

DIRECTOR'S CORNER

TDR review season is underway

by Barry Barish



The draft of the ILC Technical Design Report (TDR) was completed last November and submitted for review. On 13 and 14 December, the TDR underwent a technical review at KEK by an augmented ILCSC Program Advisory Committee. The review report endorses the technical design we have presented and recommends “no changes in the TDR.” The report does identify areas and items to address in the future.

RESEARCH DIRECTOR'S REPORT

From the Letters of Intent to the ILC Technical Design Report

by Sakue Yamada



In his last column in *ILC NewsLine*, Sakue Yamada, ILC Research director, acknowledges the tremendous collaborative effort which has made possible the accomplishment of the Physics and Detectors volumes of the ILC Technical Design Report.

AROUND THE WORLD

Shin-ichi Kurokawa awarded Chinese top prize

by Qian Pan

Shin-ichi Kurokawa, world-famous Japanese particle accelerator expert and promoter of the ILC, has made great efforts in promoting the personnel exchanges and cooperative researches between Japan and China. Last month, he received a third award in China, the International Science and Technology Cooperation Award, in recognition of his great contribution and dedication to China's accelerator science development.





Japanese science minister mentions ILC in press conference

by Rika Takahashi

On Friday, 18 January, Hakubun Shimomura, Japan's Minister of MEXT (Ministry of Education, Culture, Sports, Science and Technology), the funding agency for Japan's high-energy physics programme, stated Japan's intention to invite the ILC in the regular press conference after the cabinet meeting, responding to a question

from the press about the government's standpoint to the ILC project.

IN THE NEWS

from **NHK**

6 February 2013

ヒッグス粒子を超えろ 日本の巨大加速器計画

日本が新たな「科学技術立国」を目指す契機になるのか、計画の全容と、誘致活動の現状に迫る。(Will the ILC be the opportunity for Japan to become true scientific and technological powerhouse? Introducing the ILC project and the activities to invite it to Japan)

from **Iwate Nippo**

5 February 2013

岩手大、ILC推進会議設置へ 技術協力、ソフト面も

岩手大 藤井克己学長 は、本県の北上山地 北上高地 に誘致を目指す超大型加速器・国際リニアコライダー 計画の支援に向け、学内に「岩手大学 推進会議」を設置する。(Iwate University will set up a body to support the activities to promote ILC project)

from **Mainichi Shinbun**

5 February 2013

国際リニアコライダー:夢の施設、九州誘致へ産官学連携

宇宙誕生の謎に迫る素粒子分野の国際研究施設「国際リニアコライダー」を福岡、佐賀両県にまたがる脊振 せふり 山地に誘致しようと、両県と九州の経済団体、九州大などが推進協議会を今年度内にも設立する計画が分かった。(Saga, and Fukuoka prefectures, economic groups in Kyushu area and Kyushu University will set up a new association aiming for inviting the ILC to Sehuri mountain.)

from **Kahoku Shinpo**

2 Feb 2013

東北大と岩手県が断層調査へ 候補地・北上山地

超大型の線形加速器「国際リニアコライダー」の誘致を目指し、東北大と岩手県が 月、国内候補地の一つとなっている岩手県南部の北上山地で、活断層の有無を確かめる調査を実施することが 日、分かった。(Tohoku University and Iwate prefecture will start the investigation on active fault around Kitakami area, one of the ILC candidate sites)

from **Symmetry Magazine**

1 February 2013

Priorities in particle physics

Other high priorities include R&D for future accelerators, possible participation in the proposed International Linear Collider, which may be built in Japan, and a neutrino research program that includes local experiments and participation in projects in the United States or Japan.

from **Phys.org**
23 January 2013

[Scientists analyse global Twitter gossip around Higgs boson discovery](#)

For the first time scientists have been able to analyse the dynamics of social media on a global scale before, during and after the announcement of a major scientific discovery.

from **Frankfurter Allgemeine Zeitung Blog**
23 January 2013

[Teilchenbeschleuniger – wie geht's weiter?](#)

Während sich das Design für den ILC in einem technisch bereits fortgeschrittenen Stadium befindet und im Prinzip schon bald realisiert werden könnte, ist zur Ausarbeitung der CLIC Technologie, die am Cern stattfindet, noch einiges an Entwicklung notwendig.

CALENDAR

UPCOMING EVENTS

[Calorimetry for the High Energy Frontier \(CHEF2013\)](#)

Paris, France

22- 25 April 2013

[Les Rencontres de Physique de la Vallée d'Aoste \(La Thuile 2013\)](#)

La Thuile, Italy

24 February- 04 March 2013

UPCOMING SCHOOLS

[Joint Universities Accelerator School \(JUAS 2013\)](#)

Archamps, France

07 January- 15 March 2013

[CERN - Latin-American School of High-Energy Physics](#)

Arequipa, Peru

06- 19 March 2013

[Excellence in Detectors and Instrumentation Technologies \(EDIT 2013\)](#)

KEK, Japan

12- 22 March 2013

[CERN Accelerator School: Course on Superconductivity for Accelerators](#)

Erice, Sicily, Italy

24 April- 04 May 2013

[View complete calendar](#)

ANNOUNCEMENTS

You can still sign the ILC Detailed Baseline Design report

The signature campaign will end on 15 February. Please note that signing the DBD does not indicate any formal commitment by you. It does not indicate commitment to the specific detector designs presented, nor exclusive support for ILC over other collider programmes.

[Read the invitation letter](#)

[Sign the DBD report](#)

Goodbye **ILC NewsLine**, hello **LC NewsLine**!

Dear readers,

This is the last issue of *ILC NewsLine*. We have enjoyed bringing you news from the technical, political and human developments of the big science adventure that is the International Linear Collider for the last (nearly) eight years. We hope you enjoyed reading about it all. However, there is no need to cancel your subscription and look for a new Thursday read: on Thursday 21 February we'll publish the first issue of *LC NewsLine*. With the change of organisation from GDE to Linear Collider Collaboration, LC NewsLine will cover news and developments from both the ILC and CLIC, continue to update you on progress in detector R&D and provide you with views from the managements in Director's Corners. See you in two weeks in *LC NewsLine*!

The NewsLine team

PREPRINTS

ARXIV PREPRINTS

[1302.0485](#)

Measuring Forward-Backward Asymmetry of $t\bar{t}$ and $b\bar{b}$ at Electron-Positron Colliders

[1301.7731](#)

Test Results of Tesla-Style Cryomodules at Fermilab

[1301.7605](#)

Burgeoning the Higgs mass to 125 GeV through messenger-matter interactions in GMSB models

[1301.7088](#)

CPT analysis with top physics

[1301.6995](#)

Status and Plans for a Superconducting RF Accelerator Test Facility at Fermilab

[1301.6002](#)

Neutrino textures and charged lepton flavour violation in light of θ_{13} , MEG and LHC data

[1301.5619](#)

Mechanical Design of a High Energy Beam Absorber for the Advanced Superconducting Test Accelerator (ASTA) at Fermilab

[1301.5561](#)

Cavity beam position monitor system for the Accelerator Test Facility 2

DIRECTOR'S CORNER

TDR review season is underway

Barry Barish | 7 February 2013



Committee members Hans Weise, DESY, and John Seeman, SLAC, watching the presentations

The final deliverable for the Global Design Effort (GDE) is the *Technical Design Report* (TDR) for the ILC. We completed a draft TDR last November and submitted it for review. The accelerator volumes of the TDR consist of one volume on the R&D programme accomplishments and future programme and a second volume on the ILC design we have developed. The TDR design began from the *Reference Design Report* (RDR) and made changes optimising it for cost, performance and risk. The TDR and Detector Baseline Design (DBD) underwent a technical review on 13 and 14 December at KEK by the ILCSC Programme Advisory Committee (PAC) augmented by some additional technical experts. The main conclusion of the review was to endorse the technical design we have presented in the TDR. They recommend “no changes in the TDR.” They do identify items to be addressed in the future.

We are very pleased with the outcome of the TDR technical review, as it represents a major step towards finalising the TDR that is scheduled to be submitted to ICFA in June. The PAC comments and recommendations will be helpful in setting out the ongoing programme

for the next phase of the ILC, hopefully leading to a construction project.

The [PAC report](#) summarises our TDR presentations and makes the following set of recommendations:

1. *The PAC was very impressed by the GDE presentations to the Committee, and supports the TDR. What follows are recommendations by the Committee on items that need to be addressed in the future; however, the PAC recommends no changes to the TDR.*
2. *The lack of progress towards the 37 nm ATF2 IP goal is a concern. Several issues have already been resolved, and the currently scheduled modifications should lead to significant progress towards the goal.*
3. *Sufficient progress has been made on SCRF that the TDR sections on cavity gradient can be defended. The desired gradient is well within reach, and several manufactures have been validated. XFEL industrialization will give valuable information.*
4. *The Japanese power coupler appears to be a good design, and should be pursued further to be adaptable to the TESLA-type cavity (having the smaller cold-end interface flange).*
5. *It would be valuable to obtain more operational statistics on the Marx modulator.*
6. *The Klystron Cluster Scheme (KCS) appears to solve several important problems, but several issues remain currently open:*
 - A. *More test time of the system is needed*
 - B. *It is not clear how well the current LLRF system will operate with KCS*
 - C. *Can the system be aligned well enough that no other modes are excited?*
 - D. *The effects of a fault in the power line should be studied further to ensure that no damage will be caused by the high power levels involved.*
 - E. *A coupler breakdown in KCS could lead to availability issues.*
 - F. *It is not clear how precise adjustment of the coaxial tap-offs (CTOs) can be achieved and maintained at high power operation to ensure the right coupling ratio and matching.*

7. *More evaluation is needed of cavity tuner designs.*
8. *Alternate cavity designs producing higher gradients could be valuable for future upgrades, but the current design is appropriate for a linear collider proposal.*
9. *Are there any advantages to having a 1.9 K liquid helium system?*
10. *More R&D appears to be needed on the positron source:*
 - A. *A technical design of the rotating target should be established; it has to be compatible with ultra-high vacuum; enable fast rotation; and be robust to radiation damage.*
 - B. *The flux concentrator as a matching device should be demonstrated*
 - C. *A realistic scenario of installation and path-length adjustment for positron operation should be established.*
11. *The overall ILC cost was reduced a few years ago by shortening the damping ring from 6 km to 3 km. To keep the luminosity constant the beam sizes etc. at the IP were reduced. Thus, tolerances in several parts of the system became tighter. The recommendation is to complete a new overall tolerance study.*
12. *The IDAG presentation to the PAC meeting summarizes the recommendations on the ILC detectors, with an additional PAC comment below.*
13. *The two ILC detector designs have different L*s (distance to the IP from 1st quad). These were requested by the detector groups. If these two L*s were made the same, the retuning time between push-pull detector set-ups could be made shorter.*



Detector reviewers Michel Davier (IDAG chair) and Paul Grannis

The recommendations for the most part presents a set of recommendations that will help guide future work, but item 2 represents an important unfinished GDE task. The only major R&D goal we set out early for the GDE that has not been achieved is to demonstrate a 37-nm vertical beam size on the ATF-2, which is essentially equivalent to the ILC goal. The earthquake in Japan set this work back by about one year. Notably, ATF-2 achieved promising results soon after the PAC review. Nevertheless, our plan is to perform a GDE review of ATF-2 in April to assess achievements to date and a future plan that will demonstrate ILC goals. I will report on that review and plans for ATF-2 later this spring.

The ILC Detector Baseline Design (DBD) was also reviewed at this review. In parallel with development of the TDR over recent years, the detector designs have also been developed since the RDR. This DBD has been developed under the guidance of IDAG, a special review committee chaired by Michel Davier and reporting to the Research Director, Sakue Yamada. Since the PAC consists mostly of accelerator experts, the DBD review relied on the IDAG report. The general assessment of IDAG of the DBD made the following points:

- *The ILC physics case has been strongly documented*
- *The 125 GeV boson gives a solid boost for an accelerator beyond the LHC*
- *The two validated detector concepts have demonstrated that the physics goals can be met*
- *The physics processes studied cover the full range of ILC operation from 250 GeV to 1 TeV*
- *A vigorous R&D program has validated the detector subsystem solutions*
- *Detector R&D should continue*
- *The detector designs have met the challenge of ILC physics*
- *Many results rely on particle flow, which drives much of the detector designs*

Davier noted that DBD editing is still needed; benchmarking still needs to be crosschecked; and more work is still needed on ILDC costing. He wondered whether there were any remaining risks to achieving the desired performance, such as power pulsing (which has yet to be tested on prototypes), and also the large solenoids, which have features beyond those of any existing detector solenoids.

An intense few days of technical review were followed by a special event in Tokyo commemorating our completion and submission of the draft TDR. The morning session had presentations on "Progress of Particle Physics and International Linear Collider" by Sachio Komamiya (University of Tokyo) and a talk on "From LHC to Linear Collider" by Lyn Evans (Imperial College, London) for a

general audience. Then, in the afternoon, was a special session for invited members of the press, which consisted of talks by Sakue Yamada and myself, a draft TDR presentation ceremony, and a special panel discussion moderated by Hitoshi Murayama. Finally, there was a lively question and answer period with the press. The interest in the Linear Collider continues to increase and the possibility of it being sited in Japan has captured much attention beyond the high energy physics community.

The next stop on our busy winter TDR review schedule will be an International Cost Review, chaired by Norbert Holtkamp, and carried out in London in February. We have worked very hard to prepare for this next review and I will report on the outcome in a coming Director's Corner.



Panel Discussion at the TDR Draft handover ceremony in Tokyo. From the left: Atsuto Suzuki, Barry Barish, Sakue Yamada and Jon Bagger.

[ATF2](#) | [COST REVIEW](#) | [DETECTOR R&D](#) | [PAC](#) | [REVIEW](#) | [TECHNICAL DESIGN REPORT](#)

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RESEARCH DIRECTOR'S REPORT

From the Letters of Intent to the ILC Technical Design Report

Sakue Yamada | 7 February 2013

The Letter-of-Intent (LOI) period of the physics and detector activity of the ILC is coming close to completion. The achievements of the R&D studies during the period have been summarised in the detailed baseline design report (DBD), which will soon be submitted to ILCSC as part of the ILC's *Technical Design Report*. It is being polished after the review by the Programme Advisory Committee (PAC) of last December and will be published together with the other TDR volumes. Then our mandate will also be completed.



A historical picture: the International Detector Advisory Group IDAG at its first meeting in Warsaw in 2008. Image: Perrine Royole-Degieux.

This period started with the call for Letters of Intent of ILCSC in 2007 – as you can read in my [very first RD Report](#) in 2007. It aimed to produce two realistic detector designs which would enable us to pursue the physics at the ILC and to facilitate the settling of the machine-detector interface matters. In summer 2009, two detector groups, ILD and SiD, were validated. These groups consolidated the worldwide efforts of various advanced detector studies and software developments, and integrated them along their concepts in harmonised detector designs. While they had different guidelines for optimisation, each group reached the expected goal of the physics potential. They verified the feasibility of the components and demonstrated the detector performance with realistic simulations of benchmarks. The details of all these R&D studies are presented in the report. The physics volume investigates the physics possibilities of ILC project as a whole, and the detector volume illustrates the capability of the detectors in pursuing them. See the [previous RD Report](#) for more details.

The management team for the LOI process oriented the global efforts to this goal. It also facilitated necessary communications among the related groups. However, it did not provide any resources to conduct R&D activities. All the participating groups which submitted the LOIs had to secure their resources for R&D by themselves. The final report is a result of tremendous efforts not only for scientific programmes but also for the resources. The management relied fully on the willingness of the participating groups and individuals for all these efforts. While each of them was also for the future of the community, it was not trivial to keep the activity going for many years and through difficult moments. The management team is really grateful to all of the participating members for their persistent efforts.

We were helped much by the International Detector Advisory Group (IDAG) chaired by Michel Davier through the entire period with their valuable advice. IDAG provided rigorous evaluation for the validation of the LOIs, and after the validation IDAG kept monitoring the whole physics and detector activities towards the goal. Also on the DBD we received much detailed and productive advice from its planning stage, through drafting until its final form. The IDAG members were experienced physicists mostly from outside of the ILC community and busy with their own works. We often handed vast amounts of material to be evaluated in a short period. We heartily appreciated the given advice on them, which addressed all kinds of key points under such tight schedules.

Of course the close communication and cooperation with the accelerator people, in particular with the Global Design Effort (GDE), was indispensable for us to fulfill our mandate. In particular, all the infrastructures prepared by GDE, like the ILC website and the meeting tool, could be used by us, too, and this enabled us to communicate smoothly and to keep records with the assistance of the expert, Maura Barone. I wish to thank Barry Barish for this generous arrangement. Besides the standing communication channel for the Machine Detector Interface issues, there were intense discussions e.g. on the accelerator parameters of the [straw man baseline 2009](#) (SB2009). All of these went fine after all. But often our inertia was large to react quickly due to the

size and the diversity of the community. We were assisted by the patience of the accelerator people in such cases.

Since it is the last time for me to write in *ILC Newslines*, I wish to thank my close colleagues in the physics and detector management. The help and cooperation of the Regional Contacts, Jim Brau of America, Francois Richard and later Juan Fuster of Europe and Hitoshi Yamamoto of Asia, were essentially crucial for me to carry out the given task. Actually I could not have even started without them. The members of the Physics and Experiment Board made many decisions and all the members of the common task groups and other working groups did a lot of practical works, and their contributions all together indeed pushed the activity forward to this point, which I appreciate very much.

At the very end but not the least, the support of the communicators, which was professional and filled the gap we made in various occasions, has always been acknowledged.

The final report marks a clear milestone to show that the community has passed the basic design phase, and is ready to go forward to the next phase of advanced design, which envisages construction and include more engineering studies. Soon the next organisation will start to bring the project ahead. The present management team will stay for a while to make a smooth transition. I wish the new organisation steady progress towards the realisation of the ILC and promote the physics and detector activities as the community envisages.

[DETECTOR R&D](#) | [GDE](#) | [IDAG](#) | [LETTER OF INTENT](#)

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AROUND THE WORLD

Shin-ichi Kurokawa awarded Chinese top prize

Qian Pan | 7 February 2013

Chinese government announced that Shin-ichi Kurokawa, professor emeritus at KEK, Japan, and vice president of Cosylab, was given the International Science and Technology Cooperation Award of the People's Republic of China on 18 January 2013.



State Councillor Liu Yandong meets with Shin-ichi Kurokawa (image by Qiu Huasheng, CAS)

After receiving the Award for International Scientific Cooperation of Chinese Academy of Sciences in 2011 and the Friendship Award of China in 2012, Kurokawa has now received the International Science and Technology Cooperation Award of the People's Republic of China, in recognition of his great contribution and dedication to China's accelerator science development.

The International Science and Technology Cooperation Award of the People's Republic of China was formally set up by the State Council in 1994. According to the *Regulations on State Science and Technology Awards*, this prize shall be conferred on foreigners or foreign organisations that have made important contribution to China's science and technology undertaking and development. This award shall be conferred on no more than ten individuals or organisations each year.

This year five foreign scientists from four countries have received the award: one from Japan, two from the US, one from Denmark, and one from Canada.

Kurokawa also worked for the promotion of the ILC. He chaired the Asian Committee for Future Accelerators (ACFA) in 2004-2006, the International Linear Collider Steering committee (ILCSC) in 2005-2007, and the Asian Linear Collider Steering Committee (ALCSC) from 2007-2010.

"It is really a great pleasure for me to hear Professor Kurokawa's winning the national top prize of the International Science and Technology Cooperation both as his friend and his successor of Asian Linear Collider Steering Committee Chair. The prize is not only for the achievement certainly, but also for the winner's great spirit for the good of humankind and peace in general, which are the true values of Science and Technology development," said Gao Jie, member of the future Linear Collider Board, chair of the Asian Linear Collider Steering Committee and chief scientist of the ILC group at IHEP in Beijing, China.

Born in June 1945, Shin-ichi Kurokawa is a world-famous particle accelerator expert. He has chaired several international committees on accelerator science and also received the Rolf Widerøe Prize in 2011, the top international award in the field of particle accelerators. He has initiated the collaboration between Japan Society for the promotion of Science and the Chinese Academy of Sciences in the field of particle accelerators and served as the coordinator for the Japanese side. He has made great efforts in promoting the personnel exchanges and cooperative researches between two countries.

Since the 1980s, he has made more than 60 visits to China to actively promote collaboration with the Institute of High Energy Physics, the Shanghai Institute of Applied Physics, Tsinghua University, Peking University, University of Science and Technology of China and other Chinese research institutions. He also helped IHEP to upgrade the Beijing Electron Positron Collider (BEPC) to BEPCII, transferring the superconducting accelerating technology used at the KEKB accelerator to China. He also served as a member of the Machine Advisory Committee for BEPC II and provided many valuable comments and suggestions. He has made significant contributions to the construction of large-scale accelerator facilities in China and to their catching-up with the world-class level.

“It is my great honour to have received the three awards. These awards are not only to me but also to all Chinese and Japanese people who have been working to promote Sino-Japan cooperation in the field of accelerators with enthusiasm and sustained efforts,” said Kurokawa. “We are good friends to each other; I am fully confident that the cooperation between China and Japan will become much more strengthened on the basis of our friendship and the strong foothold we have built.”

[AWARD](#) | [CHINA](#) | [JAPAN](#) | [SHIN-ICHI KUROKAWA](#)

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AROUND THE WORLD

Japanese science minister mentions ILC in press conference

Rika Takahashi | 7 February 2013



On Friday, 18 January, Hakubun Shimomura, Japan's Minister of MEXT (Ministry of Education, Culture, Sports, Science and Technology), the funding agency for Japan's high-energy physics programme, stated Japan's intention to invite the ILC in the regular press conference after the cabinet meeting, responding to a question from the press about the government's standpoint to the ILC project.

Shimomura said that the local government officials and economic leaders from Tohoku, one of the two ILC candidate sites in Japan, visited the Minister three times already to make representations for inviting ILC to Japan, and he is expecting the visits of representatives from another candidate site, Kyushu. "However, ILC is such a big project that could not be realised by Japan only. I wish to carry forward to cooperate with countries concerned, and hopefully to invite it to Japan," he said.

Shimomura said Japanese government would start a preparation to start discussion, including the distribution of the construction cost, with countries concerned in the first half of 2013.

[CANDIDATE SITES](#) | [GOVERNMENT](#) | [JAPAN](#) | [MEXT](#)

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