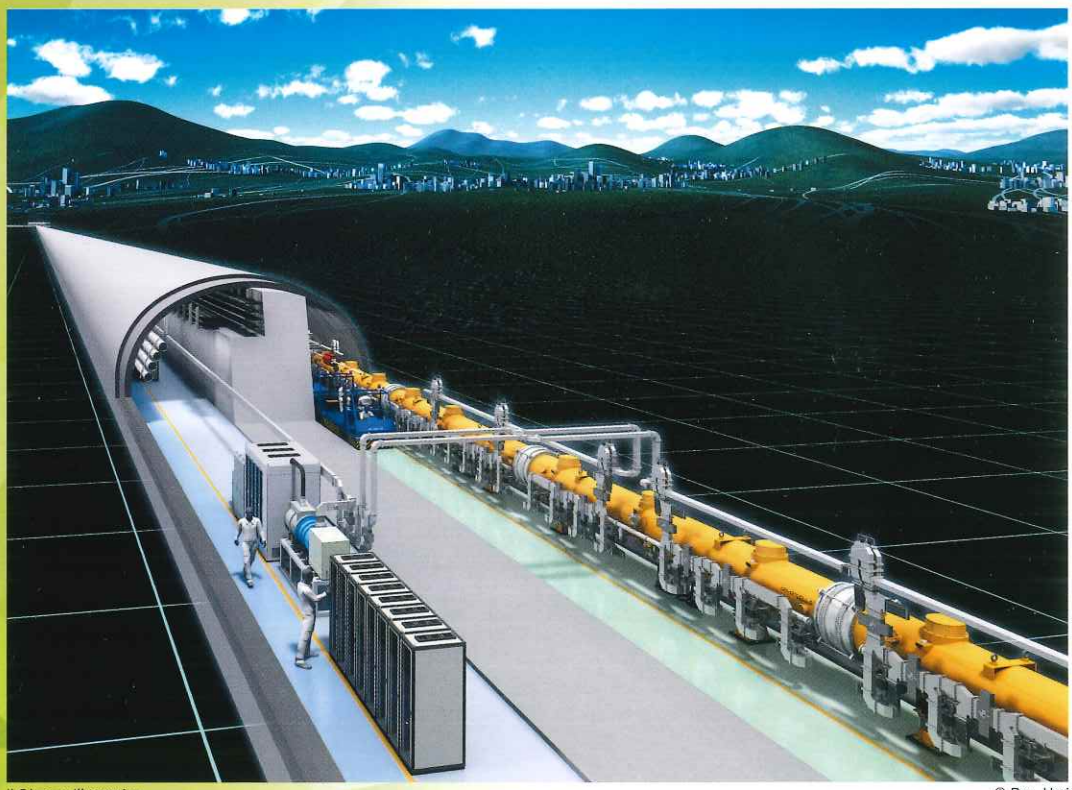
We support the ilc

Accelerating Innovation
Tohoku Japan

ILC : International Linear Collider

The International Linear Collider Will Transform Japan!



ILC Image Illustration © Rey. Hori

The purpose of the International Linear Collider (ILC) is to explore the mysteries of the birth of the universe!

Just 10^{-44} seconds after the universe was born, it began to expand rapidly due to the energy of the vacuum, growing from a diameter of 10^{-34} cm (0.00000000000000000000000000000001 cm) to more than 1 cm in diameter in just 10^{-33} seconds. At this time, a vast amount of thermal energy was released, and the universe became a fireball. The rapid expansion is called "inflation," and the moment when the universe became a fireball due to inflation is called the "Big Bang." Various elementary particles were born at this time. The universe continued to expand, and its temperature gradually decreased. In this process, the freely flying elementary particles eventually bonded together to form protons and neutrons, and from those protons, neutrons, and electrons, atoms were created. Thus, it is said that the foundation of all matter existing in the current universe was formed.

ilc Tohoku ILC Promotion Council

international linear collider

The realization of the ILC will change Japan's future!

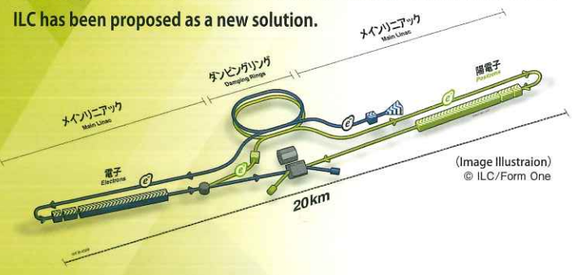
Overview of the ILC Project

What is the ILC?

- The ILC is a cutting-edge experimental facility for particle physics that uses a 20-km-long linear accelerator to reproduce the reactions that occurred shortly after the so-called Big Bang, which marked the beginning of the universe.
- If the ILC is realized, it will be Asia's first large-scale international scientific research organization, attracting numerous researchers from around the world to live in Tohoku and form an international city.

The Mechanism of the ILC

- A linear accelerator is installed in a 20-km-long underground tunnel, and by accelerating electrons and positrons to nearly the speed of light and giving them a vast amount of energy, the ILC recreates the reactions of particles that occurred shortly after the Big Bang.
- Based on the data observed during experiments, the ILC will search for unknown elementary particles and investigate their properties in detail to explore the true mechanisms of nature and the mysteries of the birth of the universe, which humanity has not yet elucidated.
- The largest accelerator in the world is currently the 27-km-circumference facility at CERN (Europe). However, due to the significant energy loss caused by the curves in circular accelerators, the linear accelerator-based ILC has been proposed as a new solution.



(Image Illustraion)
© ILC/Form One

ILC Construction Candidate Site

On August 23, 2013, the ILC Site Evaluation Committee, composed of researchers, announced its conclusion that "the Kitakami site is the most suitable domestic candidate site for the ILC," from both technical and social environmental perspectives.

ILC Construction Timeline

After engaging in international next-generation accelerator development through the ILC Technology Network, the project will enter a preparation period, and international cost-sharing negotiations will intensify. The construction phase will begin when an intergovernmental agreement is obtained and the ILC plan is formally approved. Full-scale experiments are expected to begin in the late 2030s.

The Future Opened by the ILC

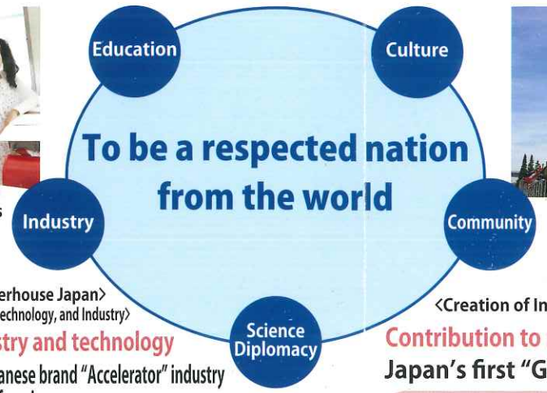
<A Leading Science and Technology Nation> <Dreams and Pride for Young People>
<Ambition of Citizens> <Lively Science Education>

From Japan to the world. The creation of science.
The frontier of knowledge since the birth of humanity.
Creating a challenging nation, Japan

<East Asian Community from Basic Science>
<Dissemination of Culture from Japan to the World>

As the third pole = the center of Asia
From brain drain to brain accumulation
Creating a nation that attracts people, Japan


For the benefit of future generations



<Rebirth of Manufacturing Powerhouse Japan>
<Foundation of Next-Generation Science, Technology, and Industry>

Spillover effects of industry and technology
New industrial infrastructure, Japanese brand "Accelerator" industry
Global talent, challenging team of engineers
Creating innovation through national strategy

<Creation of International Regions>

Contribution to regional revitalization
Japan's first "Global City"
Overseas expansion of the Tohoku, Japan, brand related to tourism, food, and technology


ILC Image Illustration © Rey. Hori

Advanced accelerator: Accumulation of technology for a new society

◆Supporting technologies
- Advanced casting technology
- Advanced plating technology
- Remote sensing
- Nanometer control technology
- Surface treatment technology
- High-frequency technology
- Advanced concrete technology
- Advanced tunnel excavation technology


Power transmission


Advanced civil and architectural technology


Advanced welding technology


Advanced integration technology


Robotics


Supercomputer


Secure network technology

The science and technology network in Tohoku and Niigata will become a source of vitality for Japan

Accelerator-related research institutions and companies are distributed throughout the Kanto, Tohoku, and Niigata regions.

- Many accelerator-related research bases operate in Japan (KEK, RIKEN, QST, etc.), located north of Tokyo.
- Tohoku and Niigata are areas with a high concentration of accelerator-related technologies, including suppliers of cutting-edge accelerator systems and companies with elemental technologies such as metal processing.

Industry–academia–government network and accumulation of manufacturing technology

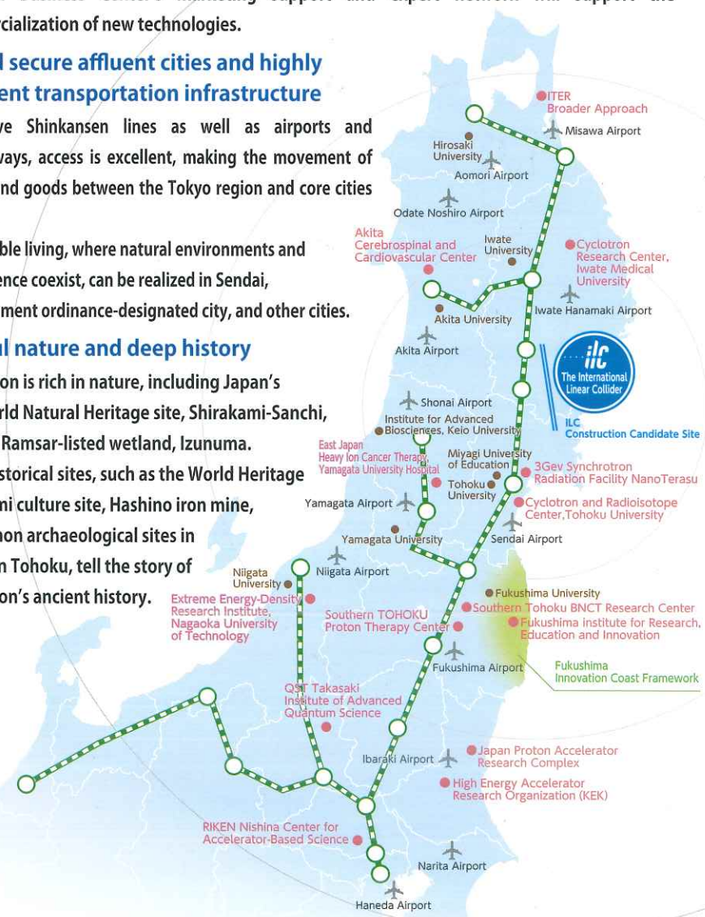
- The Tohoku region is home to many higher education institutions that have cultivated advanced research achievements and excellent human resources, including national universities.
- The history of industry–academia collaboration at Tohoku University that began before World War II and the open culture that has welcomed many international students will serve as the foundation for the next generation of international science and technology innovation hubs.
- Many companies with advanced manufacturing technologies supply parts to global corporations, such as major electronics and automobile manufacturers.
- Tokeiren Business Center's marketing support and expert network will support the commercialization of new technologies.

Safe and secure affluent cities and highly convenient transportation infrastructure

- With five Shinkansen lines as well as airports and expressways, access is excellent, making the movement of people and goods between the Tokyo region and core cities smooth.
- Sustainable living, where natural environments and convenience coexist, can be realized in Sendai, a government ordinance-designated city, and other cities.

Beautiful nature and deep history

- The region is rich in nature, including Japan's first World Natural Heritage site, Shirakami-Sanchi, and the Ramsar-listed wetland, Izunuma.
- Many historical sites, such as the World Heritage Hiraizumi culture site, Hashino iron mine, and Jomon archaeological sites in northern Tohoku, tell the story of the region's ancient history.



Message from researchers working towards the realization of the ILC

Tatsuya Nakada

Chair of the ILC International Development Team (IDT) and Emeritus Professor, Swiss Federal Institute of Technology Lausanne

One of the major challenges we face in promoting the ILC is the lack of international agreement on the project's decision-making process. Through discussions at international expert meetings, the IDT aims to achieve international consensus on the ILC's decision-making process and to work towards an international environment in which Japan can express its interest to host the ILC. Furthermore, in my view, the realization of the ILC as a global science project will greatly contribute to the achievement of the United Nations' Sustainable Development Goals (SDGs) through the provision of high-quality education and training, as well as the development of technology for carbon-neutral, large-scale research facilities.

Masanori Yamauchi

Director-General, High-Energy Accelerator Research Organization (KEK)

KEK is working with IDT and ILC Japan to establish the ILC Technology Network, holding discussions with directors of major research institutions in Europe and the United States. This is an important step towards not only improving the technical maturity of the ILC but also fostering momentum for the realization of the ILC through global collaboration. We will continue to contribute to the solution of social challenges such as carbon neutrality through international accelerator development.

Shoji Asai

Representative of ILC Japan (Director, International Center for Elementary Particle Physics, University of Tokyo)

It is believed that the Higgs particle, hidden in the vacuum, has created and evolved this universe, and many particle physicists around the world consider the Higgs Factory project to be of the utmost importance.
Compared to other Higgs Factory projects, the ILC is a very promising plan that is both environmentally friendly and has half the construction cost.
ILC Japan will work towards the realization of the ILC, in collaboration with related organizations, as the representative of the Japanese research community, so that Japan can lead the way in realizing the ILC.

Tohoku ILC Promotion Council

11th floor, Centre Tohoku 2-9-10 Chuo, Aoba Ward, Sendai, Miyagi, JAPAN 980-0021
TEL: 022-397-9092 FAX:022-262-7062 https://www.tohoku-ilc.jp/

(2023.07)