

## Affluent Future with Advanced Accelerator Science & Technology

The Advanced Accelerator Association Promoting Science & Technology (AAA) has been established to facilitate industry-government-academia collaboration, not only to obtain scientific findings in the field of particle physics but also to promote and seek various industrial applications of advanced accelerators and technologies derived from R&D on such accelerators. The AAA has designated the International Linear Collider (ILC) as its model project; with advanced accelerator science and technologies the association aims to exploit the "intellectual horizon" of humanity on various research fields (such as space, elementary particles, material and life sciences), takes on new global-level assignments (such as medical applications, energy and environment), and strengthens international competitiveness in advanced science and technology. The goal of the AAA is to establish a new form of system to gain strategic cooperation from the multilateral collaborations among industry, academia and government.

An accelerator is a big microscope. An electron microscope is also a type of accelerator that uses an electron beam to illuminate a specimen and creates a highly-magnified image.

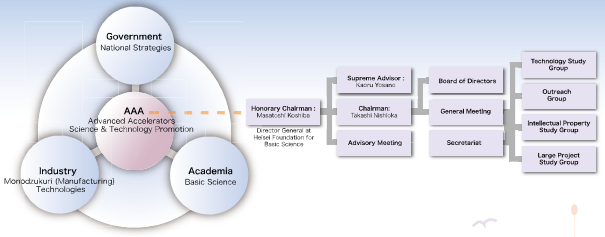
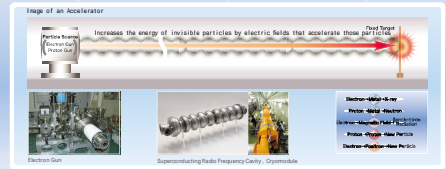
**Observing Tiny Objects**

We can study protein structures by utilizing synchrotron radiation technologies. Scientific elucidation of their structures would lead us to epochal drug discoveries.

**Creating New Drugs**

X-rays and neutron beams allow us to investigate conditions of cracks inside walls and pipes, or inner structure of an engine in operation.

**Examining Inner Conditions**



### Promoting Advanced Accelerator Science & Technology with the Industry-Government-Academia Collaboration

Worldwide outreach about all the possibilities and significant developments advanced accelerator technologies have to offer. Seek directionalities on advanced accelerator R&D and proper ways to handle intellectual property with the "ILC Project" as an underlying model. Gather "Monodzukuri (manufacturing) technologies" from a variety of industrial fields to create innovative scientific technologies.

**Protecting Our Lives**

Accelerators manufacture diagnostic medicines for PET (Positron Emission Tomography) technologies. X-rays or particle beams emitted from accelerators are also used for cancer treatments.

**Discovering Scientific Fields**

We believe that new particles will be discovered when ultra-high energy collisions occur among protons or between electrons and positrons. We are expecting to reveal remarkable scientific discoveries by studying those yet to be discovered particles.

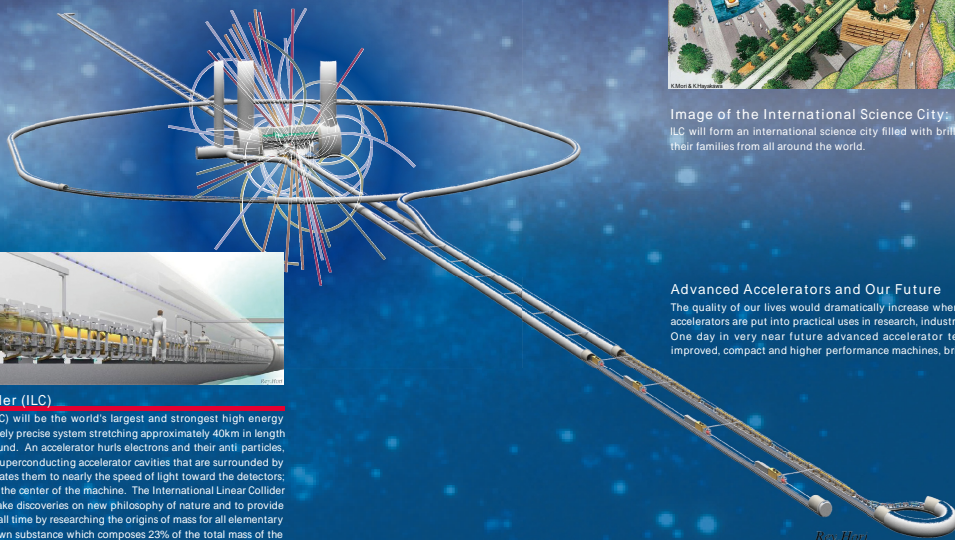
## Japan, the Leading Nation in Accelerator Technology

Japan is recognized as the leading nation in the fields of particle physics and accelerators worldwide. Japan has had several Nobel Prize Laureates in Physics; Dr. Hideki Yukawa, Dr. Sin Itiro Tomonaga and Dr. Masatoshi Koshiba. And in 2008 three researchers were added to the list; Dr. Yoichiro Nambu, Dr. Toshihide Maskawa and Dr. Makoto Kobayashi. This latest news about Japanese physicists receiving Triple Crown Nobel Prize still sounds fresh to us. KEKB remains the most powerful (high luminosity) Electron Positron (e+e-) accelerator in the world. KEK also had the proton accelerator which successfully completed neutrino oscillation experiments for the first time.

Spring 8 is one of the three largest synchrotron radiation facilities in the world. J-PARC is also the world's strongest multi purpose proton beam facility. Today Japan has a variety of accelerators that offer highly competitive performances in the world. Besides building those excellent machines in Japan, the latest Japanese manufacturing technologies have contributed fully to construct the world's biggest accelerator, the Large Hadron Collider (LHC) at the European Center for Nuclear Research (CERN) in Geneva, Switzerland.



Image of the International Science City: ILC will form an international science city filled with brilliant scientists, engineers and their families from all around the world.



### International Linear Collider (ILC)

The International Linear Collider (ILC) will be the world's largest and strongest high energy accelerator. The ILC will be an extremely precise system stretching approximately 40km in length inside a linear tunnel deep underground. An accelerator hurls electrons and their anti particles, positrons, into a series of vacuumed superconducting accelerator cavities that are surrounded by very precise devices, and then accelerates them to nearly the speed of light toward the detectors; finally, particles collide face to face at the center of the machine. The International Linear Collider will give a new cosmic doorway to make discoveries on new philosophy of nature and to provide answers to fundamental questions of all time by researching the origins of mass for all elementary particles called "Higgs boson," unknown substance which composes 23% of the total mass of the Universe, "dark matter," and "extra dimensions" of space and time beyond four dimensions we are living in.

### Advanced Accelerators and Our Future

The quality of our lives would dramatically increase when compact and more efficient accelerators are put into practical uses in research, industrial and medical fields. One day in very near future advanced accelerator technologies would produce improved, compact and higher performance machines, bringing us better lives.