

June 5, 2008 50GeV PAC

# **Status of J-PARC Construction**

Shoji Nagamiya J-PARC Center at KEK/JAEA

# **J-PARC Facility**





# Phase 1 and Phase 2























# **3 GeV Synchrotron Area**

First beam on 10/31/07 50 kW in late Feb., 2008 (equivalent to 130kW)



# MR Circulation, RF Capture & Extraction





# Neutron Experimental Hall #1 Production of Neutrons on 5/30/2008 Open to Users from December of 2008

 .....

# First Production and Detection of Neutrons









# Hadron Experimental Hall



K1.1 = 1.1 GeV/c for Kaon





# Fast Extraction Line for Neutrinos





## **Near Detector Area**





Neutrino Area Beams from JFY2009







# **Recent Major Events**

 2007 10
 Beam extraction from 3 GeV (10/31)

 11
 12

 12
 2008 1

 2
 Beam power of 5 kW/pulse (130 kW equiv.), 50 kW extracted at 3 GeV

 3
 4

 5
 Injection, RF capture and extraction with 3 GeV beams at MR (5/22)

 6
 Production of neutrons (5/30)



# **Government Review Committees**

- The Review Committee appointed by the Government was held from December of 2006 through June of 2007.
  - Linac Energy Recovery
  - Organizational Structure at the Operational Stage (J-PARC Center)
  - PAC for Neutrons and Muons + Beam-Time Fee
  - Usage of Neutron Beam Lines by Industries
  - Phase 2 Projects
  - Internationalization of the J-PARC
  - Operational Cost
  - Etc., Etc.



# 2 J-PARC Center & Two Organizations





J-PARC

# Operational Cost of J-PARC



The Review Committee understood the reason why this budget is needed. However, an effort to reduce the cost was also recommended.



### JAEA

- JAEA is not an organization to provide an open access/service fully to public (JAEA is not a user-based institution).
- MEXT proposes 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.



# 4 Major Upgrades under Discussions

- Neutrons and Muons
  - Neutron equipments: How to fill the 23 beamlines (so far about ten were funded).
  - Muon equipments: Among four beamlines, only one will be in operation in 2008. Others have to be funded.
- Hadrons
  - Must construct several kaon beamlines plus a primary beamline.
  - Hadron hall expansion (Phase 2: 60m in length to 100m): Necessary to accommodate many user groups (Many requests on this at the Int. Workshop (NP08) held on 5-7 March of 2008).
- Neutrinos
  - Power upgrade.
  - The third detector (at 2 km from J-PARC or at Okinoshima/Korea).
- Nuclear Transmutation
  - The major item for Phase 2 ... Main Goal for JAEA.
- Others
  - Energy upgrade to 50 GeV.
  - Third extraction line or Fast Extraction at Hadron Hall?
  - Polarized protons, heavy-ions, ....



# **Users Steering Committee**

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### New members were elected in November of 2007.

- Representatives from four communities are included.
  - Roadmap of the future J-PARC will be discussed at this committee.
    - Discussion items by this committee were re-identified.
    - The committee will start intense discussions from March 17th about future plans of the J-PARC.

Upgrades including Phase 2 will be discussed at this Committee 31



# 5 World Centers

Materials and Life Science: One of three world neutron centers. • Nuclear and Particle Physics: World unique Kaon Factory. One of • three world neutrino centers. For antiprotons, GSI will form a center. For transmutation, a world unique center. • ISIS  $\sim$ GSI J-PARC CERM SNS Intenationalization is Center for neutrinos Hadron (Kaon) still a big issue for Hadron (Anti-p) Center for neutrons J-PARC!



# Early March



**IAC Meeting on 3-4 March** 

The First International Symposium on Science at J-PARC on 5-7 March





# **Coordination and Competition**

GSI (H. Gutbrod):

GSI (FAIR): Anti-protons + Heavy-ions

- J-PARC: Kaon + Polarized protons
- BNL (P. Pile) + FNAL (Y.-K Kim):
  - Strangeness Nuclear Physics Experiments
    - BNL→ J-PARC
  - Nuclear/Hadron Physics Experiments
     Kaon Rare Decay Experiments
     Muon Decay Experiments (LFV, g-2, etc.)
    - Good coordianation is needed to the above three areas.
  - Neutrino Experiments and Proton Decay Experiments.
    - Competition with FNAL, or, eventually coordination???
  - Neutron Experiments

on 3/7/08 in NP08

From my summary slide





- 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.
    - 3 GeV acceleration and extraction succeeded. Higher power than scheduled was achieved.
    - Main Ring injection and extraction with RF capture succeeded.
    - Production of neutron was successful.
  - A new "Users Steering Committee" started.
  - The Users Office started its operation.
  - Operational fund for JFY2008 allows 2 cycle operation for MLF users and an experimental run for K1.8BR.
  - 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.
- Organizational structure at the operational stage (J-PARC Center)
- Operational budget ... We are setting the highest priority here.
- PAC (location), Budget for experimental facilities, Beamtime Fee, etc.
- Future Upgrade including Phase 2.
- Internationalization of the J-PARC Project. ... Urgent but not yet attained.