Vol.8 No.1

KEK News

High Energy Accelerator Research Organization

KEK Status Change

More than one year and a half past since the transition of KEK from being a part of government into an independent cooperate body on April 1, 2004. This reform was done under newly-legislated national university corporation law that rules all national universities (total 89) and all inter-university research institutes (18 institutes) in Japan. This is the most drastic reform of Japanese national university system since its establishment in Meiji era (about 130 years ago).

In Europe and in USA, universities, including national and state universities, are generally given a corporate status. In Japan, national universities and inter-university research institutes (IURI) such as KEK had been a part of the government so they did not have independent status. In response to the social and economical change towards globalization, government decided to change them into cooperate bodies to have independence and autonomous administration. That is the background of the present incorporation.

IURIs have been the infrastructure for researchers for national, public and private universities throughout Japan. IURIs have been the base stations to carry out international research collaborations which would be difficult for a university alone to carry out. IURIs have been successful driving force for research frontiers. Former KEK (National Laboratory for High Energy Physics) was established in 1971 as being the first of such organization. Following to the establishment of KEK, similar organizations in various fields (astrophysics, literature, history, etc.) were established under the same concept. Japanese universities and IURIs worked hand in hand producing quite impressive research results. That was the reason why both national universities and IURIs are covered under the same law.

In the new scheme, university or research organization is to have their own autonomous management. Fundamental operational grant that includes personnel expense is provided by the Japanese government, and its expenditure is left to the decision of each corporation. Concerning personnel affairs, there is no limit to the salary that can be offered when inviting an outstanding researcher to take up a post, because the salary limit set by the law for public servants will not be applied any more. Now, it has become possible for a non-Japanese person to take a position of university president or a director general of a research organization. In fact, inviting an application for the next KEK director general candidate (starting April 2006) was globally advertised.

Although vast autonomy is given to each corporation, follow up reviews to see how well each corporation is attaining their promised milestones. The review will be done at 6-year intervals, and the operation grant may be readjusted according to the result of the review. In order to assure that the corporate operation will be clearly visible to the public and will contribute to the society in a meaningful way, a management council is required to be in the organization. Over half of the council members must be from outside the organization, to reflect the opinion from outside.

The organizational change made it possible to offer better services to visiting researchers since KEK is free from certain binding regulations for general public servants. We can now accept credit card payment, for example. We now have more flexibility in maintaining and improving on-site accommodation. While we get more freedom in the use of the budget which should be a definite improvement, there are other side of this. The original intention in making this transition was to reduce government spending by making many governmental organizations into independent corporations, which they call a "smaller government". This intention is reflected into this transition scenario. The grant for each corporation will be reduced by 1% each year, including the grant for salaries.

We are forced to work harder to get any other sources of income such as patent licensing and make use of anything we have, including renting some of our facilities for use by outside people.

However, as an inter-university research organization, KEK will stay with the policy that academic use of its facility is free of charge including uses by researchers from foreign academic organizations. We will take advantage of this new status to make improvements in our research activities.

Professor ***Atsushi Koma*** is the director of the Institute of Materials Structure Science, as well as the chairperson of the task force for the KEK transition to the new Corporation Status from a Government Lab. He is also the head of International Affairs and Public Relations.

Construction of J-PARC in Full Swing

Several years ago, KEK and the Japan Atomic Energy Research Institute (JAERI), which is now called the Japan Atomic Energy Agency (JAEA), started to work on a joint venture to construct a new proton accelerator with the highest beam power in the world. The new accelerator is targeted for a wide range of fields, using K-meson beams, neutrino beam, neutron beam and muon beam for nuclear and particle physics, materials science, biology and nuclear engineering. These beams will be generated by bombarding high-power proton beam on nuclei at rest. The accelerator facility is called J-PARC, which is an abbreviation for Japan Proton Accelerator Research Complex.

Construction of the J-PARC facility started in 2001 and the provision of beams is set to commence in 2008. Construction work is currently in full swing in both areas of accelerator construction and civil engineering. About two thirds of the construction has been completed. The photo shows the present status of construction.

The accelerator complex consists of a Linac, a 3 GeV Synchrotron and a 50 GeV Synchrotron. While they are connected in series to step up beam energy to the final 50 GeV, each step also provide beams for particular applications. The Linac provides high intensity beam for Transmutation experiments (not yet funded), the 3 GeV Synchrotron provides neutron and muon beams for Materials and Life Science experiments through beam conversion steps. The 50 GeV Synchrotron provides high intensity beam to Hadron Physics Facility as well as neutrino beam to Super-Kamiokande located 300km away.

Because the performance of the accelerator is largely determined at the first stage of the linear accelerator, the development of technology for this portion is of crucial importance. At the beginning of November 2003, a full prescribed performance was successfully attained. The beam test through the entire linear accelerator is planned at the end of 2006.

J-PARC will be open to the world as an international facility. The number of researchers from outside of Japan (North America, Europe and Asia) who wants to participate on the subject of nuclear and particle physics has already exceeded the number of Japanese researchers. J-PARC is expected to boost levels of participation in neutron-related fields from Asia and Oceanic regions. Preparation to accommodate large number of visiting researchers from all over the world is also going ahead in cooperation with local governments including Tokai-mura Village and the Ibaraki Prefecture.

It is anticipated that in a future J-PARC may become one of the leading centers in the world. With that in mind, the project team is working day and night to forge ahead with construction work. For those who have interests in J-PARC, please visit also http://j-parc.jp/index.html.

An overall construction status of the J-PARC, as viewed from the sky. The photo was taken on February, 2006.

The author of this article, Professor ***Shoji Nagamiya***, has been the head of J-PARC project.

Discoveries of New Charm Particles at B Factory

Researchers of the Belle international collaboration, working at KEK's B factory, have been experiencing pleasant surprises as new charm particles show their appearances one after another for the past few years.

Charm particle is a collective name for mesons (made of a quark and an antiquark) and baryons (made of three quarks) with at least one of the constituent quarks being the charm quark.

Since hundreds of mesons and baryons have been known to exist, just another addition itself is not so exciting. What stirs curiosity of the Belle researchers, however, is an exciting possibility that two of their findings might be examples of new types of particle that do not quite fit into the standard classification of mesons and baryons in the context of the quark model that has been enjoying an overwhelming success in classifying all known particles and fitting them into predicted slots in its chart of mesons and baryons up to now.

The Belle group reported discoveries of η'_c (2365) in 2002 (number in parenthesis indicates the particle mass in unit of MeV/c^2), X(3872) in 2003, D_0^* (2308) and D'_1 (2427) in 2004, Σ_c (2800), Y(3940), and X(3940) in 2005, and χ'_{c2} (3930) in 2006.

The D_0^* (2308) and D'_1 (2427) are charm mesons made of a charm quark and a light antiquark (up quark and down quark are called light quark because their masses are the lightest among the quarks).

The η'_c(2365) and χ'_{c2}(3930) are mesons consisting of a charm quark and a charm antiquark. They are also called "charmonium"and have zero electric charge. The Σ_c (2800) is a baryon made of a charm quark, a strange quark, and a light quark. All these particles fit nicely into predicted but vacant slots in the chart of mesons and baryons. The Σ_c (2800)s were also found to come with three different electric charges (++, +, 0) and decay into Λ_c^+ and π meson of (+, 0, −) charge as the quark model had predicted.

The X(3872), on the other hand, did not fit into any of the slot in the chart and became known in the world-wide particle physics community as the "mystery meson". After exhaustive and detailed investigations of its properties, it is now thought that the X(3872) is probably not a quark-antiquark state but, rather, a new type of meson made of two quarks and two antiquarks. Existence of such exotic states has been postulated based on the quantum chromodynamics (QCD), fundamental theory of quarks and gluons. However, exact nature has been mostly unknown.

Last summer the Belle group reported discoveries of two particles with very similar masses. The X(3940) was discovered as a peak in the mass spectrum of particles recoiling against the J/ψ in electron-positron collisions (see Fig.1). The J/ψ is the first-observed charmonium, and the 1976 Nobel Prise in Physics were awarded to Samuel Ting and Burton Richter for its discovery. The recoil mass system must have properties of charmonium since it is produced with another charmonium J/ψ from the electron-positron system which behaves like vacuum but with just energy. Examination about what particles are in the recoil mass system revealed that the X(3940) mainly decays into a pair of charm meson (D) and charm antimeson ($\bar{D}$) as expected for charmonium states with this mass, according to the quark model.

The Y(3940) was found in the process of B^+ meson decaying into Y(3940) and K^+ meson. The Y(3940) then decays into a lighter meson ω and a J/ψ (see Fig.2). A sample of 274 million B meson decays produced only 58 Y (3940) particles. Although the Y (3940) must have properties as charmonium, it does not seem to follow the pattern of the X (3940), and its preference to decay into an ω and a J/ψ is difficult to

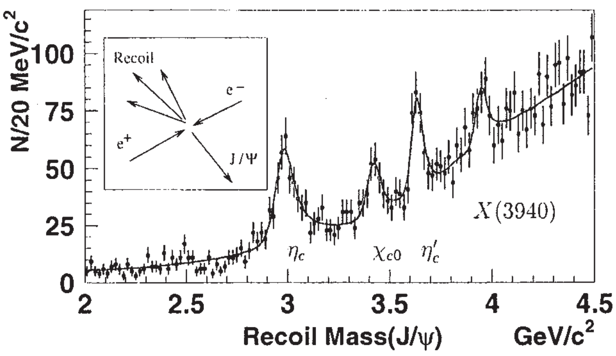


Figure 1: Recoil mass spectrum for particles that recoil against the J/ψ in the electron-positron collision. Four peaks are observed. First three peaks starting from the lower mass scale are known charmonium, η_c(2980), χ_{c0}(3415), η'_c(3653). The fourth peak corresponds to X(3940).

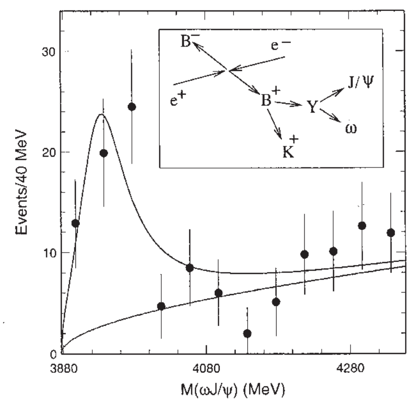


Figure 2: Mass distribution for a system of an ω and a J/ψ that are produced in the decay $B^+ \rightarrow \omega + J/\psi + K^+$. Presence of a peak near the mass of 3940 MeV/c^2 indicates that an ω and a J/ψ is forming a Y(3940). A curve that follows the data points is an expected distribution when the Y(3940) is present. The other curve is an expected distribution when there is no Y(3940).

understand in the context of the quark model. This is why the Belle researchers think they are different particles inspite of their very similar masses.

In fact, what has been exciting the researchers is that the observed decay property of the Y(3940) resembles that expected for a "hybrid meson": a conjectured particle to be made of a quark, an antiquark, and a gluon. The existence of such states was predicted in 1978 based on the QCD, but none has been seen so far. Predicted mass for a hybrid meson ranges between 4000 and 4500 MeV/c^2, a little too large for the observed mass of the Y (3940). Presently available sample of 58 Y(3940) is too few for detailed investigations. They are eager to accumulate much more data and settle if this particle is a hybrid meson or something else.

The B factory, whose main mission has been to produce a large sample of B meson decays for CP violation study, is providing very exciting results in the charm meson sector. Two of the newly discovered particles do not seem to be compatible with the quark model. They may be the first examples of new types of mesons that are not in the quark model but conjectured in the QCD. Detailed studies of their properties, and yet more new findings, may help to significantly advance our understangding of the QCD.

Professor ***Kazuo Abe*** has been a KEK staff since 1984. For the past ten years, his main research activity has been experimental exploration of the origin of CP violation that is a breakdown of matter-antimatter symmetry and is considered to have played key role for the formation of present universe.

Latest results from K2K

Neutrino mass and mixings are one of the keys to access beyond the standard model. The K2K experiment probes them through the neutrino oscillation experiment, which is suggested by the atmospheric neutrino observation by Super-Kamiokande in Kamioka using the neutrino beam generated by KEK 12 GeV-PS.

First, flux and spectrum of neutrino beam are measured by the near detector located in KEK site just after the neutrino production. After the 250km of flight, neutrinos are measured by the far detector, Super-Kamiokande, and are compared with expected values based on the near detector measurement.

K2K experiment started in 1999. The Super-Kamiokande detector was rebuilt with about half of the original photomultipliers after the accident in 2001. Total of 112 events were observed by Feb. 2004, for which 156+12/-10 events are expected if there is no neutrino oscillation. Figure 1 shows clear difference between expected and observed in the reconstructed energy spectrum which proved the existence of the neutrino oscillation. The probability to justify that neutrino oscillation does not exit according to our experiment ressult (the deficit of events and spectrum distortion) is estimated to be 0.003%. K2K confirmed the atmospheric neutrino oscillation.

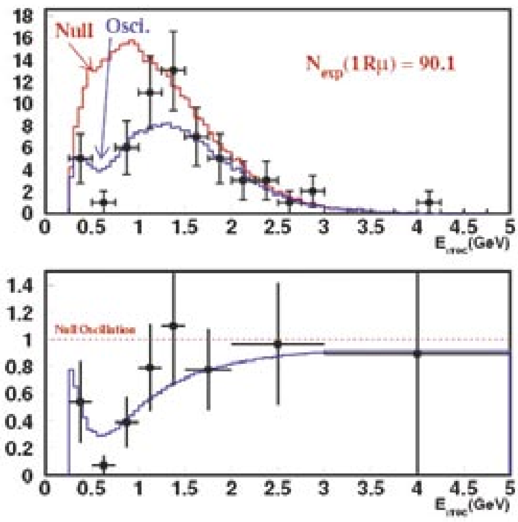


Figure 1

We plan to improve the data quality further and to measure the unknown oscillation parameters with the next long baseline experiment, T2K, utilizing the neutrino source from J-PARC

The author of this article Associate Professor ***Kenji Kaneyuki*** is a member of K2K and Super-Kamiokande collaborations. He is also the member of next generation long baseline experiment, T2K collaboration.

Early Detection of Breast Cancer

A novel refraction-based X-ray imaging for medical diagnosis was developed. Ordinary absorption-based X-ray imaging, MRI (magnetic resonance imaging), and sonography can detect a cancer greater than 5mm. Refraction-based X-ray imaging, utilizing a synchrotron radiation could become a powerful tool for early cancer diagnosis. As the synchrotron radiation has the penetration power like a laser light, one can construct an X-ray optics called X-ray dark-field imaging. We use a crystal monochro-collimator to make incident X-rays going straight forward and analyzer crystal angular filter to filtrate refracted X-ray component. The long history of silicon-based electronics industry made near defectless silicon crystals available to us. A part of a body is placed in between them in a future. A silicon angular filter with a certain thickness may have zero transmission for the straight component of light that does not have received refraction through the specimen while refraction component can pass through this angular filter.

We can survey 90mm x 90mm field in one shot using 35 keV X-rays. An excised human femoral head shows an articular cartilage that has not been visualized by any other technique. This research work was awarded a prize by the Society of Applied Physics of Japan

When this technique was applied to a breast cancer tissue, 2-dimensional distribution of breast cancer nests was revealed with extremely high contrast and high spatial resolution of 30 microns. (picture below) We achieved spatial resolution of approx. ~10microns so that each cancer cell could be seen. This will lead to clinical diagnosis and pathological diagnosis. Thanks to the higher penetration power of the 35 keV X-ray, patients will go through less painful preparation process. In a future we would like to achieve the image reconstruction for not only breast but also other organs such as lung.(Figure on page 10)

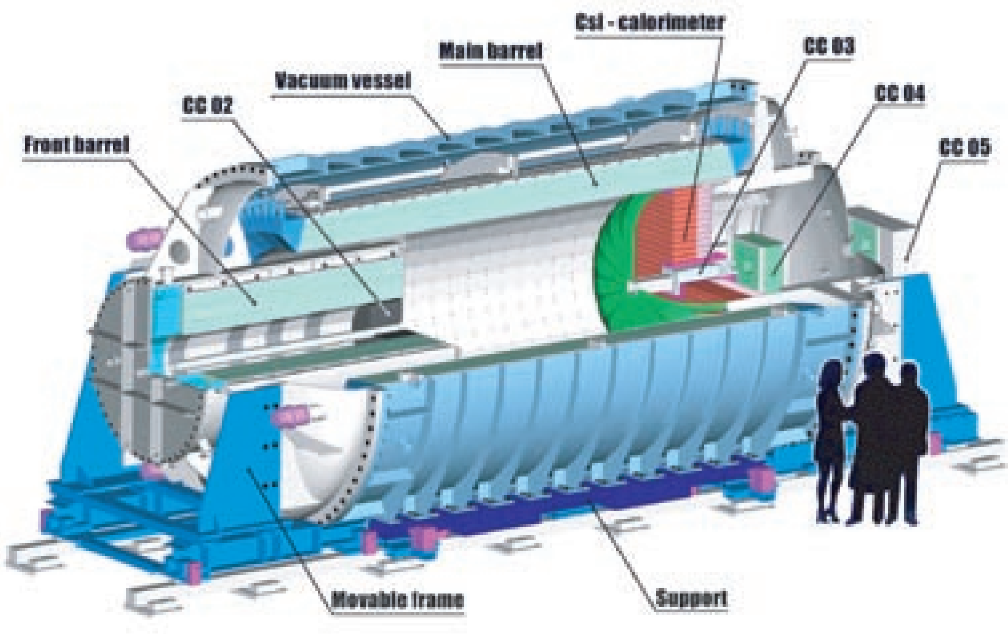
The author of this article, ***Dr. Masami Ando*** is a Professor of KEK as well as of Graduate University of Advanced Studies. He developed medical imaging techniques for clinical diagnosis using synchrotron radiation. His hobby is on butterfly and railway.

The Last experiment at the 12 GeV proton Synchrotron

One of the most challenging experiments in particle physics was completed last December at East Counter Hall in KEK. That was the E391a experiment to measure the decay branching ratio of $K_L^0 \to \pi^0 \nu\nu$. E391a was the last particle-physics experiment using the 12-GeV proton-synchrotron, which terminated its operation in December 2005.

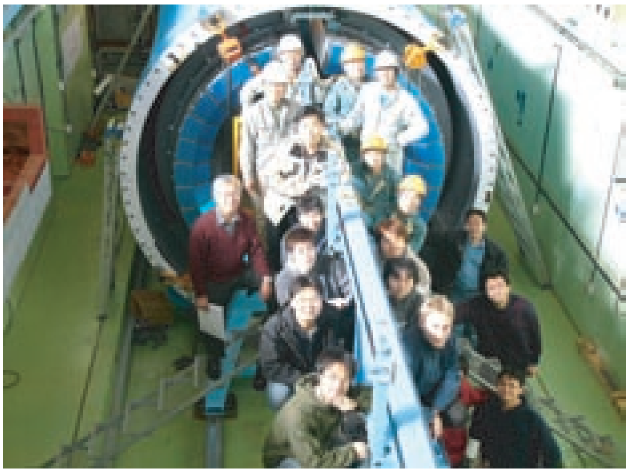
The decay $K_L^0 \to \pi^0 \nu\nu$ is expected to be extremely rare as the branching ratio is predicted to be 10^{-11} by the Standard Model. All the particles produced by the decay are neutral in electric charge, which are hard to be detected. Hence, no dedicated experiment had been carried out before, although its uniqueness was pointed out in 1989.

The decay $K_L^0 \to \pi^0 \nu\nu$ is a pure and simple process without the complication from the ambiguity of strong interaction corrections. Its measurement provides us the decisive answer to several problems of particle physics, such as the imaginary part of the transition amplitude from down to top quarks, the effect of super-symmetry and the additional source for CP violation. E391a detector, which was installed in a large volume of vacuum chamber (Figure below), was constructed in February 2004. Figure on page 10 shows the members celebrated a successful installation of the main barrel calorimeter. The data collected so far are under analysis.



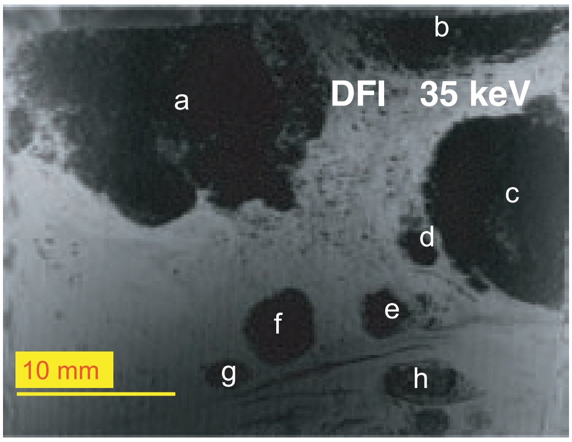
E391a detector

E391a collaboration is composed of 60 members from 11 institutes from five countries (Korea, Russia, Taiwan, USA and Japan).



At the final stage of installation

Professor ***Takao Inagaki***, who was the spokesperson of the E391a experiment, has stayed around the 12-GeV proton synchrotron for thirty years. E391a is his second experiment of rare K-decay since E137 to search for $K_L^0 \rightarrow \mu e$ in 1989. He loves sweating with young researchers.



Size of the specimen was 26mm × 22mm × 2.8mm.
Cancer nests are clearly shown.
(See article on page 8).

The Electronics Facility

The Electronics Group has been involved in many experiments in and outside of KEK including big international collaborations. We have been kept busy since commercially available electronics are often inadequate for experiments and most group can not afford to develop electronics by themselves. In addition to the circuit development work, we operate electronic component stockroom and electronics equipment pool.

Since the start of KEK some 35 years ago, we have been developing various circuits and electronic modules (mostly in NIM and CAMAC formats). Most of them are still in use. During the TRISTAN period, higher reliability, lower cost, higher packing density were the mandatory requirements. A group called Data Acquisition Development (DAD) Group was formed to design and produce electronics for the TRISTAN experiments. DAD members were people from TRISTAN experiments and computer specialists in addition to the KEK Electronics group. The group designed a system called the TKO system. It covered good portion of TRAISTAN electronics and then was adopted for Proton Synchrotron experiments afterwards. In general, we do the R&D part and outside vendors do the mass production according to our design. In post-TRISTAN era, we started to adopt the technologies of advanced telecommunication and high-tech consumer/ industrial electronics such as VME for example. Although there are off-the-shelf electronics that can be used in experiments, they do not fulfill all the requirements for experiments so that we will stay busy in a future. We have been participating in many experiments at KEK-PS and TRISTAN, we currently involved in a neutrino oscillation experiment (K2K), a B-meson experiment (BELLE), and a rare K-meson decay experiment, as well as a J-PARC project and an ATLAS experiment.

KEK electronic parts stockroom and KEK Electronic Equipment Pool (KEEP) have been under our responsibility for 30 years. The electronic parts stockroom has been appreciated for the standardized and quality-assured parts for higher reliability and much lower price tag with no waiting for delivery, all of which have proven to be vitally important for experiments. Over 1000 kinds of parts are available through a computer inventory system. In addition, we hold the Circuit Committee meetings several times a year to respond to user needs and for improvements. KEK is an inter-university research institute. The KEEP offers over 10000 units including modules, crates, power supplies and so forth so that researchers from universities often do their experiment without bringing in any electronics from outside unless they need very special ones. Taking out procedure is made very simple along with a barcode ID attached on each unit. These labor saving effort has paid off and despite of the large number of units we have to deal with every day, it is not taking up much man-power from us so that we can concentrate our effort for circuit research and development works.

Circuit Development

Up to now, systems based on NIM, CAMAC, TKO and VME modules have been developed.

We have been very conscious about reducing the development cost and time, making use of readily-available technologies in anything from sensors to computers. We regularly survey outside technologies. These effort enables us to spare time to improve members capabilities and experiences. With regard to the data processing system, development of the "COPPER" system is almost completed with the assistance of domestic and foreign collaborators. Based on this system, a sensor reading system that uses a network, PCI bus, LINUX, VME, and Euroracks from consumer technology is under consideration. This will facilitate towards lower purchase and maintenance costs. For front-end electronics and their implementation technology as well as for rear-end electronics, very high integration is essential. We have developed a technology in bipolar and CMOS integrated circuit technology. Regarding the development of some ASICs, collaboration with other universities and research organizations is underway. Regarding implementation technology and its developmental progress, we are concentrating on the possibility of using a multiplayer, flexible PCB with a low mass metal in sensor production.

Direct contact with researchers makes us fully aware of what kind of circuits are needed in a future. It is the closeness to researchers that counts. In the mean time, we will be updating our technology for the future.

The Author of this article, ***Dr. Manobu Tanaka*** has been the head of the Electronics Facility since 2000.

Tempura – the Japanese taste

Tempura is a simple dish. Just deep fry sea food or vegetable coated with batter, a mixture of flour, egg and water. Any one could come up with such cooking method. In fact, it does not look much different from, say, Fish'n Chips. So why do I brag about it? The fact so many people love the taste of tempura should mean something. Famous Charles Chaplin, for example, was known to be crazy about Tempura.

The hotel he stayed in and the ship he traveled with were selected on the basis of the skill of the tempura chef of the hotel/ the ship. I can believe it. Tempura could be very addictive. Taste of tempura can be heavenly when cooked properly. The same material cooked by another way may not give so much delight. It can also be so badly done so that you would rather throw it into a garbage bin without touching. The dynamic range in taste is astounding in case of tempura. The history of tempura does not go back very far. It became a very popular food in Tokyo (by then called Edo) around the 17th century when cooking oil became available at a reasonable cost. It has been a popular dish in Japan since then.

Not far from KEK is a little tempura restaurant. Mr. Masataka IWAMOTO (picture above), the owner/chef is in charge on everything here. Since the taste of tempura is at its peak within half a minute or so after being fried, the chef will cook right in front of you and serve you directly. With his watchful eyes, he will determine the exact timing to start cooking the next piece so that he can serve you at the moment you would be ready for it.

It should be eaten right away as the great taste quickly deteriorates into a taste of an ordinary food.

Cooking procedure for tempura is simple. Only the parameters he could control to bring out the best taste out of the particular material are the size and shape of the material, the quality and the amount of batter, the temperature of the oil and the cooking time. To become a good tempura chef, it will generally take 5 to 10 years of apprenticeship in addition to his/her born-with talent. One would wonder why just deep-frying something should take that long to acquire the art.

Well, you can watch him doing it and try it yourself after watching his act. You may get something that looks similar, you will soon recognize the incredible difference in taste. It is just like a magic. Although the same cooking procedure is followed for fish, shrimp, scallops, vegetables and so forth, each gives distinctive taste and flavor. The thin batter prevents flavor and moisture to escape from the material and enhances the taste of the original material.

The taste of the thin outside crust never dominates but is a nice compliment.

I should caution you that not all the restaurant in Japan serve such Tempura Supremo. Most chefs could provide acceptable taste but not so good to make you astonished. So, Mr. IWAMOTO is one of the gifted chefs who could make diners so happy. He would even adjust the oil temperature according to the taste of the particular customer when there are few customers in the restaurant. He would be unhappy if a customer can not appreciate his art. He will be unhappy if a customer comes in with strong perfume, which would spoil the nice smell of his tempura. He will be unhappy if a customer would be keep talking so that his tempura is left untouched. However, he is not a stubborn unyielding person and would not show such feeling against a customer. He is very talkative and a fun person to be with. He understands the meaning of life, you see...

I will tell you how to distinguish a good tempura restaurant from a bad one. A good tempura restaurant is clean. The air is not filled with burnt oil smell. Chef(s) stands right in front of a bar counter where customers sit so that the chef can observe you and serve you with ease. And the faces of customers are filled with satisfaction. One problem is that such tempura restaurant could be as expensive as an expensive French restaurant in New York.. Fortunately, his place is not that expensive so that we can enjoy the taste without worrying about the bill so much. Well, he is an exception. I would think that his tempura alone could be a sufficient reason for you to come to KEK. Bon appéit! (T.K.O.)

2005

August 19

"KEK Communication Plaza" opened.
To respond to increasing number of visitors, a hall in Kenkyu Honkan Building was totally refurbished so that self-guided tour is more visitor-friendly. KEK Public Relations Office has been working hard to further improve the exhibition hall for visitors.

September 20

Meeting of ILC Asia Region took place in KEK

October 9

Concert to commemorate International Year of Physics. KEK hosted an afternoon of lecture and concert. Nobel laureate Professor Koshiba gave a lecture and a violin/piano concert followed. Nova Hall at the center of Tsukuba City was filled with near 1000 audiences.

October 13

Deputy Minister of MEXT visited KEK and toured through various facilities.

October 17-21

The 10th Neutron School for young researchers. Lectures and hand-on experience on KEK Pulsed Neutron Source and JRR -3M Neutron source were given to 21 participants.

November 3

To improve the quality of bread in Tsukuba, Bread Tasters of Tsukuba (BRETT) group started rating breads from various bakeries in Tsukuba. Not only this made a positive impact to bakeries, but resulted a bakery to start delivering decent quality baguettes to KEK Grocery Store. Most of the BRETT members are KEK related.

November 8-9

Visitors from CEA Saclay Center. Researchers headed by Professor J. Zinn-Justin of CEA (French Atomic Energy Commission) Sacrey Center visited KEK.

Novemver 17

Installation of magnets in J-PARC 50 GeV ring started.

November 21-22

The third HEP Data Grid Workshop. KEK Computing Research Center hosted the 3rd workshop for GRID computing during November 21st and 22nd, 2005 at KEK.

This workshop series have been held once a year since the year 2003 to promote Grid in Accelerator Science Field in Japan. This time, they focus on the deployment and operation experience for Data GRID middle ware, such as LCG. The detail of the workshop will be on the web page, https://www-conf.kek.jp/hepdg/

November 24

Bell accumulated 500 inverse fempt barn data.

December 12-15

Harvesting thatches. Japanese houses used to have thatched roofs surprisingly similar to that of Europe. Some 1000 bundles of stalks grown around the KEKB ring area were harvested by over 30 people who have been working to preserve the thatched roofs of old Farm houses.

December 19-22

KEK Winter School 2005. This school is for students in graduate schools (masters degree course). Lectureres were Hikaru Kawai of Kyoto University, Takeo MOROI of Tohoku University, Mihoko NOJIRI of Yukawa Institute for Theoretical Physics (Kyoto Univeristy), Makoto Kobayashi of KEK and so forth. 40 students were participating.

December 20-21

B-Lab Program participated by High School students in KEK. Belle experiment data have been open to public and the challenge of the participants is to analyze the data hoping to find a new particle. This educational program offers high school students to experience the real thrill of being a physicist. Since the start of this program in 2004, over 200 participants enjoyed the experience.

December 28

Operation of the 12 GeV PS was terminated. The 12 GeV PS ring had been the workhorse since 1972. It offered meson beam for meson experiment as well as for cancer treatments, neutrons for materials structure science and primary proton beam for all sorts of (by then) high energy physics researches and beam tests. Its major contribution in recent years was the neutrino beam for K2K experiment.

2006
February 24

J-PARC 50 GeV synchrotron construction completed the circle of tunnel.

KEK Concerts Series offer mostly-classic music for KEK employees, visitors and people in neighboring communities. Recent concerts were: Ryoko Fukazawa Piano Recital (July 15), Oboe/Fagot/Piano Trio (Sept.30), Japanese Harp (KOTO) and Guitar Duo (November 16), Violin and Piano Duo (March 10). The KEK Concert series are getting good attentions.

Editor's Comments

We are sorry for such a long time delay to get this issue published. The transition (see page 2,3) from being a laboratory directly under the government (MEXT) to being a semi-independent cooperation was a drastic one, if not traumatic. But, we came through the transition without catastrophe, although sweating a lot. The editor feels that the transition will have more positive effects than negative ones mainly because we are under a new regulation that gives us more freedom in managing KEK while we accept far more responsibility for survival. We expect that it will take a few more years until the transition is completed to the extent that we can make the best out of this change. KEK visitors will soon find dormitory condition significantly improved, as we can get major renovation going (which is still in progress). Of course the charge for dormitory rooms and apartments had to be raised significantly (this also was not possible before) to make ends meet. But the charge after the big raise is still significantly less than that for accommodations outside of KEK.

J-PARC project is getting to the stage that we can almost say we will be ready soon for real experiments. We will be reporting on the J-PARC in more detail in future issues.

Photo credits:
Front cover photos were taken by Mr. Hiroshi Ito of JAEA, who has been responsible for the picture records of J-PARC construction process.
Back cover photo was taken by Mrs. Tatiana Lunin, the wife of a visiting researcher to KEK from Russia. The sunrise picture is related to the new start of KEK as an independent corporation.

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