unicchi. Their names come from the type of Iwate food inside of their bowls: Soba: buckwheat noodle, Koku: mixed grains, Tofu: tofu (soy bean curd), Mochi: rice cake, and Uni: sea urchin.

“The ILC is a bit difficult for many people to get into. To make the ILC more approachable and fun, we created this ILC Sobacchi character,” explained Takashi Harako from Iwate Prefecture International Linear Collider Promotion Council. The council is planning to produce promotional goods and brochures using the ILC-themed Sobacchi.

[ICHINOSEKI](#) | [ILC SITE](#) | [IWATE](#) | [KITAKAMI](#) | [SUPPORT](#) | [TOHOKU](#)

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