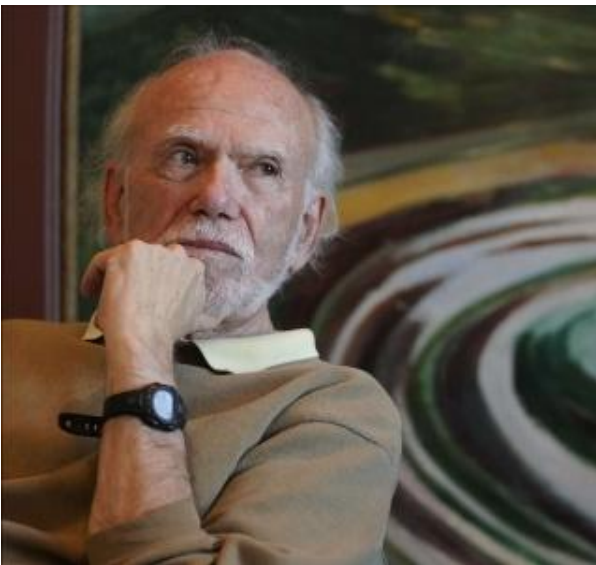




## DIRECTOR'S CORNER

## The ILC: ten years and counting

by Barry Barish



12 June 2023 marks the 10th anniversary of the publication of the ILC Technical Design Report. To commemorate the occasion, Barry Barish, who led ILC's global effort to complete this difficult job at the time, contributed this article to the ILC NewsLine.

## AROUND THE WORLD

## Diet Members in Japan promote the ILC project under new structure

by Rika Takahashi



In a resolution handed over to Japan's Minister of Education, Culture, Sports, Science, and Technology and its Minister of State for Science and Technology, the Federation of Diet Members for the ILC stress the importance of international cooperation for a global science endeavour ILC, a reliable budget and progress in accelerator technology.

FEATURE

## LCWS2023: Back to the “real” meeting

by Rika Takahashi



Over 200 scientists and engineers got together at the SLAC National Accelerator Laboratory from 15 to 19 May to attend LCWS 2023. They had been communicating through computer screens for the past three years due to the COVID-19 pandemic. This event was a great opportunity for them to finally reunite in person. What a wonderful chance to catch up and learn from each other.

## IN THE NEWS

from *Nikkei*

13 June 2023

岩手県ILC推進協議会 「省庁横断で誘致」

Iwate ILC Promotion Council "Attracting ILCs across ministries and agencies"

Confirmation of activities in industry, academia and government

岩手県国際リニアコライダー（ILC）推進協議会は12日、盛岡市で開いた役員会で、産学官での誘致活動に向けて引き続き力を注ぐことを確認した。谷村邦久会長（盛岡商工会議所会頭）は「省庁横断がキーワード。我々地元が一体となって東京・永田町の政治家を動かす」などと語った。

from *NHK*

12 June 2023

I L C 誘致へ 協議会 政府への働きかけなど強化の方針確認

Council confirms policy to strengthen lobbying of government and other measures to attract ILCs.

岩手と宮城にまたがる「北上山地」が候補地になっている次世代の大型実験施設、I L C = 国際リニアコライダーの誘致を進める協議会の会合が盛岡市で開かれ、引き続き政府への働きかけや海外への情報発信を強化していく方針を確認しました。

from 共同網

7 June 2023

日本産官学組織要求全面探讨引进加速器ILC

Japanese industry, government and academic organisations call for a comprehensive discussion on the introduction of the accelerator ILC

力争让探索宇宙诞生之谜的大型加速器“国际直线对撞机”（ILC）落户日本东北地区の産官学協議会6日、在仙台市召开大会并通过决议，要求日本政府为尽早实现此事而全面开展国际磋商。

from *Kahoku Shinpo*

7 June 2023

東北 I L C 推進協が総会で決議 国際協議の本格化を政府に要望へ

Tohoku ILC Promotion Association resolves at its general meeting to request the government to start international discussions in earnest.

岩手、宮城両県境にまたがる北上山地が建設候補地の超大型加速器「国際リニアコライダー（I L C）」の誘致を目指す東北 I L C 推進協議会は6日、仙台市で総会を開き、I L C に関する日米欧政府間の国際協議の本格化などを政府に求める決議を採択した。

from *Nishi Nippon Shimbun*

6 June 2023

加速器の東北誘致へ協議本格化を

Talks to bring the accelerator to Tohoku in earnest

宇宙誕生の謎を探る巨大加速器「国際リニアコライダー」（ILC）の東北誘致を目指す産官学の協議会は6日、仙台市で総会を開き、早期実現のため国際協議を本格化するよう政府に求める決議を採択した。

from *TBS*

2 June 2023

ILC誘致へ開発支援や技術研修 関連企業の研究会が今年度の計画を決定

Development support and technical training to attract ILCs Study group of related companies decides on plans for the current year. ILC=国際リニアコライダーの誘致を目指す関連企業などで行う研究会の総会が1日盛岡市で開かれ、今年度の事業計画が承認されました。

from *Nikkei*

17 May 2023

瀬戸際の次世代加速器 迫る中国、巻き返しへ再起動

Next-generation accelerators on the brink: China closing in, re-starting to roll back

停滞していた次世代加速器「国際リニアコライダー（ILC）」の日本建設に向けた活動が、再び動きだそうとしている。推進にむけた国会議員連盟の活動が再開され、研究者の新たな国際ネットワーク作りも始まった。一方でライバルの中国の動きも加速しており、先行される懸念も高まる。日本の研究開発力低下が叫ばれる中で、国際的な先端科学拠点作りに向けた取り組みが求められる。

from *Iwate Nippo*

2 June 2023

加速器研究の歴史紹介 盛岡のアイーナでILCセミナー

Introduction to the history of accelerator research ILC seminar at Aiina, Morioka.

高エネルギー加速器研究機構（KEK、茨城県つくば市）の横谷馨名誉教授が基調講演。直線型加速器は、電子・陽電子衝突実験のエネルギー増強のため、1980年代半ばから世界各国で研究開発が行われてきたと説明した。

## PREPRINTS

### ARXIV PREPRINTS

[2306.11413](#)

Experimental methods and prospects on the measurement of electroweak b and c-quark observables at the ILC operating at 250 GeV

[2306.00657](#)

Associated Production of Fermionic Dark Matter and Neutrino at the Future Lepton Colliders

[2305.09569](#)

Electroweak radiative corrections to polarized top quark pair production

[2304.10299](#)

Statement from the American Linear Collider Committee to the P5 subpanel

[2303.16514](#)

Axion Like Particle Search at Higgs Factories



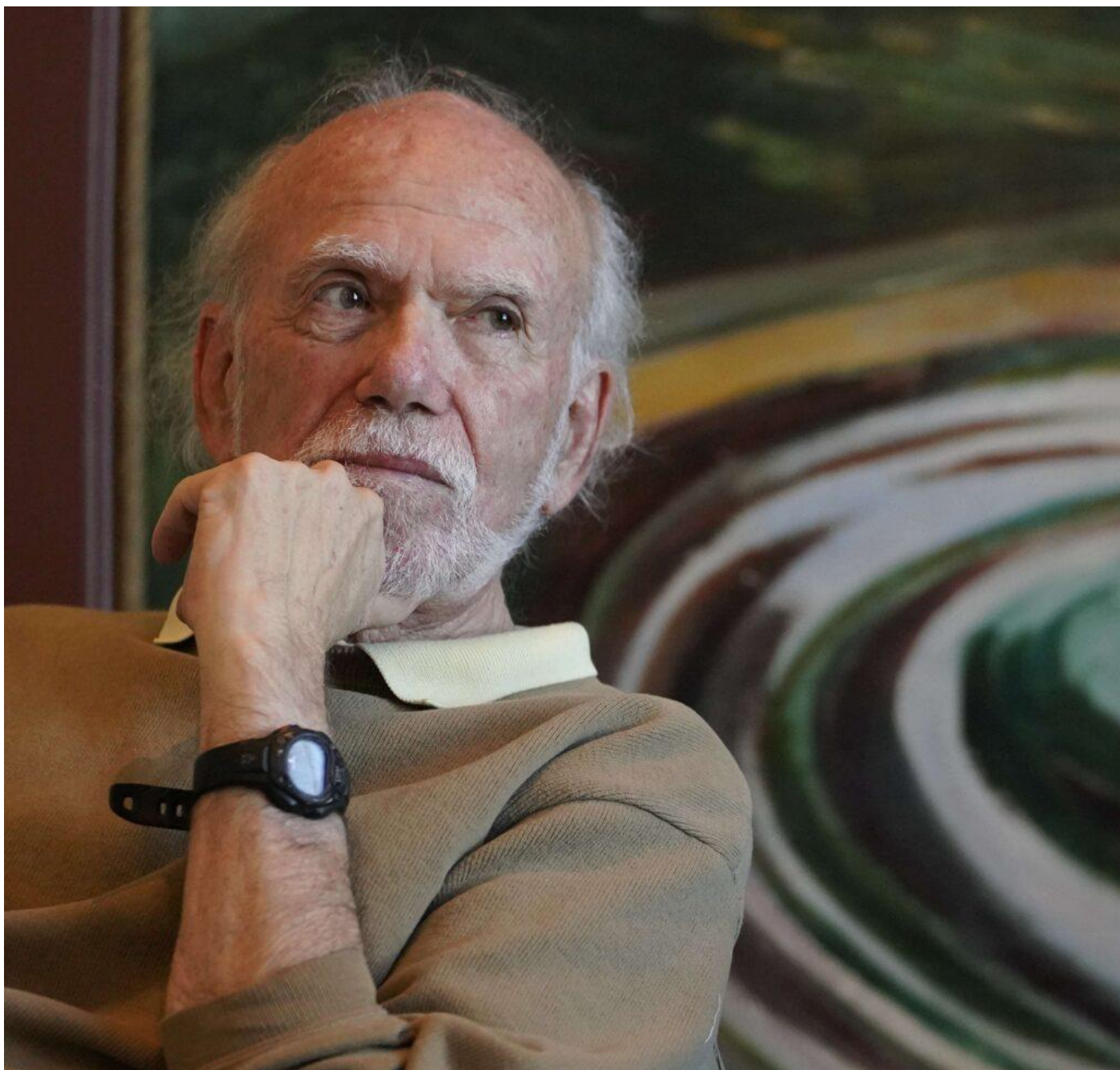
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DIRECTOR'S CORNER

## The ILC: ten years and counting

[Barry Barish](#) | [26 June 2023](#)

Early in this new century I chaired the committee that was charged with making the difficult decision whether to pursue the design of a high energy electron-positron linear collider based on 'warm' (room temperature) or 'cold' (superconducting) cavities. Our committee made a decisive forward-looking decision to base the design on superconducting RF accelerating cavities. Springing from that decision, the Global Design Effort (GDE) was created to develop the design for such a machine. I was asked, I accepted and then served as director of the GDE through the entire design phase. First, we developed a conceptual design, and then we created and submitted the Technical Design Reports, which were well-reviewed and have since served as the basis for an International Linear Collider project. In addition to the design itself, we developed a management plan, and we reviewed possible sites in Japan. At the time we submitted the TDR, most of us were optimistic that this would be the starting point for a construction project in Japan. Unfortunately, ten years have now passed, and we are still awaiting approval of the ILC project.



Of course, this has been disappointing for all of us, but the motivation for building a high-energy electron-positron collider remains very strong. The most important discovery in particle physics in this century has been the Higgs Boson, announced on 4 July 2012, almost coincident with the completion of the ILC TDR. Now, a decade later, the most pressing question in our field remains to study the physics of the Higgs through precision measurements with the help of a so-called Higgs factory accelerator. The questions include whether the Higgs is the simplest singlet form, or maybe there are partners or other new physics characteristics. The ILC remains the leading candidate to pursue these questions that require a precision instrument, and Japan remains the logical host.

I remain very enthusiastic about the ILC, but I recognise well that it sometimes takes lots of patience and a longer than hoped for period of time to reach our ambitious science goals. For me, personally, I worked toward gravitational wave detection long before the GDE, continued during the GDE period, and returned full-time to gravitational waves after the GDE. We finally succeeded and announced our first detection in 2016. The whole process took nearly three decades! So, let's hope that history repeats itself for the ILC – that it will be built and discover the fantastic science of the Higgs within the next decade.

[GDE](#) | [TDR](#)

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AROUND THE WORLD

## Diet Members in Japan promote the ILC project under new structure

[Rika Takahashi](#) | [26 June 2023](#)

Japan's Federation of Diet Members for the International Linear Collider (ILC) held a general assembly on April 27 in Nagata-cho, Japan's political center. The gathering was attended by Diet members, government officials, scientists, and industry representatives, highlighting its importance. The formation of the Federation dates back to 2006 when it was established by the members of the Liberal Democratic Party. Subsequently, in 2008, it expanded into an all-party organisation. Since then, the Federation has been actively pursuing various initiatives to realise the ILC project in Japan.



Hon. Ryu Shionoya delivers speech during the general meeting.

“Our goal in launching this Federation is to bring the ILC, an international research center, to Japan. This will help us to advance our country’s science and maintain our position as a global leader in the field,” said Ryu Shionoya, a member of the House of Representatives who was appointed as Chair of the Federation in February 2022. “Trying to reach our goal has been a challenging journey. The COVID-19 pandemic and the situation in Ukraine have had a significant effect on numerous global projects including the ILC. However, there’s been a notable uptick in activity for the ILC within the global research community. This is a positive indication,” he said.

KEK received a significantly increased research budget for accelerator R&D this year, following the resolution made by the Federation last year. Shionoya concluded his opening remarks by saying “The current government places a high priority on science and technology innovation, believing it will contribute significantly to the growth and progress of the nation and society in the future. To achieve this goal, we seek your continued and enthusiastic support in bringing the ILC to Japan.”

Shoji Asai, a professor at the University of Tokyo and Spokesperson of ILC-Japan, spoke on behalf of the research community. He stated that the increased budget will aid in establishing the ILC Technology Network- a global network of institutions committed to developing vital technologies. ILC-Japan is a promoting body by high-energy physicists in Japan.



As a keynote speaker, Masanori Yamauchi, Director General of KEK, gave a presentation to provide an update on the current progress of the ILC. In great detail, he provided an explanation of the ILC’s current status. This included basic information such as the scientific studies that will take place at the ILC, and how the ILC works, as well as global trends in particle physics research, technology development plans, and ongoing global discussions among researchers.

During the meeting, a new resolution was adopted to work towards the ILC, and it was handed to Keiko Nagaoka, Minister of Education, Culture, Sports, Science, and Technology (MEXT), and Sanae Takaichi, Minister of State for Science and Technology, after the meeting. “The meeting today allowed us to update everyone on the current status of the ILC. I would like to request your continued cooperation in helping us reach our goals,” Shionoya concluded the meeting.

A summary of the resolution is as follows:



- Encourage collaboration between relevant parties to bring the International Linear Collider (ILC Project) to Japan, which will establish the first major science and technology center in Asia.
- The ILC project cannot be accomplished by a single country alone, and international cooperation is necessary. Therefore, it is important for the government to collaborate closely with researchers who are working towards these goals and communicate with the governments of the countries involved.
- We should work towards advancing next-generation accelerator technology to support the ILC project through international cooperation. Additionally, it is important to obtain the required funds to accomplish this task.

[FEDERATION OF DIET MEMBERS](#) | [JAPAN](#) | [KEK](#)

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FEATURE

## LCWS2023: Back to the “real” meeting

[Rika Takahashi](#) | [26 June 2023](#)

“LCWS 2023 at SLAC was a very enjoyable and productive meeting with more than 200 participants from all over the world discussing future linear Higgs factories,” said Caterina Vernieri, one of the organisers of Linear Collider Workshop 2023, held at SLAC National Accelerator Laboratory from 15 to 19 May.



Attendees at the International Workshop on Future Linear Colliders (LCWS2023) pose for a group photo in the main quad at SLAC National Accelerator Laboratory. The conference was held from May 15-19. (Jacqueline Ramseyer Orrell/SLAC National Accelerator Laboratory)

The meeting was well-attended and participants full of enthusiasm, as many community members had not seen each other since the start of the COVID-19 pandemic. For the past three years, their communication had mainly been through a computer screen. Therefore, LCWS 2023 provided an excellent chance for them to reunite. “It was very nice to see this vibrant community coming together to review progress and discuss the next steps towards a linear Higgs Factory,” Vernieri said.

In addition to the “veteran” scientists and engineers who have been working on the linear collider study for a long time, there were also many young researchers present at the meeting.

“The meeting was organised by the next generation of SLAC linear collider enthusiasts – Emilio Nanni, Spencer Gessner, and Caterina Vernieri. They brought their colleagues and students,” said Michael Peskin, a particle theorist at SLAC. “This led to interesting sessions on new initiatives in the electron-positron world, for example the [C-cubed](#) (cool copper collider) concept including posters on such

innovations as a bunch compressor based on high-temperature superconducting tape, and very high-gradient plasma and structure wakefield accelerators.”



The meeting also focused specifically on accelerator [sustainability](#). “One of the highlights was a rigorous carbon cost analysis of the construction plans for CLIC and ILC, [presented by Suzanne Evans](#) ,” said Peskin. Like other large enterprises, the exploration of high-energy particle collisions inevitably has an environmental cost. But the mood was forward-looking: What are the correct metrics for environmental impact? How can we track the all relevant contributing elements? How can we revise our own plans, and how can we work with governments and industry, to make particle physics as green as possible?

Japan’s industrial association for the realisation of the ILC, Advanced Accelerator Association promoting science and technology (AAA), also gave a presentation about their activities including their study to make the ILC sustainable accelerator called “[Green ILC](#),” and the study to create the next generation of sustainable communities that people around the world aspire to live in.

At the meeting, a panel comprised of Shoji Asai, Jens Osterhoff, Michael Peskin, Steinar Stapnes, and Caterina Vernieri collaborated on creating a statement to present to the P5 committee. The committee is currently assessing the U.S.’ high-energy physics priorities for the next two decades. After several discussions and revisions, the [final version](#) of the statement was shared during the panel discussion on the last day, and finalised to send it to P5 committee.

“This statement reaffirms that the community recognises and acknowledges the value of the ILC, including its cost-effectiveness, energy-extendability, and importance of implementing it as a global effort. This is extremely valuable,” said Shoji Asai, a professor at the University of Tokyo, and spokesperson of ILC-Japan. “It is significant that we were able to create this statement despite the varying circumstances of countries. Our ability to come to a shared opinion is noteworthy,” he said.

The “Statement on the Future of e+e- Higgs Factories from LCWS 2023” is available [online](#).

[LCWS](#) | [P5](#) | [SLAC](#)

