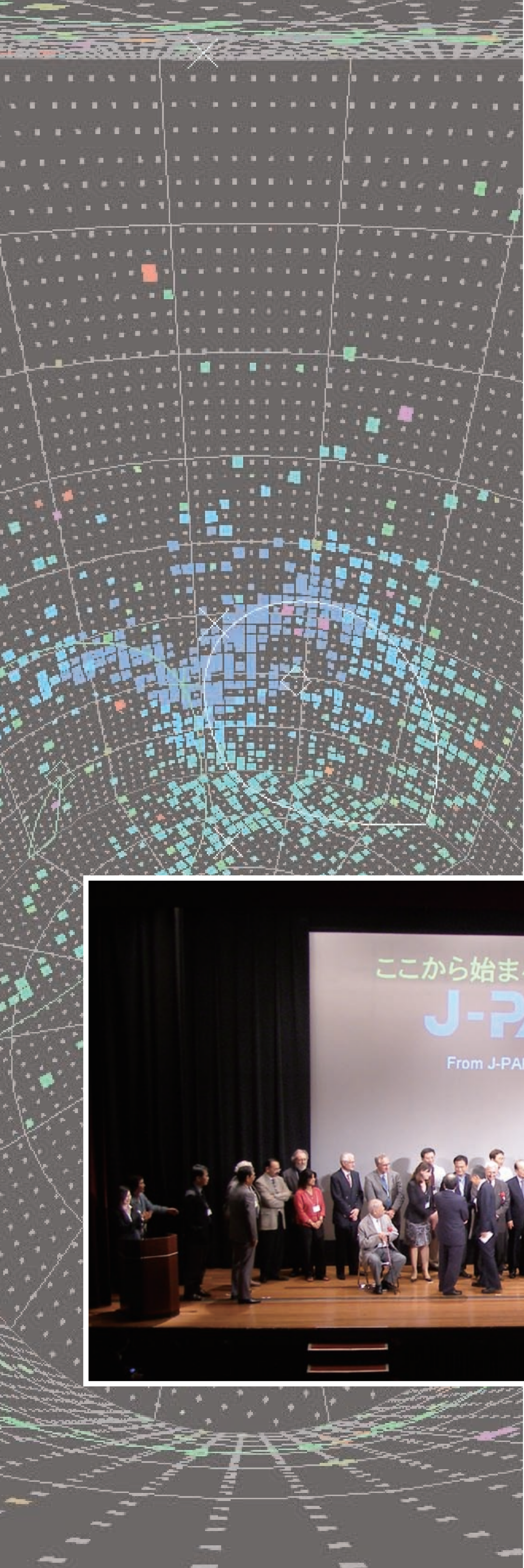
J-PARC

ANNUAL REPORT 2009



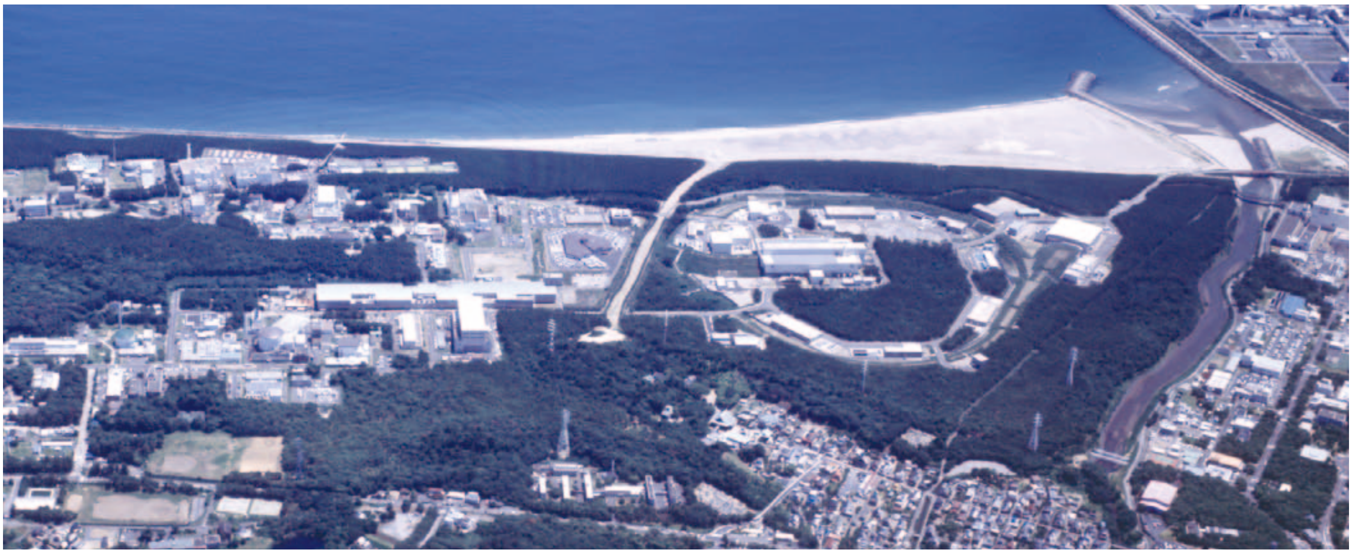
Japan Proton Accelerator Research Complex

Eminent figures including two Nobel Laureates, Makoto Kobayashi and Masatoshi Koshiba, on the stage of the inauguration ceramony of J-PARC, which was held at Kudan Kaikan in Tokyo on July 6, 2009.

First neutrino event mesured at Super-Kamiokande, which is located 295 km away from J-PARC.

J-PARC Annual Report 2009

Contents



Preface

This is the second Annual Report of the Japan Proton Accelerator Research Complex (J-PARC), which covers the period of fiscal year 2009. During this period, J-PARC was finally completed, with neutrino beams in April of 2009 (after the neutron, muon and kaon beams in the preceding fiscal year). We have moved, for the first time, into full operational mode.

The first achievement in this fiscal year was the successful operation of 120 kW at 3 GeV. Prior to the summer of 2009, we have suffered for a long time from an RFQ problem (involving one of the Linac elements). Utilizing the summer shutdown we improved the vacuum of the RFQ system and finally solved the major problem. At this moment, the availability of the accelerator is up to 90-95%.

Also, the first neutrino beam was detected at SuperKamiokande in February 2010. Since then, the neutrino data acquisition has been progressing rather smoothly.

In the hadron hall we obtained a very good kaon separation with a static separator. A high efficiency for slow extracted beams of up to 98.5% was reached in the Main Ring. Many experimental groups are preparing to commence data acquisition using these long-spill beams from the Main Ring.

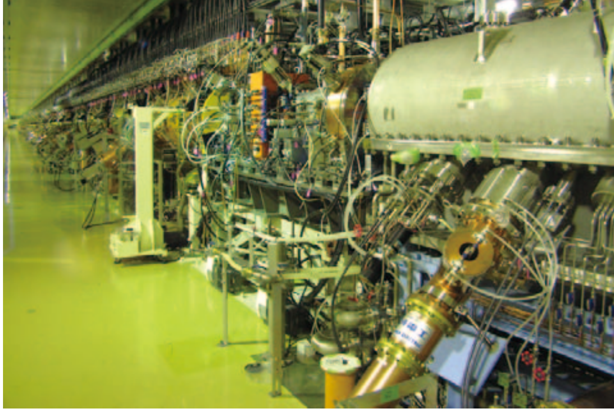
Concerning the 3 GeV, a smooth operation of beams of up to 120 kW produced many productive data for both muons and neutrons. Specifically, the neutron beam lines have already produced data in several areas including magnetism, distortion, complicated crystal structure, protein and other molecular data, etc. Some data have already been published and many other results are being prepared for publication. Currently, 18 out of 23 beamlines have already received funding for neutrons, while only one beam line out of four has been funded for muons.

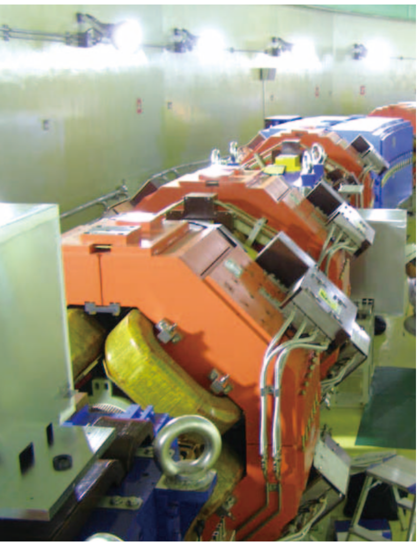
One of our goals is to make this facility available internationally. We made a lot of effort to internationalize the J-PARC facility. First, the Users Office has been strengthened. We are building new lodging (about 50 dorm rooms will be completed in December 2010). We are asking the local Village and the local Government to cooperate with us in accommodating a large number of foreign visitors. In addition to the internationalization, efforts have been made as well to open this facility to industrial companies. Finally, the central Government has been constantly supporting J-PARC by increasing the amount of funding.

From now on, our most important mission will be to produce the best scientific results from J-PARC.

Shoji Nagamiya
Director of the J-PARC Center

Linac
3 GeV RCS
50 GeV MR





Accelerators

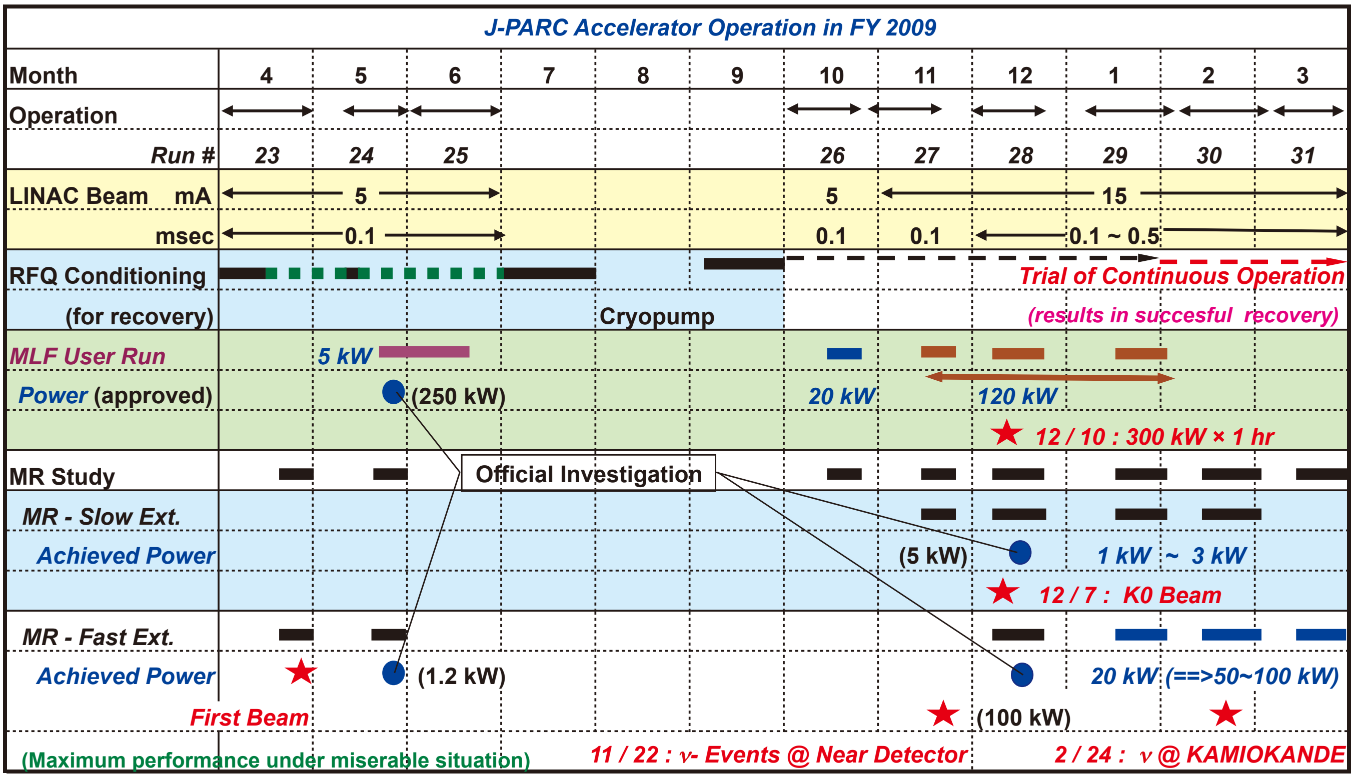
Overview

The main events of the accelerators' operations are summarized in Table 1. The first half of the time was spent on conditioning and improvement against the discharge of the radio-frequency quadrupole (RFQ) linac with efforts to show a maximum performance under the miserable situation. This effort resulted in steady progress of the recovery from the discharge and the 120-kW operation of rapid cycling synchrotron (RCS) for Materials and Life Science Experimental Facility (MLF) user runs started in November 2009. Then the 300 kW operation (2.7×10^{13} protons/pulse) for MLF was successfully demonstrated on December 10th. This operation was limited to one hour, from 10:45 to 11:45, because the maximum intensity officially permitted was 250 kWh in every hour.

The beam services of Main Ring (MR) started in October to Hadron target and in November to Neutrino target, the typical beam power levels were 1.2 kW and 20 kW with 6 bunches, respectively. The tuning of MR-Fast Extraction (MR-FX) toward 100 kW power had been in progress. On February 27th, 7.3×10^{13} protons were extracted to the Neutrino target that corresponds to 100 kW if operated with a repetition period of 3.52 s.

The availability was ~ 92.4 % in MLF user runs from November (Run #27) to January (Run #29) for the total beam-on time of 842.3 hours. The statistics of accelerators' operation are 253 days in total, 69 days for MLF user runs, 24 days for Hadron and 24 days for Neutrino.

Table 1. Operation schedule and typical achievements in fiscal year 2009.



The costs and issues were reinvestigated for the designed goal of 1 MW in RCS and 0.75 MW in MR-FX by taking into account the construction time and the necessary progress in the understanding and control of the beam. The essence is summarized in the following figure and table.

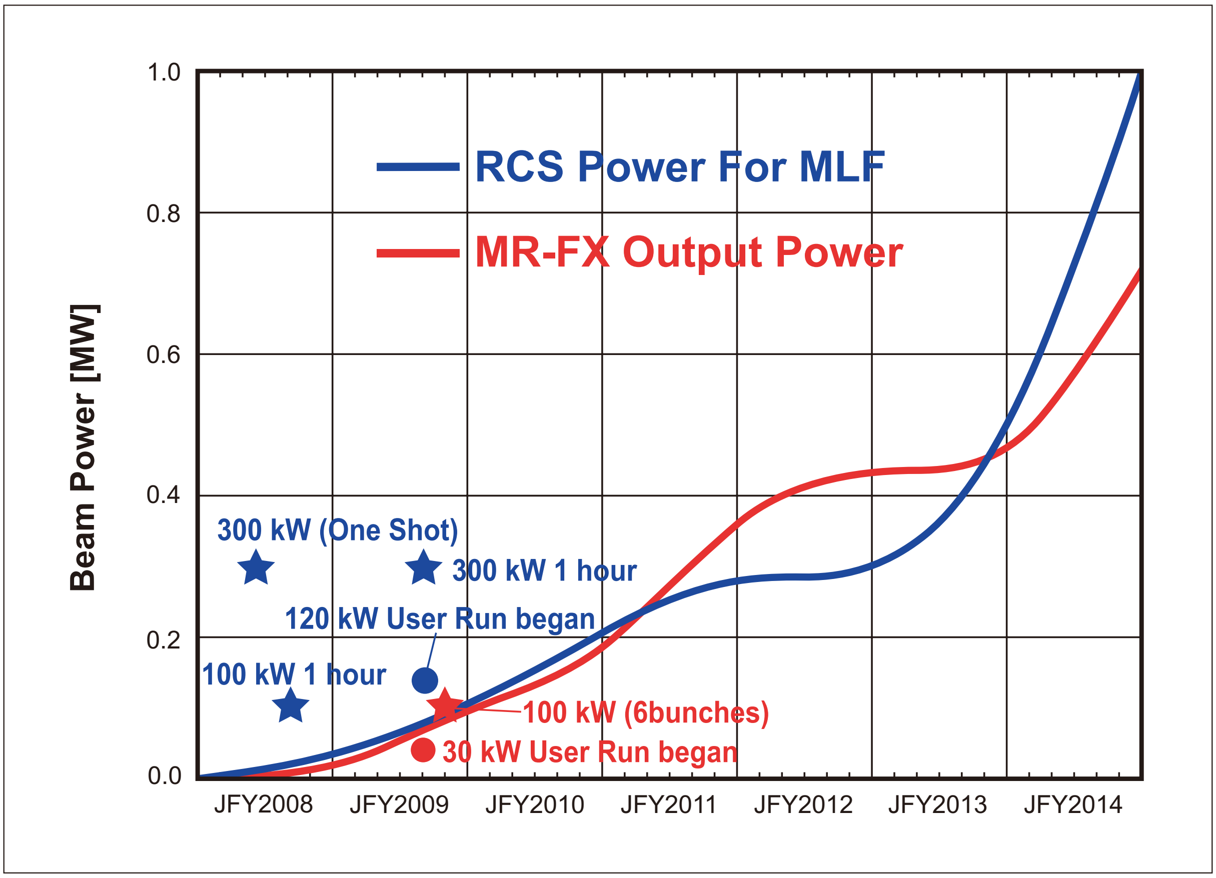


Fig. 1. Road to 1 MW in RCS and 0.75 MW in MR-FX.

Table 2. Schedule of Linac, RCS and MR.

JFY		2008	2009	2010	2011	2012	2013	2014
LINAC	400 MeV	Components Construction				Installation High Power Test	Beam Commissioning	Operation
	[Peak Current 50 mA] System			Construction		Installation		Operation
RCS	400 MeV Inj.			Construction & Tuning			Beam Commissioning / Operation	
	Correction Mag.		Machine Study & Design		Construction / Installation / Beam Commissioning / Operation			
	12th RF Cav.				Construction & Installation		Beam Commissioning / Operation	
MR Installation	RF Cavity	Cavity #1 -#4.	Cavity #5.	2nd Harmonic Cav. #1		Cavity #6. 2nd Harmonic Cav. #2	2nd Harmonic Cav. #3	
	Injection				Septum Magnet #1	Septum Magnet #2	Many issues to be solved	
	Extraction			Kicker Magnets	Septum Magnets	Septum Magnets		
	Collimator			3-50BT	Ring			

LINAC

The linac beam test started in November 2006 and a 181 MeV beam was successfully accelerated in January 2007. Since then, the linac has delivered beams for commissioning of the linac itself, downstream accelerators and research facilities. Trip rates for the RFQ, however, unexpectedly increased in September 2008, and this situation has been disrupting the operations of the user runs.

We assumed that the problem came from damages done during the operation and conditioning, because previously we had been operating the RFQ for hundreds of hours without any trouble. After the trouble, we applied several measures such as changing the RF interlock setting, better suppression of unexpected beam injection, reduction of vane voltage and improvement of the vacuum properties.

In March 2009, we added two ion pumps to the RFQ, one turbo molecular pump in the LEBT (Low Energy Beam Transport), an orifice in the LEBT to reduce gas flow, and a moisture filter in the hydrogen gas system of the ion source. For diagnostics we installed a cold cathode gauge and a quadrupole mass analyzer. We undertook a second vacuum system improvement during the summer shutdown. We replaced the oil rotary pumps with oil-free scroll pumps. Also, we replaced the old LEBT chamber with a new clean chamber with a divider plate which had an orifice for differential pumping. A cryopump was installed on the RFQ side and a 1500 l/s turbo molecular pump on the ion source side. In July we began a 10 day baking process to accelerate the degassing (see Fig. 2).

To reduce the unscheduled beam shutdowns, which the users naturally dislike, the conditioning days for RFQ clean up are scheduled in the operational calendar. At first, we set cycles of 2 or 3 days of operation followed by one conditioning day. In November, based on the stable operation of the RFQ at 20 kW in October, we tried to increase the beam power for the MLF user operation; increasing the beam pulse length from 0.1 to 0.2 ms, and the peak beam current from 5 to 15 mA, thus reaching a 6 fold increase from 20 to 120 kW. We were able to deliver a beam to MLF users without incident. In December we demonstrated 300 kW operation for one hour to the MLF. The linac and the RFQ delivered the beam with a pulse width of 0.5 ms, which was the full design specification. The results verified the restoration of the RFQ as well as the 3 GeV RCS performance.

A compromise was made during phase 1 by limiting the linac energy to 180 MeV. Now, funding has been secured to increase the energy of the linac to 400 MeV as originally intended. This is one of the requirements for achieving the predicted 1 MW power level in the RCS or 0.75 MW in the MR. The upgrade process is under control and the installation is planned for the summer shutdown in 2012. Procure-

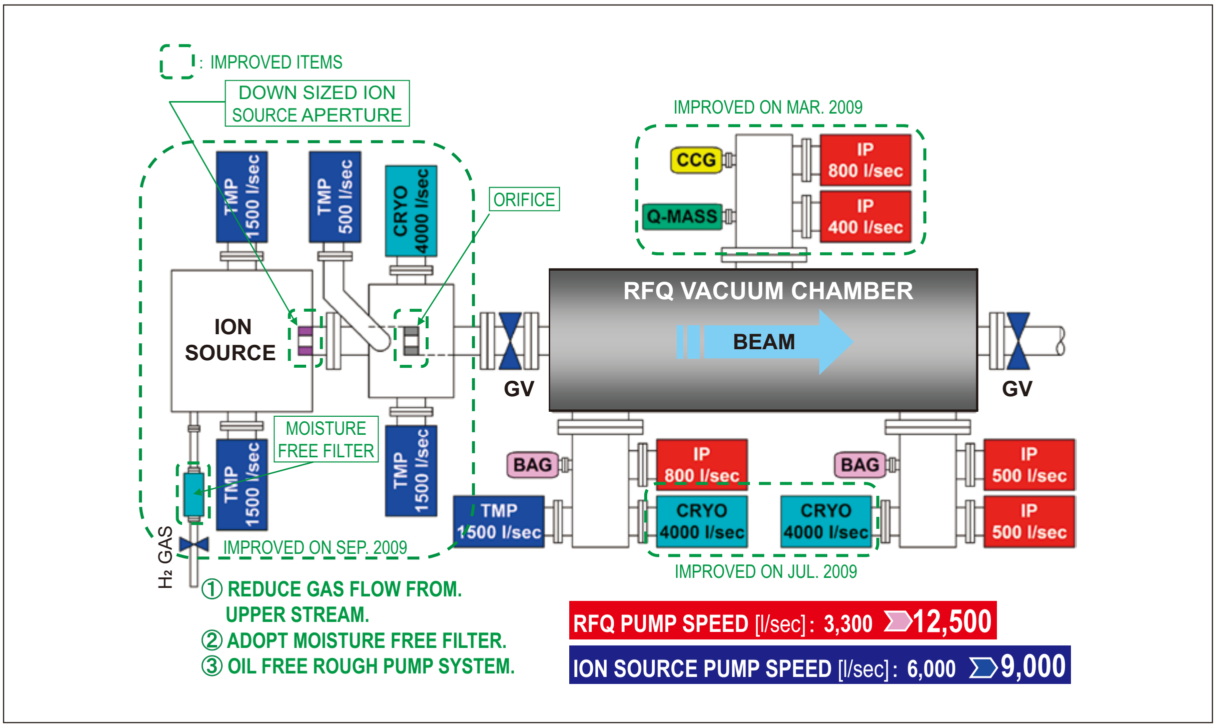


Fig. 2. Diagram of vacuum system.

ment and fabrication of the major components of the 400 MeV energy upgrade are being performed. The R&D module consisting of accelerating and coupling segments with tuners has been built. Off-line high-power tests of the annular-ring coupled structure (ACS) module have been successfully performed. These tests validated the fabrication technology based on simplified machining of the accelerating cells developed for the mass production of the ACS accelerating cells. In addition, the operation of the tuners at high-power level has been successfully demonstrated.

Table 3. Evolution of RFQ and Linac.

Date	Event	RF/beam widths (μs)	Peak cunent (mA)	Pwr@MLF (kW)	Condition or Cont. op. days
Sept. 2008	Trip rate increase	200/100	5		Very Poor
Nov.	Improvement: interlock, conditioning, etc.				
Dec.	MR study and MLF user program after conditioning	155/100	5	20	Poor
Jan. - Feb. 2009	Conditioning and operation user program was cancelled	155/100	5	20	Poor
Mar.	Vacuum system improvement, Conditioning procedure changed				
April.	Tank level was decreased from 102 to 95%				
Jun.	MLF user program	155/100	5	20	2
Jul. - Sept.	Vacuum system improvement, Cryo, Pumps, baking, oil-free pumps				
Sept.	Conditioning				
Oct.	MLF user program	155/100	5	20	2
Nov.	MLF user program	255/200	15	120	2 to 3
Dec.	MLF user program	255/200	15	120	2 to 3
Dec.	MLF high power demonstration (1 hour)	555/500	15	300	
Jan. 2010.	MLF user program	255/200	15	120	3
Jan.	Demonstration of continuous operation for 6 days	255/200 -555/500	15	120	6
Feb.	MR and HD/NU study, beam delivery	255/200 -555/500	15	Cancelled	7 to 6
Apr. - May	MLF and MR(NU) beam delivery	255/200 -555/500	15	120	13 (Max.)

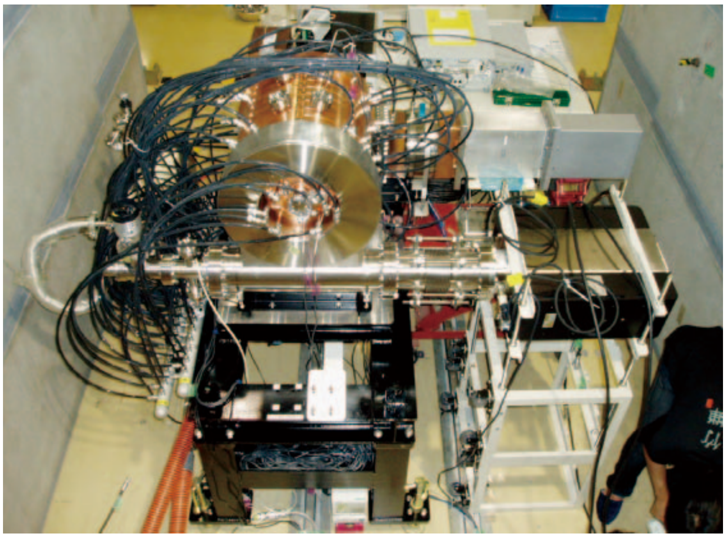


Photo 1. R&D module of ACS.

RCS

The RCS has been operating for the neutron and muon user program at MLF since December 23rd, 2008. The RCS operations were not only supporting the MLF but also were providing beams for the MR user program. In parallel we took on the challenge to realize higher beam power operations with better stability.

Figure 3 shows the one-hour average power and the integrated power for the MLF user operation in Japan fiscal year 2009. Before the 2009 summer shutdown, the beam power was limited by the front end of about 20 kW, after that shutdown the RCS has been operating at a beam power level of more than 100 kW for MLF users. After the beam delivery operation to the MR and MLF, while the priority was given to their beam tuning, the RCS has also continued further beam studies to achieve higher beam intensity. On December 7th, 2009, the RCS reached beam power of more than 300 kW to the neutron production target with 25 Hz for 1 hour, shown in Fig. 4. There were 3 occurrences of beam drop within an hour, but the operation was eventually stabilized.

The maximum residual activation became a level of about 1.5 mSv/h after 2-weeks user operation with 120 kW and high power operation of 300 kW for 1 hour. These activations were measured through a contact on the vacuum chamber 6 hours after completion of the beam operation. Since the beam loss was proportional to the number of the stripping foil hits from beam studies and simulations, it was concluded that the large angle events with Coulomb scattering made a hot spot at the H0 branch and the entrance of quadrupole focusing magnet (QFM) at the injection section. In order to reduce these beam losses, the number of foil hits should be reduced by a transverse painting injection and by optimization of the foil size. It will be expected that with the new foil, which is to be installed during 2010 summer shutdown, the number of foil hits will be reduced to less than a half.

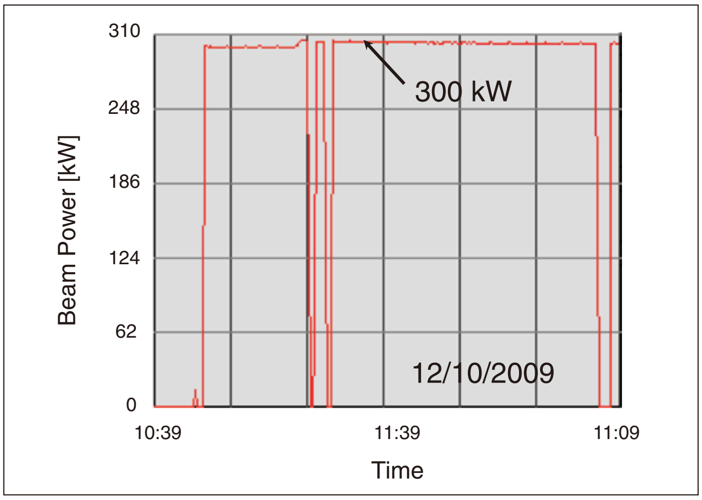


Fig. 4. High power operation of 300 kW for 1 hour.

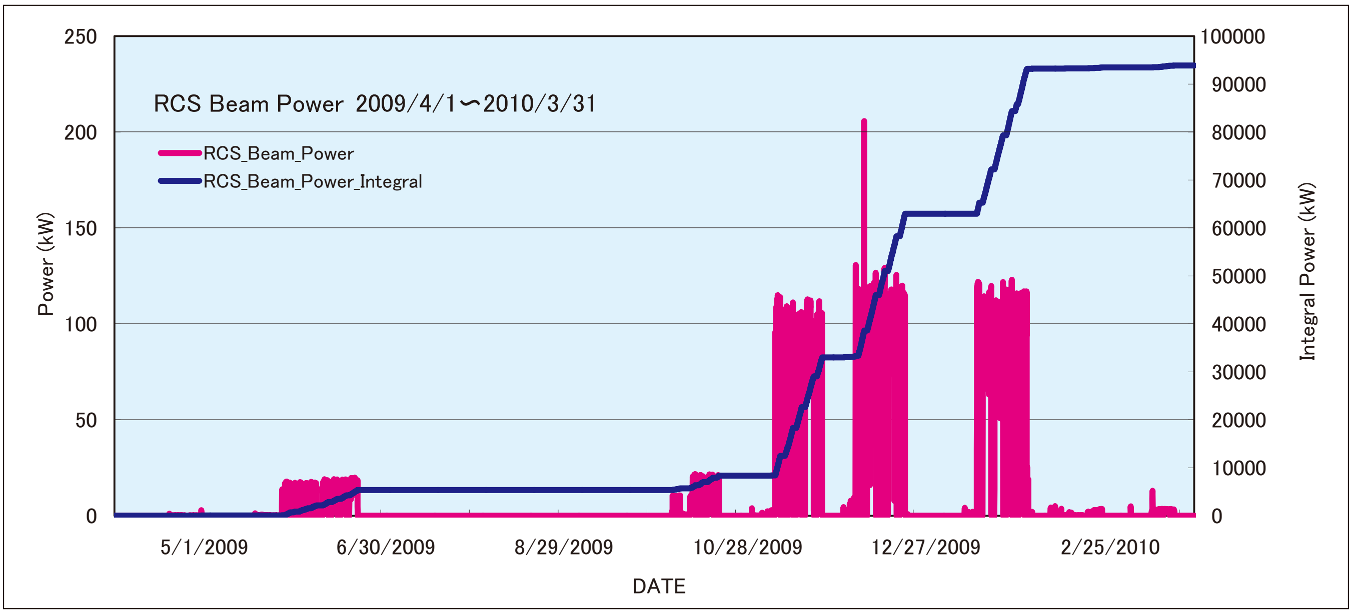


Fig. 3. 1-hour average power and integrated power for MLF user operation for this one year.

MR

The MR has three-fold symmetry and its circumference is 1567.5 m. Three dispersion-free 116-m-long straight sections are dedicated to "injection and beam collimators", "Slow Extraction (SX)", and "RF cavities and fast extraction (FX)", respectively. The MR is the first large proton accelerator that adopts a lattice configuration with imaginary transition energy. It does not have the transition crossing between the injection and the extraction energies.

The fast extraction system delivers the beam to the neutrino beam line for the T2K (Tokai-to-Kamioka) experiment. The beam commissioning of the neutrino beam line began in April 2009. After intensive beam studies of the MR and the neutrino beam line, the T2K collaboration started the acquisition of physics data in January 2010. The cycle time for the FX operation is 3.52 s including an acceleration time of 1.9 s and flat top of 0.15 s. Beam intensity of 40 kW in maximum was delivered to the T2K experiment by the end of Japan fiscal year 2009.

We have performed a demonstration of high power beam operation of the MR with single shot mode. In this demonstration, the beam is extracted to the abort line by the FX system. Figure 5 shows a typical beam intensity in the high power demonstration together with the kinetic energy of the beam. The number of particles extracted to the abort line is 7.2×10^{13} protons per pulse. It corresponds to ~100 kW if operated in the 3.52 s cycle. Beam loss is almost localized on the collimator section in the injection timing. The loss is about 7.7×10^{11}, which corresponds to ~100 W, while the design capability of the collimator currently is 450 W.

The SX system delivers the beam to the Hadron (HD) experimental facility. In the 2009 summer shutdown, we installed a spill feedback system, which consists of two types of quadrupoles and a Digital Signal Processing (DSP) system. The beam spill signal is fed into the DSP system and current patterns of the correction are sent to the power supplies of the feedback quadrupoles. The quadrupoles, named "Extraction Q" and "Ripple Q" (Photo 2) are designed to make a constant spill shape in the overall time of the extraction and to compensate the fine ripple structures, respectively. Figure 6 shows a typical beam intensity of the SX operation with the feedback system. After the beam acceleration reaches 30 GeV, the beam is extracted for 1.7 s. The cycle time for the slow extraction operation is 6 s. The extracted beam power is 1.9 kW in this figure. The maximum intensity delivered to the HD facility by the end of Japan fiscal year 2009 was 2.6 kW.

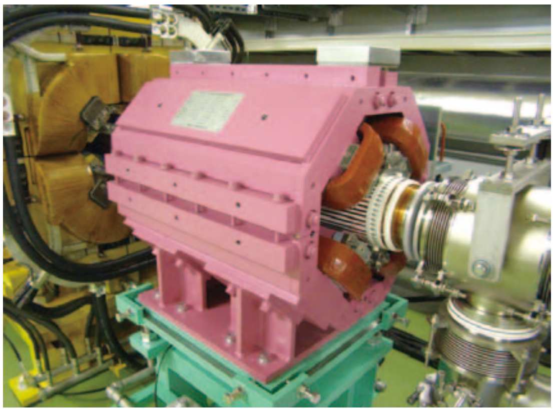


Photo 2. The newly installed RQ (Ripple Quadrupole), one of feedback quadrupoles for the slow extraction.

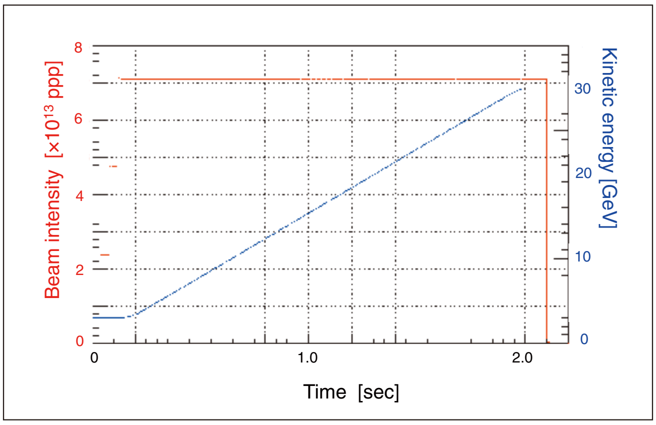


Fig. 5. Kinetic energy and circulating beam intensity in the 100 kW demonstration of the fast extraction.

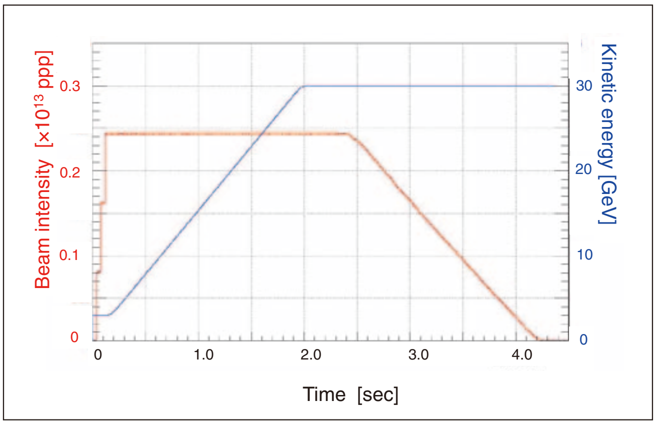
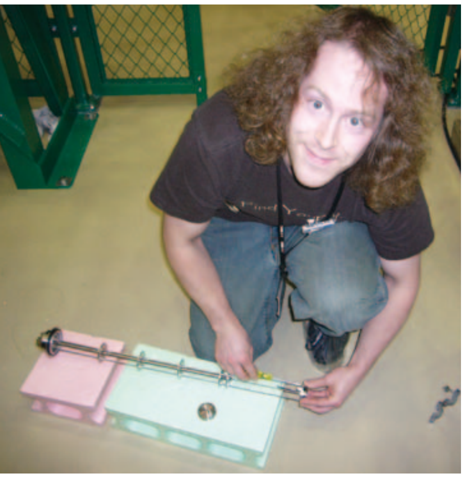


Fig. 6. Kinetic energy and circulating beam intensity in the users operation of the slow extraction.



Materials and Life Science Experimental Facility

Overview

At the Materials and Life Science Experimental Facility (MLF), 9 neutron instruments are open for general use and 3 are at the commissioning stage in fiscal year 2009. In addition, 6 neutron instruments have been newly budgeted so that a total of 18 beam lines are either working or budgeted out of 23 available ports. At the decay muon line (D-line), the commissioning was started at the D2 instrument while the D1 instrument has been open for general use since preceding fiscal year. About 250 proposals were collected through the year, more than 30% of them were from industrial users.

We are pleased to announce that since November 2009 the proton beam intensity delivered to the neutron and muon production targets was not only ramped up to 120 kW but the high availability at around 86 to 92 % was also accomplished for the user program. The 120 kW stable operation has inspired both instrumental scientists and users. Experiments with small-size samples and/or higher resolution experiments, etc., which cannot be carried out with the 20 kW beam, have been realized.

This exciting event came up on December 10th. It was an operation which used beam power of 300 kW, the highest to date. It was found that the neutrons emitted from the hydrogen moderator toward the unit at an solid angle per pulse increased up to 5.1×10^{12}, and the general purpose μSR spectrometer (DΩ1) at the surface muon experimental area recorded 4.5×10^{6}/s, (1.8×10^{5} per pulse) of surface muons. As shown in Fig. 1, the neutron and the surface muon intensities obtained at J-PARC reached at that moment the world's highest level compared with other pulsed source facilities.

Unfortunately, from February to March of 2010 the user program was cancelled due to a problem, which occurred in a cryogenic hydrogen loop for moderators. Eventually, the problem was repaired and the user program resumed from May, 2010. The year of 2009 has given us very satisfying experiences and it also stimulated us to take further steps toward achieving an operation with a high power beam.

Table 1. Beam up rate for user program in the Japanese fiscal year 2009.

No. of run cycle	Duration	Scheduled Time (h)	Availability (%)
#24-25	09/05/28 18pm - 06/22 07am	394	75.1
#26	09/10/12 12pm - 10/23 07am	183	84.3
#27	09/11/10 13pm - 11/26 07am	270	86.3
#28	09/12/08 12pm - 12/24 07am	273	92.6
#29	10/01/17 13pm - 02/03 10am	297	89.7
#30-31		Canceled	

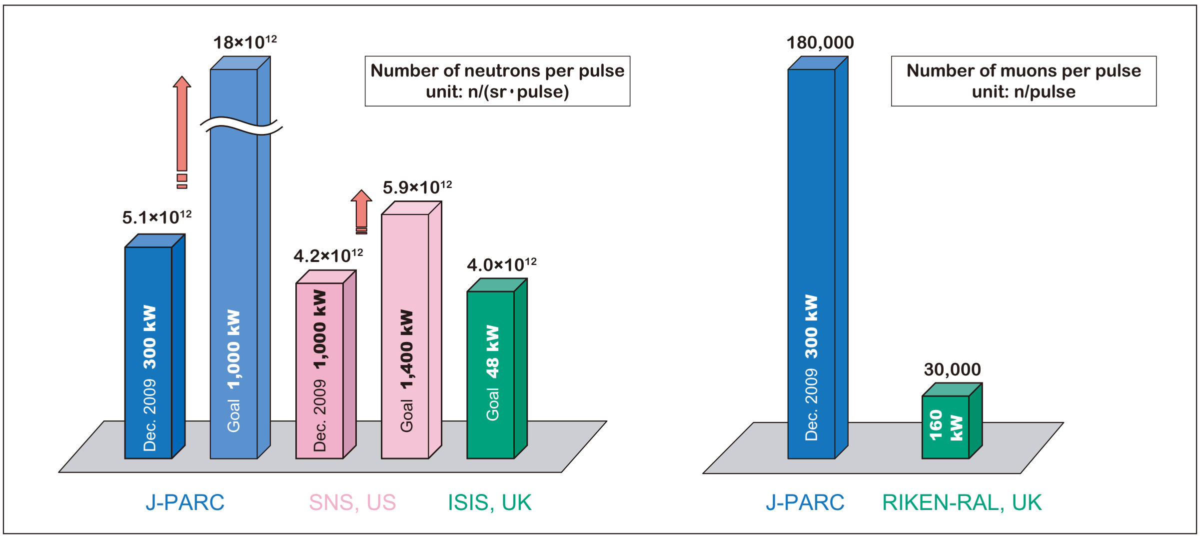
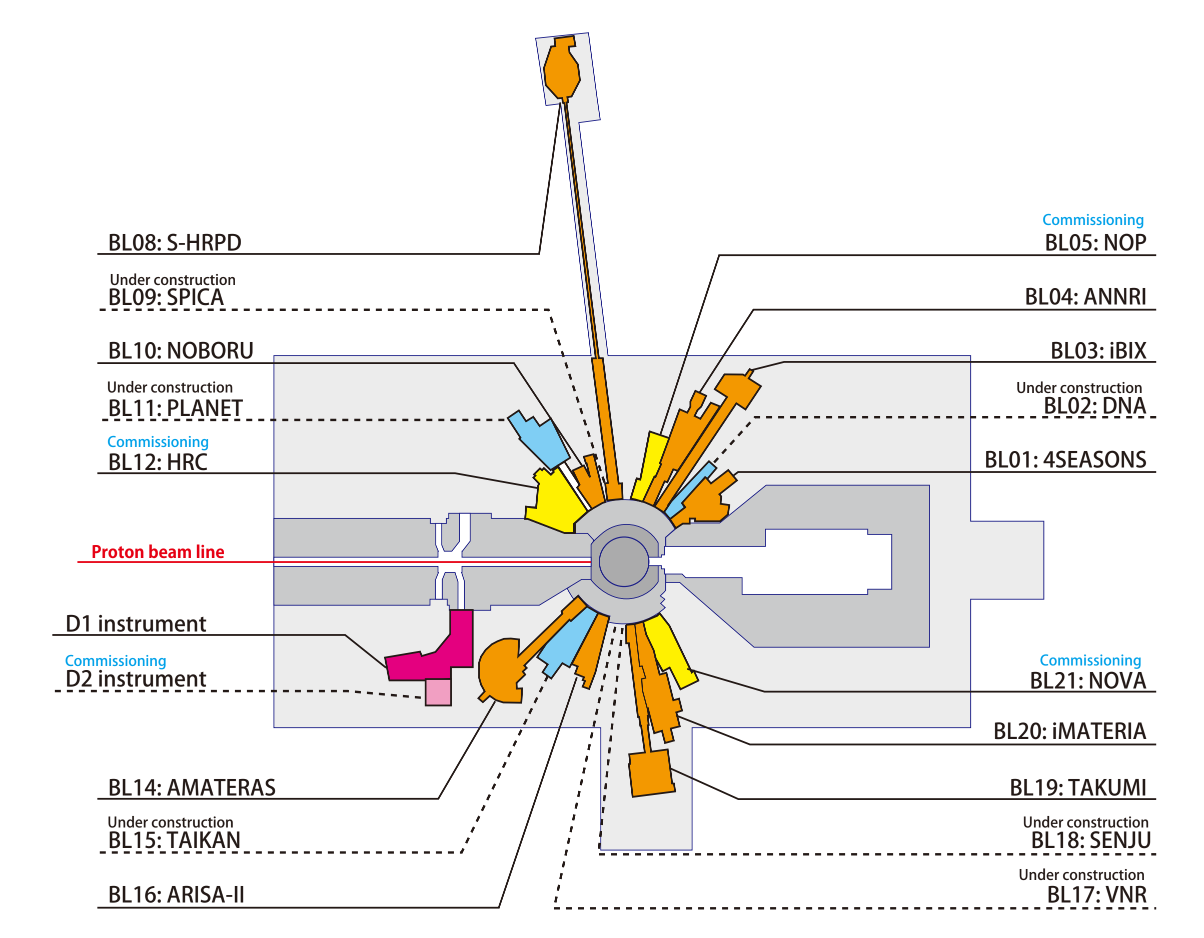


Fig. 1. Comparison of neutron and muon intensities among major pulsed neutron/muon facilities in the world (as of December 2009). Low repetition rate of 25 Hz at J-PARC compared to 60 Hz of SNS and 50 Hz of RAL is a reason for the increasing number of neutrons and muons in each pulse. An unique moderator shape and a new neutron absorbing material of Ag-In-Cd alloy also contributed the increase of the neutron intensity. The improvement of the DC separator increased the muon intensity at the D-line.



Neutron instruments

BL	Name of Instruments	Moderator	Status
BL01	**4SEASONS** : 4D Space Access Neutron Spectrometer	Coupled	In use
BL02	**DNA** : Biomolecular Dynamics Spectrometer	Coupled	Under construction
BL03	**iBIX** : IBARAKI Biological Crystal Diffractometer	Coupled	In use
BL04	**ANNRI** : Neutron-Neucleus Reaction Instrument	Coupled	In use
BL05	**NOP** : Neutron Optics and Fundamental Physics	Coupled	Commissioning
BL08	**S-HRPD** : Super High Resolution Powder Diffractometer	Poisoned	In use
BL09	**SPICA** : Special Sample Environment Neutron Diffractometer	Poisoned	Under construction
BL10	**NOBORU** : NeutrOn Beam-line for Observation & Research Use	Decoupled	In use
BL11	**PLANET** : High Pressure Neutron Diffractometer	Decoupled	Under construction
BL12	**HRC** : High Resolution Chopper Spectrometer	Decoupled	Commissioning
BL14	**AMATERAS** : Cold-Neutron Disk-Chopper Spectrometer	Coupled	In use
BL15	**TAIKAN** : Smaller-Angle Neutron Scattering Instrument	Coupled	Under construction
BL16	**ARISA-II** : High-Performance Neutron Reflectometer with a Horizontal Sample Geometry	Coupled	In use
BL17	**VNR** : Reflectometer with Vertical Sample Geometry	Coupled	Under construction
BL18	**SENJU** : Single Crystal Neutron Diffractometer under Extreme Condition	Poisoned	Under construction
BL19	**TAKUMI** : Engineering Materials Diffractometer	Poisoned	In use
BL20	**iMATERIA** : IBARAKI Material Design Diffractometer	Poisoned	In use
BL21	**NOVA** : High Intensity Total Diffractometer	Decoupled	Commissioning

Muon instruments

BL	Name of Instruments	Status
D1	**D1 instrument**	In use
D2	**D2 instrument**	Commissioning

Fig. 2. Status of the neutron and muon instruments at the MLF as of March, 2010.

Neutron Source

Characteristics of the neutron beam delivered to the users

Since 2008, through operation cycles under low beam power of up to 20 kW, a delegation of neutron measurements has been carried out at the neutron instruments for the purpose of characterizing the neutronic performance of the three distinctive hydrogen moderators arranged at the top and the bottom of the neutron production mercury target. The measured neutron spectral shape and the pulse shape were reproduced very accurately by the calculation using the PHITS code as shown in Fig. 3, proving that the neutronics design calculation was appropriate. The measured data would be useful not only for the users to understand the source characteristics but also for the instrument scientists to examine the beamline components alignment.

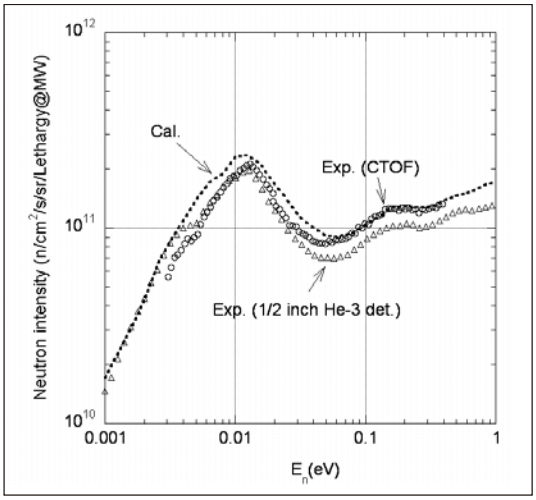


Fig. 3. Absolute neutron spectral intensity measured with a current-mode time-of- flight technique using scintillators (open circle) and a He-3 detector (open triangle). The calculated results from a Monte-Carlo particle transport code PHITS are also displayed, showing good agreement with the measured results within ±30%.

Progress of the 3 GeV proton beam transport facility.

The 3 GeV proton beam transport facility (3NBT) has been fully operational since the beam commissioning started and its reliability has been extremely high. The properties of the proton beam, such as β functions and emittances, were studied and confirmed to be very consistent with the original design values.

An activation method was applied to measure the two-dimensional proton beam profile on the mercury target vessel. The residual dose rate is thought to be representative of the beam profile, since the proton beam is very stable. An Imaging Plate has been placed on the proton entrance side of the target vessel and exposed to the radiation from the vessel for a few minutes. The map of the dose rate after the 120 kW beam operation is given in Fig. 4. It was proved that the proton beam was normally distributed both in horizontal and vertical directions and no skew was observed.

The projections of the proton beam profile onto the horizontal and vertical axes can be measured with multi-wire profile monitors (MWPM) in the proton beam window assembly. The MWPM's are continuously providing data during beam operations, which show beam distributions consistent with the results of the activation method. Their reliable data have been therefore used for proton beam diagnosis.

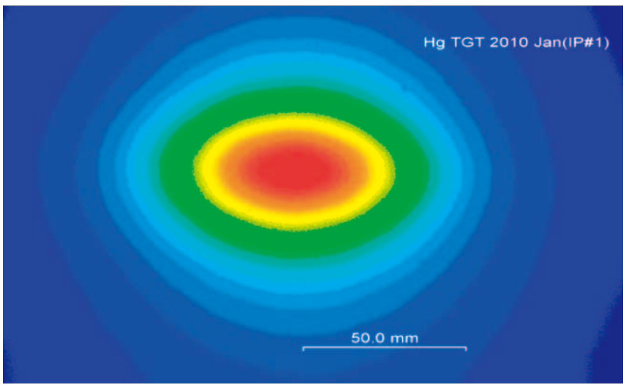


Fig. 4. Radiation dose plot on the proton entrance side of the target vessel obtained with an Imaging Plate after the 120-kW beam operation.

Demonstration of components' operation under a 300 kW proton beam

On December 10, 2009, the neutron production mercury target experienced the high power proton beam operation at 300 kW for the first time. It was a short-term test operation which took only one hour. Nevertheless, we recorded promising performance data for the target vessel and the cryogenic hydrogen loop for moderators towards the operation under the rated beam power of 1 MW. The cryogenic hydrogen loop activated its pressure control system through a passive volume control using an accumulator and a heater so that the pressure change caused by the heat deposition of the secondary particles could be suppressed as designed. The measured pressure fluctuation for the 300 kW proton beam injection was about 15 kPa at maximum, which suggested that the estimated value at the 1 MW beam operation could be lower than the design criteria of 50 kPa.

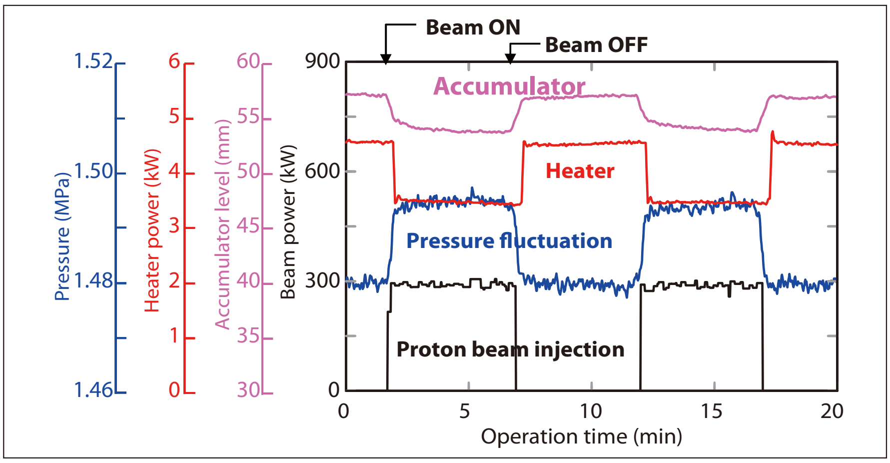


Fig. 5. Pressure control in the cryogenic hydrogen loop through a passive volume control using an accumulator and a heater at 300 kW beam operation.

Progress of the next generation Mercury target development

The microbubble injection technology for mitigating pressure waves induced in the mercury flowing target vessel has been in the process of successful development. The multi type swirl bubbler producing micro-bubbles with optimal radii less than 50 μm for the pressure wave mitigation was developed and demonstrated using the real size mercury loop at the Oak Ridge National Laboratory under a joint venture research and development of the spallation neutron source between J-PARC and SNS. The experimental results indicated that a proper amount of microbubbles could be distributed in the target vessel through the proper arrangement of the bubbler installation position.

On the other hand, the first spare target vessel (see Photo 1) and its storage container were prepared, in which the issues of the fabrication of the existing target vessel were scrutinized. The structure design of the rear part was revised to eliminate the outer shroud and the inner mercury vessel was substituted by thick pipes to reduce the fabrication cost without sacrificing safety. We are in the process of designing a next–generation target whose rear part can be separated from the front portion.

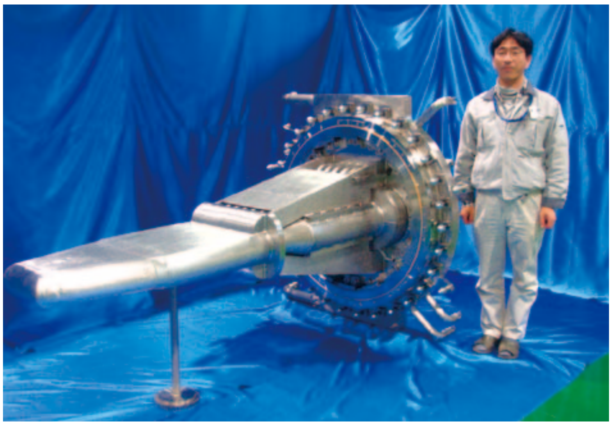


Photo 1. Spare target container.

Photo 2. Target model used for performance tests of microbubble injection device.

Neutron Science

Status of instruments

In fiscal year 2009, we called the J-PARC general user proposals for nine instruments, 4SEASONS (BL01), iBIX (BL03), SuperHRPD (BL08), NOBORU (BL10), AMATERAS (BL14), ARISA-II (BL16), TAKUMI (BL19), iMATERIA (BL20), as well as the Ibaraki prefecture general user proposals for industrial uses in iBIX and iMATERIA. The commissioning of NOP (BL05), HRC (BL12), BL21 (NOVA) is in an advanced stage and these instruments are expected to be available for general use in the next year. Construction of the following six instruments has already started: DNA (BL02), SPICA (BL09), PLANET (BL11), TAIKAN (BL15), VNR (BL17), and SENJU (BL18). Those 18 instruments are shown in Fig. 2. During the instrument construction, we made a progress in the development of the computing environment (data acquisition, analysis, device control, data base and etc.), standardization of sample environment, choppers (T0, Fermi and disk choppers) and other devices.

New measurement with event-recording data acquisition system

The event-recording data acquisition system of MLF has accomplished flexible neutron measurement. One of the examples is the repetition rate multiplication (RRM). Through RRM with the monochromating chopper, we could obtain multiple data with different incident energies (E_i's) simultaneously (multi-E_i measurement). This method allows observing a wide energy range with reasonable energy resolution. The multiplicity factor can be regarded as an additional gain factor of the present pulsed spallation neutron source (JSNS) at MLF since the single-E_i measurement was normal before JSNS. An event-recording system is essential for RRM because the flexible setting of the Time-of-Flight time channel width realizes a reasonable energy resolution of each E_i. The first demonstration result on 4SEASONS (BL01) of the RRM technique by a Fermi chopper spectrometer is shown in Fig. 6, it proved its high potential in inelastic scattering measurements. The result was published as the honorable first paper with neutron scattering data in MLF [M. Nakamura et al., J. Phys. Soc. Jpn. **78** (2009) 093002].

The observations of time-transient phenomena are also a good target of the event-recording system. Figure 7 shows an *in-situ* experiment program with changing temperature and (compressive) load (a), and diffraction pattern (b) obtained during the measurement Takumi (BL19). In this case, the heating/compression test is conducted in a synchronized time during diffraction measurement. The data are sliceable according to time, temperature, load or statistics. The event-mode system is very useful for such type of measurement in the sense that we can manipulate data even after the measurement is finished, and this will let us take a maximum advantage of the diffraction data.

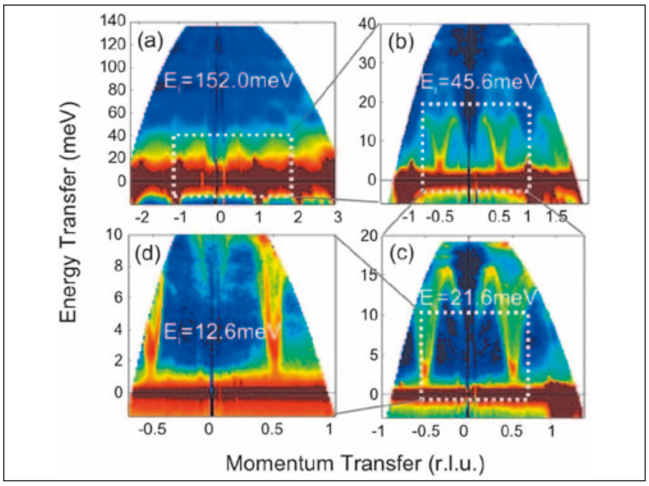


Fig. 6. Magnetic scattering spectra of $CuGeO_3$ below the spin-Peierls transition temperature measured on 4SEASONS, where the data at 4 different incident neutron energies of (a) E_i = 152.0 meV, (b) 45.6 meV, (c) 21.6 meV, and (d) 12.6 meV are obtained simultaneously. With decreasing the incident neutron energy E_i the observation range is zoomed up within three steps. The energy resolution at 12.6 meV is 40 times higher than that at 152.0 meV.

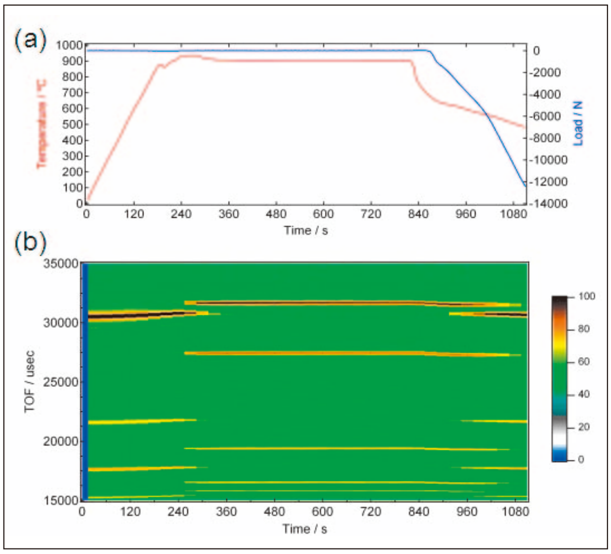


Fig. 7. Result of the neutron diffraction measurement under high temperature and compression loading. (a) Temperature and compression load profile. (b) Time-TOF 2-dimensional diffraction pattern.

Water immersion of PMMA

ARISA-II (BL16) is a reflectometer with horizontal sample geometry. Water immersion and thermal annealing effect is observed through ARISA-II. A deutrated polymer (poly (methyl methacrylate); PMMA) layer was put on a normal polymer film, and the structure changes of the surface polymer layer were observed after water immersion and thermal annealing (Fig. 8). By analyzing these data, it was shown that the annealing effect of these two treatments were almost the same (Fig. 9), even though water is a non-solvent for PMMA. [A. Horinouchi et al., Chem. Lett. **39** (2010) 810-811.]

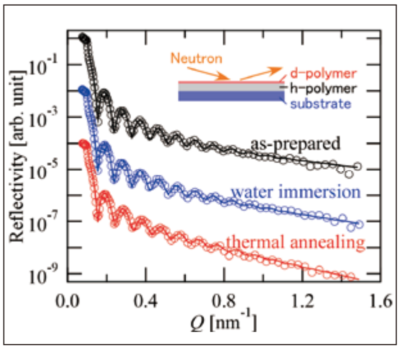


Fig. 8. Reflectivity of polymer bilayers as prepared, after water immersion, and after thermal annealing.

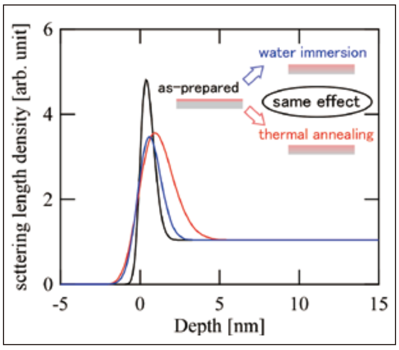


Fig. 9. Scattering length density profile at the surfaces of polymer bilayers evaluated by reflectivity analysis.

Internal strain of superconducting cable

Residual strain measurements in the International Thermonuclear Experimental Reactor (ITER) Toroidal Field (TF) conductor (Photo 3) was investigated on TAKUMI (Photo 4). The ITER TF conductor is a Cable-In-Conduit Conductors (CICC) composed of 900 Nb_3Sn strands, 522 copper strands, a central spiral and a type 316LN stainless steel circular jacket. Although it is well known that the superconducting properties of Nb_3Sn strands vary significantly depending on the presence of the internal strain, the internal strain of strands in the conductor has not been measured so far because of the cables' configuration, their location in a jacket and the low volume fraction of Nb_3Sn.

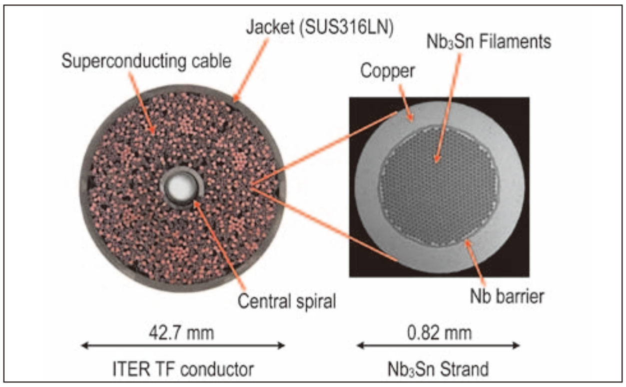


Photo 3. Cross sectional views of the ITER TF conductor and Nb_3Sn strand.

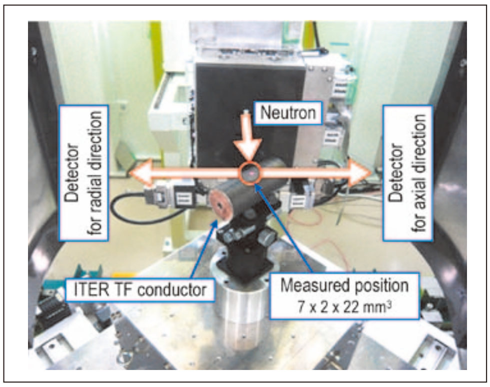


Photo 4. Experimental set-up of strain measurement in ITER TF conductor.

Due to its high intensity and low background, TAKUMI has successfully measured the diffraction peaks of Nb_3Sn phase. The observed peaks from Nb_3Sn phase were subsequently fitted to determine the lattice spacing, and then the reliable residual strains could be evaluated by comparing with the strain-free Nb_3Sn filament extracted from the ITER TF conductor (Fig. 10). Further results have been reported [T. Hemmi, et al., submitted to IEEE Trans. Appl. Supercond.]. Data from the neutron diffraction experiments herewith can be anticipated to help clarifying strain states in coils for 100 kA class fusion reactors.

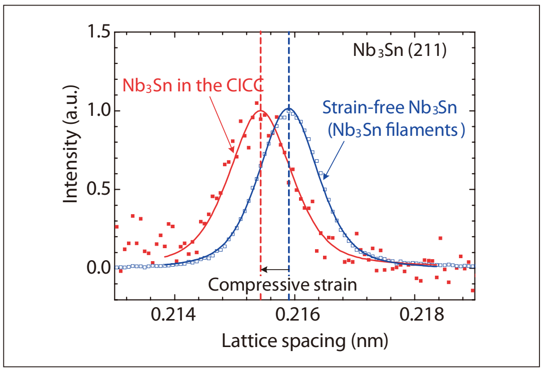


Fig. 10. Difference in the lattice spacing of the Nb_3Sn in ITER TF conductor and the strain-free Nb_3Sn filaments extracted from the Nb_3Sn strands.

Muon Science

Muon beam lines and their optimization and improvement

After the extraction of the first muon beam in the summer of 2008, the Muon Science Establishment (MUSE) group at J-PARC has been optimizing the magnet settings and parameters to maximize the intensity of the muons extracted in the Decay Muon line (D-line).

The muon beam profile monitor (MBPM), which consists of two sets of 16 scintillator strip arrays positioned perpendicular to each other (Fig. 11) is a powerful tool to determine the location and the shape of the muon beam. [P. Strasser et al., Phys. Conf. series **225**, 012050 (2010).] The advantage of the beam profile monitor is its response speed; it returns the beam profile instantly, in contrast to an imaging plate (IP) that requires an off-line readout process using a dedicated machine. The electric current settings of the 18 quadrupole magnets, 3 bending magnets and one superconducting solenoid magnet have been optimized according to the beam profile measured by MBPM (Fig. 12).

During the analysis and optimization of the beam line components, it became clear that the gap between the electric plates (10 cm) of the electrostatic (DC) separator is too small to accept the full muon beam profile. We manufactured a new DC separator with a wider gap of 20 cm (Photo 5), and installed it in the D-line in the summer of 2009.

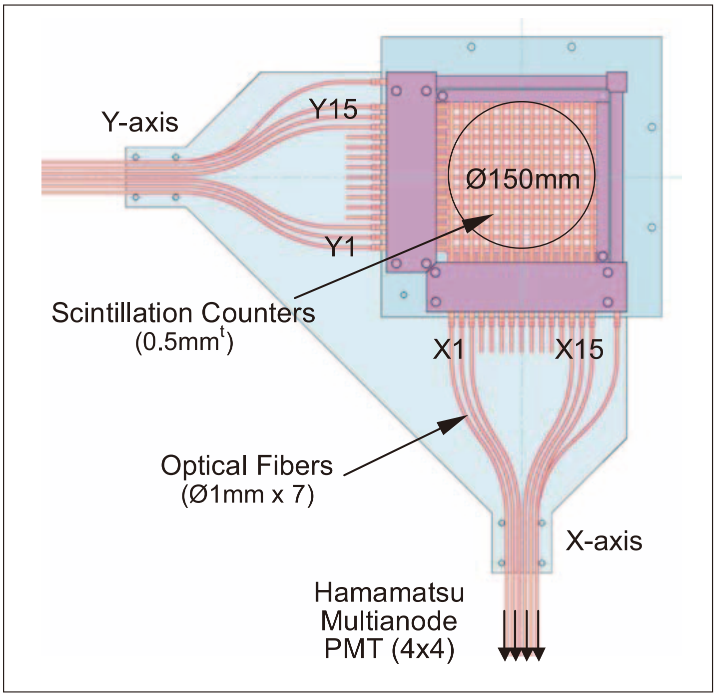


Fig.11. Schematic view of the muon beam profile monitor

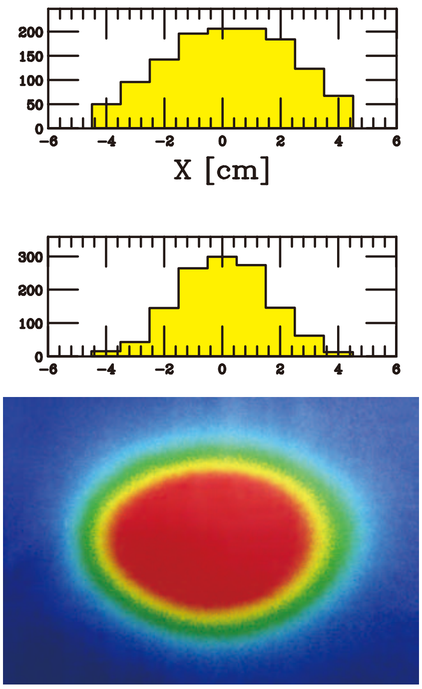


Fig. 12. Muon beam profile measured by the profile monitor (in X and Y) and imaging plate.

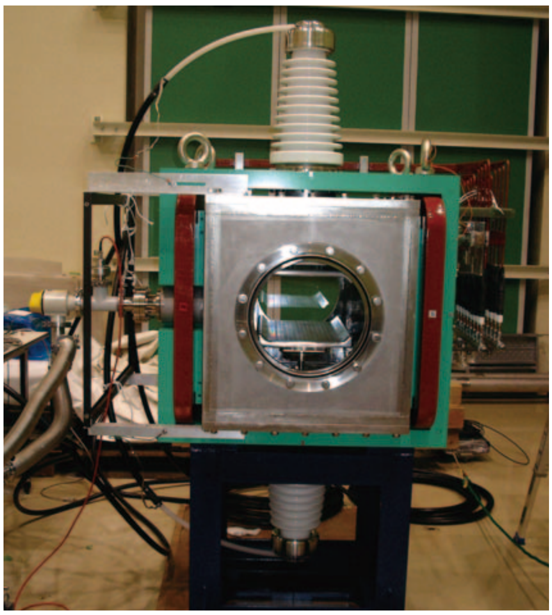


Photo 5. New electric DC separator with widened gap.

In the pulsed muon facility, the time width of the muon beam bunch limits the maximum timing resolution of the experiment. By slicing the muon beam in time, the timing resolution could be improved. We manufactured and installed in the D1 experimental area a muon beam slicer, which generates a pulsed electric field (*E*) applied perpendicular to a stationary magnetic field (*B*). The muon passes through the slicer only when both the *E* and *B* fields are in effect. In 2009, we confirmed that (1) one of the double bunch in a muon beam pulse can be selected by the slicer, and that (2) the single bunch may be sliced down to the width of 37 ns in FWHM. [W. Higemoto et al., J. Phys. Conf. series **225**, 012012 (2010).]

The double bunch of the muon beam will be separated and sent to the D1 and D2 experimental areas simultaneously when a pair of kicker and septum magnets is installed at the last bending magnet position of the D-line. The designing, manufacturing and testing of this device is underway.

Experimental Proposals and general use beam time in MUSE

For general use of the muon beam, nineteen experimental proposals were accepted in 2009A and B period. Out of 81 days of operation of MUSE, 49 days were dedicated for these general use experiments.

First scientific paper from J-PARC

Iron arsenide and pnictide superconductors, which were first reported by Prof. Hosono's group at Tokyo Institute of Technology in 2008, have now become the material with the highest Tc after the discovery of the cuprate high-Tc materials. The fact that iron is the major building block of this material is another reason why scientists are interested in; normally, iron exhibits ferromagnetism, which is a state very different from superconductivity.

Shortly after the first muon beam delivery at the J-PARC MUSE, this new beamline was used in an actual experiment to characterize the magnetism of the newly discovered iron arsenide superconductors.

One of the advantages of μSR among local magnetic probes is its sensitivity to the volume fraction of magnetism (Fig. 13). A presence of a macroscopic phase separation between the superconducting and magnetic phases was observed in $Ca(Fe_{1-x}Co_x)AsF$ (x=0.0–0.15). It was reported that the magnetic phase tends to retain the high transition temperature (Tm > Tc), while Co doping induces strong randomness. The volumetric fraction of the superconducting phase is nearly proportional to the Co content x with a constant superfluid density. These observations suggest the formation of superconducting "islands" (or domains) associated with Co ions in the Fe_2As_2 layers (Fig. 14), indicating a very short coherence length.

The above result has been published and actually became the first scientific paper produced in J-PARC. [S. Takeshita, et al., Phys. Rev. Lett. **103**, 027002 1-4 (2009).]

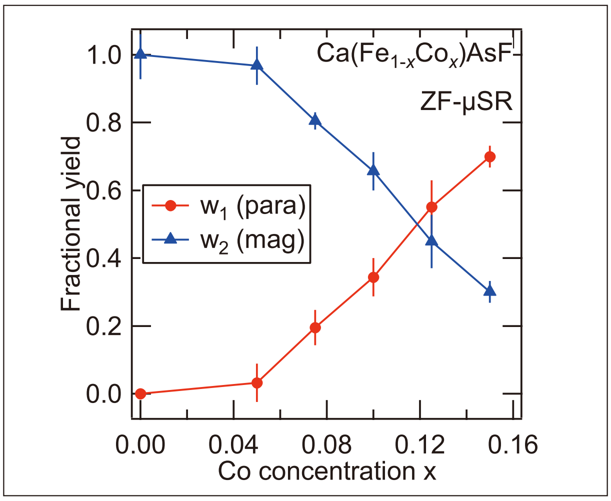


Fig. 13. Volumetric fraction of paramagnetic (w_1) and magnetic (w_2) components in $Ca(Fe_{1-x}Co_x)$- AsF, where the former becomes superconducting below Tc.

Fig. 14. Picture of "island" superconductivity obtained by μSR measurement. At the center of circles, the dopant Co ion may locate.

Neutron Device

Commissioning of two-dimensional neutron detector for iBIX

A commissioning test on two-dimensional compact scintillation detectors using the neutron-sensitive scintillator and wavelength-shifting fiber technology was performed successfully at IBARAKI biological crystal diffractometer, iBIX, (Photo 6, 7). The detector exhibited a spatial resolution of 1.2 mm with a detector efficiency of 40% for 2.2-Å neutrons.

Dedicated small sized amplifier/discriminator and encoder/signal processing electronics that handle 512 channels were developed and mounted right behind the detector head. This type of detector has a significant impact not only on the data collection efficiency but also on the data quality of the iBIX.

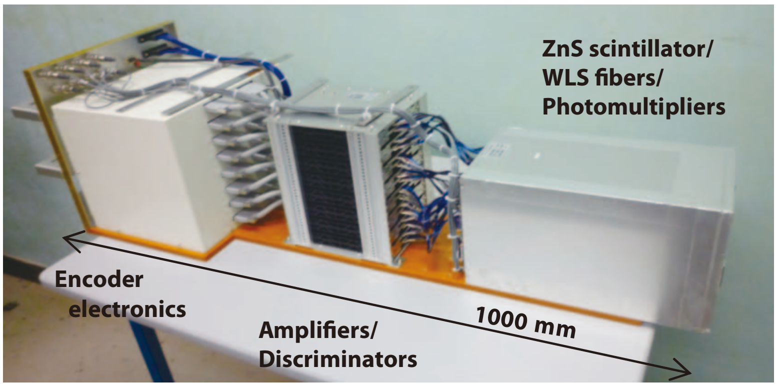


Photo 6. Detector modules of the two-dimensional compact scintillation detector.
The right-hand part is the neutron-detection head, which is composed of two $ZnS/^{10}B_2O_3$ scintillator screens and ribbons of wavelength shifting (WLS) fibers. Over 65% of the cross sectional area of the detection head, that is 133x133 mm^2, is neutron-sensitive.

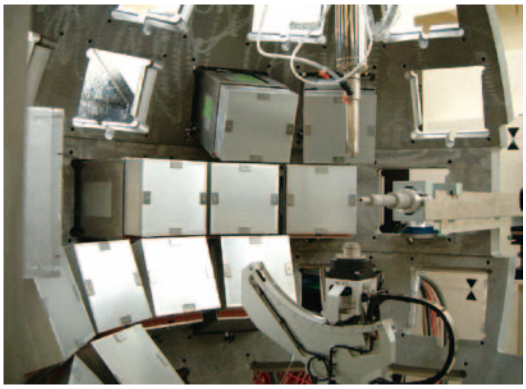


Photo 7. Two dimensional scintillator modules mounted on the iBIX.

One-dimensional neutron detectors for TAKUMI

Eight one-dimensional scintillation detectors (No.3 - No.10) with “ISIS-type” fiber coded method were equipped on the Engineering Materials Diffractometer, TAKUMI, (BL19). It was demonstrated that the detector and the electronics system accomplished excellent performances of a neutron detection efficiency of more than 50% at a neutron wavelength of 1 Å and a gamma-ray sensitivity less than 10-6 at a gamma-ray energy of 1.3 MeV.

Micro-pixel neutron detectors

We developed a gas-based neutron detection system, which reads out individual lines with a micro-pixel detector element, and conducted preliminary neutron irradiation tests. The micro-pixel detector element pulses had a short duration, the full width at half maximum of the pulse being 160 ns. The detection system exhibits spatial resolutions, of about 2.5 mm FWHM, in both the anode and cathode directions at gas pressures of 0.45 MPa for He and 0.05 MPa for CF_4.

Wideband beam focusing using a precisely fabricated elliptic supermirror

We developed a one-dimensional elliptic mirror combining a supermirror coated with ion-beam sputtering and precise elliptic surface figured with the numerically-controlled local wet etching process under cooperation between JAEA and Osaka University.

A mirror substrate was prepared by figuring a surface of synthesized quartz glass into a plano-elliptical shape. The focal length is 1050 mm. The mirror size is 90 mm (elliptic) × 40 mm (straight). NiC/Ti supermirror (m=4) was deposited on the elliptic quartz surface. The focused beam width was 0.25 mm in full width at half maximum, almost reproducing the initial beam size defined by the slit. The focused peak intensity was 6 times the unfocused average intensity.

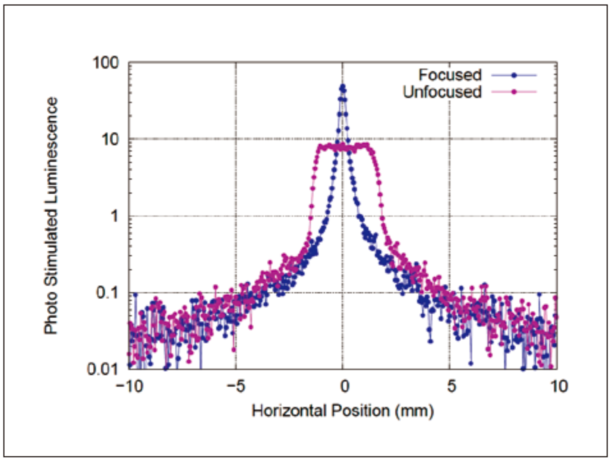


Fig. 15. Horizontal profiles of a focused and unfocused beam.

In-situ SEOP polarized ^{3}He neutron spin filter

An *in-situ* spin-exchange optical pumping (SEOP) polarized ^{3}He neutron spin filters (hereafter referred as SEOP filter) has been developed at J-PARC to promote studies of magnetic materials and hydrogen contained material structures with pulsed polarized neutrons. Photo 8 shows the setup of the SEOP filter system which is comprised of a diode laser emitter, external cavity optics to narrow the laser wavelength band, laser optics for laser beam shaping and polarization and a solenoid coil with an oven. A diode laser system pumps the nuclear spin of ^{3}He atoms continuously, making it possible to keep the polarization degree of the SEOP filter during an experiment. ^{3}He gas is encapsulated in an aluminosilicate glass (GE-180) cell. As a result of a neutron transmission measurement, it was confirmed that the degree of ^{3}He nuclear spin polarization was 73% for the spin filter cell with 17 atm-cm ^{3}He gas. The performance of the SEOP filter system is at a world standard level, and we are ready to apply it to practical neutron scattering experiments at J-PARC.

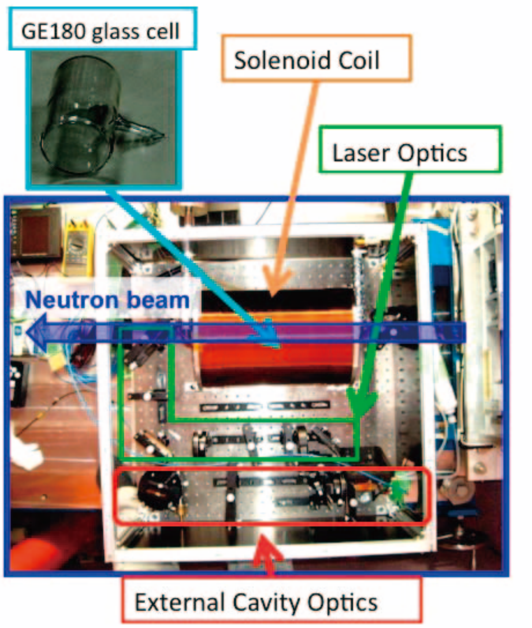
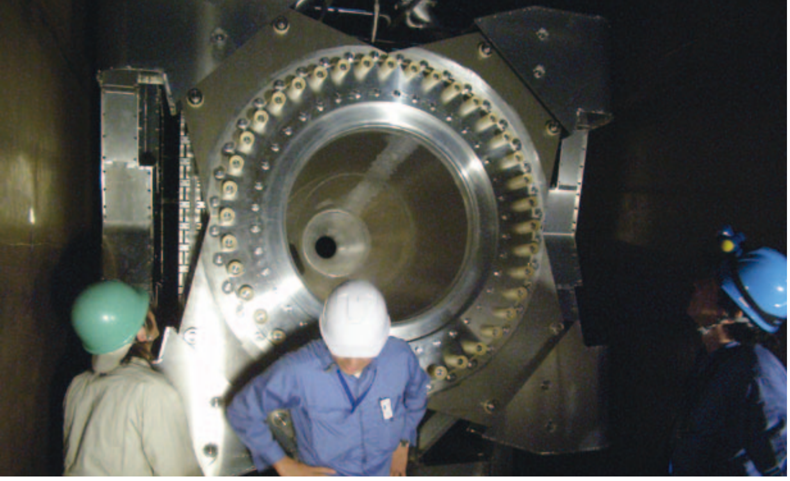
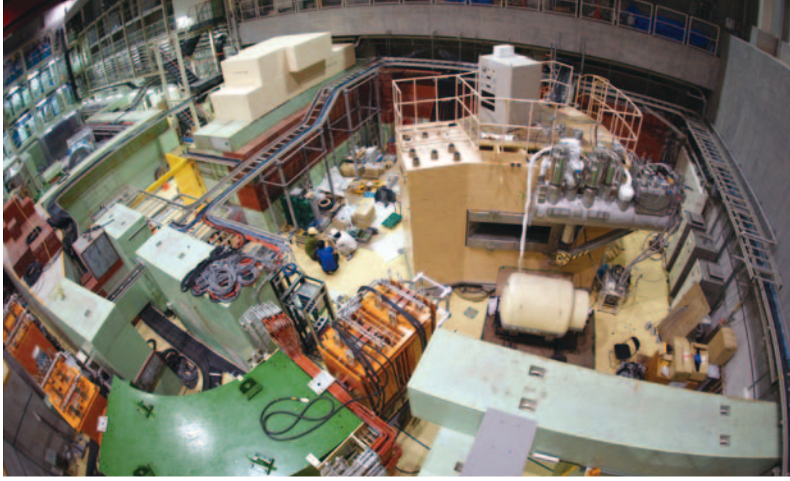
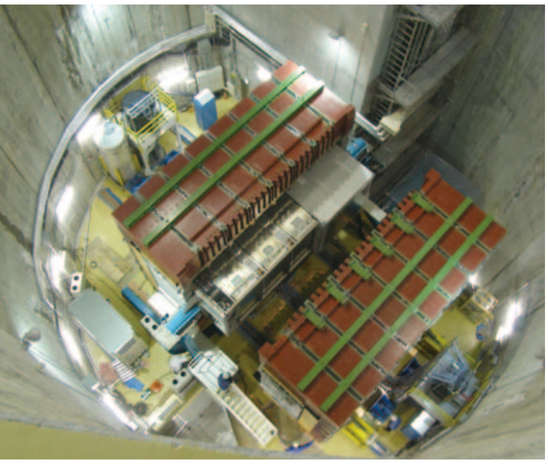
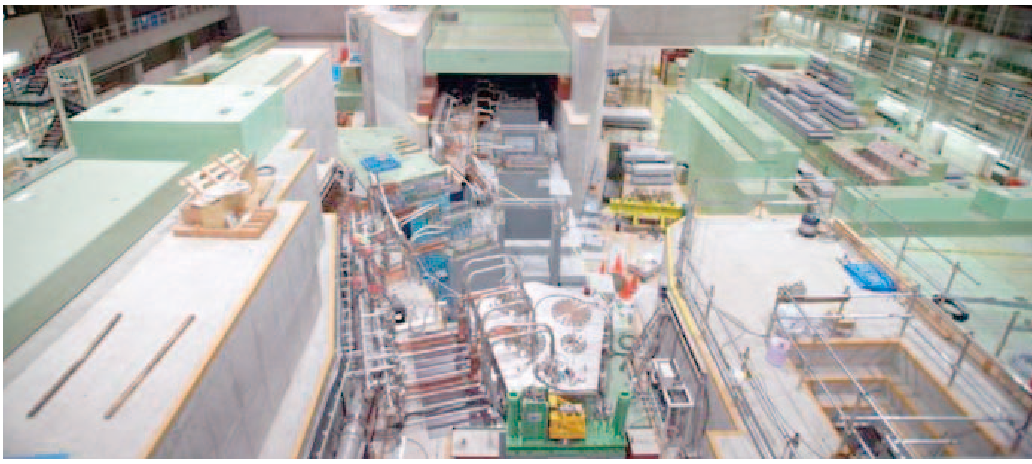


Photo 8. Developed in-situ SEOP polarized ^{3}He neutron spin filter system.

Particle and Nuclear Physics

J-PARC's Hadron Hall Takes Step forward to Particle Nuclear Physics Experiments

Hadron Hall is a multipurpose experimental facility for conducting experiments in the field of the nuclear and particle physics. It uses intense secondary kaon and/or pion beams produced by a high-intensity proton beam. This proton beam is "slowly" extracted to create a quasi-DC beam that extends for 2 s out of every 6-s accelerator operation cycle. To accomplish this, the proton beam extracted from the Main Ring (MR) is transported to Hadron Hall through the slow-extraction beamline in the beam switching yard (SY).

Hadron Hall is designed to accept a maximum beam power of 50 GeV at 15 μA (750 kW). The Hadron Facility group is working together with the accelerator group for achieving early beam commissioning. And currently, the maximum beam power that has been achieved stands at about 2 kW at 30 GeV.

The primary proton beam is focused on the production target (T1), which can be either a 6-cm-long platinum (50% loss) or 5.4-cm-long nickel (30% loss) piece. Currently, Hadron Hall's size is 60 m across and 56 m long along the beam direction. Further plans exist to extend the hall to accommodate a second production target (T2) and beamlines, which will widen the physics scope of Hadron Hall. And to accommodate these plans, the beam-dump is designed to be movable downstream.

The upper-right inset of Fig. 1 shows the layout of the beamlines at Hadron Hall. After the completion of construction in the beginning of January 2009, the first beam was extracted to Hadron Hall on the 27th of that month. Currently, there are three beam lines: K1.8 for separated charged kaon beams up to about 2 GeV/c, a branch of K1.8 called K1.8BR, and KL for neutral kaon beams. The first kaon beam was identified in the K1.8BR beamline, as stated in the 2008 Annual Report.

When beam commissioning resumed in October 2009, the physicists working at Hadron Hall successfully confirmed the charged and neutral kaon production in the newly constructed K1.8 and KL beamlines, respectively.

K1.8 is a charged-particle beamline that can deliver mass-separated beams of up to 2 GeV/c with very high purity, thanks to the double-stage electrostatic separator (ESS) system. The beam spectrometer, that is the last part of the beamline, is designed to achieve a good resolution of $\Delta p/p = 3.3 \times 10^{-4}$ (FWHM), which is remarkable accomplishment. Called the Superconducting Kaon Spectrometer (SKS), it is a high-resolution spectrometer with a large solid angle (100 msr, where msr represents millisteradian) that was moved from KEK to J-PARC and installed at K1.8 to study scattered particles. The SKS, together with the high-purity kaon beam, make the K1.8 beamline the best place to investigate hypernuclei, which are nuclei with one or two strange-quarks in the form of Lambda or other hyperons. As a result of that, the organization planned a large number of spectroscopy experiments with the purpose to elicit deeper insights into the nature of the strong force.

Beam operation began in October 2009, following the completion of construction over the course of that summer. Subsequently, despite the limited beam time available for tuning, enhanced kaons were produced by the ESS system as expected (see Fig. 1). But obviously, further beam tuning will be attempted to achieve even higher purity for both positive and negative charges.

The superconducting magnet of SKS was successfully excited up to 2.45 tesla with a current of 400 A after cooling down. The performance evaluations of both the beamline and SKS on the basis of Σ^- production via the reaction with a liquid H_2 target ($\pi^- + p \to K^+ + \Sigma^-$) showed a good resolution of 1.7 MeV/c^2. Thus, currently, both the K1.8 beamline and SKS are ready for conducting experiments.

The KL beamline is designed to transport only the neutral particles produced in the target by the proton beam by sweeping charged particles away using a dipole magnet. The KOTO group (J-PARC Experiment E14) designed and constructed the new beamline to generate a narrow neutral beam (called a "pencil" beam) by using two stages of a metal collimator. The group began a survey of the beam quality in the fall of 2009. Since the neutral kaons cannot be measured directly with the usual methods, they detected the secondary particles: charged pions and photons from kaon decay, reconstructed their primary particle, and calculated the mass. After analyzing the data collected in November, they successfully observed the peak at the neutral-kaon mass (500 MeV/c^2) in the reconstructed mass distribution, which was consistent with the distribution predicted in computer-simulation studies, and confirmed the presence of neutral kaons in the KL beam line. During the J-PARC operations until February, they continued the survey to improve the statistical precision of the measurement and to obtain the yield and momentum spectrum of the neutral kaons in the KL beamline.

The purpose of the J-PARC E14 KOTO experiment is to find the origin of the broken symmetry between particles and anti-particles (CP violation) by measuring the extremely rare decay mode of the neutral *K* meson by using the high-intensity beam from J-PARC. The aim is to obtain experimental evidence for the decay process of a long-lived neutral kaon (K_L) into a neutral π meson and a pair of neutrinos, which is predicted in the Standard Model of particle physics to occur with a rate of once in forty billion. As the next step, the KOTO collaboration will begin detector construction in 2010.

This confirmation of charged and neutral kaon beams with excellent performance clearly marks the start of the long-awaited new Kaon Factory. Concrete physics output could be expected with further improvements in the beam power and quality. The first experiment (E19: Penta-quark search) is planned to start its physics run in the fall of 2010. Furthermore, the new K1.1BR beamline will be ready for test experiments in the fall as well, when the construction is expected to be completed.

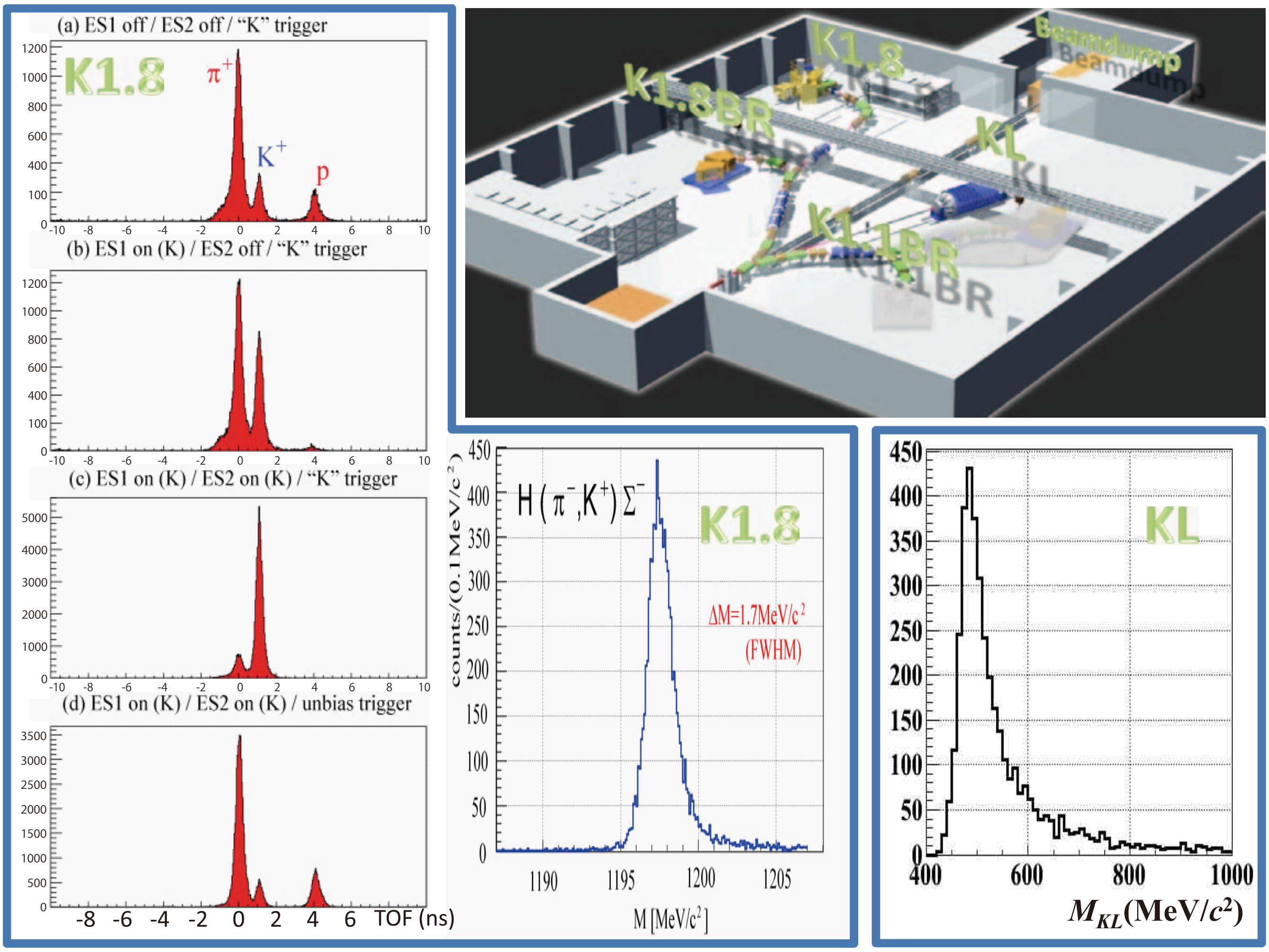


Fig. 1. Schematic layout of the beamlines at Hadron Hall. Kaon beams are clearly identified in both K1.8 and KL beamlines.

T2K experiment

Japan fiscal year 2009 was a very important and successful year for the neutrino experiment facility. Its operation started in April 2009, with receiving the first proton beam, and it generated a neutrino beam. The final installation was carried out during the summer shut down, and it resumed operation in November. The first neutrino event in the on-site near detector was recorded with the on-axis detector INGRID on November 22, with the off-axis detector ND280 on December 19, and eventually with the Super-Kamiokande on February 24. We have been collecting data for physics analysis continuously, with the aim to discover the first electron appearance event.

The Tokai-to-Kamioka (T2K) experiment is a second-generation long baseline neutrino oscillation experiment with so-called off-axis configuration. Muon neutrino beam is produced at J-PARC with 2.5 degrees off from the direction to the Super-Kamiokande (SK), travels 295 km across the earth, and is detected by SK. The off-axis beam gives us the highest possible intensity of low-energy neutrinos of interest with less high-energy tail, and enables precise measurements with minimum background. The primary goal of the T2K experiment is to determine the last unknown neutrino mixing angle θ_{13} by investigating oscillation where muon neutrinos turn into electron neutrinos. Owing to the unprecedented intensity of the neutrino beam, the sensitivity of the T2K experiment is more than one order of magnitude higher than the present upper bound of θ_{13}. If θ_{13} is sufficiently large to be measured in the early phase of the experiment, the possibility of discovering CP violation in the future will be enhanced.

In April and May, the first beam commissioning to establish the primary proton beam line operation was carried out with one of the three electromagnetic horns installed. The beam-line magnets were tuned to lead the protons to the target with single-shot operation of the single-bunch beam with intensity of 4×10^{11} [p/bunch]. The proton beam monitors successfully measured the beam orbit, profile, intensity and beam loss. The fluorescence plate installed in the beam profile monitor just in front of the target (OTR) confirmed that the protons hit the center of the target, and the production of the neutrino was confirmed by observing the co-product muons by muon monitors (MUMON) as shown in Fig. 2. The pion focusing by the horn was confirmed by observing the increase of the number of muons detected by MUMON. The continuous beam operation with 6-second cycle was performed, and the neutrino facility passed the government inspection for the radiation safety.

In November and December, with all three horns installed during the summer shutdown, the commissioning with full equipments was conducted using 6 bunch-beam with 3.5 second cycle. The highest single-shot beam intensity during this period was 1×10^{13} [p/bunch], which corresponds to 80 kW beam. Fine beam tuning to obtain optimum beam envelope, and thus to reduce beam losses, was carried out together with response study of proton beam monitors. Loss monitors were calibrated using 10^{-5} level beam loss caused by Ti foil of profile monitors. All monitors satisfy requirement from 1 kW beam to 50 kW beam: intensity can be measured with 2% precision, position better than 0.5 mm,

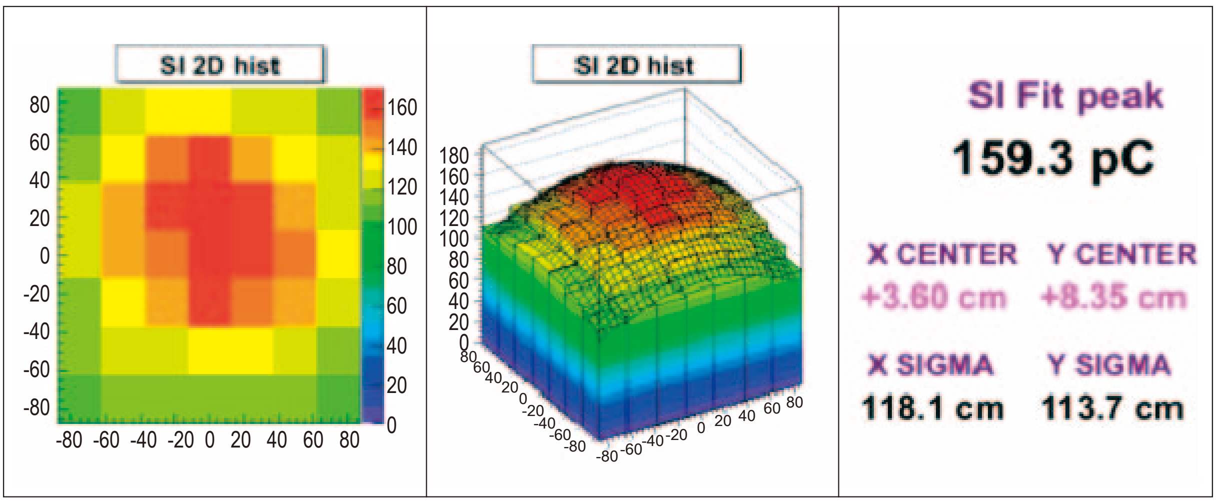


Fig. 2. Muon profile measured by MUMON detector.

size better than 0.5 mm, loss down to a few hundred mW level. The OTR monitor measures the beam position and size at the target front-face reliably. The discrepancy of the measured beam orbit from the design orbit was less than 2 mm. The neutrino beam direction towards SK was tuned within 1~mrad accuracy by monitoring the muon profile center. The continuous operation with 20 kW beam was performed and it was confirmed that the beam loss was small enough. The first neutrino event in the on-site near detector was recorded with the on-axis detector on November 22 as shown in Fig. 3, and with the off-axis detector on December 19.

In January 2010, after installation of a collimator and improvement of underground air-tightness to be prepared for higher-intensity beam, continuous operation to accumulate physics data started. By the end of March 2010, the beam power for continuous operation reached 30 kW, and the number of delivered protons became 3.9×10^{18}.

The first neutrino interaction at SK on the beam timing was observed on February 24, 2010. The event display of SK detector is shown in Fig. 4. This is one of the most important milestones for the T2K experiment. It also indicated that the timing synchronization between J-PARC and SK worked as expected. Beam intensity has been increasing and we have been accumulating a number of protons on the target as shown in Fig. 5. T2K will accumulate more neutrino events at SK to search for a new type of neutrino oscillation with the world's best sensitivity.

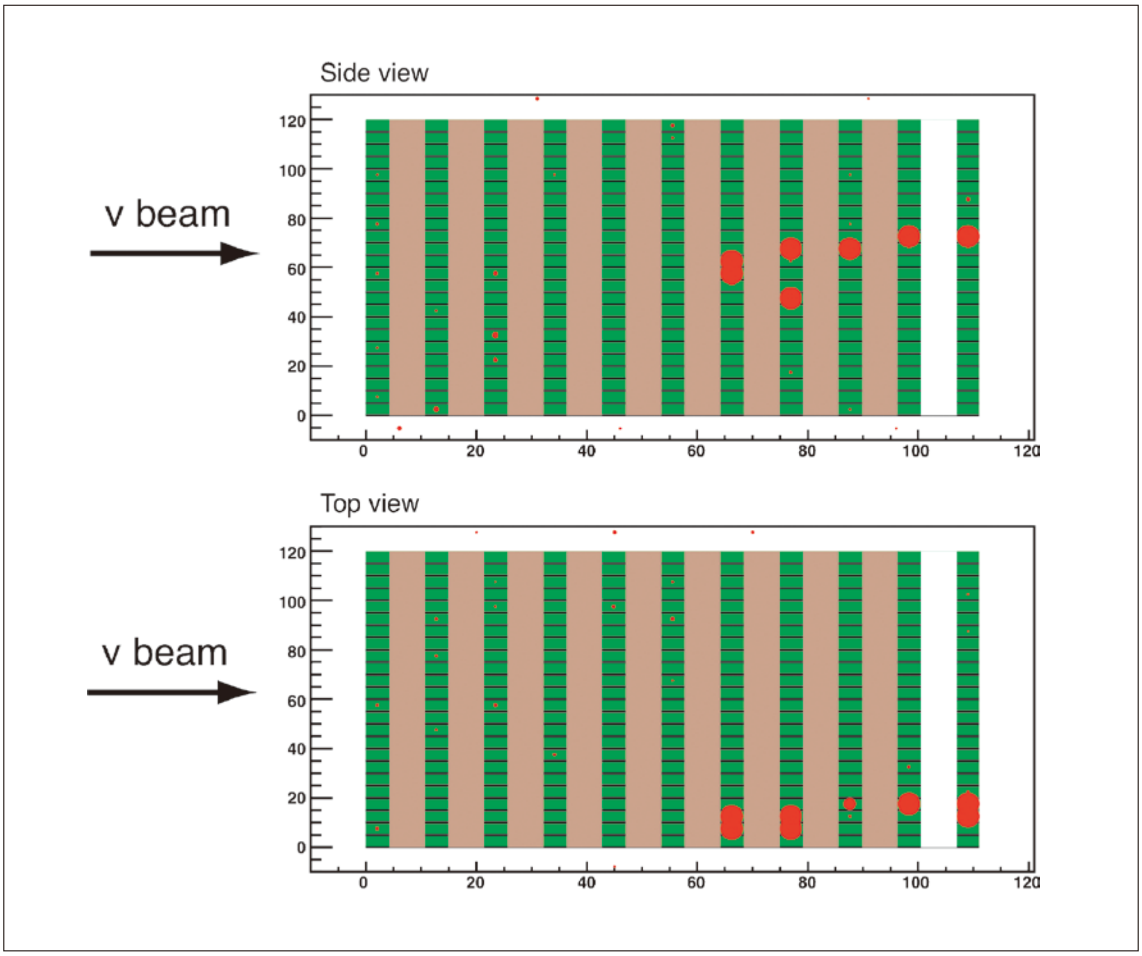


Fig. 3. First neutrino event measured by INGRID on-axis detector.

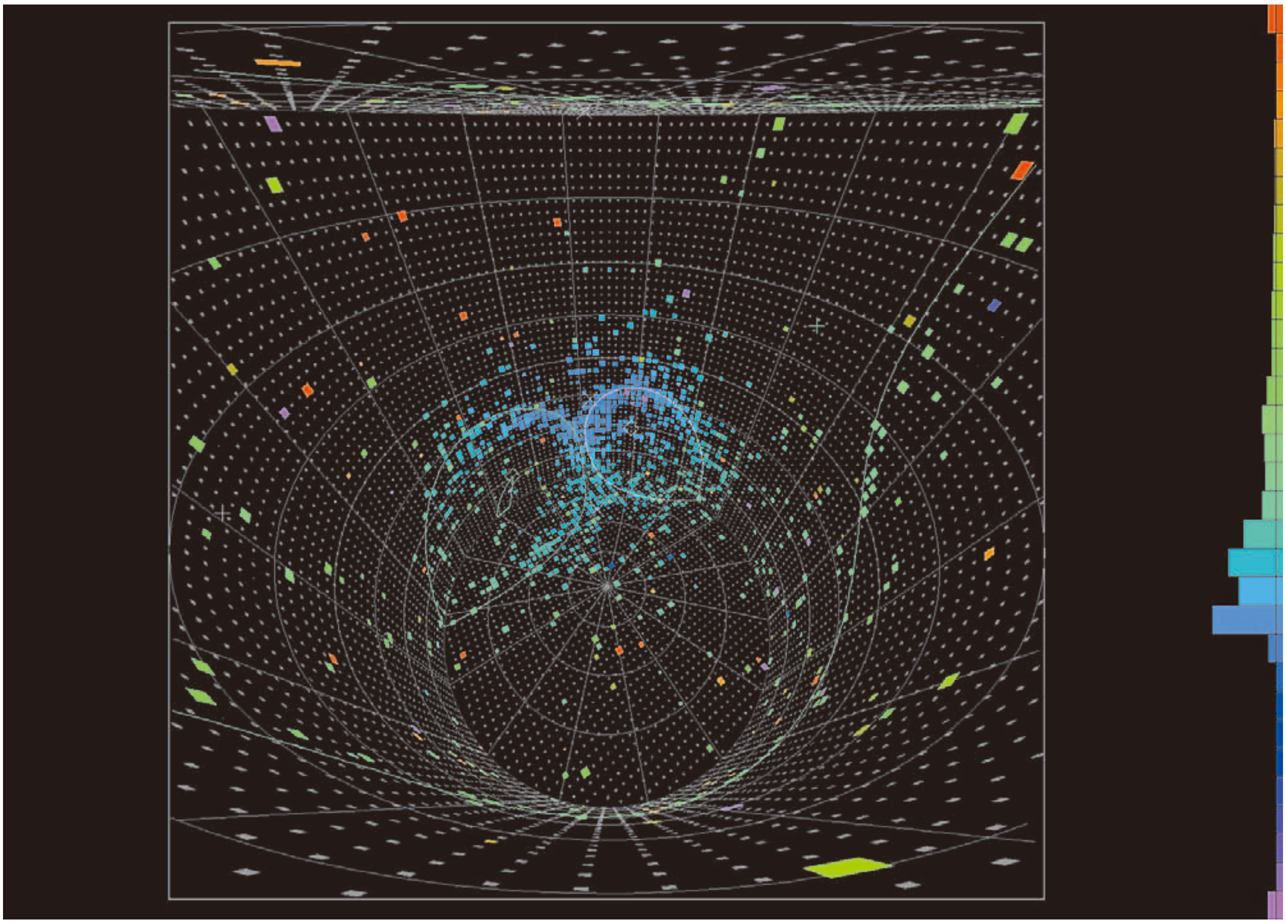


Fig. 4. First neutrino event measured by Super-Kamiokande.

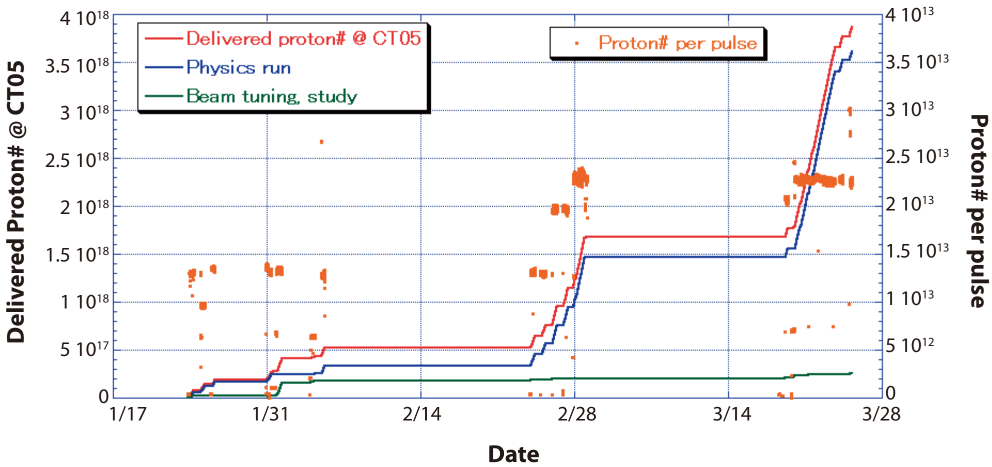


Fig. 5. History plot of the number of protons delivered to the target. The red line is the total number of protons, while the blue line shows the number used for physics analysis.

Superconducting magnet for the J-PARC neutrino beam line

Cryogenics

J-PARC Neutrino Beam Line Superconducting Magnet System

A superconducting magnet system for the J-PARC neutrino beam line was developed with the contributions and in cooperation of the Cryogenics Science Center of Applied Research Laboratory (ARL) and the cryogenics group at Institute of Particle and Nuclear Physics Studies (IPNS) in KEK. The system consists of 14 doublet cryostats; each contains 2 combined function magnets (SCFM). The SCFM uses two single layer left/right asymmetric coils that produce a dipole field of 2.6 T and quadrupole of 19 T/m. The system installation and commissioning took place from February 2008 to March 2009. The beam operation started in April 2009 and the first neutrino beam was generated on 23rd April. Beamline studies were performed to verify the ratio of the dipole field to the quadrupole field, as well as the SCFM alignment in the beam optics. A beam induced quench test was also performed to verify the operational safety. In both tests, the system showed sufficient performance and safety for the continuation of the beam operation.

The initial beam commissioning continued until June 2009 followed by a scheduled maintenance shutdown. The system resumed operation in the end of September 2009, and since then, the magnets have been kept cold, planned, until the next summer shutdown in 2010. The cryogenic system was stopped periodically for short shutdown (about a week or less) for scheduled maintenance. During those short shutdowns the magnets warmed up to about 100 K, so that re-cooling was rapid (for 3 to 4 days), and then a small enough amount of helium gas was kept in the tunnel to ensure safety during the maintenance work. During the continuous operation period, significant efforts were made to minimize the power consumption of the helium refrigerator, which was major part of the remaining power consumption after achieving substantial power savings by using the superconducting magnet system. Figure 1 shows the trends of the various parameters of the helium refrigerator during the transition from the normal mode to power saving mode. The power saving was achieved by reducing and optimizing both the helium-gas flow capacity and the outlet pressure of a main compressor of the refrigerator. After multiple tuning efforts, the automatic transition operation was accomplished, and the power consumption was brought down to 420 kW from 600 kW, or by one third, corresponding to a reduction of the carbon dioxide emissions by about 70 ton per month.

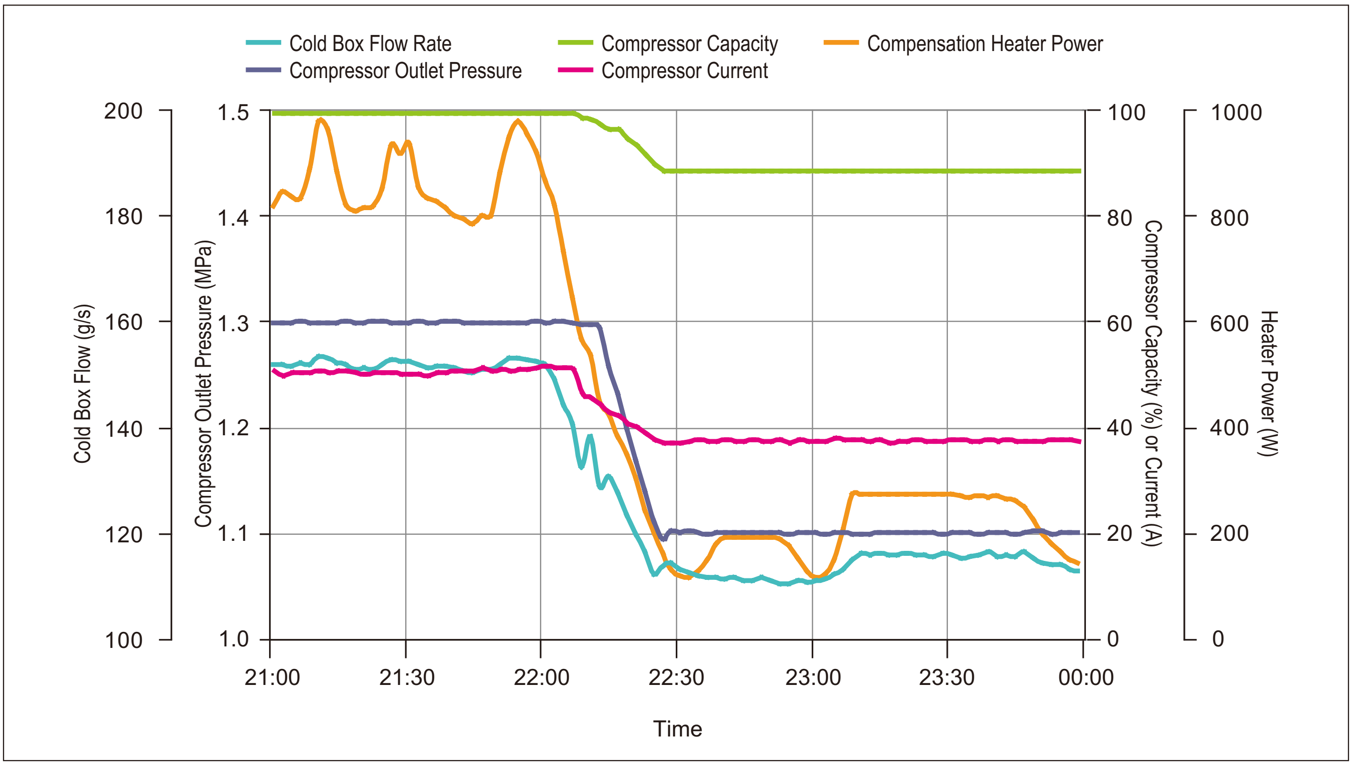


Fig. 1. Trend curves of various parameters during the transition from the normal mode to power saving mode.

Development of Superconducting Solenoids for Muon Beam Lines at MLF

In collaboration with the Muon Science Division of Institute of Materials Structure Science in KEK, we developed a superconducting curved solenoid for the Super-Omega muon beam line, one of four secondary muon beamlines at the Materials and Life Science Experimental Facility (MLF) in J-PARC. The beam line starts to extract the beam 45° into backward angles from the production target to transport the surface μ^+ and cloud μ^- to the MLF experimental hall 2. Once the beam line is completed, it will produce the highest intensity pulsed muon beam ever achieved in the world, with 4×10^8 μ^+/s and 10^7 μ^-/s, and it will be used primarily for producing an ultra-slow muon beam. The beam line contains a superconducting solenoid magnet system including 45° curved solenoid sections to transport the high-quality muon beam. Since Japan fiscal year 2008, the R&D for the curved solenoid has been carried out and various model coils have been fabricated as shown in Photo 1. In Japan fiscal year 2009, we conducted intense studies for quench protection and safety of the superconducting solenoid coils. During the studies, a new protection design so-called "passive self-quench back scheme" was confirmed to work very well. Based on this experience, the same design is being applied to a newly renovated muon beam line (Muon Science International Center: MUSIC) at the Research Center for Nuclear Physics (RCNP) in Osaka University.

Photo 1. Cryogenics setup for testing super omega curved solenoid model coil.

Superconducting Magnet R&D for COMET Experiment

A new experiment, COherent Muon to Electron Transition (COMET) has been proposed to search for coherent neutrino-less conversion of muons to electrons using the high intensity proton beam from J-PARC Main Ring. The Cryogenics section has been involved in the COMET experiment to contribute to the development of the superconducting magnet system. In Japan fiscal year 2009, a conceptual design of the magnet system was established, as shown in Fig. 2, and several R&D works were carried out. An important milestone was the development of the prototype aluminum stabilized NbTi superconductor for the so-called "pion capture solenoid" with an inner diameter of 1.6 m and a central field of 5 T.

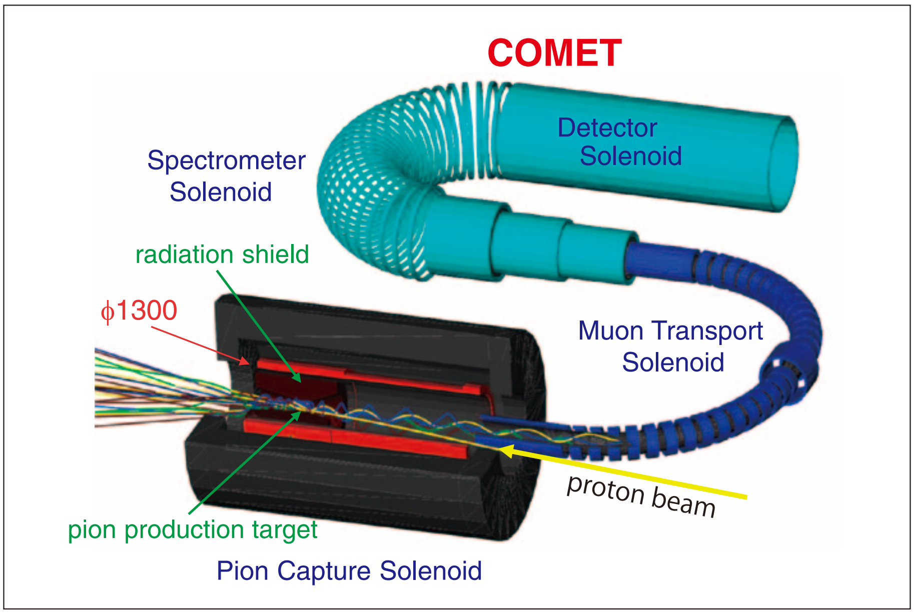


Fig. 2. Schematic view of a superconducting magnet system for the COMET experiment.

High Precision Superconducting Solenoid R&D for Muon g-2 Experiment

The anomalous magnetic moment of the muon is directly sensitive to electromagnetic, strong, and weak forces, and the precise measurement of g-2 might lead the new physics beyond the standard model. The experiment at J-PARC to measure the g-2 value with a very high sensitivity level of 0.1 ppm has been proposed by the group in the Institute of Particle and Nuclear Physics Studies, IPNS. A very high precision superconducting solenoid magnet is expected to play an important role in the storage of muon beams in this experiment, the development started in cooperation between IPNS and the Cryogenics section in fiscal year 2009. The required specification is very challenging, it consists of a central magnetic field of 3 T with a field variation below 0.1 ppm within a cylindrical storage region of 33.3 ± 5 cm in radius, ±10 cm in height. To achieve such high uniformity, the precision field monitoring system is also required to check the field quality with an accuracy of 0.1 ppm, the prototype of the system was developed in fiscal year 2009 as shown in Photo 2. It will be tested with a 3 T MRI magnet at the National Institute of Radiological Science in the next fiscal year. In addition, a seismic ground vibration at J-PARC MLF has been measured for later mechanical analysis, because the mechanical vibration of the magnet due to the ground vibration might disturb the field uniformity. This vibration measurement will be carried out throughout the year to observe the year-round change.

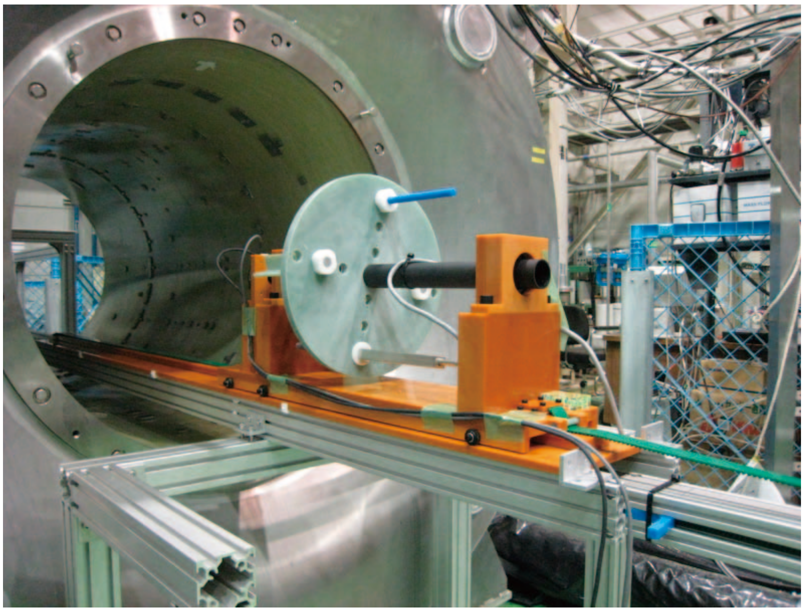
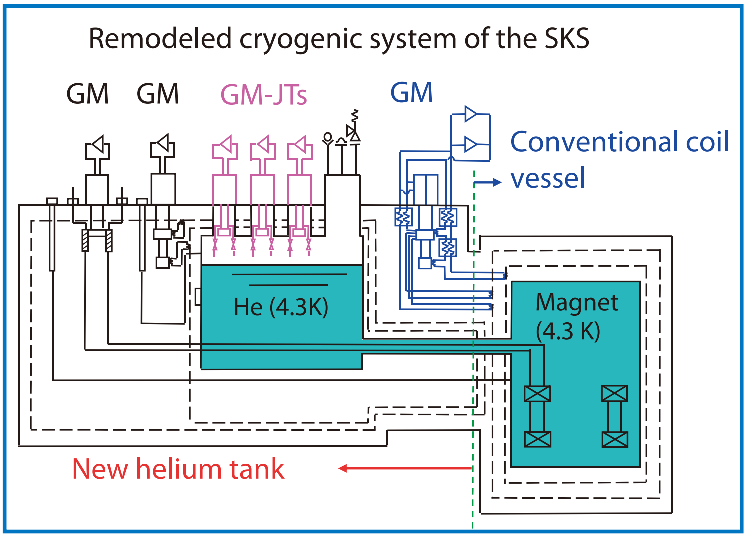


Photo 2. Developed horizontal moving stage for the precision field monitoring system.

Superconducting Kaon Spectrometer (SKS)

The Superconducting Kaon Spectrometer (SKS) was installed into the K1.8 experimental area at the J-PARC Hadron Hall. The SKS system and its schematic flow are shown in Fig. 3. After the system was built, the superconducting magnet was cooled-down and the liquid helium volume in the magnet has been kept at even level by using a set of GM and GM/JT cryocoolers. The magnet has successfully passed system commissioning. Then the magnet has been used for physical experiments since November 2009.



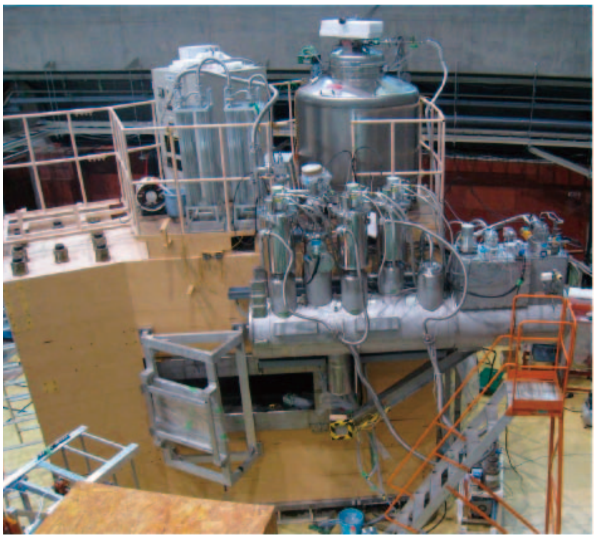


Fig. 3. The Superconducting Kaon Spectrometer (SKS) magnet with three GM-JT cryocoolers to maintain the LHe level and three GM cryocoolers for the shield cooling.

Cryogen Supply and Technical Support at Tokai Campus

The cryogenics section has also started to supply liquid helium for physics experiments and various development activities in J-PARC. The helium liquefaction facility, with a capacity of 100 l/h, is already owned and operated by the Accelerator division at JAEA for superconducting RF development. The evaporated helium gas is recovered from remote experimental areas to a recovery station provided by KEK to the west of the MLF building. The service started in September 2009, and more than 15,000 liter of liquid helium was supplied as shown in Fig. 4 and most of the evaporated gas was been mostly recovered.

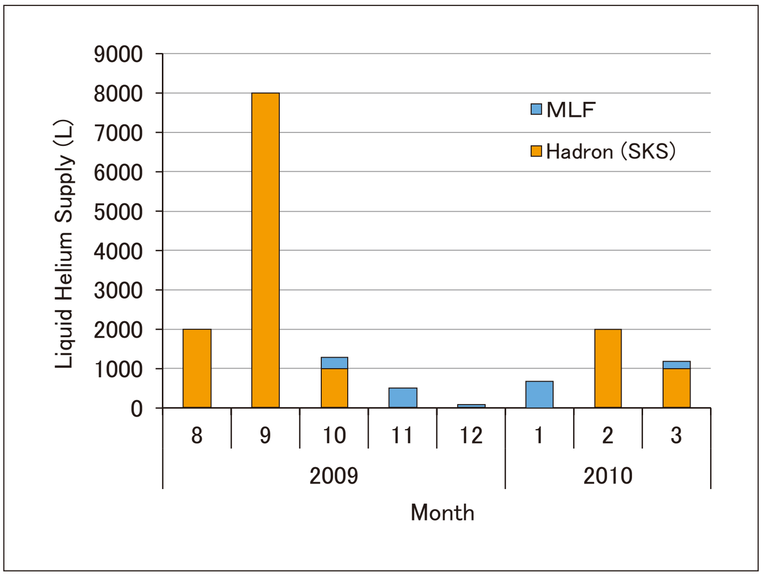


Fig. 4. Supply of liquid helium for fiscal year 2009.




Information System

Overview

The J-PARC Information System is a system of computers and networks used to conduct researches in J-PARC. The Information System Section designs, manages and operates the system. The activities of the section consist of running the Infrastructure Network system, Authentication System and Data Base System. The aim for each system is to be both secure and easy-to-use ICT (Information Communication Technology) infrastructure for J-PARC users. In 2009, J-PARC started to utilize KEK's central computing system for neutrinos, nuclear physics and MLF experiments data analysis and data archive through a SINET3 (http://www.sinet.ad.jp/) (2 Gbps) and IBBN (100 Mbps) backup link which connected Tsukuba and Tokai area.

J-PARC network (JLAN) growth

JLAN is an information and communication infrastructure for J-PARC public users and staff. As shown below, the number of hosts connected to JLAN increased 130% in 2009 and the edge switches of JLAN exceeded 80 devices. It also transparently covers two sites in J-PARC, the Tokai site and Tsukuba site which are about 60 km apart. The SINET3 information network (http://www.sinet.ad.jp/) had linked these sites with 1 Gbps bandwidth since October 2008. Thanks to the support of the Japan National Institute of Informatics (NII), which managed the SINET network, the link bandwidth was doubled to 2 Gbps just before the 2009 autumn RUN and it will be upgraded up to 10 Gbps in Japan fiscal year 2011. Figure 3 shows a track record of the data transfer from Tokai to Tsukuba.

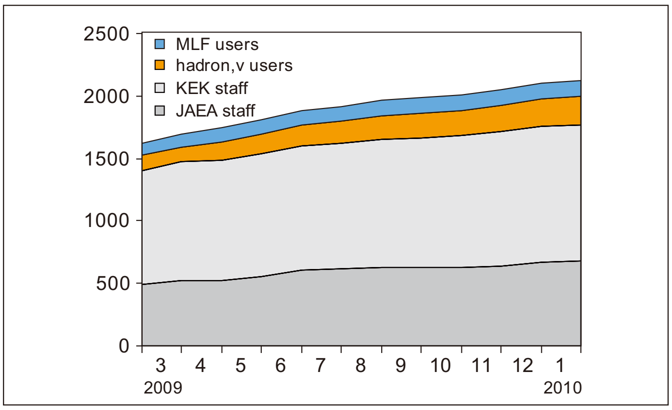


Fig. 1. Number of hosts on JLAN.

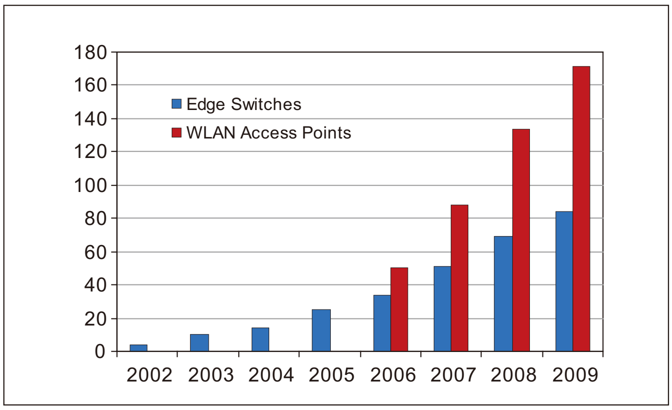


Fig. 2. Number of JLAN Edge Switches and Wireless Access Points.

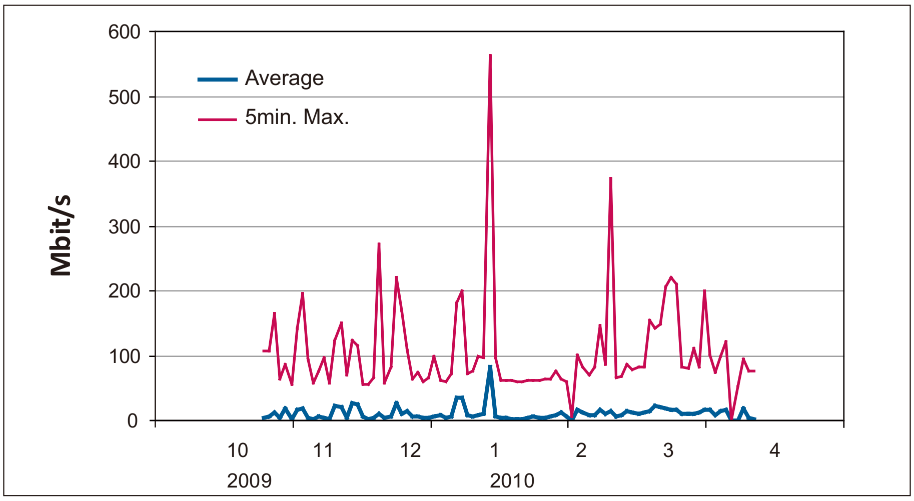


Fig. 3. Data transfer rate from Tokai to Tsukuba campus.

Starting to utilize KEK's Central computer system

J-PARC does not have its own computing facility, but it is authorized to share with KEK computing resources consisting of 1600 SPECint06 computing power, 150 TBytes RAID disks and 2 PBytes tape libraries in KEK's Central computer system at the Tsukuba site. Figure 4 depicts the system structure. In the Neutrino and Hadron experiments, data taken in the J-PARC experimental hall will be temporarily saved at the Tokai site and promptly transferred to, stored and analyzed in the Tsukuba system. The storage of the system will be utilized as a data archive for MLF experiments. Figures 5 to 8 shows the utilization records of the system in 2009. The Hadron users who used the system constantly were users who continue their experiment in series from the former KEK 12 GeV Proton synchrotron to J-PARC. The Neutrino users just started to use the system after the autumn run and gradually began to store data. The MLF users still seem to be satisfied with the local computing resources at the Tokai area.

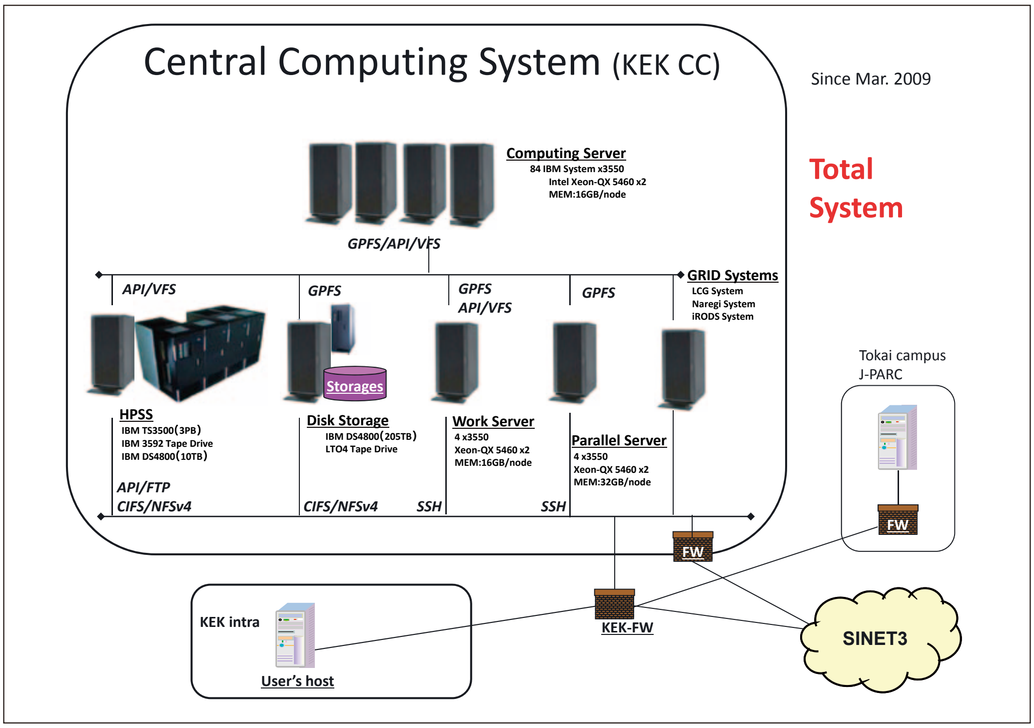


Fig. 4. KEK's Central Computer System. (this figure includes resources for users other than J-PARC)

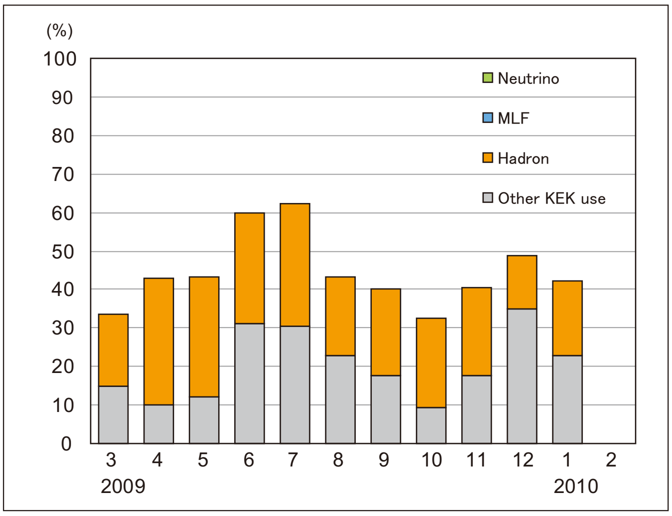


Fig. 5. CPU utilization of KEK's central computer by J-PARC users.

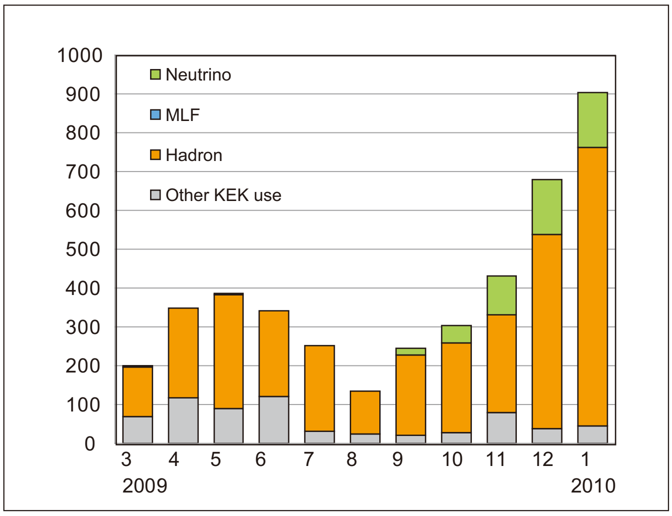


Fig. 6. Number of Logins by J-PARC users.

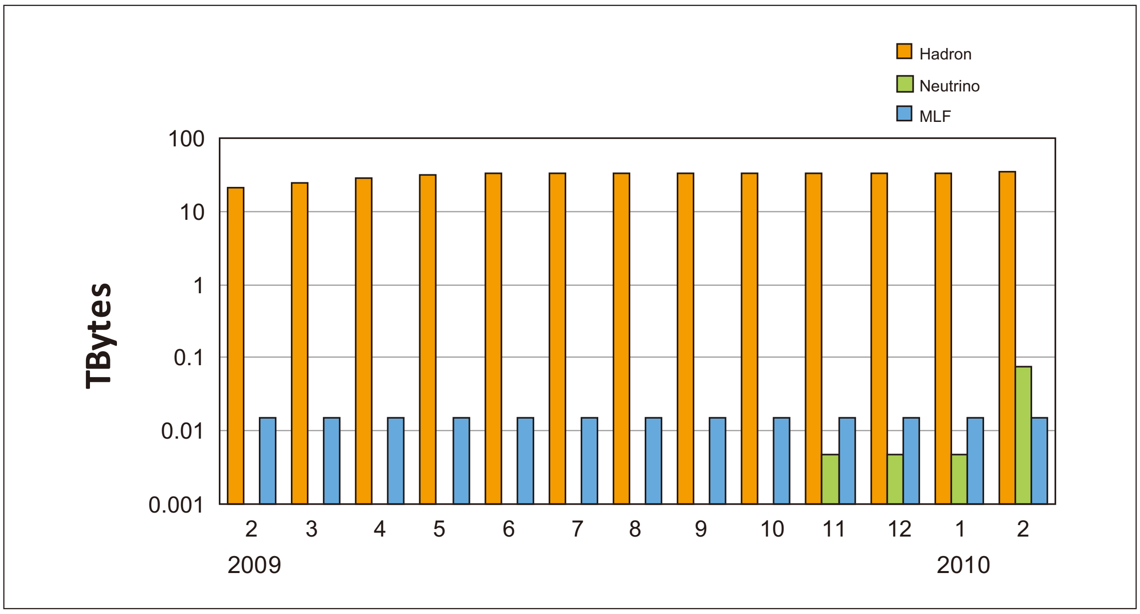


Fig. 7. Disk utilization by J-PARC users.

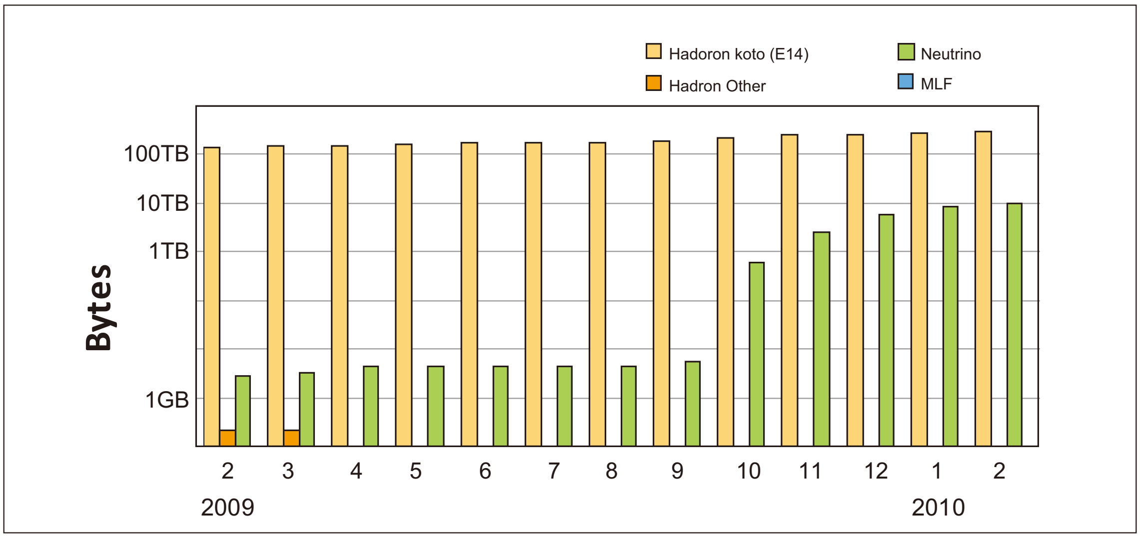


Fig. 8. Tape utilization by J-PARC users.

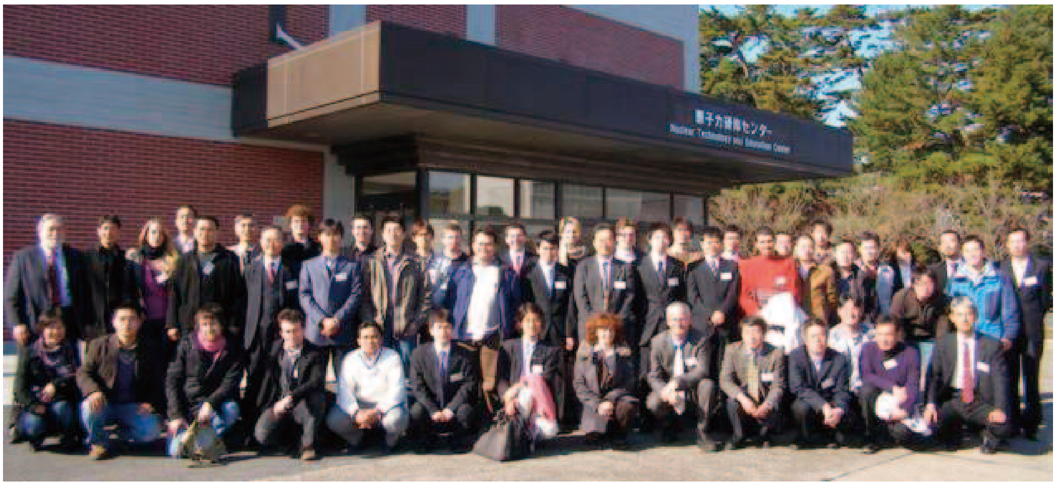

Preparation for a experiment at JLBL-4
(JAEA Lead Bismuth Loop-4)


Observation of a sample using an scanning electron microscopy

Transmutation Studies

International ADS Workshop

A workshop titled "Accelerator-driven Transmutation System for Young Scientists and Engineers from Europe and Asia", covering the Accelerator-Driven System (ADS), was held from December 1st through 4th at the Tokai-site of JAEA in cooperation with J-PARC, the Nuclear Science and Engineering Directorate, and the Nuclear Technology and Education Center (NuTEC). The workshop was organized as a part of the research cooperation between JAEA and the European ADS project called EUROTRANS, and also as a part of a training course of the European Nuclear Education Network (ENEN) with which NuTEC is in collaboration. Moreover, this event was organized as the 7th workshop of the Asia ADS Network as well. It was open to young scientists from Asian and European countries, 55 participants attended, including 32 foreign attendees from 15 countries. The four lectures given during the workshop covered research fields related to ADS and research activities for ADS in Japan, China, Korea, and Europe. Moreover, the young participants presented 20 papers, and actively discussed important issues about ADS and the international collaboration actively discussed. In a technical tour, the participants visited Materials and Life Science Experimental Facility and Hadron Hall in J-PARC.



Activities

Corrosion test under flowing Pb-Bi

The JAEA Lead Bismuth Loop -1 (JLBL-1) has been operating for about 10 years with the purpose to investigate the corrosion behaviour of materials in flowing lead-bismuth (Pb-Bi). The experimental results are to be used to develope a beam window and structural materials for ADS. Recently, a corrosion test of solution annealed (SA)-JPCA and 20% cold worked (CW)-JPCA pipe specimen was conducted for 1,000 hours using JLBL-1, TIG welds were applied for joining SA-JPCA and 20%CW-JPCA, and its compatibility in flowing Pb-Bi has also been investigated. The results showed that Pb-Bi penetrated superficially into the matrix of SA-JPCA through a thin ferrite layer formed due to nickel and chromium dissolution. As for 20%CW-JPCA, a dissolution attack occurred only partially, and localized superficial pitting corrosion was observed. We found out that the difference in the corrosion behaviour occurred due to the structure transformation of the austenitic caused by the cold working. By using MFM (Magnetic Force Microscopy), magnetization of the 20%CW-JPCA was revealed as shown in Fig. 1. It was shown that a transformation from austenitic structure to martensitic structure occurred, and it affected the corrosion resistance of the JPCA steel in liquid Pb-Bi. As a next step, corrosion test of the same type materials and high-Cr ODS (oxide dispersion strengthened) has been performed for 3,000 hours.

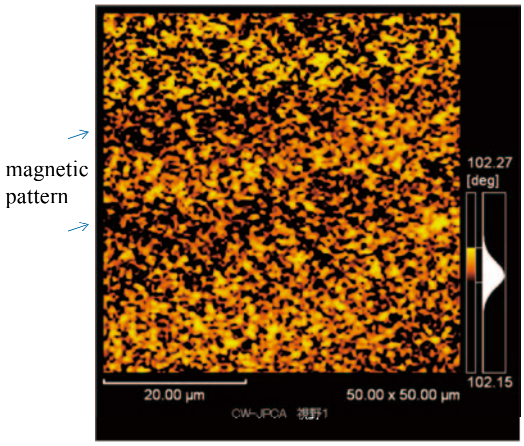


Fig. 1. MFM analysis of 20%CW-JPCA

Post Irradiation Test

To obtain the irradiation data on structural materials of spalltion target, the STIP (SINQ target irradiation program, SINQ; Swiss spallation neutron source) has been in progress. Post irradiation examination (PIE) of specimens was carried out at Waste Safety Testing Facility (WASTEF) in the Tokai Research and Development Center, JAEA. The results of the bend-fatigue tests on austenitic steel JPCA indicated that the fatigue life of specimens irradiated up to 19.5 dpa is almost the same as that of unirradiated specimens. Dose dependence of the fatigue life was not observed either.

MEGAPIE

The world's first megawatt-class lead-bismuth target, MEGAPIE (MEGAwatt Pilot Experiment), was successfully operated and dismantled at the ZWILAG hot-lab. Several meetings on MEGAPIE were held at PSI (Paul Scherrer Institute, Swizerland) in November 2009. In the meetings, the dismantling process of MEGAPIE target and the related hot-lab activities were reported. It became clear that the schedule of the sample cutting and transport will be delayed.

Development of Flow Measurement Techniques

This study* proposes a new technique that enables the measurement of the velocity vector in multi-dimensions on a line in the flow field based on ultrasonic velocity profiling (UVP) method. It was named Vector-UVP. This system was created and successfully applied to an actual liquid metal flow for three-dimensional velocity vector measurements. The schematic illustration and measurement configuration are shown in Fig. 2. The working fluid was LBE which was kept at 150 °C constant. Figure 3 shows an example of the experimental result. The spatial-resolution was 0.88 mm, and the time-resolution was 50 msec. The time-averaged result had an orderly flow like a Poiseuille flow. However, Vector-UVP system was able to measure the instantaneous flow, which had a vortex flow with three-dimensional structure caused by the velocity fluctuation. In the future, this system will accomplish the measurement of the various liquid metal flows in actual temperature conditions by using the high-temperature ultrasonic transducer.

*This study was supported by an innovative nuclear research and development program created by the Japan Science and Technology agency (JST).

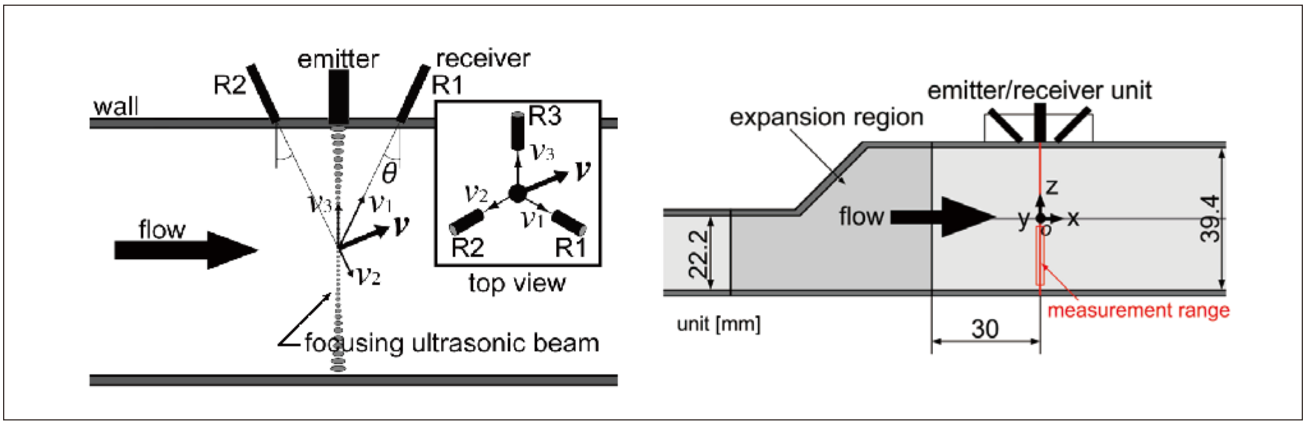


Fig. 2. schematic illustration and configuration for LBE flow measurement

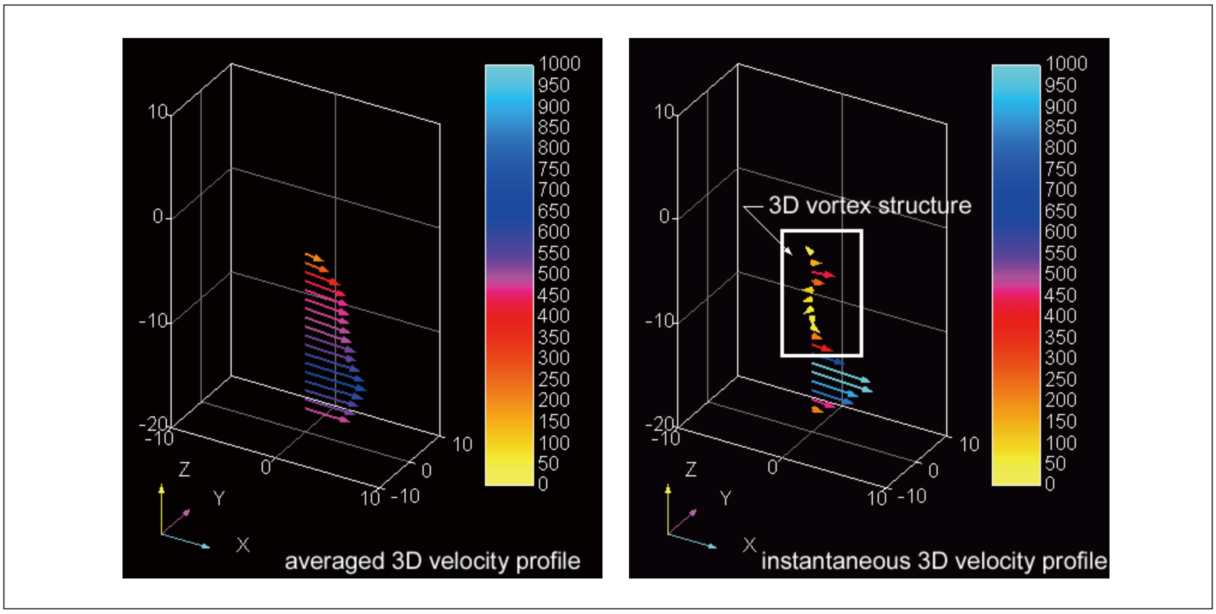


Fig. 3. Averaged and instantaneous three-dimensional velocity vector profile in LBE loop measured by Vector-UVP system

Safety

J-PARC is a proton accelerator complex with various experimental facilities. It is managed under the Law Concerning Prevention of Radiation Hazards Due to Radio-Isotopes, etc. in the Japanese legal system. A license for its use must be issued by the Ministry of Education, Culture, Sports, Science and Technology (MEXT), and the related safety inspection must be conducted by the Nuclear Safety Technology Center (NUSTEC), before the accelerator and the experimental facilities begin their operations. The application process for the license started in 2005 for the first phase of construction of the accelerator LINAC. By the end of fiscal year 2008, we have already submitted five applications to MEXT and received the permission to deliver the 3 GeV/250 kW proton beams to Materials and Life Sciences Experimental Facility (MLF), and 30 GeV/1.2 kW proton beams to the Hadron and Neutrino facilities.

In fiscal year 2009, two applications, shown in the table, were submitted to MEXT. In the first application, we applied for the usage of two secondary beam lines (K1.8 and KL) in the Hadron experimental facility and the increase of proton beam intensity of 100 kW for 50 GeV proton synchrotron ring (MR) and Neutrino experimental facility, and of 5 kW for the Hadron experimental facility. We submitted the application to MEXT on June 24, 2009, and all items that we applied for were approved on September 25, 2009. In the second application, which we submitted on January 20, 2010, we requested the usage of a secondary beam line (K1.1BR) in the Hadron experimental facility, and the item was approved on April 1, 2010.

The on-site inspections for the applications of fiscal year 2008 and the first application of fiscal year 2009 were successfully conducted by NUSTEC on May 29, 2009 and December 16, 2009, respectively. Therefore, the secondary beam lines (K1.8 and KL) in the Hadron experimental facility were officially opened for users to conduct beam experiments, and we were able to operate proton beams with an intensity of 5 and 100 kW for the Hadron and Neutrino experimental facilities, respectively. Photos 1 and 2 show the safety inspection conducted by NUSTEC.

The building for radiation measurements (2-story above the ground, 700 m^2) was newly constructed (Photo 3). The application for setting up a radiation controlled area in the building was submitted to MEXT, and we received the permission on March 25, 2009. The area will be set up in May, 2010, and the radioactivity in environment will be measured.

In fiscal year 2009, 2154 individuals were registered as radiation workers in J-PARC (about 16% increase compared to fiscal year 2008). The radiation exposure of the workers has been monitored individually with glass dosimeters and solid state nuclear track detectors. According to the records, the individual exposure to radiation for almost all was undetectable, and 0.1 mSv/y was recorded for only 2 workers (staffs).

Table 1. Application items for the license in fiscal year 2009

Accelerator /Facility	Item	Application (1) submitted : Jun. 24, 2009 approved : Sep. 25, 2009	Application (2) submitted : Jan. 20, 2010 approved : Apr. 1, 2010
Linac	-	-	-
3 GeV RCS	Max. accelerating particles	From 1.9×10^{18}/h (@250 kW) to 2.0×10^{18}/h (@260 kW)	-
MR	Max. accelerating particles	From 9.0×10^{14}/h (@1.2 kW) to 7.5×10^{16}/h (@100 kW)	-
MLF	-	-	-
Hadron	Max. accelerating particles	From 9.0×10^{14}/h (@1.2 kW) to 3.75×10^{15}/h (@5 kW)	-
Hadron	Experimental beam lines	Add K1.8 and KL beam lines	Add K1.1BR beam line
Neutrino	Max. accelerating particles	From 9.0×10^{14}/h (@1.2 kW) to 7.5×10^{16}/h (@100 kW)	-

Photo 1. Safety inspection by NUSTEC (1)

Photo 2. Safety inspection by NUSTEC (2)

Photo 3. Building for radiation measurements

Users Office

Overview

The J-PARC Center Users Office (UO) was set up in 2007 to act as a direct interface between J-PARC and its users, which was thought to be one of the effective ways of making J-PARC user-friendly.

In general, those who would like to request beam time submit their proposals. Once the proposals are accepted, they create procedures for work at J-PARC. After the beam time's completion, they submit experimental reports. J-PARC has introduced a web-based system, which enables them to execute the above processes on-line. The system consists of proposal submission system, proposal review system, user support system and experimental report submission system. The proposal submission system and the user support system started in 2008. And in 2009 the proposal review system started and the experimental report submission system was developed. The experimental report submission system is scheduled to start its operations in 2010.

The UO had the following tasks in 2009:

1) Procedures for Working at J-PARC

User registration
Issue of J-PARC User ID Card
Issue of Cafeteria Card
Issue of Car Driving Permit
Procedures for working at radiation controlled area
Procedures for Network (JLAN) use in Tokai area
Visa application support

2) Daily Life Support

Accommodation booking
Car renting support
Bike lending
Offering daily life information

3) User Programs Acceptance

Accepting user proposals through the proposal submission system and forwarding them to the Proposal Review Committee

4) Advice Request Acceptance

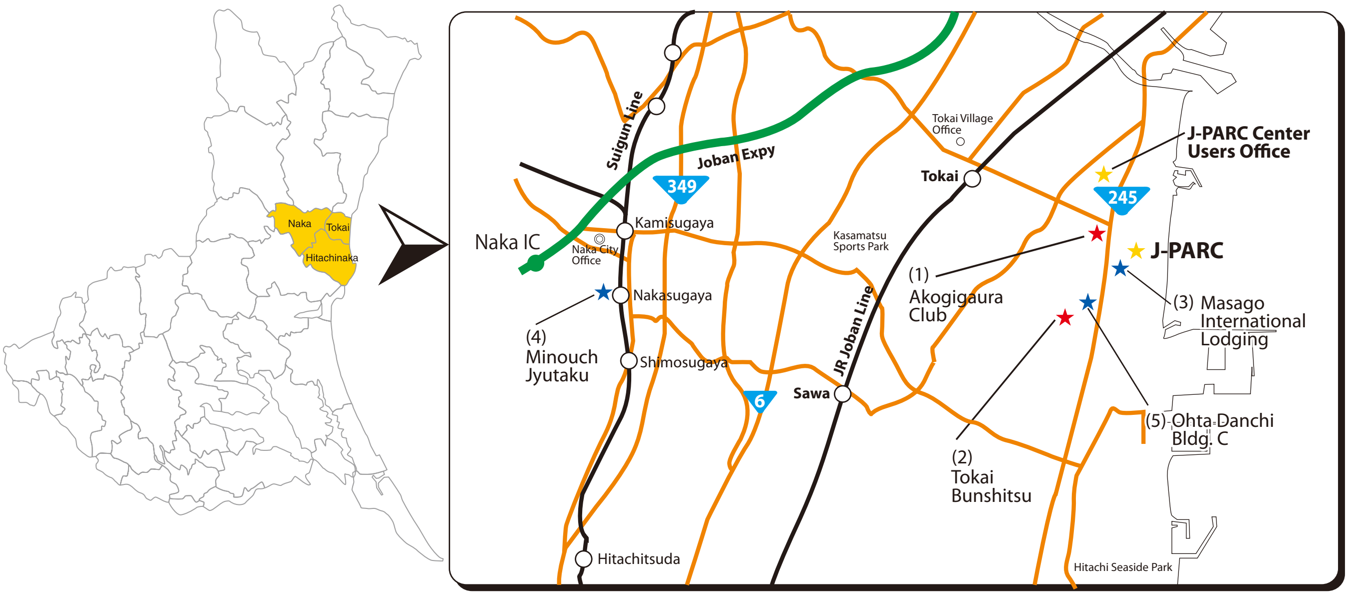
Accepting advice request concerning proposals or technical matters and forwarding them to persons concerned

Status of accommodations

It has been crucial to provide good accommodations for the users. Since its inception the UO, cooperating with other departments concerned, has been making efforts to secure good accommodations. The accommodations available in 2009 are listed with photographs in this section.

Moreover the construction of a new user dormitory with 49 rooms at Ibaraki Quantum Beam Research Center was started. It is scheduled to open in January 2011. The availability of Ohta Danchi Bldg. B and D with 12 apartments (3DK) for more than one month stay was considered as well. They are scheduled to be available in October, 2010.

Locations of accomodations available in 2009



(1) Akogigaura Club
for less than one month stay
Single (western style): 15 rooms
Twin (western style): 2 rooms
Single (Japanese style): 8 rooms

(2) Tokai Bunshitsu
for less than one month stay
Single (western style): 9 rooms
Twin (western style): 2 rooms

(3) Masago International Lodging
for more than one month stay
Single (western style): 30 rooms
Twin (western style): 3 rooms

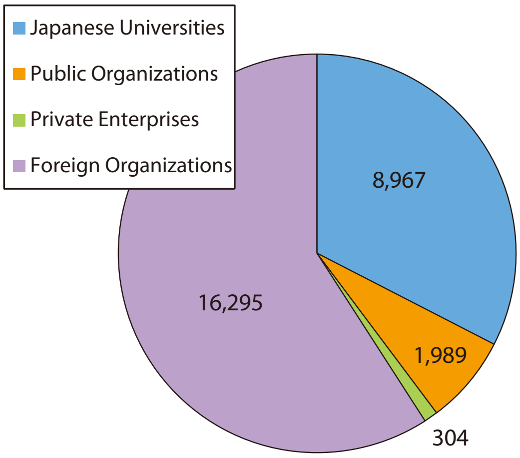
(4) Minouchi Jyutaku
for more than one month stay
15 houses (3LDK)

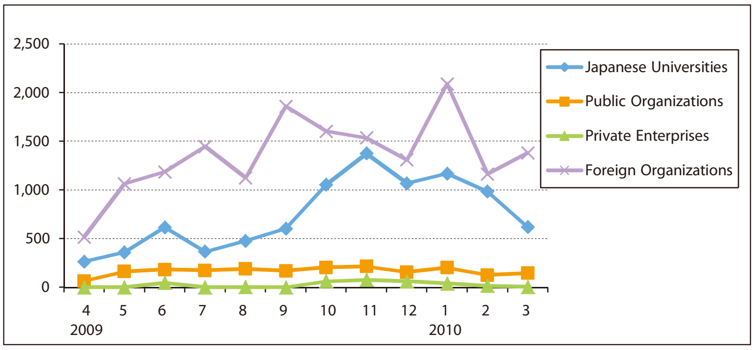
(5) Ohta Danchi Bldg.C
for more than one month stay
12 apartments (3DK)

User statistics

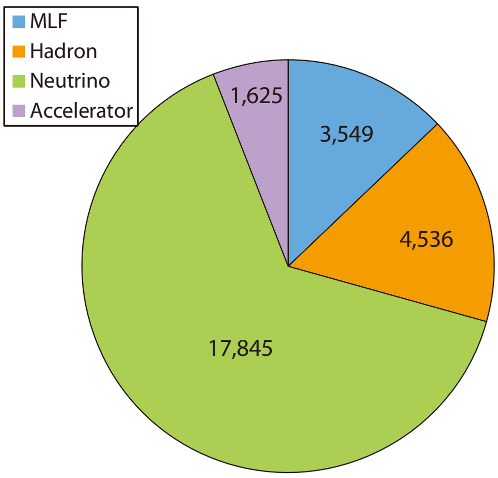
As a whole the number of the users has been increasing, although it is not an accurately constant increase. The followings are charts showing the number of users who stayed at J-PARC in 2009.

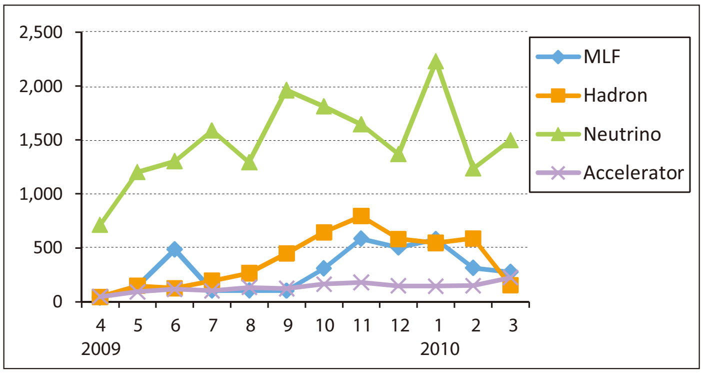
(1) Users in 2009 (according to organizations, person-days)



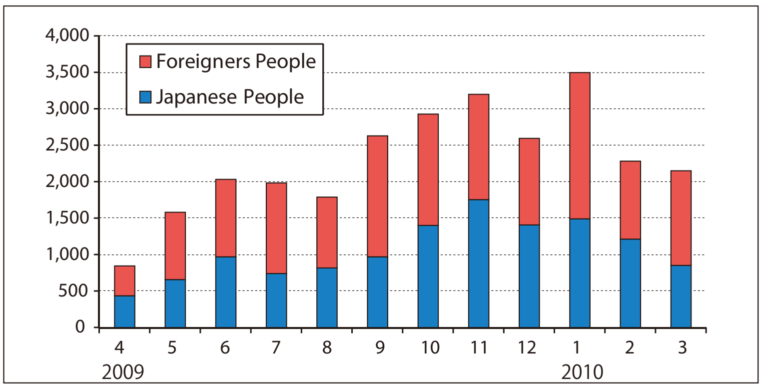


(2) Users in 2009 (according to facilities, person-days)



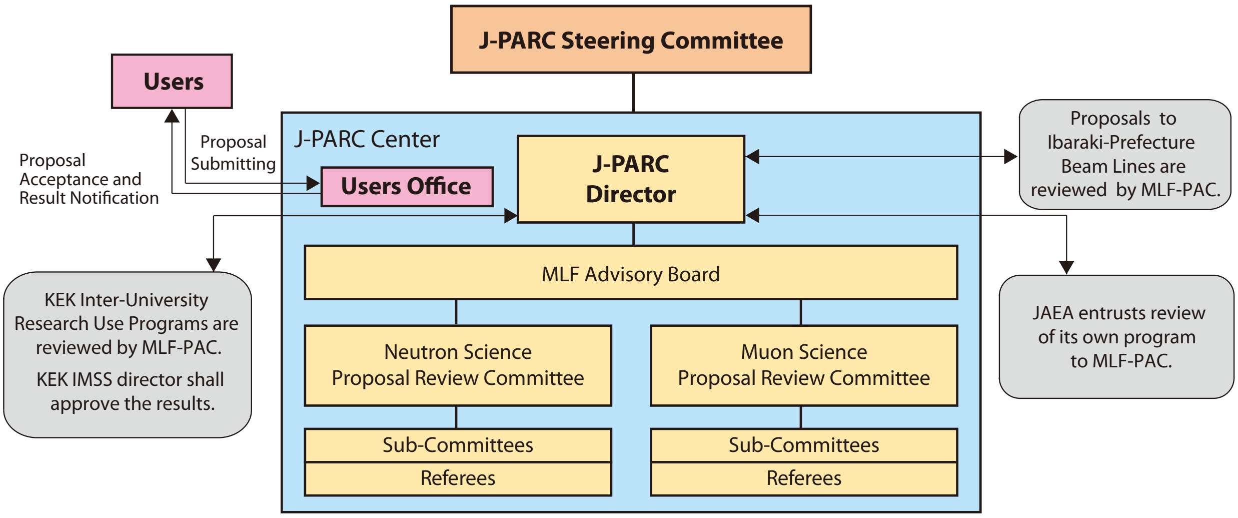


(3) Users in 2009 (Japanese people · Foreigners people, person-days)



User Program

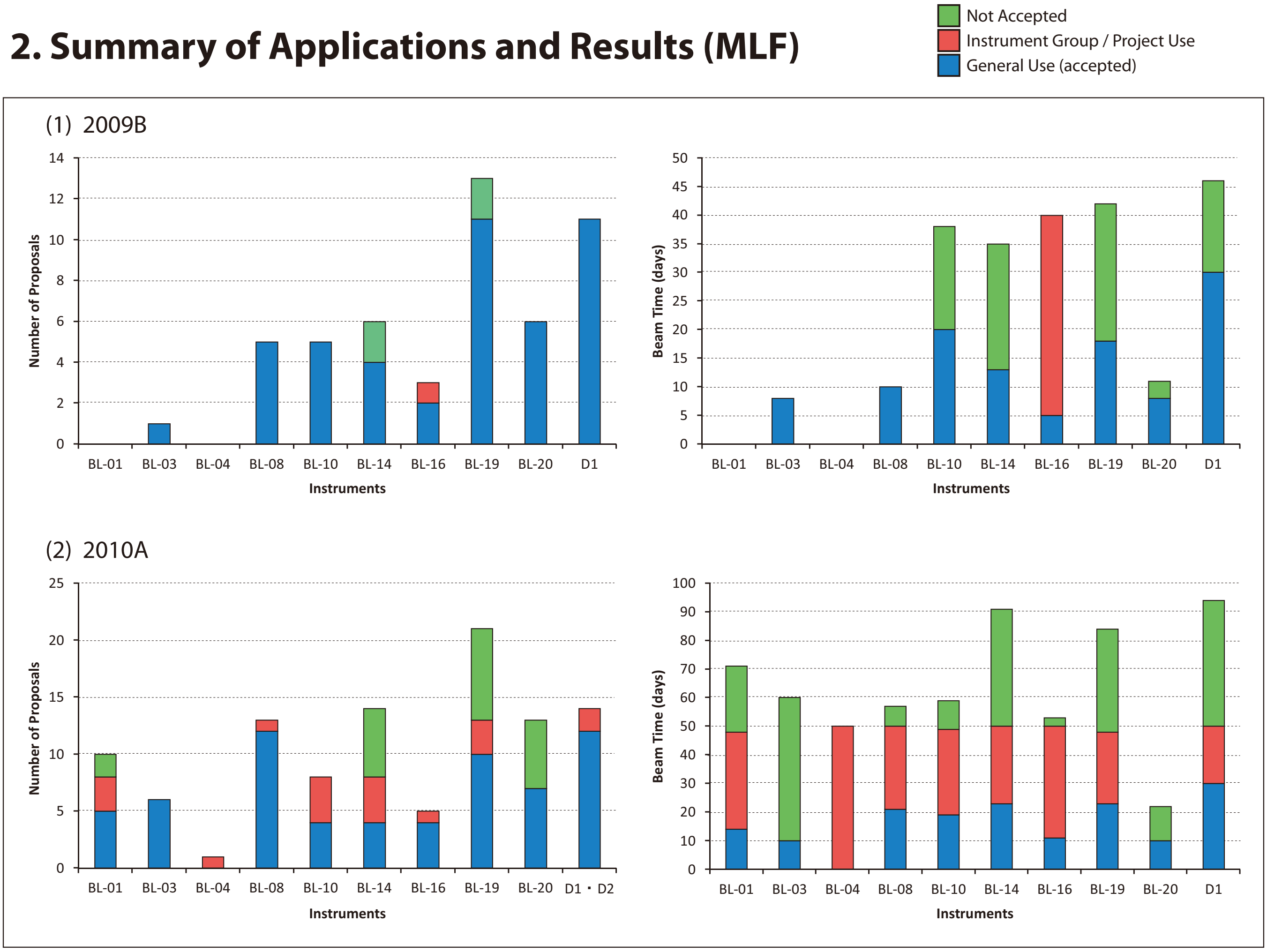
1. Proposal Reviewing System for the MLF User Program



Call for proposals for the second half of 2009 (2009B): June 1 – June 19, 2009
The review results were announced in October, 2009.

Call for proposals for the first half of 2010 (2010A): December 1, 2009 – February 7, 2010
The review results were announced in April, 2010.

2. Summary of Applications and Results (MLF)



3. Access Mode for MLF Use

(1) General use

The general use provides both local and international users with opportunities to conduct experiments. A variety of experiments are accepted both for academic researches and industrial applications.

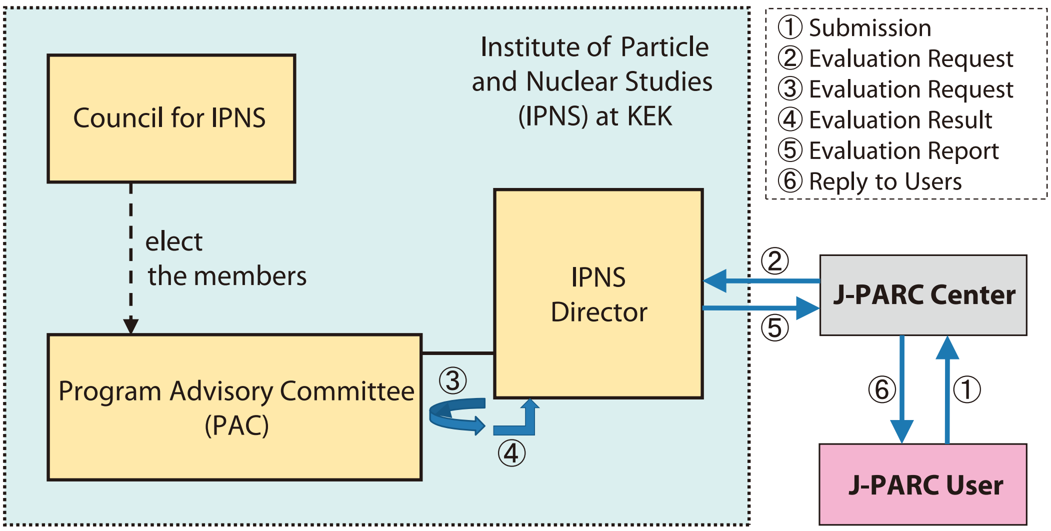
(2) Project use

The project use provides JAEA and KEK with opportunities to conduct their main-task-oriented programs such as inclusive scientific research projects, research programs proposed to fulfill the plans for the midterm goals of JAEA, joint research programs and contract research programs with other institutes or organizations. The principal researchers in the project may request beamtime longer than one year.

(3) Instrument group use

The instrument group use provides the instrument scientists responsible for the beam-line instruments with opportunities to maintain and/or improve the performance of their instruments and conduct leading-edge research and development which would ensure maximum performance of the instruments so that MLF can always provide the users with superior experimental conditions.

4. Process for Approving Experimental Programs in Particle and Nuclear Physics



The eighth PAC meeting was held on July 17 – 19, 2009.
The ninth PAC meeting was held on January 15 – 17, 2010.

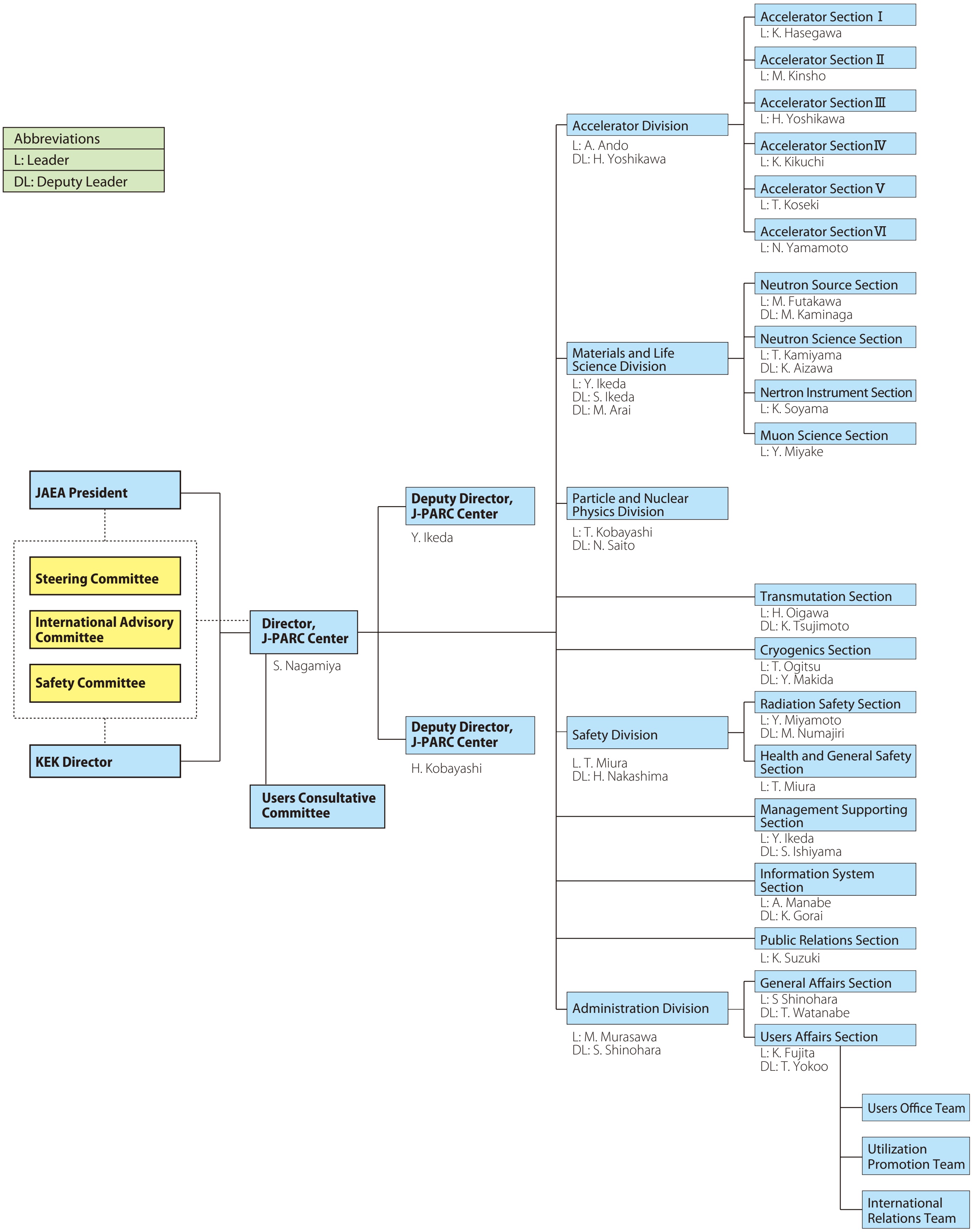
5. Approval Summary of the Particle and Nuclear Physics Experiments after the 9-th PAC Meeting (January 17, 2010)

	(Co-) Spokespersons	Affiliation	Title of the experiment	Approval status (PAC recom-mendation)	Slow line priority		Beamline
					Day1?	Day1 Priority	
E03	K. Tanida	Kyoto U	Measurement of X rays from Ξ^- Atom	Stage 2			K1.8
P04	J.C.Peng; S. Sawada	U of Illinois at Urba-na-Champaign; KEK	Measurement of High-Mass Dimuon Production at the 50-GeV Proton Synchrotron	Deferred			Primary
E05	T. Nagae	Kyoto U	Spectroscopic Study of Ξ-Hypernucleus, $^{12}_{\Xi}$Be, via the ^{12}C(K^-, K^+) Reaction	Stage 2	Day1	1	K1.8
E06	J. Imazato	KEK	Measurement of T-violating Transverse Muon Polarization in $K^+ \to \pi^0 \mu^+ \nu$ Decays	Stage 1			K1.1BR
E07	K. Imai, K. Nakazawa, H. Tamura	Kyoto U, Gifu U, Tohoku U	Systematic Study of Double Strangeness System with an Emulsion-counter Hybrid Method	Stage 2			K1.8
E08	A. Krutenkova	ITEP	Pion double charge exchange on oxygen at J-PARC	Stage 1			K1.8
E10	A. Sakaguchi, T. Fukuda	Osaka U	Production of Neutron-Rich Lambda-Hypernuclei with the Double Charge-Exchange Reaction (Revised from Initial P10)	Stage 2			K1.8
E11	T. Kobayashi	KEK	Tokai-to-Kamioka (T2K) Long Baseline Neutrino Oscillation Experimental Proposal	Stage 2			neutrino
E13	H. Tamura	Tohoku U	Gamma-ray spectroscopy of light hypernuclei	Stage 2	Day1	2	K1.8
E14	T. Yamanaka	Osaka U	Proposal for $K_L \to \pi^0 \nu \bar{\nu}$ Experiment at J-PARC	Stage 2			KL
E15	M. Iwasaki, T. Nagae	RIKEN, Kyoto U	A Search for deeply-bound kaonic nuclear states by in-flight 3He(K^-, n) reaction	Stage 2	Day1		K1.8BR
E16	S. Yokkaichi	RIKEN	Electron pair spectrometer at the J-PARC 50-GeV PS to ex-plore the chiral symmetry in QCD	Stage 1			High p
E17	R. Hayano, H. Outa	U Tokyo, RIKEN	Precision spectroscopy of Kaonic ^{3}He 3d->2p X-rays	Stage 2	Day1		K1.8BR
E18	H. Bhang, H. Outa, H. Park	SNU, RIKEN, KRISS	Coincidence Measurement of the Weak Decay of $^{12}_{\Lambda}$C and the three-body weak interaction process	Stage 1			K1.8
E19	M. Naruki	KEK	High-resolution Search for Θ^+ Pentaquark in $\pi^- p \to K^- X$ Reac-tions	Stage 2	Day1		K1.8
E21	Y. Kuno	Osaka U	An Experimental Search for $\mu - e$ Conversion at a Sensitivity of 10^{-16} with a Slow-Extracted Bunched Beam	Stage 1			New beamline
E22	S. Ajimura, A. Sakaguchi	Osaka U	Exclusive Study on the Lambda-N Weak Interaction in A=4 Lambda-Hypernuclei (Revised from Initial P10)	Stage 1			K1.8
T25	S. Mihara	KEK	Extinction Measurement of J-PARC Proton Beam at K1.8BR	test experiment			K1.8BR
P26	K. Ozawa	U Tokyo	Direct measurements of ω mass modifcation in A(π^-, n) ω reaction and $\omega \to \pi^0 \gamma$ decays	Deferred			K1.8
E27	T. Nagae	Kyoto U	Search for a nuclear Kbar bound state K^-pp in the d(π^+, K^+) reaction	Stage 1			K1.8
P28	H. Fujioka	Kyoto U	Study of isospin dependence of kaon-nucleus interaction by in-flight 3He(K^- ,n/p) reactions	approved as a part of E15			K1.8BR
P29	H. Ohnishi	RIKEN	Study of in medium mass modification for phi meson using phi meson bound state in nucleus	Deferred			K1.1
E31	H. Noumi	Osaka U	Spectroscopic study of hyperon resonances below KN thresh-old via the (K^-, n) reaction on Deuteron	Stage 1			K1.8BR
T32	A. Rubbia	ETH, Zurich	Towards a Long Baseline Neutrino and Nucleon Decay Ex-periment with a next-generation 100 kton Liquid Argon TPC detector at Okinoshima and an intensity upgraded J-PARC Neutrino beam	test experiment			K1.1BR
P33	H. M. Shimizu	KEK	Measurement of Neutron Electric Dipole Moment	Deferred			Linac
P34	N. Saito, M. Iwasaki	KEK, RIKEN	An Experimental Proposal on a New Measurement of the Muon Anomalous Magnetic Moment g-2 and Electric Dipole Moment at J-PARC	Deferred			MLF
P35	T. Kajita	ICRR, Tokyo	A test experiment to measure sub-GeV flux in the on-axis direction at the J-PARC neutrino beam	to be Decided by E11 and Lab			

Organization and Committees

Organization structure

(as of April 2009)



Members of the committees organized for J-PARC

(as of March 2010)

1) Steering Committee

Yasuhiko Fujii	Japan Atomic Energy Agency, Japan
Hideo Hirayanma	High Energy Accelerator Research Organization, Japan
Yukihide Kamiya	High Energy Accelerator Research Organization, Japan
Satoru Kondo	Japan Atomic Energy Agency, Japan
Shoji Nagamiya	J-PARC Center, Japan
Sohei Okada	Japan Atomic Energy Agency, Japan
Osamu Shimomura	High Energy Accelerator Research Organization, Japan
Fumihiko Takasaki	High Energy Accelerator Research Organization, Japan
Hiroshi Uetsuka	Japan Atomic Energy Agency, Japan
Michio Yamada	High Energy Accelerator Research Organization, Japan
Hideaki Yokomizo	Japan Atomic Energy Agency, Japan

2) International Advisory Committee

Ian Anderson	Oak Ridge National Laboratory, USA
Sergio Bertolucci	CERN, Switzerland
Bernard Frois	CEA-Saclay, France
Hidetoshi Fukuyama	Tokyo University of Science, Japan
Stuart Henderson	Oak Ridge National Laboratory, USA
Young-Kee Kim	Fermi National Accelerator Laboratory, USA
Hugh Montgomery	Thomas Jefferson National Accelerator Facility, USA
Jean-Michel Poutissou	TRIUMF, Canada
Thomas Roser	Brookhaven National Laboratory, USA
Tsumoru Shintake	RIKEN, Japan
Hoerst Stoecker	GSI, Germany
Satoru Tanaka	University of Tokyo, Japan
Andrew Taylor	Rutherford Appleton Laboratory and ISIS, UK
Eiko Torikai	University of Yamanashi, Japan
John W. White	Australian National University, Australia (chair)

3) Users Consultative Committee for J-PARC

Hiroaki Aihara	University of Tokyo, Japan
Yasuhiko Fujii	Japan Atomic Energy Agency, Japan
Toshiharu Fukunaga	Kyoto University, Japan
Yoshiaki Fukushima	Toyota Central R&D Labs., Inc., Japan
Makoto Hayashi	Ibaraki Prefecture, Japan
Tomohiko Iwasaki	Tohoku University, Japan
Shinichi Kamei	Mitsubishi Research Institute, Inc., Japan
Toshiji Kanaya	Kyoto University, Japan
Yoshiaki Kiyanagi	Hokkaido University, Japan
Takashi Kobayashi	High Energy Accelerator Research Organization, Japan
Yasuhiro Miyake	High Energy Accelerator Research Organization, Japan
Tomofumi Nagae	Kyoto University, Japan
Tsuyoshi Nakaya	Kyoto University, Japan
Kazuma Nakazawa	Gifu University, Japan
Nobuhiko Nishida	Tokyo Institute of Technology, Japan

Kazumi Nishijima	Mochida Pharmaceutical Co., Ltd., Japan
Naohito Saito	High Energy Accelerator Research Organization, Japan
Hideyuki Sakai	University of Tokyo, Japan
Mamoru Sato	Yokohama City University, Japan
Mitsuhiro Shibayama	University of Tokyo, Japan
Hirokazu Tamura	Tohoku University, Japan
Eiko Torikai	University of Yamanashi, Japan
Kazuyoshi Yamada	Tohoku University, Japan
Taku Yamanaka	Osaka University, Japan (chair)

4) Accelerator Technical Advisory Committee

David Findlay	Rutherford Appleton Laboratory, UK
Roland Garoby	CERN, Switzerland
John Galambos	Oak Ridge National Laboratory, USA
Stephen Holmes	Fermi National Accelerator Laboratory, USA
Akira Noda	Kyoto University, Japan
Peter Ostroumov	Argonne National Laboratory, USA
Uli Ratzinger	Frankfurt University, Germany
Thomas Roser	Brookhaven National Laboratory, USA (chair)
Jie Wei	Tsinghua University, China

5) Neutron International Advisory Committee

Günter Bauer	Forschungszentrum Jülich GmbH (retired), Germany
Stephen Bennington	Rutherford Appleton Laboratory, UK
Kurt Clausen	Paul Scherrer Institute, Switzerland
John Haines	Oak Ridge National Laboratory, USA
Toshiji Kanaya	Kyoto University, Japan
Yoshiaki Kiyanagi	Hokkaido University, Japan
Dan Neumann	National Institute of Standards and Technology, USA (chair)
Robert Robinson	Australian Nuclear Science and Technology Organization, Australia
Kazuyoshi Yamada	Tohoku University, Japan

6) Muon Science Advisory Committee

Jun Akimitsu	Aoyama Gakuin University, Japan
Hiroshi Amitsuka	Hokkaido University, Japan
Robert Cywinski	University of Huddersfield
Elvezio Morenzoni	Paul Scherrer Institute, Switzerland (chair)
Jean-Michel Poutissou	TRIUMF, Canada
Atsushi Shinohara	Osaka University, Japan
Jeff E. Sonier	Simon Fraser Uiversity, Canada
Eiko Torikai	University of Yamanashi, Japan

7) Radiation Safety Committee

Yoshihiro Asano	RIKEN, Japan
Shuichi Ban	High Energy Accelerator Research Organization, Japan
Hideo Hirayama	High Energy Accelerator Research Organization, Japan
Kenjiro Kondo	High Energy Accelerator Research Organization, Japan
Takeshi Murakami	National Institute of Radiological Sciences, Japan
Tetsuo Noro	Kyushu University, Japan
Kotaro Sato	High Energy Accelerator Research Organization, Japan

Seiichi Shibata	Kyoto University, Japan (chair)
Hiroshi Uetsuka	Japan Atomic Energy Agency, Japan
Yoshitomo Uwamino	RIKEN, Japan
Yoshihiro Yamaguchi	Japan Atomic Energy Agency, Japan
Makoto Yoshida	Japan Atomic Energy Agency, Japan

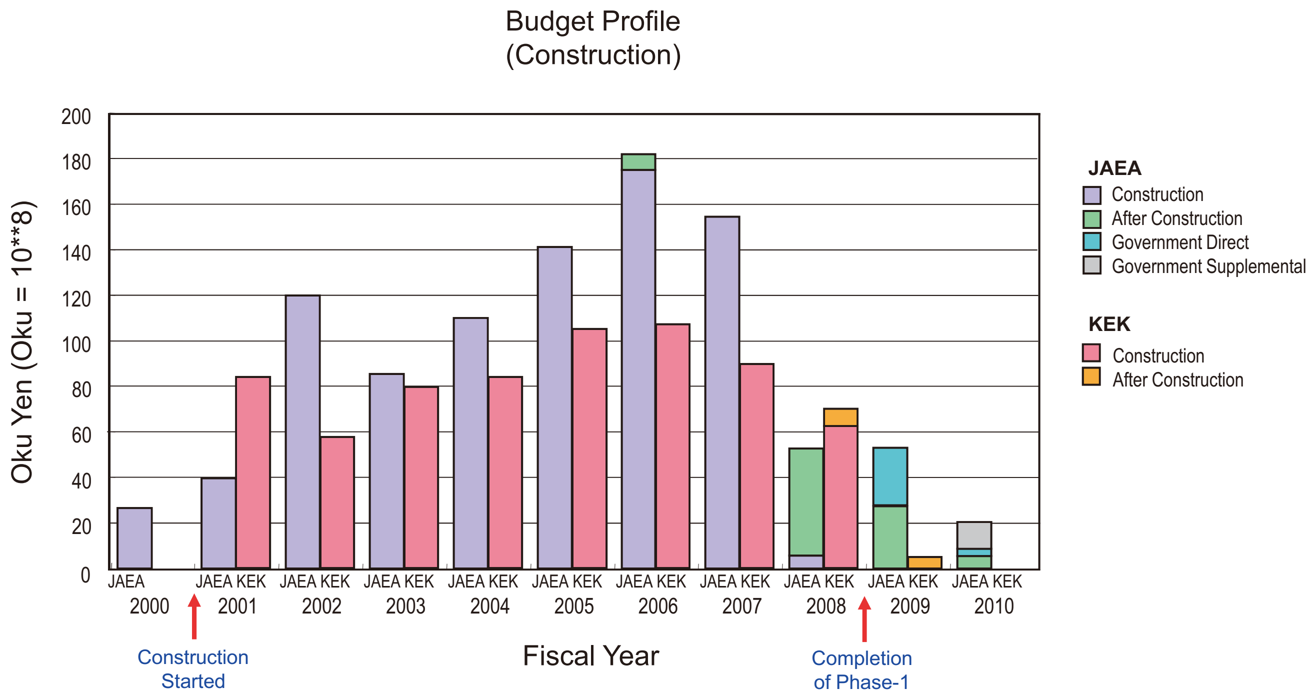
8) MLF Advisory Board

Masatoshi Arai	Japan Atomic Energy Agency, Japan
Kazuhisa Kakurai	Japan Atomic Energy Agency, Japan
Toshiharu Fukunaga	Kyoto University, Japan
Yasuhiko Fujii	Japan Atomic Energy Agency, Japan
Makoto Hayashi	Ibaraki Prefecture, Japan
Susumu Ikeda	High Energy Accelerator Research Organization, Japan
Yujiro Ikeda	Japan Atomic Energy Agency, Japan
Ryosuke Kadono	High Energy Accelerator Research Organization, Japan
Shinichi Kamei	Mitsubishi Research Institute, Inc., Japan
Takashi Kamiyama	High Energy Accelerator Research Organization, Japan
Toshiji Kanaya	Kyoto University, Japan
Yoji Koike	Tohoku University, Japan
Teiichiro Matsuzaki	RIKEN, Japan
Yasuhiro Miyake	High Energy Accelerator Research Organization, Japan
Junichiro Mizuki	Japan Atomic Energy Agency, Japan
Nobuhiko Nishida	Tokyo Institute of Technology, Japan
Yukio Noda	Tohoku University, Japan
Mamoru Sato	Yokohama City University, Japan
Hideki Seto	High Energy Accelerator Research Organization, Japan
Mitsuhiro Shibayama	University of Tokyo, Japan
Hirohiko Shimizu	High Energy Accelerator Research Organization, Japan
Jun Sugiyama	Toyota Central R&D Labs., Inc., Japan
Junichi Suzuki	Japan Atomic Energy Agency, Japan
Kazuyoshi Yamada	Tohoku University, Japan (chair)

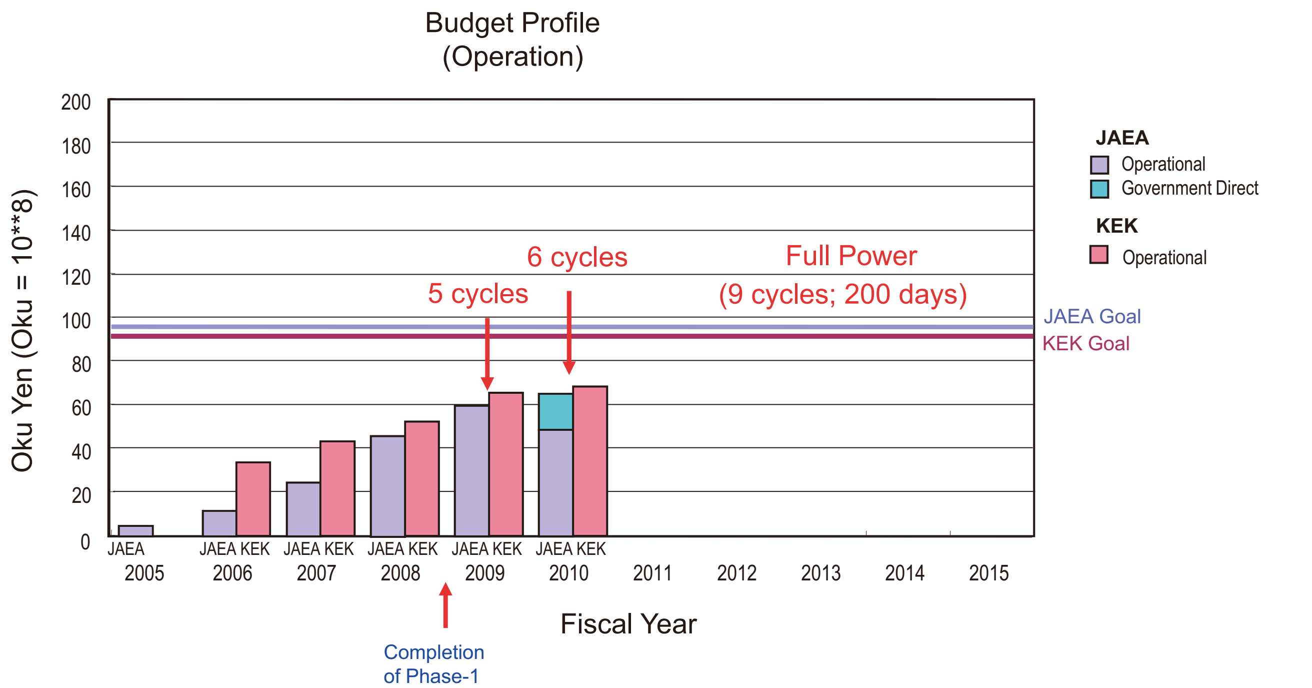
9) Nuclear and Particle Physics Experiments at the J-PARC 50 GeV Proton Synchrotron Program Advisory Committee (~March 2010)

Augusto Ceccucci	CERN, Research Physicist
Hideto Enyo	RIKEN Wako institute, Senior Researcher
Avraham Gal	The Hebrew University, ISRAEL, Faculty of Science, Professor
Kaoru Hagiwara	High Energy Accelerator Research Organization, ISPN, Theory Division, Professor
Shunzo Kumano	High Energy Accelerator Research Organization, ISPN, Theory Division, Professor
Toshinori Mori	ICEPP, University of Tokyo, Professor
Yasuki Nagai	Osaka University, Professor, Emeritus, JAEA, Guest Researcher
Satoshi Nakamura	Tohoku University, Graduate school of science, Associate Professor
Takashi Nakano	Research Center for Nuclear Physics, Osaka University, Professor
Jen-chieh Peng	University of Illinois, Dept. of Physics, Professor
Michael Shaevitz	Columbia University, Dept. of Physics, Professor
Susumu Shimoura	CNS, University of Tokyo, Graduate school of science, Professor
Robert S. Tschirhart	Fermi National Accelerator Laboratory, Research Physicist
Hitoshi Yamamoto	Tohoku University, Graduate school of science, Professor
Katsuo Tokushuku	High Energy Accelerator Research Organization, ISPN, Physics Division 2, Professor

Budget



Initial Construction (JAEA) = 858 Oku Yen (56%) After Construction (JAEA) = 200 Oku Yen incl. > 2010
Initial Construction (KEK) = 666 Oku Yen (44%) After Construction (KEK) = 18 Oku Yen incl. > 2010



Notes;
Operational budget does not include salaries for JAEA and KEK. It includes, however, outsourcing personnel's.
A new budget frame was adopted on the basis of the Law for the Promotion of Public Utilization of the Specific Advanced Large Facilities which was established on July 1, 2009.

Main Parameters

Present main parameters of Accelerator

Linac	
Acclerated . Particles	Negative hydrogen
Energy	181 MeV
Peak Current	15mA for user program
Pulse Width	0.5 ms
Repetition Rate	25 Hz
Freq. of RFQ, DTL, and SDTL	324 MHz
RCS	
Circumference	348.333 m
Injection Energy	181 MeV
Extraction Energy	3 GeV
Repetition Rate	25 Hz
RF Frequency	0.938 MHz → 1.67 MHz
Harmonic Number	2
Number of RF cavities	11
Number of Bending Magnet	24
Main Ring	
Circumference	1567.5 m
Injection Energy	3 GeV
Extraction Energy	30 GeV
Repetition Rate	~0.3 Hz
RF Frequency	1.67 MHz → 1.72 MHz
Harmonic Number	9
Number of RF cavities	5
Number of Bending Magnet	96

Key parameters of Materials and Life Science Experimental Facility

Injection energy	3 GeV
Repetition rate	25 Hz
Neutron source	
Target material	Mercury
Number of moderators	3
Moderator material	Supercritical hydrogen
Moderator temperature/pressure	20K/ 1.5 MPa
Number of neutron beam ports	23
Muon production target	
Target material	Graphite
Number of muon beam extraction ports	4
Neutron instruments*	
Open for user program (general use)	9
Under commissioning/construction	3/6
Muon instruments*	
Open for user program (general use)	1
Under commissioning	1

(* as of March, 2010)

Events

Events

July 6, 2009

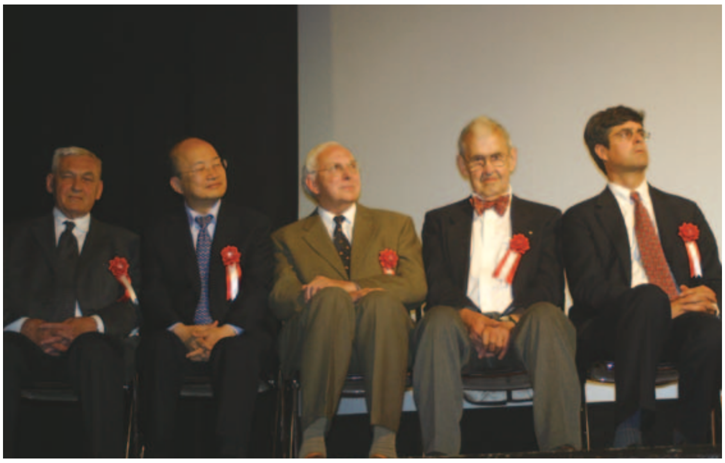
Commemoration Ceremony Marks the J-PARC's Completion

On July 6, 2009, a commemoration ceremony marking the completion of J-PARC was held in KUDAN KAIKAN, Tokyo. About 900 people attended it, and 60 of them were from abroad. During the ceremony, we announced the completion of the first phase of construction. Mr. Shionoya, Minister of Education, Culture, Sports, Science and Technology, expressed his great expectations for J-PARC, just like many other international guests and researchers.

From left:
President Toshio Okazaki of JAEA,
Director Shoji Nagamiya of J-PARC Center,
Director General Atsuto Suzuki of KEK.

Ryu Shionoya,
Minister of Education,
Culture, Sports, Science
and Technology

Makoto Kobayashi,
Professor emeritus of KEK



From right:
Thom Mason/Director at Oak Ridge National Laboratory,
Erich Vogt/Previous Director at TRIUMF,
John White/Professor at Australian National University,
Dong-Pil Min/Chairman, Korea Research Council of Fundamental Science and Technology (KRCFST),
Leonid Ponomarev/Director of Russian MUCATEX and member of the Russian Academy of Sciences.

Researchers from overseas took the stage.

August 1, 2009

J-PARC Open House

On August 1, 2009, J-PARC was open to the public, that is, the three accelerators, which were stopped for the periodical summer maintenance (LINAC, the 3 Gev synchrotron, and the 50 Gev synchrotron) and the three experimental facilities (Materials and Life Science Experimental Facility, Hadron Experimental Facility, and Neutrino Experimental Facility). Thanks to the warm weather, there were as many as 4700 visitors (3700 for J-PARC), which was the largest number that we have ever had.

Visitors to RCS.

Visitors to MLF.

November 9 – 12, 2009

The International Workshop on Pulsed Spallation Neutron Sources, Tokai, Ibaraki, Japan.

The neutron source section members of J-PARC and 4 staffs of SNS at Oak Ridge National Laboratory in USA eagerly discussed the common issues concerning the pulsed spallation neutron sources operated with the high power beam of mega-watt on the basis of the operational experiences in both facilities so far. 6 members of the European Spallation Source project team and 9 members of the China Spallation Neutron Source project team also participated in exchanging information for their own planning facilities. The satellite workshop on the cavitation damage mitigation technology for mercury target was also held in parallel on November 11 and 12.

Discussion at a conference room

December 1, 2009

Social Gathering with the Foreign Users

On December 1, 2009, many foreign researchers, Mr. Murakami, the Tokai village mayor and people employed by J-PARC assembled for a social gathering. It was a fruitful meeting, at which they discussed their research and impressions of the life in Japan.

Attendees of the social gathering

March 29 – 31, 2010

The First MLF Symposium, Tokai, Ibaraki, Japan.

Over 220 participants from universities, academic institutes, and companies attended and discussed many topics such as superconductivity, Li-ion batteries, mechanical engineering, protein structures, etc. as well as the progress of neutron source facility, muon target, neutron and muon instrumentations.

Prominent Visitors to J-PARC in 2009

Ikuo Kamei, Upper House Member (April. 27)

Seiko Noda, Minister of State for Science and Technology Policy (July, 3)

Sadakazu Tanigaki, Lower House Member (July, 7)

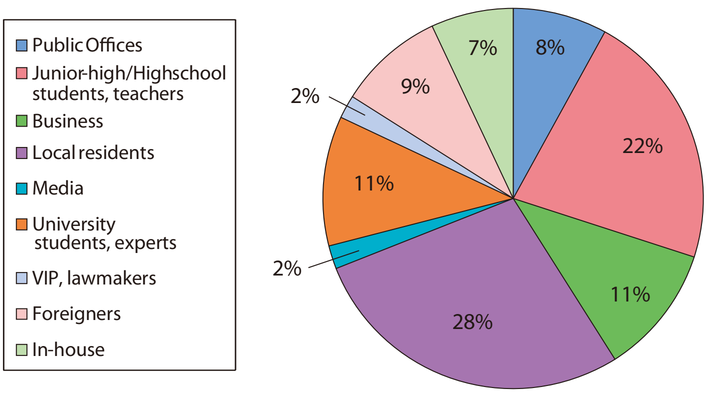
Masaharu Nakagawa, Deputy Minister of Education, Culture, Sports, Science and Technology (December, 18)

Hudi Hastowo, Head of The National Nuclear Energy Agency of Indonesia (BATAN) (October, 8)

The Committee on Education, Culture, Sports, Science and Technology of the House of Representatives (March, 31)
(Right) **Makiko Tanaka**, Committee Chairperson

More Than 30,000 People Visited J-PARC

The number of J-PARC's visitors for the period from April 2005 to the end of January 2010 exceeded 30,000. Regular people and local residents, junior-high and high school students and teachers accounted for the half of that number.



Director Nagamiya, of the J-PARC Center, explains the facility to citizens of Falls, Idaho, the sister city of Tokai village (August 2008).

Summaries of International Advisory Committees

International Advisory Committee

The International Advisory Committee was held on March 15 and 16 in 2010. The committee congratulated the success that all the elements are running nicely. On the other hand, the committee pointed out much smoother organizational structure by having mirror image of the two organizations. In addition, the most urgent issue is to go to 1 MW as quickly as possible. It was pointed out to us that the financial arrangement must be planned carefully and, at the same time, rigorously.

The ninth meeting of Accelerator Technical Advisory Committee (ATAC).

The ninth meeting of ATAC was held on March 11 to 13 in 2010. Dr. Thomas Roser of BNL succeeded Stephen Holmes of FNAL as the chair. Following the presentations by the accelerator members of J-PARC, enthusiastic and frank discussions were made, in particular, towards a steady and fast realization of 1 MW at RCS and 0.75 MW at MR fast extraction. The importance of a comprehensive scheduling was also pointed out because the common use of both MLF and MR must proceed with an approval of machine time for users consistent with the construction and the beam commissioning of the LINAC energy upgrade to 400 MeV.

Neutron International Advisory Committee (NIAC).

The NIAC was newly organized in fiscal year 2009 and held on February 24 to 26 in 2010, in which Dr. Dan Neumann (National Institute of Standards and Technology, US) is acting the chair. Previously this was a technical advisory committee for the neutron target technology and engineering and has been organized seven times since fiscal year 2002. Because Materials and Life Science Experimental Facility has started the user program since 2008, the mission of the committee has been changed so that it gives advice on organization, operation, safety, instrumentation and target station.

8th Muon Science Advisory Committee (MuSAC-8)

The MuSAC-8 was held on March 11 and 12 in 2010. The committee (chair: Dr. E. Morenzoni from PSI) expressed congratulation to all the people involved at J-PARC MUSE for their many achievements since the first successful extraction of muon beam. The committee was pleased to hear about the successes of the muon user program, which include the first refereed journal publication from J-PARC by S. Takeshita, *et al*. The committee reinforced the support of the ultra slow muon beam line for μSR as a top priority, and acknowledged the progress that was made thus far in its design. The committee concluded that the highest priority should be to secure funding for fully developing this beam line, as it would promise to be a unique tool for novel experiments in nano-materials research. The committee expressed their conviction that this beam line would have great potential even at reduced power, and that it would attract users from around the globe, suggesting the importance to involve the condensed matter physics and materials science communities in this unique opportunity.

Radiation Safety Committee

The Radiation Safety Committee met twice in fiscal year 2009. The seventh meeting was held on June 2, 2009 to discuss the application of 3 GeV Rapid Cycling Synchrotron, Materials and Life Science Experimental Facility, Main Ring (MR), Nuclear and Particle Physics Facility (HD), and Neutrino Facility (NU). The main points were the enlargement of two secondary beam lines in HD: K1.8 and KL, and the beam-intensity upgrade in MR and NU. At next, the 8th meeting was held on December 15, 2009, at which the application of HD was discussed. The main point was the enlargement of two secondary beam lines in HD: K1.1BR and KL.

Dates for Committees

1) Steering Committee

May 1st, 2009 @Nuclear Science Research Institute, JAEA, Tokai, Ibaraki
June 30th, 2009 @Ibaraki Quantum Beam Research Center, Tokai, Ibaraki
September 29th, 2009 @Ibaraki Quantum Beam Research Center, Tokai, Ibaraki
December 24th, 2009 @ Ibaraki Quantum Beam Research Center, Tokai, Ibaraki

2) User Consultative Committee

October 28th, 2009 @Tokyo Office, JAEA

3) MLF Advisory Board

7th Board: September 7th, 2009 @Tokyo Office, JAEA
8th Board: March 17th, 2010 @Nuclear Science Research Institute, JAEA

4) Program Advisory Committee for Nuclear and Particle Physics Experiments at the J-PARC 50GeV Proton Synchrotron

8th Committee: July 17th - 19th @Tsukuba campus, KEK
9th Committee: January 15th - 17th @Tsukuba campus, KEK

Publications

Publications in Periodical Journals

A-001
Maekawa, F.
J-PARC 1MW pulsed spallation neutron source
Activation Analysis, vol. 25, p. 15 (2010)

A-002
Ogura, K. et al.
Proton-induced nuclear reactions using compact high-contrast high-intensity laser
Appl. Phys. Express, vol. 2, p. 066001_1 (2009)

A-003
Yamamoto, K. et al.
Estimation of secondary electron effect in the J-PARC rapid cycling synchrotron after first study
Appl. Surf. Sci., vol. 256, p. 958 (2009)

A-004
Nagamiya, S.
Appointed to President-Elect for the Physical Society
Butsuri, vol. 65, p. 69 (2010)

A-005
Nagamiya, S.
Coming up a new facility J-PARC
Butsuri, vol. 65, p. 108 (2010)

A-006
Onuki, T. et al.
Concurrent transformation of Ce(III) and formation of biogenic manganese oxides
Chem. Geol., vol. 253, p. 23 (2008)

A-007
Shen, G. et al.
Tuning of RF amplitude and phase for the drift tube linac in J-PARC
Chinese Phys. C, vol. 33, p. 577 (2009)

A-008
Kato, T. et al.
Cryogenic hydrogen system for a spallation neutron source in J-PARC
Cryo. Eng., vol. 43, p. 409 (2008)

A-009
Nagamiya, S.
Multi-Purposed Facility - J-PARC
Energy Review, vol. 28, p. 7 (2008)

A-010
Ukon, S. et al.
Radiation resistant cable
Fujikura Giho, vol. 3, p. 26 (2008)

A-011
Nagamiya, S.
Research Curiocity and Nobel Prize
Gakujyutu-no-doukou, June Issue, p. 1 (2009)

A-012
Nagamiya, S.
Birth of J-PARC
Hamon, vol. 18, p. 7 (2008)

A-013
Tatsumoto, H.
Through development of the cryogenic hydrogen system for the spallation neutron source in J-PARC
Hamon, vol. 19, p. 4 (2009)

A-014
Maruyama, R.
Effect of roughness correlation on diffuse intensity in a neutron supermirror
Hamon, vol. 19, p. 9 (2009)

A-015
Takahashi, N.
Construction of a novel backscattering spectrometer DNA at J-PARC
Hamon, vol. 19, p. 14 (2009)

A-016
Kajimoto, R. et al.
4D space access neutron spectrometer 4SEASONS *(SIKI)*
Hamon, vol. 20, p. 8 (2010)

A-017
Oikawa, K. et al.
Launch of NOBORU (BL10)
Hamon, vol. 20, p. 34 (2010)

A-018
Hattori, T. et al.
Design concept and the current construction state of J-PARC high-pressure neutron diffractometer PLANET
Hamon, vol. 20, p. 39 (2010)

A-019
Sasaki, S. et al.
W-values for Heavy Ions in Gases
IEEE Nucl. Sci. Conf. R., vol. 2009, p. 702 (2009)
(The 2009 IEEE Nucelar Science Symposium and Medical Imaging Conference)

A-020
Saito K. et al.
Scintillation Mechanism in Helium Mixed with Xenon
IEEE Nucl. Sci. Conf. R., vol. 2009, p. 1521 (2009)
(The 2009 IEEE Nucelar Science Symposium and Medical Imaging Conference)

A-021
Ohshita, H. et al.
Performance of a Neutron Beam Monitor with a GEM for the High-Intensity Total Diffractometer at J-PARC
IEEE Nucl. Sci. Conf. R., vol. 2009, p. 2286 (2009)
(The 2009 IEEE Nucelar Science Symposium and Medical Imaging Conference)

A-022
Tatsumoto, H. et al.
Numerical analysis of forced convection heat transfer of subcooled liquid nitrogen
IEEE T. Appl. Supercon., vol. 18, p. 1483 (2008)
(20th International Conference on Magnet Technology (MT-20))

A-023
Ogitsu, T. et al.
Status of superconducting magnet system for the J-PARC neutrino beam line
IEEE T. Appl. Supercon., vol. 19, p. 1081 (2009)
(The 2008 Applied Superconductivity Conference)

A-024
Okamura, T. et al.
Test results of superconducting magnets for the J-PARC neutrino beam line
IEEE T. Appl. Supercon., vol. 19, p. 1125 (2009)
(The 2008 Applied Superconductivity Conference)

A-025
Sakasai, K. et al.
Detection of fast neutron by storage phosphors with low g-ray sensitivity
IEEE T. Nucl. Sci., vol. 55, p. 2352 (2008)
(2007 IEEE Nuclear Science Symposium and Medical Imaging Conference)

A-026
Nagamiya, S.
Positive and negative aspects in Science
Isotope News, vol. 649, p. 1 (2008)

A-027
Enomoto, S. et al.
New utilization and promotion of RI
Isotope News, vol. 657, p. 2 (2009)

A-028
Fujii, Y. et al.
Japan Proton Accelerator Research Complex (J-PARC); Materials and Life Science Facility
J. Appl. Phys. Jpn., vol. 78, p. 758 (2009)

A-029
Maruyama, R. et al.
Effect of interfacial roughness correlation

on diffuse scattering intensity in a neutron supermirror
J. Appl. Phys., vol. 105, p. 083527_1 (2009)

A-030
Kubo, J. et al.
Improvement of poly (vinyl alcohol) properties by the addition of magnesium nitrate
J. Appl. Polym. Sci., vol. 112, p. 1647 (2009)

A-031
Nagamiya, S.
Moving toward an opening at J-PARC
J. Atom. Energy Soc. Jpn., vol. 50, p. 758 (2008)

A-032
Oyama, Y. et al.
Quantum beams open up the future, 3
J. Atom. Energy Soc. Jpn., vol. 51, p. 14 (2009)

A-033
Nagamiya, S.
Low-temperature technology and its history
J. Cryogenic Soc, Jpn., vol. 43, p. 131 (2008)

A-034
Ikeda, Y.
Overview of Japan Proton Accelerator Research Complex (J-PARC) project and Materials and Life Science Experimental Facility (MLF)
J. Crystall. Soc. Jpn., vol. 50, p. 2 (2008)

A-035
Ohara, T. et al.
Direct observation of crystalline-state reactions by single crystal neutron diffraction analyses
J. Crystall. Soc. Jpn., vol. 50, p. 98 (2008)

A-036
Yoshiasa, A. et al.
High pressure and high temperature EXAFS and diffraction study of AgI (MS35)
J. Crystall. Soc. Jpn., vol. 51, p. 66 (2009)

A-037
Kurata, Y. et al.
Corrosion of CrN-coated steels for nuclear reactors in liquid Pb-Bi
J. Jpn. Inst. Met., vol. 72, p. 470 (2008)

A-038
Kurata, Y. et al.
Corrosion behavior of steels in liquid lead-bismuth with low oxygen concentrations
J. Nucl. Mater., vol. 373, p. 164 (2008)

A-039
Yoshiie, T. et al.
Reaction kinetics analysis of damage evolution in accelerator driven system beam windows
J. Nucl. Mater., vol. 377, p. 132 (2008)
(8th International Workshop on Spallation Materials Technology (IWSMT-8))

A-040
Nagata, S. et al.
Damage process and luminescent characteristics in silica glasses under ion irradiation
J. Nucl. Mater., vol. 386-388, p. 1045 (2009)
(13th International Conference on Fusion Reactor Materials (ICFRM-13))

A-041
Kurata, Y. et al.
Characterization and re-activation of oxygen sensors for use in liquid lead-bismuth
J. Nucl. Mater., vol. 398, p. 165 (2010)
(9th International Workshop on Spallation Materials Technology (IWSMT-9))

A-042
Takada, H. et al.
Validation of JENDL high-energy file through analyses of spallation experiments at incident proton energies from 0.5 to 2.83 GeV
J. Nucl. Sci. Technol., vol. 46, p. 589 (2009)

A-043
Haga, K. et al.
Mockup experiments to investigate the leak rate correlation between mercury and helium for the mercury target system of J-PARC
J. Nucl. Sci. Technol., vol. 46, p. 1145 (2009)

A-044
Suzuki, H. et al.
Pitting damage and residual stress induced by cavitation erosion on mercury target vessel
J. Nucl. Sci. Technol., vol. 47, p. 136 (2010)

A-045
Ogiwara, N. et al.
Reduction of hydrogen content in pure Ti
J. Phys. Conf. Ser., vol. 100, p. 092024_1 (2008)
(17th International Vacuum Congress (IVC-17)/13th International Conference on Surface Science (ICSS-13)/International Conference on Nanoscience and Technology (ICN+T2007))

A-046
Fukuda, T. et al.
Lattice dynamics of $LaFeAsO_{(1-x)}F_x$ and $PrFeAsO_{(1-y)}$ via inelastic X-ray scattering and first-principles calculation
J. Phys. Soc. Jpn., vol. 77, p. 103715_1 (2008)

A-047
Ishikado, M. et al.
Two-dimensional spin density wave state in LaFeAsO
J. Phys. Soc. Jpn., vol. 78, p. 043705_1 (2009)

A-048
Nakamura, M. et al.
First demonstration of novel method for inelastic neutron scattering measurement utilizing multiple incident energies
J. Phys. Soc. Jpn., vol. 78, p. 093002_1 (2009)

A-049
Takeda, M. et al.
Nematic-to-smectic transition of magnetic texture in conical state
J. Phys. Soc. Jpn., vol. 78, p. 093704_1 (2009)

A-050
Shamoto, S. et al.
Front lines of structural analyses by pulsed neutron diffraction
J. Plasma Fusion Res., vol. 84, p. 323 (2008)

A-051
Nishitani, T. et al.
Functional materials for diagnostics and plasma control
J. Plasma Fusion Res., vol. 84, p. 635 (2008)

A-052
Ogiwara, N. et al.
The Development of a Pirani vacuum gauge with a platinum wire in the J-PARC 3-GeV rapid cycling synchrotron
J. Vac. Soc. Jpn., vol. 53, p. 158 (2010)

A-053
Nagamiya, S.
Sciences to be explored at J-PARC
Kagaku, vol. 79, p. 340 (2009)

A-054
Nagamiya, S.
Overview of J-PARC
Lecture Note in Phys., vol. 781, p. 1 (2009)

A-055
Koga, T. et al.
New insight into hierarchical structures of carbon black dispersed in polymer matrices; A Combined small-angle scattering study
Macromolecules, vol. 41, p. 453 (2008)

A-056
Arai, M.
Prospective neutron scattering studies at J-PARC
Magnetics Jpn., vol. 4, (2009)

A-057
Kikuchi, K.
Introduction of J-PARC
Maintenology, vol. 6, p. 49 (2008)

A-058
Arai, M.
New trends in materials science explored by the new neutron source of J-PARC
Materia Jpn., vol. 48, p. 347 (2009)

A-059
Otsuka, S. et al.
Effect of nano-size oxide particle dispersion and δ-ferrite proportion on creep strength of 9Cr-ODS steel
Mater. Trans., vol. 50, p. 1778 (2009)

A-060
Kurata, Y. et al.
Temperature dependence of corrosion of ferritic/martensitic and austenitic steels in liquid lead-bismuth eutectic
Mater. Trans., vol. 50, p. 2410 (2009)

A-061
Nagamiya, S.
Expectation toward future J-PARC
Monbu Kagaku Jiho, vol. 1605, p. 10 (2009)

A-062
Bull, M. et al.
Safeguarding neutron facilities
Neutron News, vol. 20, p2 (2009)

A-063
Hori, T. et al.
High power test of 972 MHz waveguide systems for J-PARC Linac
NIFS-MEMO-55, p. 289 (2008)

A-064
Takeda, M. et al.
Double focusing Heusler monochromator and analyzer systems for the polarized neutron triple-axis spectrometer
Nucl. Instrum. Meth. A, vol. 586, p. 229 (2008)

A-065
Iwamoto, Y. et al.
Measurement of thick target neutron yields at 0° bombarded with 140, 250 and 350 MeV protons
Nucl. Instrum. Meth. A, vol. 593, p. 298 (2008)

A-066
Murata, I. et al.
Angle-correlated spectrum measurement for two neutrons emitted from (n,2n) reaction with the coincidence detection technique using a pencil-beam DT neutron source
Nucl. Instrum. Meth. A, vol. 595, p. 439 (2008)

A-067
Shen, G. et al.
Tuning of RF amplitude and phase for the separate-type drift tube linac in J-PARC
Nucl. Instrum. Meth. A, vol. 598, p. 361 (2009)

A-068
Iwamoto, Y. et al.
Measurements of double-differential neutron-production cross-sections for the ^{9}Be(p,xn) and ^{9}Be(d,xn) reactions at 10 MeV
Nucl. Instrum. Meth. A, vol. 598, p. 687 (2009)

A-069
Ikeda, Y.
J-PARC status update
Nucl. Instrum. Meth. A, vol. 600, p. 1 (2009) (1st J-PARC International Symposium; International Symposium on Pulsed Neutron and Muon Sciences at J-PARC 2008 (IPS '08))

A-070
Futakawa, M. et al.
Development of the Hg target in the J-PARC neutron source
Nucl. Instrum. Meth. A, vol. 600, p. 18 (2009) (1st J-PARC International Symposium; International Symposium on Pulsed Neutron and Muon Sciences at J-PARC 2008 (IPS '08))

A-071
Miyake, Y. et al.
J-PARC muon source, MUSE
Nucl. Instrum. Meth. A, vol. 600, p. 22 (2009) (1st J-PARC International Symposium; International Symposium on Pulsed Neutron and Muon Sciences at J-PARC 2008 (IPS '08))

A-072
Bakule, P. et al.
Prospects for ultra-low-energy muon beam at J-PARC
Nucl. Instrum. Meth. A, vol. 600, p. 35 (2009) (1st J-PARC International Symposium; International Symposium on Pulsed Neutron and Muon Sciences at J-PARC 2008 (IPS '08))

A-073
Meigo, S. et al.
Beam commissioning for neutron and muon facility at J-PARC
Nucl. Instrum. Meth. A, vol. 600, p. 41 (2009) (1st J-PARC International Symposium; International Symposium on Pulsed Neutron and Muon Sciences at J-PARC 2008 (IPS '08))

A-074
Utsumi, W. et al.
Neutron powder diffraction under high pressure at J-PARC
Nucl. Instrum. Meth. A, vol. 600, p. 50 (2009) (1st J-PARC International Symposium; International Symposium on Pulsed Neutron and Muon Sciences at J-PARC 2008 (IPS '08))

A-075
Suzuki, S. et al.
New pipelined data acquisition system for μSR experiments at J-PARC
Nucl. Instrum. Meth. A, vol. 600, p. 53 (2009) (1st J-PARC International Symposium; International Symposium on Pulsed Neutron and Muon Sciences at J-PARC 2008 (IPS '08))

A-076
Haga, K. et al.
Bubble flow simulations in target vessel
Nucl. Instrum. Meth. A, vol. 600, p. 64 (2009) (1st J-PARC International Symposium; International Symposium on Pulsed Neutron and Muon Sciences at J-PARC 2008 (IPS '08))

A-077
Maruyama, R. et al.
Development of high-reflectivity neutron supermirrors using an ion beam sputtering technique
Nucl. Instrum. Meth. A, vol. 600, p. 68 (2009) (1st J-PARC International Symposium; International Symposium on Pulsed Neutron and Muon Sciences at J-PARC 2008 (IPS '08))

A-078
Sakai, K. et al.
Construction status of a general control system for the Materials and Life Science Experimental Facility (MLF) at J-PARC
Nucl. Instrum. Meth. A, vol. 600, p. 75 (2009) (1st J-PARC International Symposium; International Symposium on Pulsed Neutron and Muon Sciences at J-PARC 2008 (IPS '08))

A-079
Kinoshita, H. et al.
Remote handling devices in MLF
Nucl. Instrum. Meth. A, vol. 600, p. 78 (2009) (1st J-PARC International Symposium; International Symposium on Pulsed Neutron and Muon Sciences at J-PARC 2008 (IPS '08))

A-080
Hasegawa, S. et al.
Effect of hydrogen loop fluctuation on cold neutron performance with hybrid control system in JSNS
Nucl. Instrum. Meth. A, vol. 600, p. 81 (2009) (1st J-PARC International Symposium; International Symposium on Pulsed Neutron and Muon Sciences at J-PARC 2008 (IPS '08))

A-081
Oikawa, K. et al.
Engineering design of JSNS shutter system
Nucl. Instrum. Meth. A, vol. 600, p. 84 (2009) (1st J-PARC International Symposium; International Symposium on Pulsed Neutron and Muon Sciences at J-PARC 2008 (IPS '08))

A-082
Harada, M. et al.

Settlement of Materials and Life Science Experimental Facility at J-PARC
Nucl. Instrum. Meth. A, vol. 600, p. 87 (2009) (1st J-PARC International Symposium; International Symposium on Pulsed Neutron and Muon Sciences at J-PARC 2008 (IPS '08))

A-083
Takahashi, N. et al.
Study of the analyzer crystals for use in the near-backscattering spectrometer DNA at J-PARC
Nucl. Instrum. Meth. A, vol. 600, p. 91 (2009) (1st J-PARC International Symposium; International Symposium on Pulsed Neutron and Muon Sciences at J-PARC 2008 (IPS '08))

A-084
Oishi, R. et al.
Rietveld analysis software for J-PARC
Nucl. Instrum. Meth. A, vol. 600, p. 94 (2009) (1st J-PARC International Symposium; International Symposium on Pulsed Neutron and Muon Sciences at J-PARC 2008 (IPS '08))

A-085
Kogawa, H. et al.
Development on mercury pump for JSNS
Nucl. Instrum. Meth. A, vol. 600, p. 97 (2009) (1st J-PARC International Symposium; International Symposium on Pulsed Neutron and Muon Sciences at J-PARC 2008 (IPS '08))

A-086
Satoh, S. et al.
Development of a readout system employing high-speed network for J-PARC
Nucl. Instrum. Meth. A, vol. 600, p. 103 (2009) (1st J-PARC International Symposium; International Symposium on Pulsed Neutron and Muon Sciences at J-PARC 2008 (IPS '08))

A-087
Shinohara, T. et al.
Design and performance analyses of the new time-of-flight smaller-angle neutron scattering instrument at J-PARC
Nucl. Instrum. Meth. A, vol. 600, p. 111 (2009) (1st J-PARC International Symposium; International Symposium on Pulsed Neutron and Muon Sciences at J-PARC 2008 (IPS '08))

A-088
Ooi, M. et al.
Developmental status of a server system for the MLF general control system
Nucl. Instrum. Meth. A, vol. 600, p. 120 (2009) (1st J-PARC International Symposium; International Symposium on Pulsed Neutron and Muon Sciences at J-PARC 2008 (IPS '08))

A-089
Nakahara, K. et al.
The super omega muon beamline at J-PARC
Nucl. Instrum. Meth. A, vol. 600, p. 132 (2009) (1st J-PARC International Symposium; International Symposium on Pulsed Neutron and Muon Sciences at J-PARC 2008 (IPS '08))

A-090
Sato, T. J. et al.
Versatile inelastic neutron spectrometer (VINS) project for J-PARC
Nucl. Instrum. Meth. A, vol. 600, p. 143 (2009) (1st J-PARC International Symposium; International Symposium on Pulsed Neutron and Muon Sciences at J-PARC 2008 (IPS '08))

A-091
Makimura, S. et al.
Present status of construction for the muon target in J-PARC
Nucl. Instrum. Meth. A, vol. 600, p. 146 (2009) (1st J-PARC International Symposium; International Symposium on Pulsed Neutron and Muon Sciences at J-PARC 2008 (IPS '08))

A-092
Wakui, T. et al.
Effects of pitting damage and repeated stresses on lifetime of mercury target
Nucl. Instrum. Meth. A, vol. 600, p. 150 (2009) (1st J-PARC International Symposium; International Symposium on Pulsed Neutron and Muon Sciences at J-PARC 2008 (IPS '08))

A-093
Strasser, P. et al.
Alignment and shields in the M2 primary proton beamline at J-PARC
Nucl. Instrum. Meth. A, vol. 600, p. 154 (2009) (1st J-PARC International Symposium; International Symposium on Pulsed Neutron and Muon Sciences at J-PARC 2008 (IPS '08))

A-094
Sakasai, K. et al.
Development of neutron detector for engineering materials diffractometer at J-PARC
Nucl. Instrum. Meth. A, vol. 600, p. 157 (2009) (1st J-PARC International Symposium; International Symposium on Pulsed Neutron and Muon Sciences at J-PARC 2008 (IPS '08))

A-095
Fujimori, H. et al.
Radiation resistant magnets for the J-PARC muon facility
Nucl. Instrum. Meth. A, vol. 600, p. 170 (2009) (1st J-PARC International Symposium; International Symposium on Pulsed Neutron and Muon Sciences at J-PARC 2008 (IPS '08))

A-096
Nakayoshi, K. et al.
Development of a data acquisition sub-system using DAQ-Middleware
Nucl. Instrum. Meth. A, vol. 600, p. 173 (2009) (1st J-PARC International Symposium; International Symposium on Pulsed Neutron and Muon Sciences at J-PARC 2008 (IPS '08))

A-097
Kai, T. et al.
Users' beam interlock system at the Materials and Life Science Experimental Facility of J-PARC
Nucl. Instrum. Meth. A, vol. 600, p. 176 (2009) (1st J-PARC International Symposium; International Symposium on Pulsed Neutron and Muon Sciences at J-PARC 2008 (IPS '08))

A-098
Higemoto, W. et al.
J-PARC muon control system
Nucl. Instrum. Meth. A, vol. 600, p. 179 (2009) (1st J-PARC International Symposium; International Symposium on Pulsed Neutron and Muon Sciences at J-PARC 2008 (IPS '08))

A-099
Higemoto, W. et al.
JAEA-ASRC μSR project at J-PARC MUSE
Nucl. Instrum. Meth. A, vol. 600, p. 182 (2009) (1st J-PARC International Symposium; International Symposium on Pulsed Neutron and Muon Sciences at J-PARC 2008 (IPS '08))

A-100
Kajimoto, R. et al.
Study of the neutron guide design of the 4SEASONS spectrometer at J-PARC
Nucl. Instrum. Meth. A, vol. 600, p. 185 (2009) (1st J-PARC International Symposium; International Symposium on Pulsed Neutron and Muon Sciences at J-PARC 2008 (IPS '08))

A-101
Ishigaki, T. et al.
IBARAKI materials design diffractometer(iMATERIA)-Versatile neutron diffractometer at J-PARC
Nucl. Instrum. Meth. A, vol. 600, p. 189 (2009) (1st J-PARC International Symposium; International Symposium on Pulsed Neutron and Muon Sciences at J-PARC 2008 (IPS '08))

A-102
Shimomura, K. et al.
Superconducting muon channel at J-PARC
Nucl. Instrum. Meth. A, vol. 600, p. 192 (2009) (1st J-PARC International Symposium; International Symposium on Pulsed Neutron and Muon Sciences at J-PARC 2008 (IPS '08))

A-103
Ohhara, T. et al.
Development of data processing software

for a new TOF single crystal neutron diffractometer at J-PARC
Nucl. Instrum. Meth. A, vol. 600, p. 195 (2009)
(1st J-PARC International Symposium; International Symposium on Pulsed Neutron and Muon Sciences at J-PARC 2008 (IPS '08))

A-104
Tatsumoto, H. et al.
Design of hydrogen vent line for the cryogenic hydrogen system in J-PARC
Nucl. Instrum. Meth. A, vol. 600, p. 269 (2009)
(1st J-PARC International Symposium; International Symposium on Pulsed Neutron and Muon Sciences at J-PARC 2008 (IPS '08))

A-105
Maekawa, F. et al.
NOBORU; J-PARC BL10 for facility diagnostics and its possible extension to innovative instruments
Nucl. Instrum. Meth. A, vol. 600, p. 335 (2009)
(1st J-PARC International Symposium; International Symposium on Pulsed Neutron and Muon Sciences at J-PARC 2008 (IPS '08))

A-106
Mishima, K. et al.
Design of neutron beamline for fundamental physics at J-PARC BL05
Nucl. Instrum. Meth. A, vol. 600, p. 342 (2009)
(1st J-PARC International Symposium; International Symposium on Pulsed Neutron and Muon Sciences at J-PARC 2008 (IPS '08))

A-107
Ida, M. et al.
On the effect of microbubble injection on cavitation bubble dynamics in liquid mercury
Nucl. Instrum. Meth. A, vol. 600, p. 367 (2009)
(1st J-PARC International Symposium; International Symposium on Pulsed Neutron and Muon Sciences at J-PARC 2008 (IPS '08))

A-108
Harada, H. et al.
Beam-commissioning study of high-intensity accelerators using virtual accelerator model
Nucl. Instrum. Meth. A, vol. 602, p. 320 (2009)

A-109
Morishita, T. et al.
The Slow-ground-motion monitoring based on the hydrostatic leveling system in J-PARC linac
Nucl. Instrum. Meth. A, vol. 602, p. 364 (2009)

A-110
Nakamura, T. et al.
Wavelength-shifting-fibre-based neutron image detector with a fibre-optic taper to increase the spatial resolution
Nucl. Instrum. Meth. A, vol. 604, p. 158 (2009)
(8th International Conference on Position Sensitive Detectors (PSD-8))

A-111
Nakamura, T. et al.
A Half-millimetre spatial resolution fibre-coded linear position-sensitive scintillator detector with wavelength-shifting fibre read-out for neutron detection
Nucl. Instrum. Meth. A, vol. 606, p. 675 (2009)

A-112
Sanami, T. et al.
A Bragg curve counter with an internal production target for the measurement of the double-differential cross-section of fragment production induced by neutrons at energies of tens of MeV
Nucl. Instrum. Meth. A, vol. 610, p. 660 (2009)

A-113
Nagamiya, S.
J-PARC Program Overview
Nucl. Phys. A, vol. 827, p. 179c (2009)

A-114
Yashima, H. et al.
Benchmark experiment of neutron penetration through iron and concrete shields for hundreds of MeV quasi-monoenergetic neutrons - I:Measurements of neutron spectrum by a multimoderator spectrometer
Nucl. Technol., vol. 168, p. 298 (2009)
(11th International Conference on Radiation Shielding (ICRS-11) and 15th Topical Meeting of the Radiation Protection and Shielding Division (RPSD-2008))

A-115
Hagiwara, M. et al.
Benchmark experiment of neutron penetration through iron and concrete shields for hundreds of MeV quasi-monoenergetic neutrons - II:Measurements of neutron spectrum by an organic liquid scintillator
Nucl. Technol., vol. 168, p. 304 (2009)
(11th International Conference on Radiation Shielding (ICRS-11) and 15th Topical Meeting of the Radiation Protection and Shielding Division (RPSD-2008))

A-116
Iwamoto, Y. et al.
Measurement of angular dependent neutron production from thick target bombarded with 140-MeV protons
Nucl. Technol., vol. 168, p. 340 (2009)
(11th International Conference on Radiation Shielding (ICRS-11) and 15th Topical Meeting of the Radiation Protection and Shielding Division (RPSD-2008))

A-117
Nakashima, H. et al.
Experimental studies of shielding and irradiation effects at high-energy accelerator facilities
Nucl. Technol., vol. 168, p. 482 (2009)
(11th International Conference on Radiation Shielding (ICRS-11) and 15th Topical Meeting of the Radiation Protection and Shielding Division (RPSD-2008))

A-118
Nakane, Y. et al.
Monte Carlo calculations for the shielding design of beam injection and extraction areas at the 3-GeV synchrotron in J-PARC
Nucl. Technol., vol. 168, p. 519 (2009)
(11th International Conference on Radiation Shielding (ICRS-11) and 15th Topical Meeting of the Radiation Protection and Shielding Division (RPSD-2008))

A-119
Sakamoro, Y. et al.
Generation and application of bremsstrahlung production data calculated by EGS4 code
Nucl. Technol., vol. 168, p. 585 (2009)
(11th International Conference on Radiation Shielding (ICRS-11) and 15th Topical Meeting of the Radiation Protection and Shielding Division (RPSD-2008))

A-120
Sakamoto, Y. et al.
Accelerator experiments on source term and radiation shielding performed by Japan Atomic Energy Agency
Nucl. Technol., vol. 168, p. 654 (2009)
(11th International Conference on Radiation Shielding (ICRS-11) and 15th Topical Meeting of the Radiation Protection and Shielding Division (RPSD-2008))

A-121
Masukawa, F. et al.
Estimation of radioactivity produced in cooling water at high-intensity proton accelerator facility
Nucl. Technol., vol. 168, p. 680 (2009)
(11th International Conference on Radiation Shielding (ICRS-11) and 15th Topical Meeting of the Radiation Protection and Shielding Division (RPSD-2008))

A-122
Kinoshita, N. et al.
Depth profile of radioactivity induced in the thick concrete shield in EP1 Beam line at the kek 12-GeV Proton synchrotron facility
Nucl. Technol., vol. 168, p. 694 (2009)
(11th International Conference on Radiation Shielding (ICRS-11) and 15th Topical Meeting of the Radiation Protection and Shielding Division (RPSD-2008))

A-123
Kirihara, Y. et al.
Comparison of several Monte Carlo codes with neutron deep penetration experiments
Nucl. Technol., vol. 168, p. 773 (2009)
(11th International Conference on Radiation Shielding (ICRS-11) and 15th Topical Meeting of the Radiation Protection and Shielding Division (RPSD-2008))

A-124
Matsumura, H. et al.
Adsorption behavior of radionuclides on ionexchange resin from cooling water for the K2K target and magnetic horns
Nucl. Technol., vol. 168, p. 979 (2009)
(11th International Conference on Radiation Shielding (ICRS-11) and 15th Topical Meeting of the Radiation Protection and Shielding Division (RPSD-2008))

A-125
Arai, M. et al.
Japan Spallation Neutron Source (JSNS) of J-PARC
Nuclear Physics News, vol. 19, p. 34 (2009)

A-126
Kiriyama, H. et al.
Generation of high-contrast and high-intensity laser pulses using an OPCPA preamplifier in a double CPA, Ti:sapphire laser system
Opt. Commun., vol. 282, p. 625 (2009)

A-127
Ida, M.
Multibubble cavitation inception
Phys. Fluids, vol. 21, p. 113302_1 (2009)

A-128
Uchino, T. et al.
In situ X-ray diffraction study of the size dependence of pressure-induced structural transformation in amorphous silica nanoparticles
Phys. Rev. B, vol. 77, p. 132201_1 (2008)

A-129
Brazhkin, V. V. et al.
Nature of the structural transformations in B_2O_3 glass under high pressure
Phys. Rev. Lett., vol. 101, p. 035702_1 (2008)

A-130
Oguri, H. et al.
Status of the Japan Proton Accelerator Research Complex H^- ion source
Phys. Rev. Spec. Top.-AC, vol. 12, p. 010401_1 (2009)

A-131
Shobuda, Y. et al.
Analytical method for the evaluation of field modulation inside the rf-shielded chamber with a time-dependent dipole magnetic field
Phys. Rev. Spec. Top.-AC, vol. 12, p. 032401_1 (2009)

A-132
Tamura, F. et al.
Longitudinal painting with large amplitude second harmonic rf voltages in the rapid cycling synchrotron of the Japan Proton Accelerator Research Complex
Phys. Rev. Spec. Top.-AC, vol. 12, p. 041001_1 (2009)

A-133
Kamiya, J. et al.
Performance of extraction kicker magnet in a rapid cycling synchrotron
Phys. Rev. Spec. Top.-AC, vol. 12, p. 072401_1 (2009)

A-134
Shobuda, Y. et al.
Coupling impedances of a resistive insert in a vacuum chamber
Phys. Rev. Spec. Top.-AC, vol. 12, p. 094401_1 (2009)

A-135
Hotchi, H. et al.
Beam commissioning of the 3-GeV rapid cycling synchrotron of the Japan Proton Accelerator Research Complex
Phys. Rev. Spec. Top.-AC, vol. 12, p. 40402 (2009)

A-136
Saha, P. K. et al.
Direct observation of the phase space footprint of a painting injection in the Rapid Cycling Synchrotron at the Japan Proton Accelerator Research Complex
Phys. Rev. Spec. Top.-AC, vol. 12, p. 40403 (2009)

A-137
Doyama, M. et al.
Transmission positron microscopes, application of imaging plates to positron, electron and muon research and a proposal for a strong positron source at J-PARC
Phys. Status Solidi C, vol. 6, p. 2471 (2009)

A-138
Miyake, Y. et al.
Birth of an intense pulsed muon source, J-PARC MUSE
Physica B, vol. 404, p. 957 (2009)
(11th International Conference on Muon Spin Rotation, Relaxation and Resonance)

A-139
Imazato, J. et al.
Measurement of μ^+ relaxation rates in Al and Mg alloys for the precise μ^+ transverse polarization experiment TREK at J-PARC
Physica B, vol. 404, p. 962 (2009)
(11th International Conference on Muon Spin Rotation, Relaxation and Resonance)

A-140
Suzuki, S. et al.
Development of a pipelined data acquisition system for μSR experiments at J-PARC
Physica B, vol. 404, p. 1002 (2009)
(11th International Conference on Muon Spin Rotation, Relaxation and Resonance)

A-141
Maruyama, R. et al.
A Beam divergence correction mirror for neutron resonance spin echo
Physica B, vol. 404, p. 2594 (2009)
(7th International Workshop on Polarized Neutrons in Condensed Matter Investigations and 2nd International Symposium of Quantum Beam Science Directorate of JAEA)

A-142
Shinohara, T. et al.
Design of a neutron polarizer using polarizing super mirrors for the TOF-SANS instrument at the J-PARC
Physica B, vol. 404, p. 2640 (2009)
(7th International Workshop on Polarized Neutrons in Condensed Matter Investigations and 2nd International Symposium of Quantum Beam Science Directorate of JAEA)

A-143
Okayasu, S. et al.
Aalpha-ray detection with a MgB_2 transition edge sensor
Physica C, vol. 468, p. 1998 (2008)
(20th International Symposium on Superconductivity (ISS 2007))

A-144
Kitazawa, S. et al.
Radiation-induced luminescence from TiO_2 by 10-keV N^+ ion irradiation
Radiat. Phys. Chem., vol. 77, p. 1333 (2008)
(International Symposium on Charged Particle and Photon Interactions with Matter (ASR 2007))

A-145
Nakashima, H.
Operational radiation protection issues specific to high-intensity beams
Radiat. Prot. Dosim., vol. 137, p. 35 (2009)

A-146
Arai, M.
The World class neutron source J-PARC to be ready for action
Rev. High Pres. Sci. Tech., vol. 19, p. 4 (2009)

A-147
Kiriyama, H. et al.
Temporal contrast and spatial beam quality improvement techniques in a high intensity Ti:sapphire laser system
Rev. Laser Eng., vol. 37, p. 425 (2009)

A-148
Yogo, A. et al.
Ion acceleration using temporally-controlled high-intensity laser pulses
Rev. Laser Eng., vol. 37, p. 449 (2009)

A-149
Oguri, H. et al.
Development and operation of a Cs-free J-PARC H^- ion source
Rev. Sci. Instrum., vol. 79, p. 02A506_1 (2008)
(12th International Conference on Ion Sources (ICIS 2007))

A-150
Oguri, H. et al.
Recent operation status of Japan Proton Accelerator Research Complex H^- ion source
Rev. Sci. Instrum., vol. 81, p. 02A715_1 (2010)
(13th International Conference on Ion Sources (ICIS 2009))

A-151
Okoshi, K. et al.
Development of an H^- ion source for Japan Proton Accelerator Research Complex upgrade
Rev. Sci. Instrum., vol. 81, p. 02A716_1 (2010)
(13th International Conference on Ion Sources (ICIS 2009))

A-152
Ikegami, K. et al.
A Survey of optimal filament shape in a Japan Proton Accelerator Research Complex H^- ion source
Rev. Sci. Instrum., vol. 81, p. 02A717_1 (2010)
(13th International Conference on Ion Sources (ICIS 2009))

A-153
Ueno, A. et al.
An Innovative high-power constant-current pulsed-arc power-supply for a high-density pulsed-arc-plasma ion-source using a LaB_6-filament
Rev. Sci. Instrum., vol. 81, p. 02A718_1 (2010)
(13th International Conference on Ion Sources (ICIS 2009))

A-154
Kartini, E. et al.
Universal dynamics behavior in superionic conducting glasses
Solid State Ionics, vol. 180, p. 506 (2009)

A-155
Fujii, Y. et al.
The Frontiers of condensed matter science advanced by J-PARC
Solid State Phys., vol. 43, p. 441 (2008)

A-156
Kitazawa, S. et al.
Radiation-induced luminescence from TiO_2 by 10 keV O^+, N^+ and Ar^+ ion irradiation
Thin Solid Films, vol. 517, p. 3735 (2009)

A-157
Yamazaki, T. et al.
Buried H monolayer at hetero-interface between highly mismatched Sr films and Si substrates
Transactions of the Materials Research Society of Japan, vol. 33, p. 611 (2008)

A-158
Ogiwara, N. et al.
Influence of magnetic fields on turbo-molecular pumps
Vacuum, vol. 84, p. 718 (2009)
(4th Vacuum and Surface Sciences Conference of Asia and Australia (VASSCAA-4))

A-159
Ogiwara, N. et al.
Vacuum system of the 3-GeV RCS in J-PARC
Vacuum, vol. 84, p. 723 (2009)
(4th Vacuum and Surface Sciences Conference of Asia and Australia (VASSCAA-4))

Conference Reports and Books

C-001
Oigawa, H. et al.
Concept of waste management and geological disposal incorporating partitioning and transmutation technology
Actinide and Fission Product Partitioning and Transmutation, OECD 2010, p. 123
(Proc. of 10th Information Exchange Meeting on Actinide and Fission Product Partitioning and Transmutation)

C-002
Kikuchi, K. et al.
Material development in lead-bismuth spallation target system
Actinide and Fission Product Partitioning and Transmutation, OECD 2010, p. 315
(Proc. of 10th Information Exchange Meeting on Actinide and Fission Product Partitioning and Transmutation)

C-003
Sasa, T. et al.
Status of J-PARC transmutation experimental facility
Actinide and Fission Product Partitioning and Transmutation, OECD 2010, p. 349
(Proc. of 10th Information Exchange Meeting on Actinide and Fission Product Partitioning and Transmutation)

C-004
Kurata, Y. et al.
Results of corrosion tests in liquid Pb-Bi at JAEA; Temperature and oxygen concentration dependence, and corrosion properties of Si-enriched steels
Actinide and Fission Product Partitioning and Transmutation, OECD 2010, (CD-ROM)
(Proc. of 10th Information Exchange Meeting on Actinide and Fission Product Partitioning and Transmutation)

C-005
Obayashi, H.
Flow measurement of high temperature liquid metal using ultrasonic doppler profiling
Actinide and Fission Product Partitioning and Transmutation, OECD 2010, (CD-ROM)
(Proc. of 10th Information Exchange Meeting on Actinide and Fission Product Partitioning and Transmutation)

C-006
Sasa, T. et al.
Continuous-energy cross-section library based on JENDL high energy file 2007
Actinide and Fission Product Partitioning and Transmutation, OECD 2010, (CD-ROM)
(Proc. of 10th Information Exchange Meeting on Actinide and Fission Product Partitioning and Transmutation)

C-007
Sugawara, T. et al.
Importance of reactor physics experiment using MA-bearing fuel
Actinide and Fission Product Partitioning and Transmutation, OECD 2010, (CD-ROM)
(Proc. of 10th Information Exchange Meeting on Actinide and Fission Product Partitioning and Transmutation)

C-008
Sasa, T. et al.

Liquid-fuelled accelerator-driven transmutation system
Actinide and Fission Product Partitioning and Transmutation, OECD 2010, (CD-ROM) (Proc. of 10th Information Exchange Meeting on Actinide and Fission Product Partitioning and Transmutation)

C-009
Sugawara, T. et al.
Investigation of beam window structure for accelerator-driven system
Actinide and Fission Product Partitioning and Transmutation, OECD 2010, (CD-ROM) (Proc. of 10th Information Exchange Meeting on Actinide and Fission Product Partitioning and Transmutation)

C-010
Takei, H. et al.
Evaluation of the acceptable frequency of beam trips based on thermal responses of the ADS reactor system
Actinide and Fission Product Partitioning and Transmutation, OECD 2010, (CD-ROM) (Proc. of 10th Information Exchange Meeting on Actinide and Fission Product Partitioning and Transmutation)

C-011
Tatsumoto, H. et al.
Forced convection heat transfer of subcooled liquid nitrogen in horizontal tube
AIP Conf. Proc., vol. 985, p. 665 (2008) (2007 Cryogenic Engineering Conference and International Cryogenic Materials Conference (CEC-ICMC 2007))

C-012
Tatsumoto, H. et al.
Thermal stress analysis for a transfer line of hydrogen moderator in J-PARC
AIP Conf. Proc., vol. 985, p. 1225 (2008) (2007 Cryogenic Engineering Conference and International Cryogenic Materials Conference (CEC-ICMC 2007))

C-013
Miyake, Y. et al.
Ultra slow muon project at J-PARC, MUSE
AIP Conf. Proc., vol. 1104, p. 47 (2009) (4th International Conference on Laser Probing)

C-014
Arai, M. et al.
Neutron Imaging and Applications
Neutron Scattering Applications and Techniques, Springer Science 2009, p13

C-015
Ida, M. et al.
Numerical verification of cavitation suppression by gas microbubble injection
Proceedings of 2008 Annual Meeting, Japan Society of Fluid Mechanics (CD-ROM), p. 4 (2008)

C-016
Hotchi, H. et al.
Status of the J-PARC 3GeV RCS
Proc. of 5th Annual Meeting of Particle Accelerator Society of Japan and 33rd Linear Accelerator Meeting in Japan (CD-ROM), p. 4 (2008)

C-017
Morishita, T.
Recent progress in beam commissioning of J-PARC linac
Proc. of 5th Annual Meeting of Particle Accelerator Society of Japan and 33rd Linear Accelerator Meeting in Japan (CD-ROM), p. 81 (2008)

C-018
Suzuki, T. et al.
Development of J-PARC linac/RCS MPS sub system
Proc. of 5th Annual Meeting of Particle Accelerator Society of Japan and 33rd Linear Accelerator Meeting in Japan (CD-ROM), p. 84 (2008)

C-019
Hayashi, N. et al.
The Status of the J-PARC RCS beam monitor system
Proc. of 5th Annual Meeting of Particle Accelerator Society of Japan and 33rd Linear Accelerator Meeting in Japan (CD-ROM), p. 243 (2008)

C-020
Mio, K. et al.
Radiation resistance of vacuum equipment in J-PARC RCS
Proc. of 5th Annual Meeting of Particle Accelerator Society of Japan and 33rd Linear Accelerator Meeting in Japan (CD-ROM), p. 252 (2008)

C-021
Takahashi, H. et al.
The Status of the timing system for J-PARC Linac/RCS
Proc. of 5th Annual Meeting of Particle Accelerator Society of Japan and 33rd Linear Accelerator Meeting in Japan (CD-ROM), p. 262 (2008)

C-022
Kawase, M. et al.
Design of the control application tools for J-PARC 3GeV RCS
Proc. of 5th Annual Meeting of Particle Accelerator Society of Japan and 33rd Linear Accelerator Meeting in Japan (CD-ROM), p. 274 (2008)

C-023
Tamura, F. et al.
Commissioning of beam acceleration in J-PARC RCS and MR
Proc. of 5th Annual Meeting of Particle Accelerator Society of Japan and 33rd Linear Accelerator Meeting in Japan (CD-ROM), p. 337 (2008)

C-024
Schnase, A. et al.
Cavity voltage calibration for J-PARC Ring RF
Proc. of 5th Annual Meeting of Particle Accelerator Society of Japan and 33rd Linear Accelerator Meeting in Japan (CD-ROM), p. 340 (2008)

C-025
Hikichi, Y. et al.
Change in sensitivity of Pirani vacuum gauge in J-PARC RCS
Proc. of 5th Annual Meeting of Particle Accelerator Society of Japan and 33rd Linear Accelerator Meeting in Japan (CD-ROM), p. 343 (2008)

C-026
Suganuma, K. et al.
A Tensile test of vacuum fired titanium
Proc. of 5th Annual Meeting of Particle Accelerator Society of Japan and 33rd Linear Accelerator Meeting in Japan (CD-ROM), p. 346 (2008)

C-027
Takayanagi, T. et al.
Performance of the painting injection of the 3-GeV RCS in J-PARC
Proc. of 5th Annual Meeting of Particle Accelerator Society of Japan and 33rd Linear Accelerator Meeting in Japan (CD-ROM), p. 352 (2008)

C-028
Ueno, T. et al.
Electro-magnetic compatibility for the IGBT based large current power supply
Proc. of 5th Annual Meeting of Particle Accelerator Society of Japan and 33rd Linear Accelerator Meeting in Japan (CD-ROM), p. 355 (2008)

C-029
Yamamoto, M. et al.
Longitudinal particle simulation for J-PARC RCS
Proc. of 5th Annual Meeting of Particle Accelerator Society of Japan and 33rd Linear Accelerator Meeting in Japan (CD-ROM), p. 358 (2008)

C-030
Kanazawa, K. et al.
Influence of magnetic field on turbomolecular pumps
Proc. of 5th Annual Meeting of Particle Accelerator Society of Japan and 33rd Linear Accelerator Meeting in Japan (CD-ROM), p. 391 (2008)

C-031
Hasegawa, K. et al.
HOM analysis of magnetic alloy cavity
Proc. of 5th Annual Meeting of Particle Accelerator Society of Japan and 33rd Linear Accelerator Meeting in Japan (CD-ROM), p. 394 (2008)

C-032
Suzuki, H. et al.
DATA collection using memory area of PLC touch panel for J-PARC linac RF
Proc. of 5th Annual Meeting of Particle Accelerator Society of Japan and 33rd Linear Accelerator Meeting in Japan (CD-ROM), p. 467 (2008)

C-033
Fang, Z, et al.
Auto-tuning and Q-value monitoring of RF cavities at the J-PARC linac
Proc. of 5th Annual Meeting of Particle Accelerator Society of Japan and 33rd Linear Accelerator Meeting in Japan (CD-ROM), p. 476 (2008)

C-034
Hori, T. et al.
Present status of the 972 MHz RF test stand for J-PARC 2008
Proc. of 5th Annual Meeting of Particle Accelerator Society of Japan and 33rd Linear Accelerator Meeting in Japan (CD-ROM), p. 482 (2008)

C-035
Yamazaki, M. et al.
Present status of RF source operation at J-PARC linac
Proc. of 5th Annual Meeting of Particle Accelerator Society of Japan and 33rd Linear Accelerator Meeting in Japan (CD-ROM), p. 485 (2008)

C-036
Kobayashi, T. et al.
Pulse-by-pulse switching of beam loading compensation in J-PARC linac LLRF
Proc. of 5th Annual Meeting of Particle Accelerator Society of Japan and 33rd Linear Accelerator Meeting in Japan (CD-ROM), p. 488 (2008)

C-037
Ao, H. et al.
Status of the ACS cavity development for the J-PARC linac energy upgrade
Proc. of 5th Annual Meeting of Particle Accelerator Society of Japan and 33rd Linear Accelerator Meeting in Japan (CD-ROM), p. 494 (2008)

C-038
Hirano, K. et al.
High power test of the first ACS module for the J-PARC linac
Proc. of 5th Annual Meeting of Particle Accelerator Society of Japan and 33rd Linear Accelerator Meeting in Japan (CD-ROM), p. 497 (2008)

C-039
Sato, S. et al.
Beam energy measurement at J-PARC linac
Proc. of 5th Annual Meeting of Particle Accelerator Society of Japan and 33rd Linear Accelerator Meeting in Japan (CD-ROM), p. 500 (2008)

C-040
Koseki, T.
Commissioning status of J-PARC MR
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 1 (2009)

C-041
Tomizawa, M. et al.
Slow extraction from J-PARC main ring
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 30 (2009)

C-042
Sato, Y. et al.
Construction and beam commissioning of J-PARC hadron experimental facility
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 70 (2009)

C-043
Takahashi, H. et al.
Large vacuum chamber pentagon at J-PARC hadron target station
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 73 (2009)

C-044
Watanabe, H.
Construction of a neutral KL beamline for the J-PARC KOTO experiment
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 76 (2009)

C-045
Toyoda, A. et al.
Development of OTR beam profile monitor for J -PARC hadron beamline (4)
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 130 (2009)

C-046
Sako, H. et al.
Suppression of beam loss at the bending magnet of the first arc in the J-PARC linac
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 217 (2009)

C-047
Yamamoto, M. et al.
Longitudinal Particle Simulation for J-PARC RCS
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 247 (2009)

C-048
Toyama, T. et al.
Operating experiences of the J-PARC MR BPMs
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 250 (2009)

C-049
Yamanoi, Y. et al.
Development of vacuum windows for J-PARC hadron beamline
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 272 (2009)

C-050
Sato, K. et al.
Development of IPM for J-PARC MR
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 292 (2009)

C-051
Sato, K. et al.
Present status of the J-PARC MR BLM system
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 295 (2009)

C-052
Sato, S. et al.
Tuning of MEBT-Chopper by using wire scanner monitor
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 298 (2009)

C-053
Takano, J. et al.

Measurement of Beta Function of the J-PARC MR
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 301 (2009)

C-054
Takano, J. et al.
Dispersion Measurement of the J-PARC MR
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 304 (2009)

C-055
Wei, G. et al.
Beam tuning of injection and fast extraction of J-PARC MR
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 307 (2009)

C-056
Tani, N. et al.
Present status of survey and alignment for J-PARC
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 317 (2009)

C-057
Yoshimura, K. et al.
Measurement of beam extinction at J-PARC 50 GeV PS
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 356 (2009)

C-058
Yoshii, M. et al.
The status of J-PARC Ring RF systems
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 362 (2009)

C-059
Tamura, F. et al.
Longitudinal Painting by Using Large Amplitude Second Harmonic RF
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 366 (2009)

C-060
Nomura, M. et al.
Impedance measurements of RF cavities in J-PARC Synchrotrons
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 369 (2009)

C-061
Ohmori, C. et al.
Upgrade scenario of J-PARC ring RF
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 372 (2009)

C-062
Ogitsu, T. et al.
Commissioning of Superconducting Combined Function Magnet System for J-PARC Neutrino Beam Line
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 412 (2009)

C-063
Odagiri, J. et al.
Application of epics on F3RP61 to accelerator control
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 435 (2009)

C-064
Kamikubota, N. et al.
Evolution of device applications during J-PARC MR beam-commissioning
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 527 (2009)

C-065
Iitsuka, T. et al.
Archive data display system of J-PARC MR
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 530 (2009)

C-066
Nemoto, H. et al.
Development of Monitoring System for Network Switches and UPS Units Using EPICS
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 533 (2009)

C-067
Takagi, M. et al.
Control of the J-PARC slow extraction line based on embedded epics
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 536 (2009)

C-068
Akiyama, A. et al.
Accelerator protection system of the MR division of J-PARC using embeded epics
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 539 (2009)

C-069
Nemoto, H. et al.
Development of J-PARC PPS Monitoring System for J-PARC Accelerator Control System
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 542 (2009)

C-070
Mochiki, K. et al.
Effect of quadrupoles electromagnets for ripple removal of slow extraction (from the data of KEK 12 GeV PS)
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 548 (2009)

C-071
Watanabe, Y. et al.
Suppression scheme of COD variation caused by switching ripple in J-PARC 3GeV Dipole Magnet Power Supply
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 551 (2009)

C-072
Igarashi, S. et al.
Magnetic field ripple measurement of the J-PARC MR main magnets
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 557 (2009)

C-073
Okamura, K. et al.
Development of the magnet power supply for the slow beam extraction from the J-PARC main ring
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 560 (2009)

C-074
Muto, R. et al.
Development of the magnetic septa for the slow beam extraction from the J-PARC Main Ring
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 566 (2009)

C-075
Suganuma, K. et al.
Improvement of electric strength for high voltage connectors in J-PARC RCS kicker system
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 569 (2009)

C-076
Motohashi, S. et al.
Improvement of PLC-based data acquisition system for beam loss monitors of the J-PARC main ring

Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 684 (2009)

C-077
Ito, T. et al.
Trouble report for J-PARC DTL and SDTL
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 690 (2009)

C-078
Hasegawa, K. et al.
Status of the J-PARC RFQ
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 693 (2009)

C-079
Kiyomichi, A. et al.
Development of Spill Control System for the J-PARC Slow Extraction (II)
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 696 (2009)

C-080
Agari, K. et al.
Design and Development of Beam Dump for J-PARC Hadron-hall [3]
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 699 (2009)

C-081
Miura, A. et al.
Design of beam diagnostic systems for energy upgraded linac
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 733 (2009)

C-082
Yoshimoto, M. et al.
Reconstruction of the 2-dimensitonal beam profile at longitudinal phase space with tomography method in J-PARC RCS and MR
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 737 (2009)

C-083
Yamada, S. et al.
Analysis of J-PARC main ring orbit data using singular value decomposition
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 741 (2009)

C-084
Ikegami, K. et al.
A Survey of optimal filament shape in the J-PARC H^- ion source
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 839 (2009)

C-085
Oguri, H. et al.
Operation status of the J-PARC H^- ion source
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 842 (2009)

C-086
Namekawa, Y. et al.
Cesium seeding experiment for J-PARC H^- ion source
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 845 (2009)

C-087
Uota, M. et al.
The present status of vacuum system of J-PARC main ring and 3-50 beam transport
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 974 (2009)

C-088
Kondo, Y. et al.
Design of an RF coupler for the J-PARC RFQ
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 1038 (2009)

C-089
Naito, F. et al.
Study of the ACS linac with the direct RF-power supply system
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 1041 (2009)

C-090
Ao, H. et al.
Fabrication of the ACS R&D module for the J-PARC linac upgrade
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 1044 (2009)

C-091
Morishita, T. et al.
Engineering design of RFQ at J-PARC linac
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 1047 (2009)

C-092
Morishita, T. et al.
RF simulation for RFQ designing at J-PARC linac
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 1050 (2009)

C-093
Fang, Z, et al.
Recent progresses in the LLRF FPGA control system of the J-PARC linac
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 1053 (2009)

C-094
Hirano, K. et al.
Coupling factor adjustment of the ACS module by using the reflector
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 1056 (2009)

C-095
Chishiro, E. et al.
972MHz RF sources for J-PARC high energy linac
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 1059 (2009)

C-096
Kawamura, M. et al.
Present status of klystron power supply systems for J-PARC linac 2009
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 1062 (2009)

C-097
Kobayashi, T. et al.
Automatic frequency matching for cavity warming-up in J-PARC linac digital LLRF control
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 1065 (2009)

C-098
Kobayashi, T. et al.
972-MHz RF digital feedback control system for J-PARC linac
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 1068 (2009)

C-099
Fukui, Y. et al.
Data Acquisition System of the 972MHz Klystron Test Stand for J-PARC LINAC
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 1071 (2009)

C-100
Suzuki, H. et al.
The ACS TUNER controller development
Proc. of 6th Annual Meeting of Particle

Accelerator Society of Japan (CD-ROM), p. 1074 (2009)

C-101
Schnase, A. et al.
Core buckling position measurement for J-PARC RCS cavity
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 1077 (2009)

C-102
Shimada, T. et al.
Measurement of thermal deformation of magnetic alloys cores for RF cavities
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 1080 (2009)

C-103
Takahashi, T. et al.
3D electromagnetic field analysis of RF accelerating structure loaded with oil-cooled magnetic metal cores
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 1107 (2009)

C-104
Miyahara, M.
Considerations about the construction of an accelerator tunnel and the ground conditions in the seaside site
Proc. of 6th Annual Meeting of Particle Accelerator Society of Japan (CD-ROM), p. 1143 (2009)

C-105
Toyoda, A. et al.
First light for optical transition radiation monitor at the J-PARC
Proc. of DIPAC09, p. 372 (2009)

C-106
Schnase, A. et al.
J-PARC RCS non-linear frequency sweep analysis
Proc. of 11th European Particle Accelerator Conf. (EPAC '08) (CD-ROM), p. 346 (2008)

C-107
Yamamoto, M. et al.
Acceleration voltage pattern for J-PARC RCS
Proc. of 11th European Particle Accelerator Conf. (EPAC '08) (CD-ROM), p. 379 (2008)

C-108
Hiroki, S. et al.
Multi-wire profile monitor for J-PARC 3 GeV RCS
Proc. of 11th European Particle Accelerator Conf. (EPAC '08) (CD-ROM), p. 1131 (2008)

C-109
Sugawara, T. et al.
Recent activities for accelerator driven system in JAEA
Proc. of International Conference on Advanced Nuclear Fuel Cycle; Sustainable Options & Industrial Perspectives (Global 2009) (CD-ROM), p. 1782 (2009)

C-110
Minato, K. et al.
Recent research and development on partitioning and transmutation by double-strata fuel cycle concept in JAEA
Proc. of International Conference on Advanced Nuclear Fuel Cycle; Sustainable Options & Industrial Perspectives (Global 2009) (CD-ROM), p. 504 (2009)

C-111
Sugawara, T. et al.
Improvement effect of neutronics design accuracy by conducting MA-loaded critical experiments in J-PARC
Proc. of International Conference on the Physics of Reactors, Nuclear Power; A Sustainable Resource (PHYSOR '08) (CD-ROM), p. 8 (2008)

C-112
Shiotsu, M. et al.
Forced convection heat transfer to supercritical fluids
Proc. of International Cryogenic Engineering Conference 22 (ICEC-22) and International Cryogenic Materials Conference 20 (ICMC 2008), p. 359 (2008)

C-113
Tatsumoto, H. et al.
Forced convection heat transfer of nitrogen at supercritical pressure
Proc. of International Cryogenic Engineering Conference 22 (ICEC-22) and International Cryogenic Materials Conference 20 (ICMC 2008), p. 383 (2009)

C-114
Tatsumoto, H. et al.
Performance test of a helium refrigerator for the cryogenic hydrogen system in J-PARC
Proc. of International Cryogenic Engineering Conference 22 (ICEC-22) and International Cryogenic Materials Conference 20 (ICMC 2008), p. 711 (2009)

C-115
Tatsumoto, H. et al.
Commissioning of the cryogenic hydrogen system in J-PARC; First cool-down operation with helium
Proc. of International Cryogenic Engineering Conference 22 (ICEC-22) and International Cryogenic Materials Conference 20 (ICMC 2008), p. 717 (2009)

C-116
Aso, T. et al.
Commissioning of the cryogenic hydrogen system in J-PARC; Preliminary operation by helium gas
Proc. of International Cryogenic Engineering Conference 22 (ICEC-22) and International Cryogenic Materials Conference 20 (ICMC 2008), p. 741 (2009)

C-117
Hasegawa, K. et al.
Operating experience of the J-PARC Linac
Proc. of 24th Int. Linear Accelerator Conf. (LINAC 2008) (CD-ROM), p. 55 (2009)

C-118
Oigawa, H. et al.
Research and development programme on ADS in JAEA
Proc. of 5th International Workshop on the Utilization and Reliability of High Power Proton Accelerators (HPPA-5), p. 387 (2008)

C-119
Hayashi, N.
Commissioning status of the rapid-cycling synchrotron at J-PARC
Proc. of 16th Pacific Basin Nuclear Conf. (PBNC-16) (CD-ROM), p. 6 (2008)

C-120
Iwamoto, Y. et al.
Thick target neutron yield at 0 degree by 250 and 350 MeV protons
Proc. of 8th Specialists' Meeting on Shielding Aspects of Accelerators, Targets and Irradiation Facilities (SATIF-8), p. 195 (2010)

C-121
Ida, M. et al.
Suppression of mercury cavitation by gas bubble injection
Proceedings of the 21st Computational Mechanics Conference (CD-ROM), p. 572 (2008)

C-122
Igarashi, Y. et al.
An integrated data acquisition system for J-PARC hadron experiment
Real Time Conference, 2009. RT '09. 16th IEEE-NPSS, vol. 5321566, p. 472 (2009)

JAEA Reports

J-001
Yamada, K. et al.
Ion generation method at TIARA ion implanter
JAEA-Conf 2008-005 (2008)

J-002
Nakamura, T. et al.
Development of two-dimensional scintillator neutron detector using wavelength-shifting fibres; Development of a compact detector for iBIX instrument in J-PARC/MLF
JAEA-Research 2008-115 (2009)

J-003
Nakamura, T. et al.
Development for upgrading Japanese ENGIN-X type linear scintillation neutron detectors; Development of new ZnS scintillator, light reflector and digital signal processing module
JAEA-Research 2008-116 (2009)

J-004
Takei, H. et al.
Estimation of acceptable beam trip frequencies of accelerators for ADS and comparison with performances of existing accelerators
JAEA-Research 2009-023 (2009)

J-005
Sugawara, T. et al.
Investigation of safety for accelerator driven system; Investigation for abnormal event and safety analysis for accident event
JAEA-Research 2009-024 (2009)

J-006
Sugawara, T. et al.
Investigation of nuclear design accuracy for transmutation systems and effect of MA-loaded experiments
JAEA-Research 2009-033 (2009)

J-007
Arai, M. et al.
Proceedings of the International Advisory Committee on Biomolecular Dynamics Instrument DNA and the Workshop on Biomolecular Dynamics Backscattering Spectrometers; February 27-29, 2008, J-PARC Center, Japan Atomic Energy Agency, Tokai, Ibaraki, Japan
JAEA-Review 2008-036 (2009)

J-008
Arai, M. et al.
Proceedings of the 2nd International Advisory Committee on Biomolecular Dynamics Instrument DNA in MLF at J-PARC; November 12 - 13, 2008, J-PARC Center, Japan Atomic Energy Agency, Tokai, Ibaraki, Japan
JAEA-Review 2009-014 (2009)

J-009
Haga, K. et al.
Thermal hydraulic design of the mercury target vessel
JAEA-Technology 2008-033 (2009)

J-010
Yamada, K. et al.
Ion generation method for TIARA Ion Implanter
JAEA-Technology 2008-090 (2009)

J-011
Kasugai, Y. et al.
Risk assessment of the mercury leak at Materials & Life Science Experimental Facility of J-PARC
JAEA-Technology 2009-010 (2009)

J-012
Mio, K. et al.
Development of radiation resistant PEEK insulation cable
JAEA-Technology 2009-018 (2009)

J-013
Wakui, T. et al.
Fabrication of mercury target vessel
JAEA-Technology 2009-040 (2010)

J-014
Wakui, T. et al.
Structural design on mercury target vessel
JAEA-Technology 2009-041 (2010)

J-015
Sakai, K. et al.
Design, construction and operation of general control system of Materials and Life Science Experimental Facility (MLF-GCS) in J-PARC
JAEA-Technology 2009-042 (2009)

J-016
Mio, K. et al.
Radiation resistance of vacuum equipment in J-PARC RCS
JAEA-Technology 2009-064 (2010)

J-017
Sakai, K. et al.
Commissioning of operation and control for Materials and Life Science Experimental Facility (MLF) in J-PARC
JAEA-Technology 2010-001 (2010)

KEK Report

K-001
Molodozhentsev, A. et al.
Beam dynamics and low loss operation of the J-PARC Main Ring
KEK_Preprint, vol. 2009, p. 1 (2009)

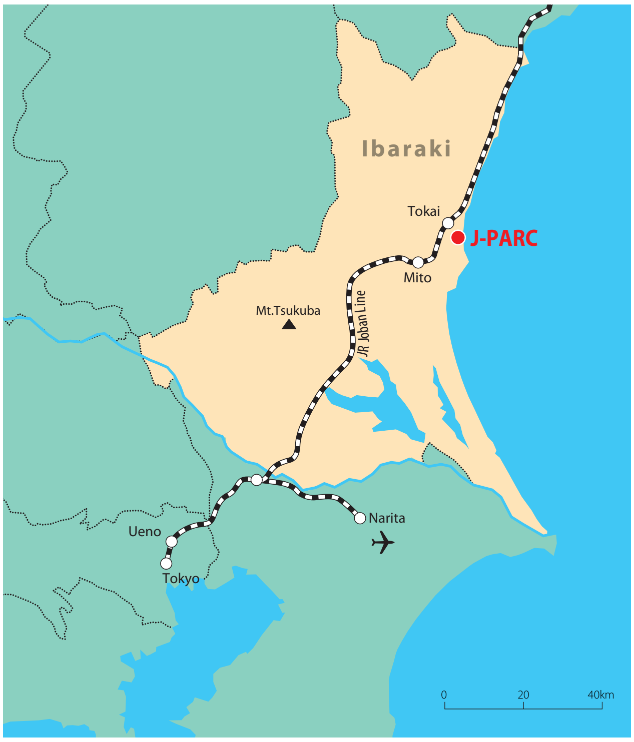
High Energy Accelerator Research Organization
Japan Atomic Energy Agency
J-PARC Center
2-4 Shirakata Shirane, Tokai-mura, Naka-gun, Ibaraki, 319-1195, Japan

J-PARC Center Web Page
http://j-parc.jp
October 2010

J-PARC

JAPAN PROTON ACCELERATOR RESEARCH COMPLEX

High Energy Accelerator Research Organization (KEK)
Japan Atomic Energy Agency (JAEA)



2-4 Shirakata Shirane, Tokai-mura, Naka-gun, Ibaraki 319-1195, Japan

http://j-parc.jp/