



October 16, 2008
6th J-PARC PAC Meeting

J-PARC Status

Shoji Nagamiya

J-PARC Center

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

J-PARC Facility (KEK/JAEA)

North to South

50 GeV
Synchrotron

500 m

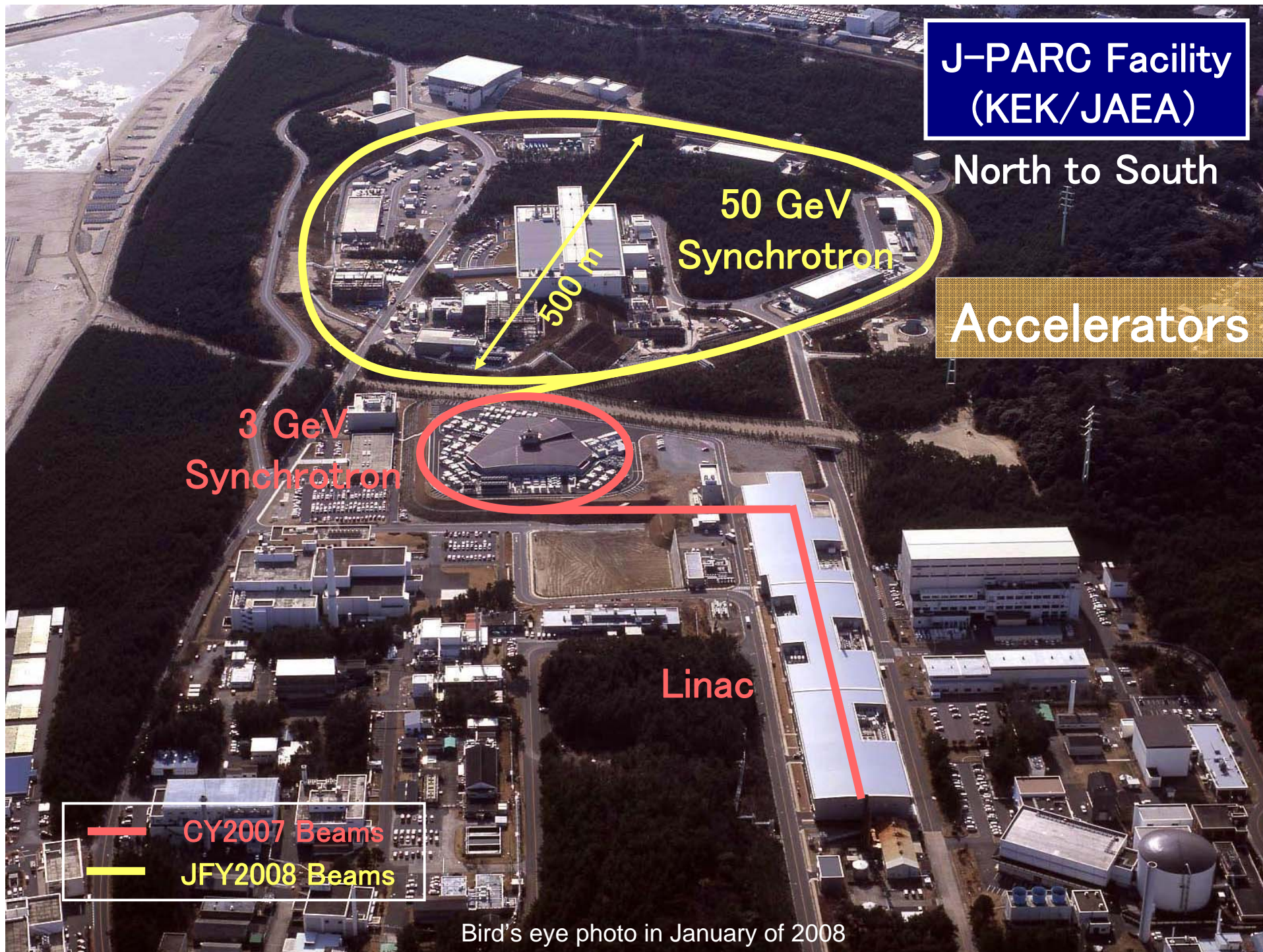
Accelerators

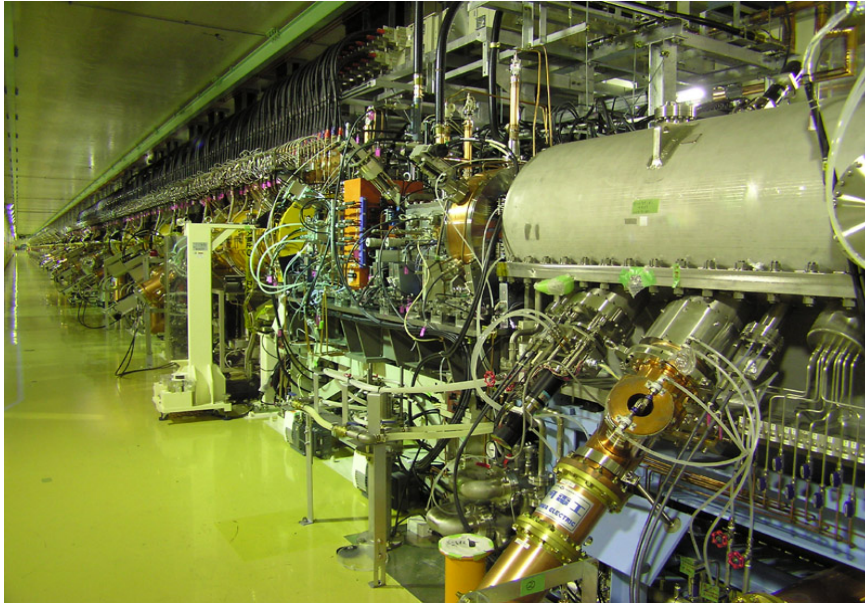
3 GeV
Synchrotron

Linac

— CY2007 Beams
— JFY2008 Beams

Bird's eye photo in January of 2008





Linac (330m)



3 GeV Synchrotron (350m)



50GeV Synchrotron (1600 m)



Superconducting magnets for the neutrino beamline

**J-PARC Facility
(KEK/JAEA)**

South to North

**Experimental
Areas**

Linac

3 GeV
Synchrotron

Neutrino Beams
(to Kamioka)

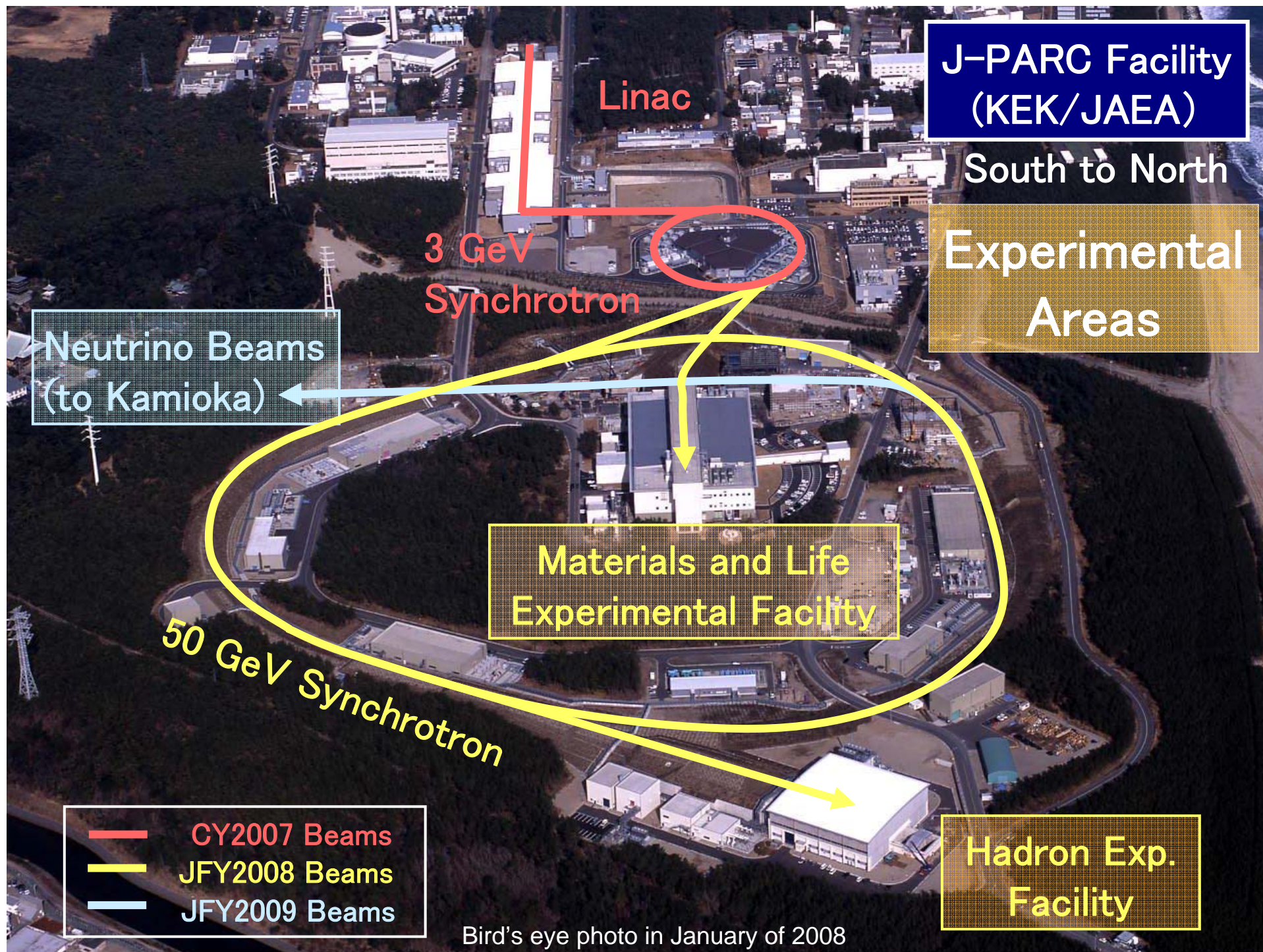
**Materials and Life
Experimental Facility**

50 GeV Synchrotron

**Hadron Exp.
Facility**

— CY2007 Beams
— JFY2008 Beams
— JFY2009 Beams

Bird's eye photo in January of 2008



Number of Beam Particles



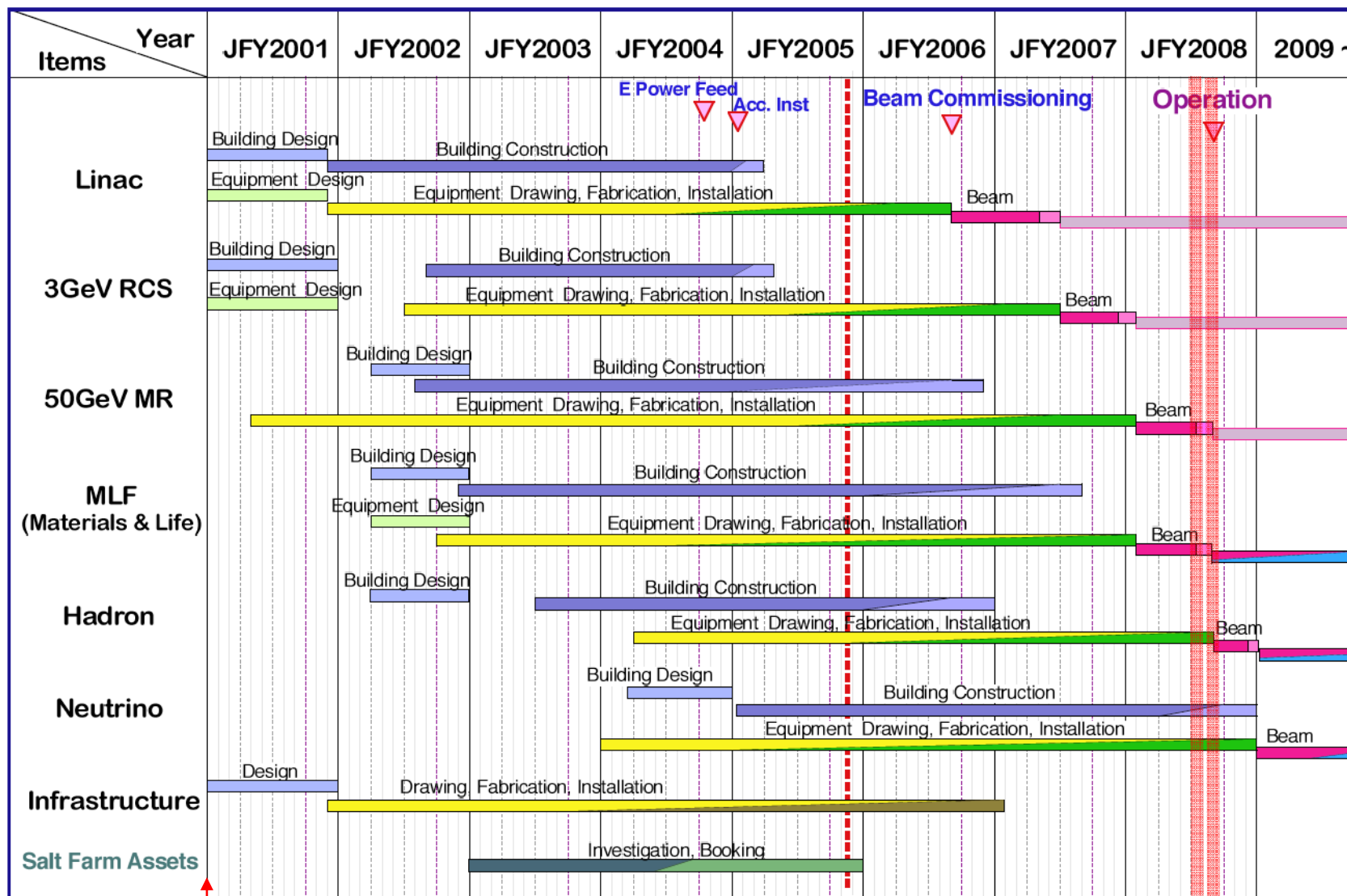
Beam Flux at the Full Power Proton Beams

	# of particles per one proton	# of particles per second	Typical number of particles at one beamline*)
Neutron	80	1.0^{17}	1.0^8
Muon	1.0^{-4}	1.0^{11}	1.0^7
Kaon	1.0^{-4}	1.0^{10}	1.0^6
Neutrino	6	1.0^{15}	3×1.0^7

*) Number listed here is at Super Kamiokande.

J-PARC Construction Schedule

Feb. 27 2006



Construction
Start

Time when this
schedule was created
(J-PARC Center started)

Now
Open to
Users

Preparation of Neutron Equipments

- 23 beam lines are available.
- Application for equipment open to public.
- About 10 equipments within JFY2008.

Super High Resolution Powder Diffractometer (SHRPD) – KEK



Nuclear Interaction (Hokkaido, JST)



IBARAKI Biological Crystal Diffractometer – Ibaraki Prefecture

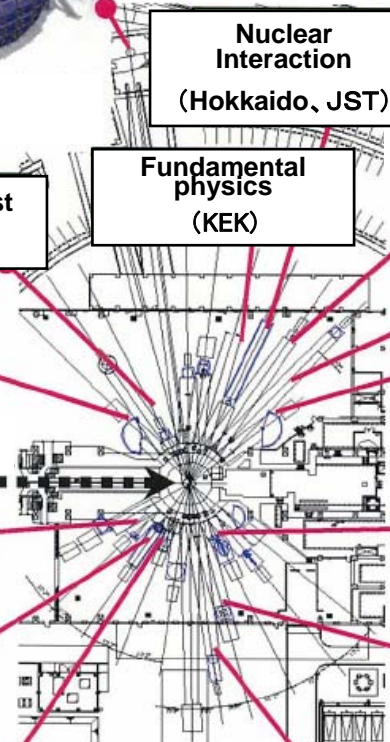
Protein Dynamics Analysis Instrument (DIANA) – JAEA



Beam Test (JAEA)



Fundamental physics (KEK)



Proton beam



4d Space Access Neutron Spectrometer(4SEASONS) – Grant-in-Aid for Specially Promoted Research, MEXT,



High-intensity Versatile Neutron Total Diffractometer – KEK, NEDO



IBARAKI Materials Design Diffractometer – Ibaraki Prefecture



Engineering Diffractometer – JAEA



Neutron Reflectometer with Horizontal-Sample Geometry – KEK



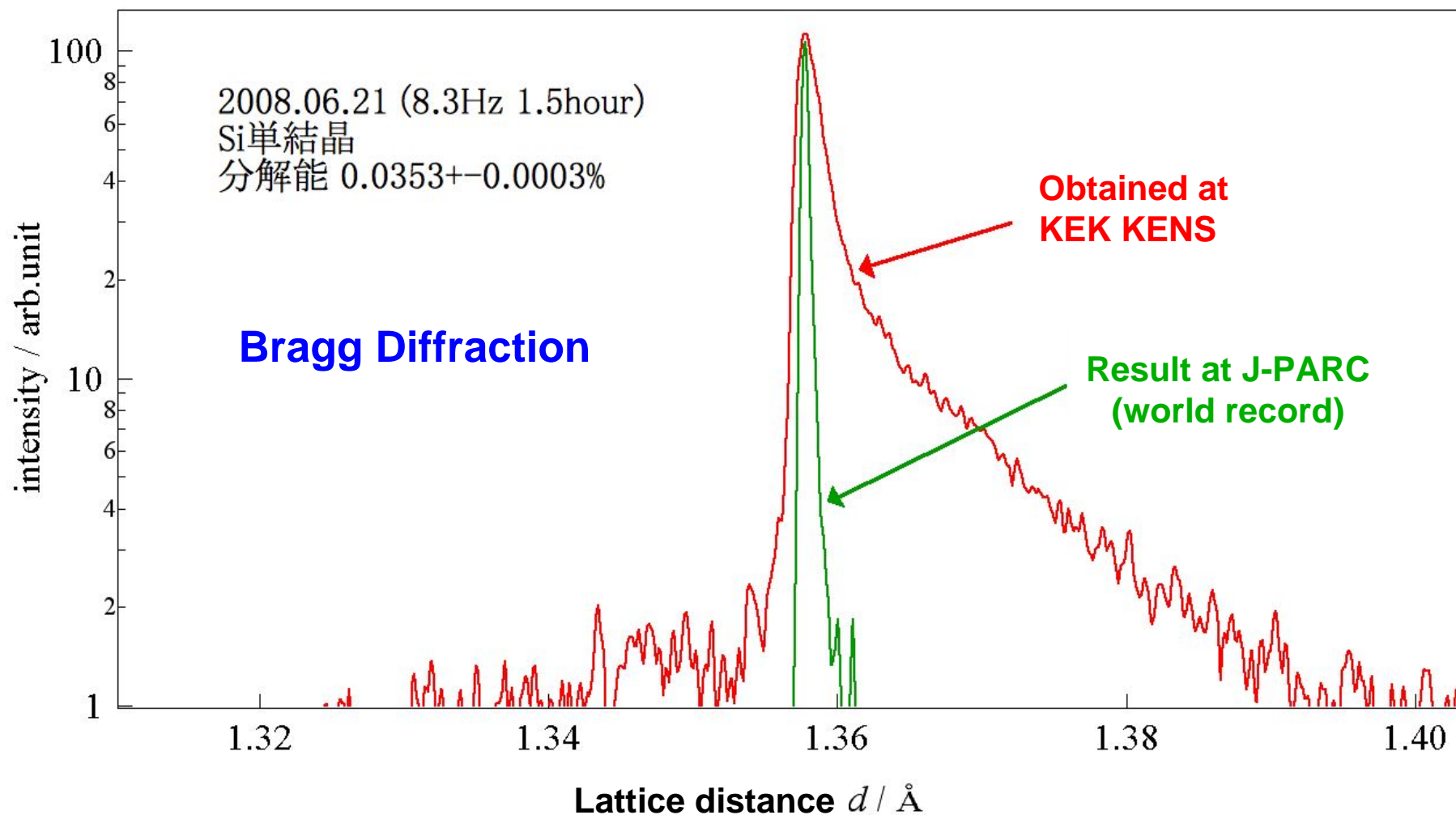
High-intensity SANS (HI-SANS) – JAEA



Life Science

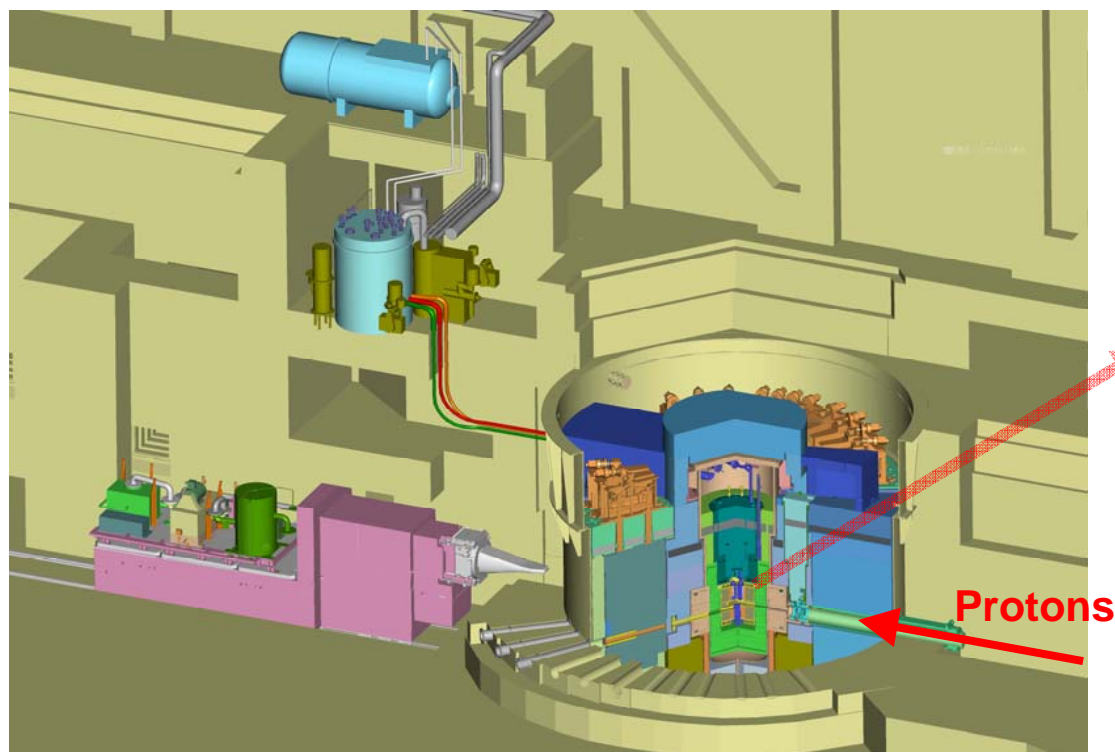
Materials Science

Example of Test Results in June, 2008

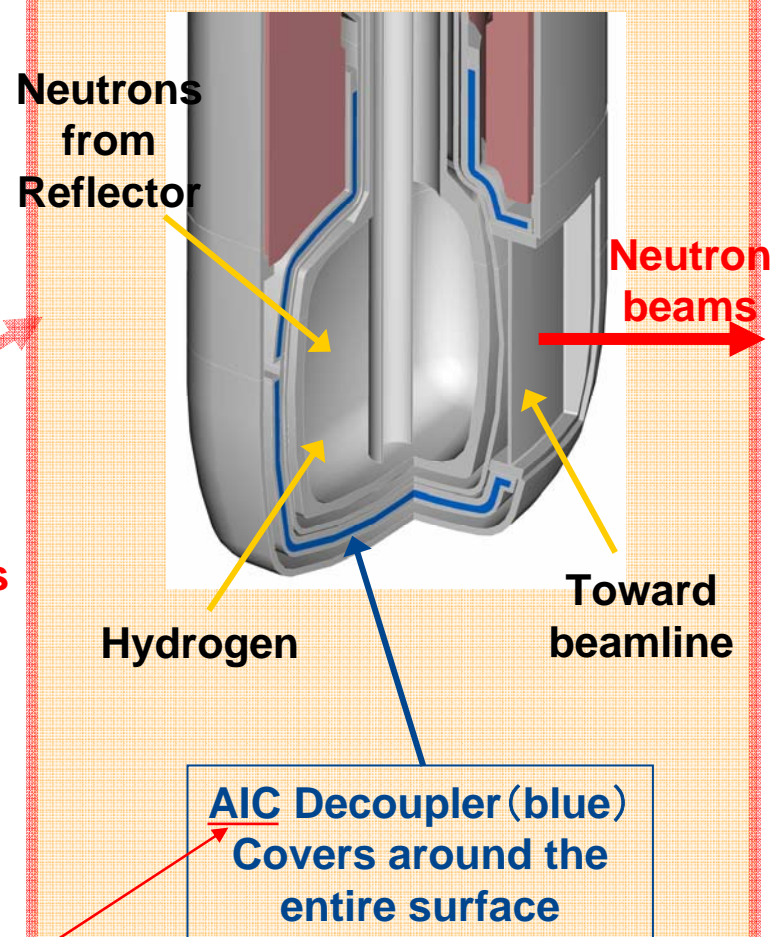


New Invention for Moderator

Neutron Source

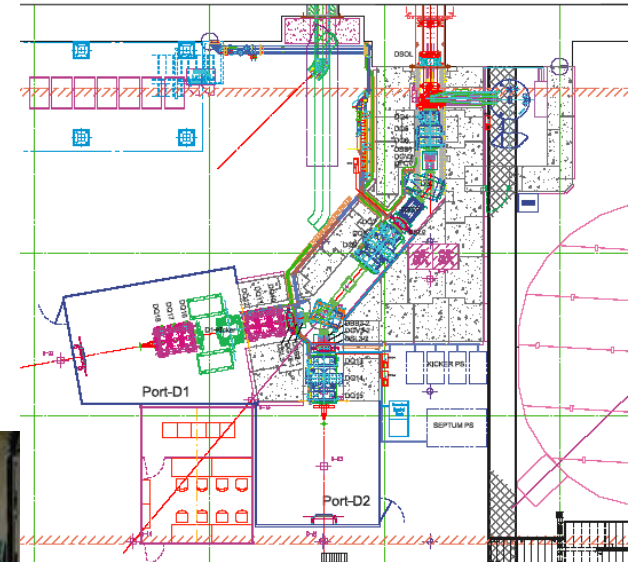
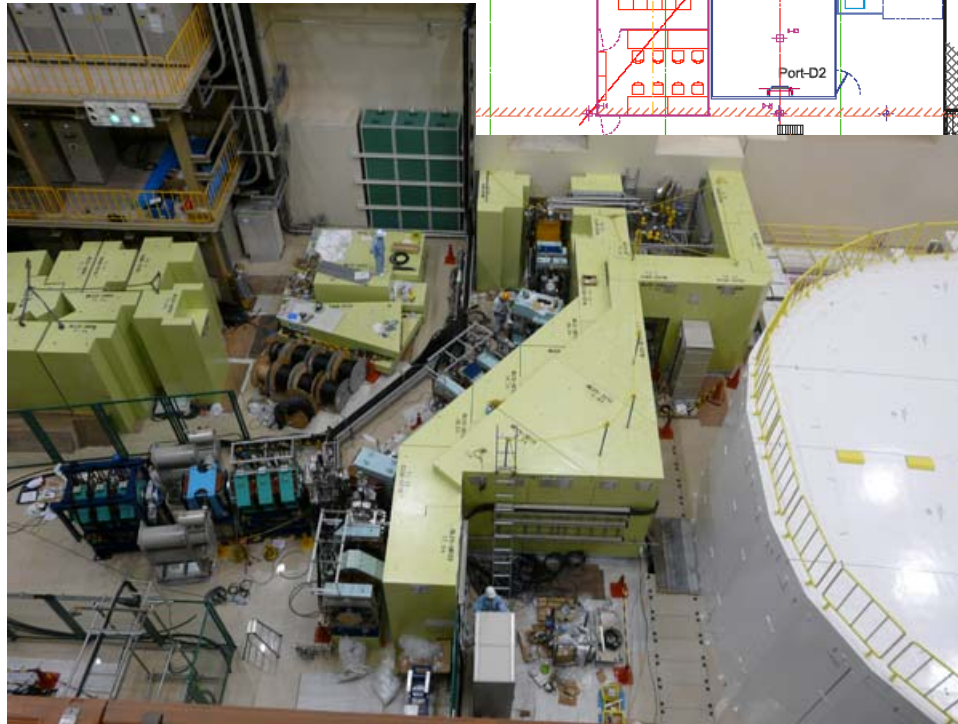


Moderator



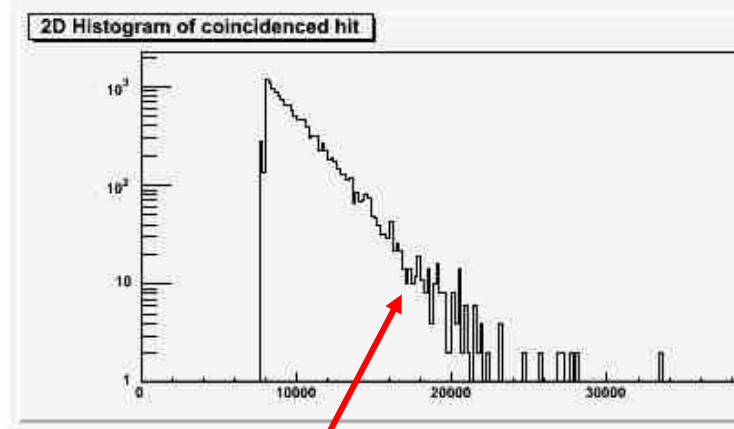
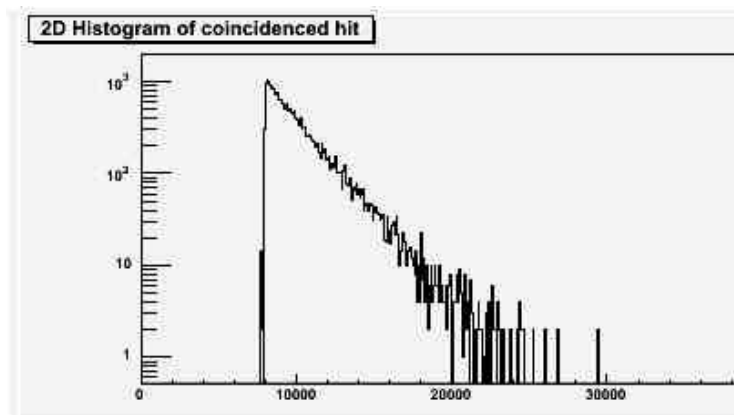
Ag,In,Cd

Muon Beam Area

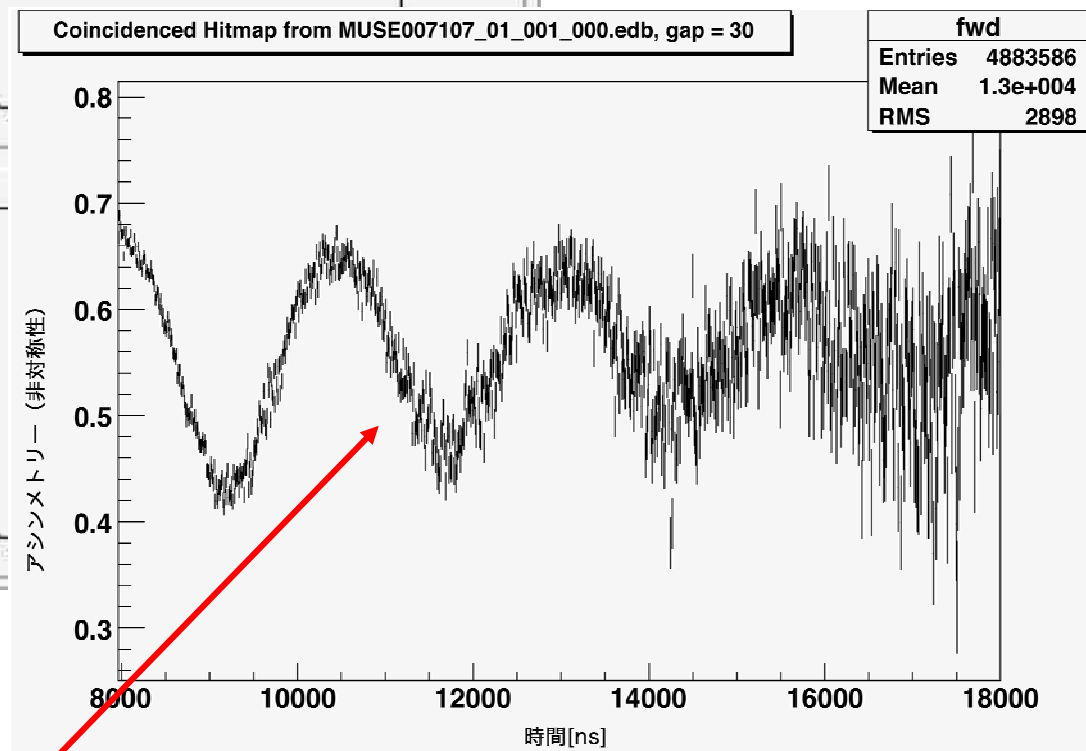


Muon Lifetime and Muon Rotation

September 26, 2008



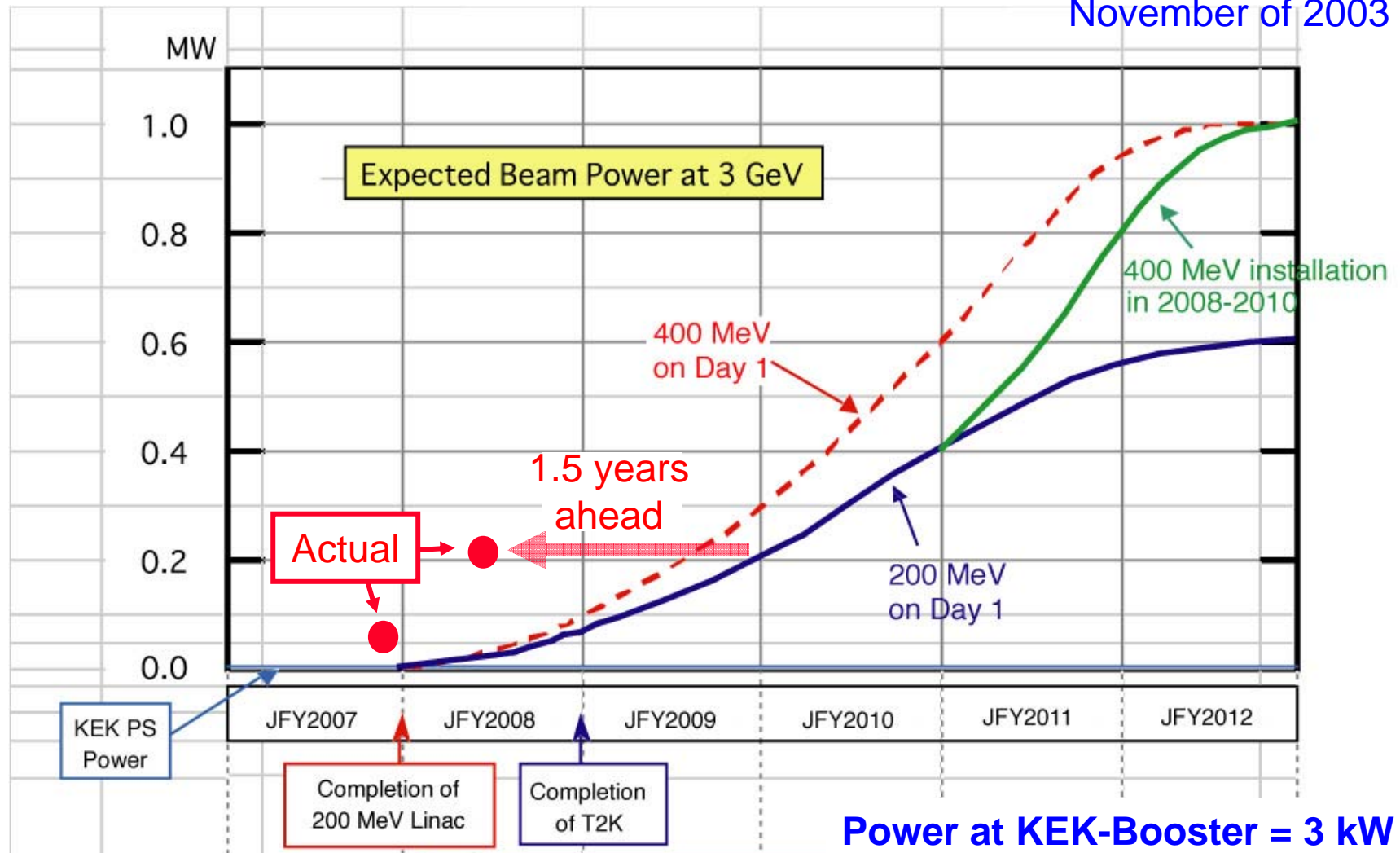
Lifetime = $2.2 \mu\text{s}$



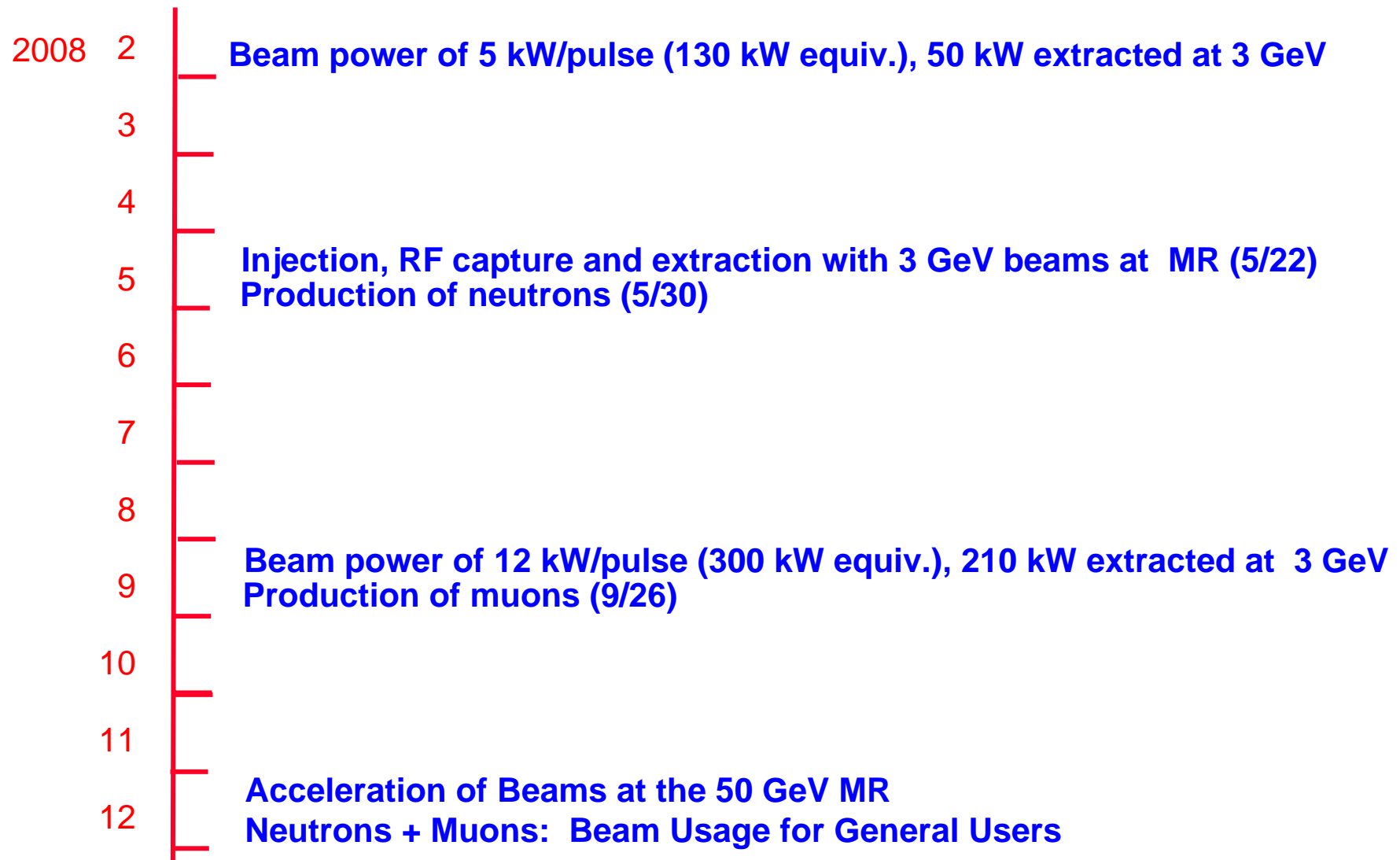
Muon Spin Rotation in a Magnetic Field

Expected Power vs. Actual Power

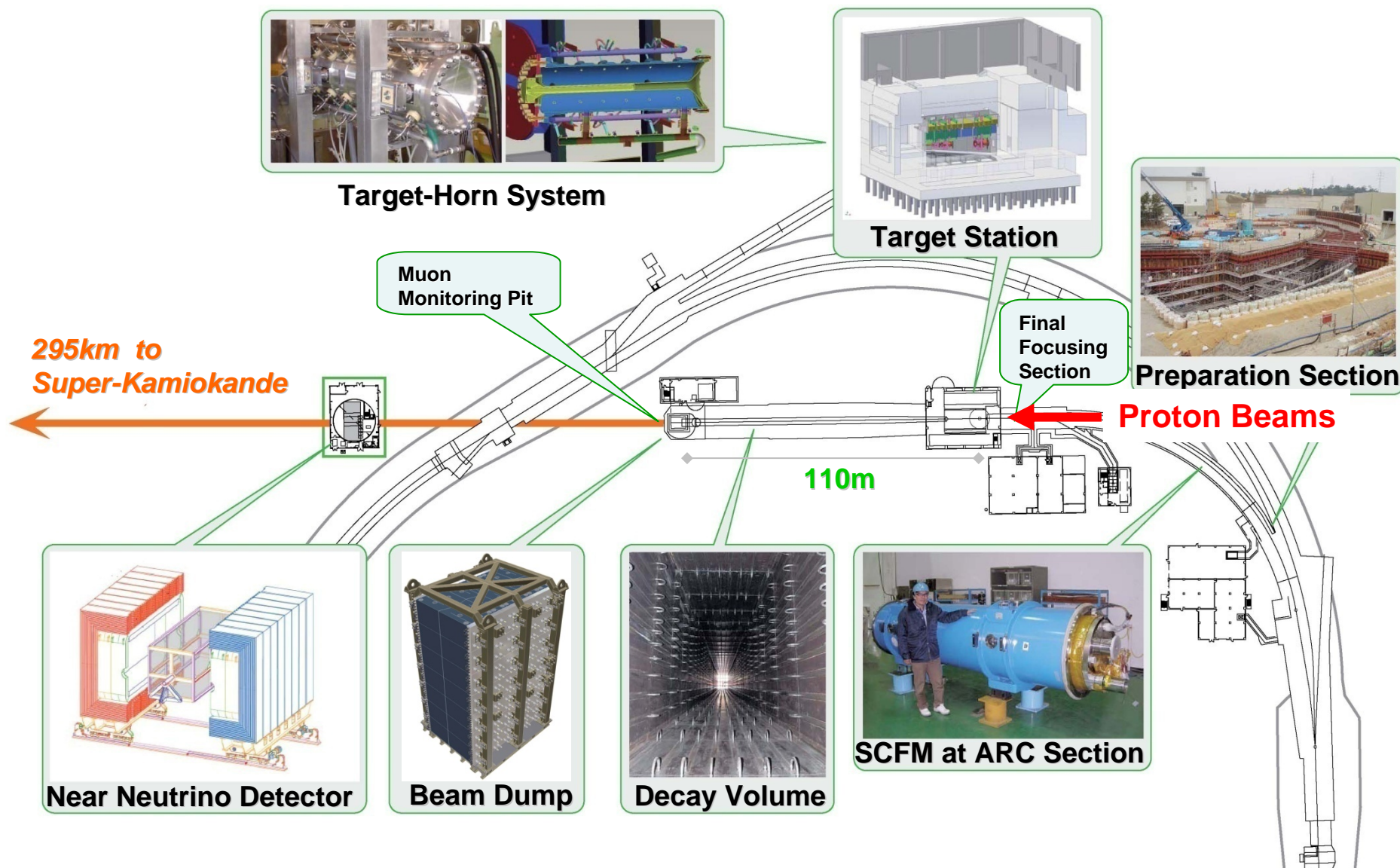
November of 2003



Recent Major Events



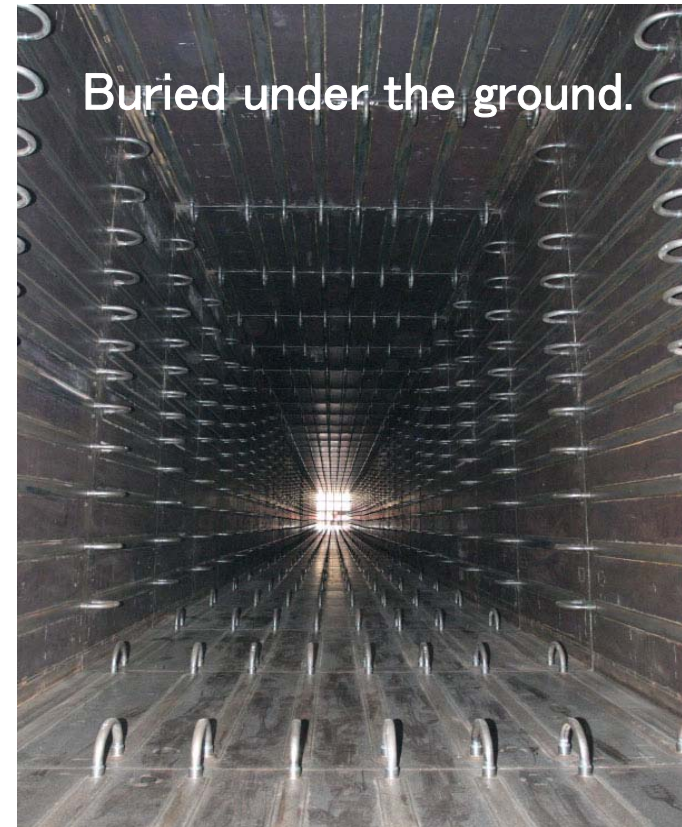
Neutrino System at J-PARC



Production Area and Decay Volume



Production Area
 $(p + A \rightarrow \pi)$

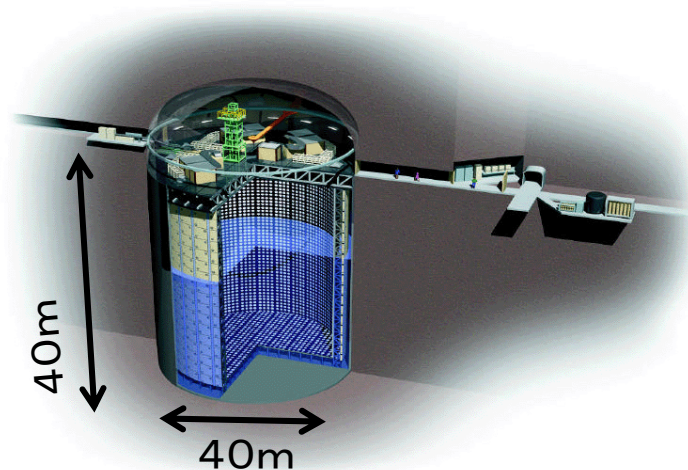


Buried under the ground.

Decay volume
 $(\pi \rightarrow \mu + \nu)$

Detection of Neutrinos

Purified Water **50,000 tons**
Over 10,000 phototubes
 Cerenkov light after neutrino interactions with water



Super Kamiokande

30 million neutrinos/second,
A few trillion neutrinos/day
Pass through the detector

To be detected is, however,
Only 10-20/day


 Neutrino beams
 (1/1000 seconds from
 Tokai to Kamioka)

First Detector in Tokai



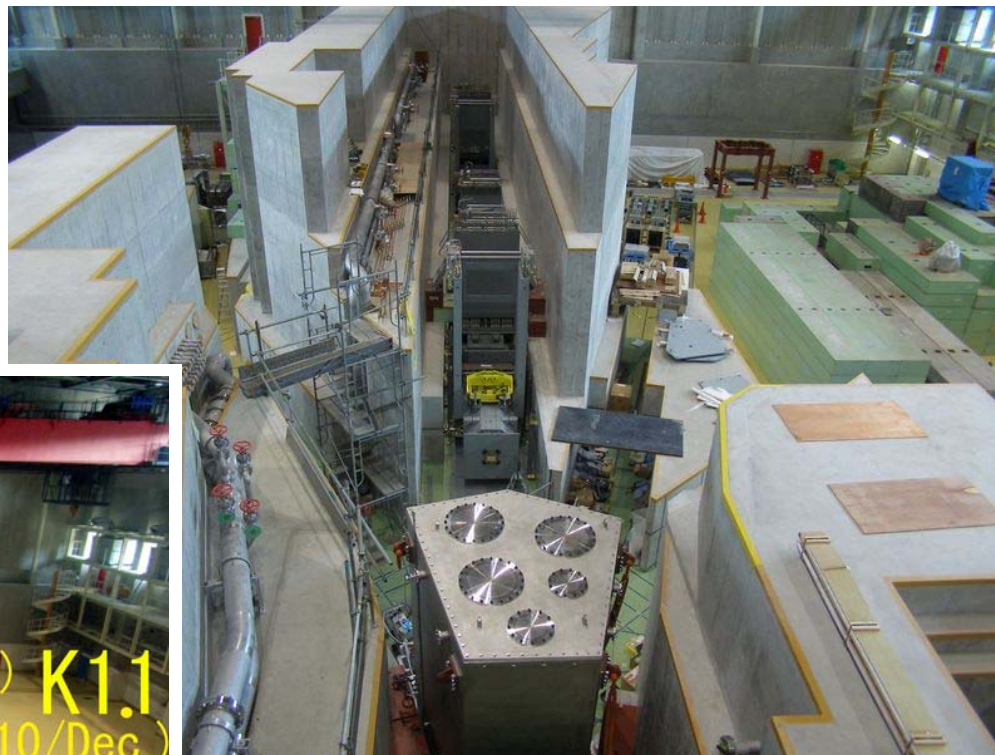
First Detector

Neutrino Area

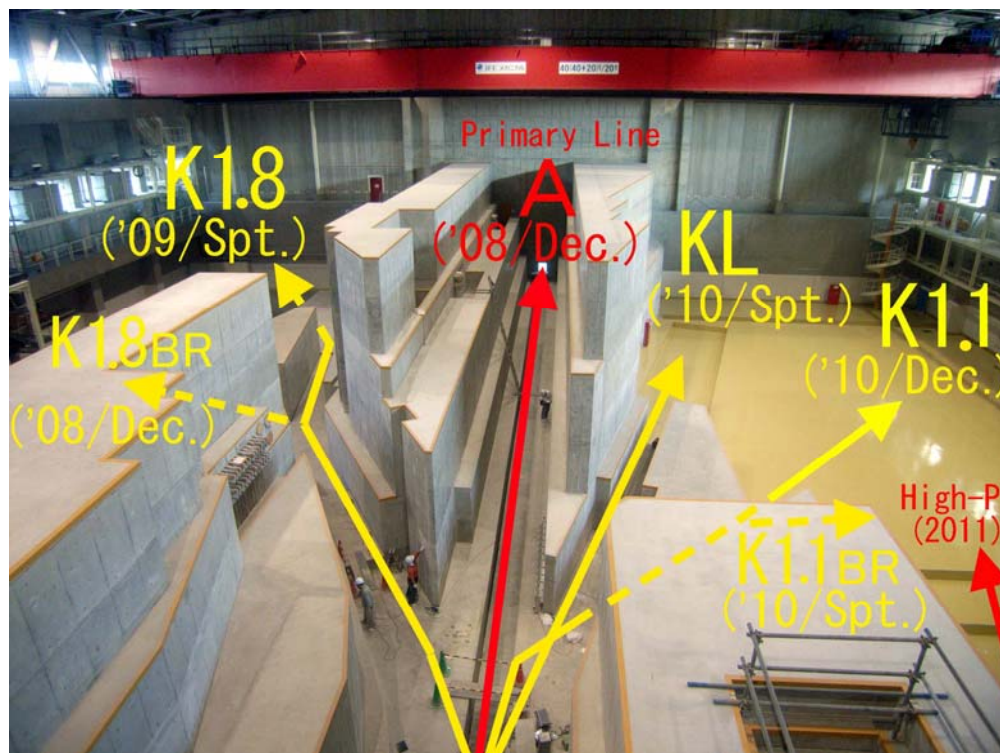
**Beams in
 JFY2009**

Hadron Experimental Area

Now



Summer in 2007



Hadron Area

Beam within
JFY2008



Budget Request for JFY2009



- Operation of the Facility to 7 Cycles (154 days)
 - 85 Oku Yen for KEK and 85 Oku Yen from JAEA were requested from MEXT to the Ministry of Finance.
 - However, we were told that “the budget is very tight next year”.
- Linac Energy Recovery
 - 21 Oku Yen was requested. Three years from JFY2009.
- Others
 - 2 neutron beamlines + equipments
 - most likely covered by the other category of the money.
 - Research buildings?
 - Lodging
 - Very unfortunately, this request was not approved at MEXT.
 - Negotiation with Tokai Village (discussions with the Mayor, etc.)
 - Also, negotiation with local lodging association is in progress.
 - Usage of JAEA lodgings, etc. is also in progress.

How to Grow Operational Budget?



■ JAEA

- JAEA is not an organization to provide an open access/service fully to public (JAEA is not a user-based institution).
- MEXT proposed to introduce a new scheme (which has been adopted by the SPring-8) so that the Government takes a responsibility to open the facility 100% to users (broader than the usage which is related to nuclear energy mission alone).
- In this case, the JAEA will take a responsibility for the operation of the facility, whereas a “contractor” must be assigned to promote scientific programs (e.g., management for selection of experimental proposal) on behalf of the Government.

■ KEK

- KEK is an organization to provide an open access/service to university and other academic institutions.
- MEXT is discussing possible mechanisms of how to provide a growing J-PARC operational budget, since the total KEK operational fund cannot grow too much.

Progress Since June

■ JAEA

- MEXT started to create a law to adopt a new budget scheme (which has been adopted by the SPring-8).
- MEXT already proposed new budget to construct new neutron beamlines which can be operated by this new budget scheme.
- This new law will be discussed in the Diet in early next year, to make it effective from next JFY.

■ KEK + JAEA

- After good news of three Nobel Prizes in Physics, the Government might be moving toward approval of “new” supplemental budget???

Accelerate budget for J-PARC???

Accelerate budget for ILC???

テクノロジー

素粒子実験施設、文科省が整備前倒しへ...ノーベル賞受け

10月12日11時53分配信 読売新聞

ノーベル物理学賞を日本人3人が独占した快挙を受け、文部科学省は高エネルギー加速器研究機構(茨城県つくば市)が計画中的大強度陽子加速器施設(J-PARC)の運用を1年程度早める方針を固めた。

ノーベル賞の対象となった「小林・益川理論」は同機構の施設の実験で証明された。未知の粒子の探索などの研究を急ぎ素粒子物理学の地位を固めたい考えた。

最終更新:10月12日11時53分

YOMIURI ONLINE 20

All of these are just rumors at this stage !!!



Growing Visitors

■ Open House

- August 10: 2,600 Visitors came for the J-PARC Open House.

■ Diet Members + VIP's

- During the summer time, we had visit of Minister, Upper House members, Lower House member, and many VIP's. Almost every week we had these visits. Still now.

■ J-PARC Users

- Users Office is functioning more smoothly than before (housing, rental car, etc.)
- Official financial accounts for user groups are being prepared.

■ Office Space

- NTT area is being renovated by the Ibaraki Prefecture.
- Office space will be available from December this year



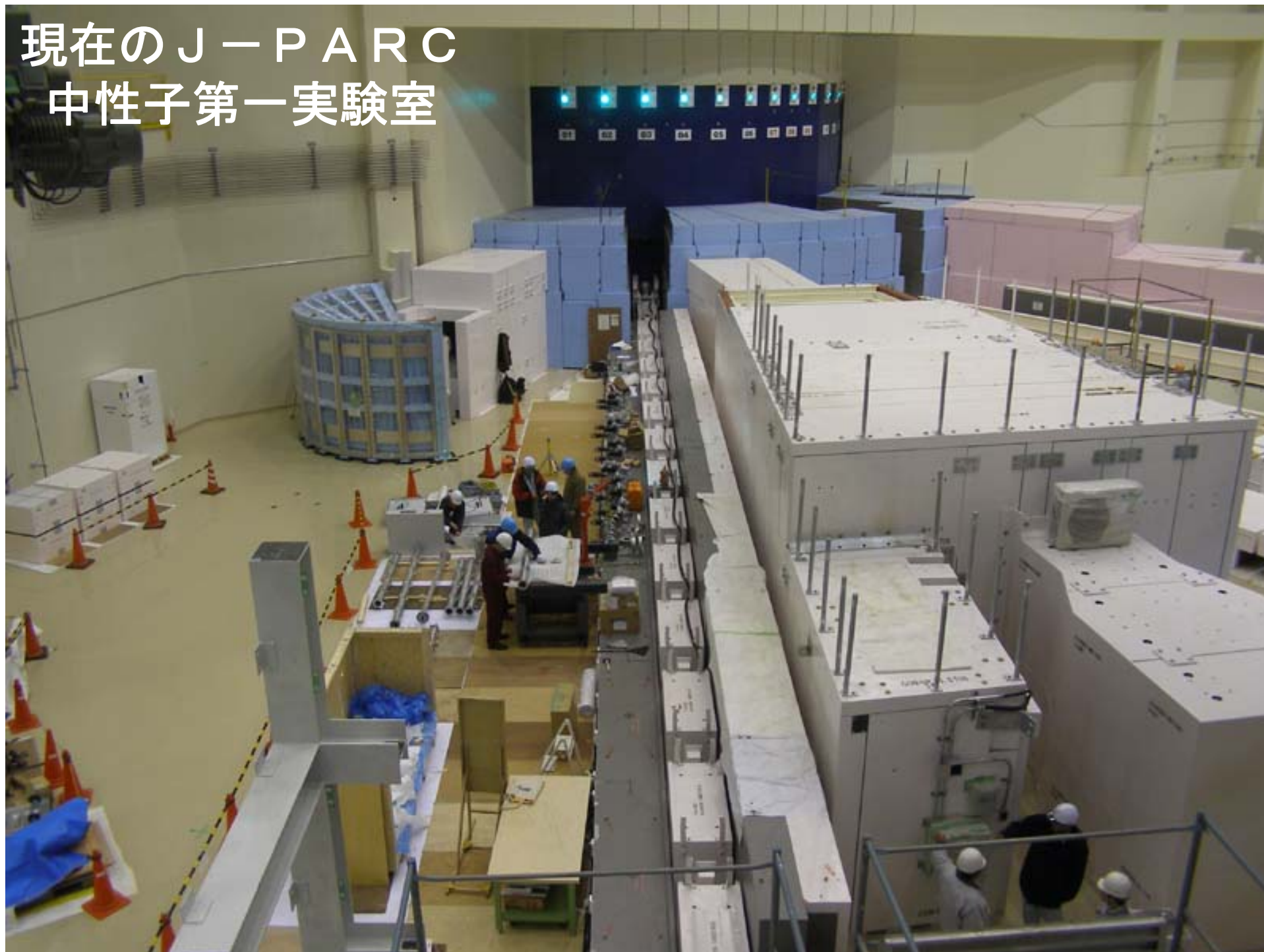






中性子の発生部に用いられる
アウターライナー

現在のJ-PARC 中性子第一実験室





- Uniqueness of the J-PARC Project - Multipurpose Facility
 - Variety of secondary beams → Variety of frontier sciences (Materials, Life, Particle and Nuclear, Nuclear Engineering, etc).
 - From “basic science” to “industrial usage”.
- News during the Past Half a Year
 - Construction for both equipments and facilities: On schedule.
 - Main Ring injection and extraction with RF capture succeeded.
 - Production of neutron was successful.
 - Production of muon was successful.
 - 210kW beams was extracted from 3 GeV.
 - The Users Office became more active.
 - New scheme of the operational budget for the JAEA portion is in progress.
 - Will deliver beams within JFY2008 for both Materials and Life Experimental Hall and the Hadron Hall. Beams for neutrinos will start from April of 2009.
- Issues
 - Linac energy recovery.
 - Operational budget ... We are setting the highest priority here.
 - Internationalization of the J-PARC Project. ... Urgent but not yet attained.
 - Creation of mechanism for usage of neutron beams by industries.