

Welcome to KEK and Mandate to PAC

1. Budget for 2011
2. Summary of accelerator operation status
3. Task force for higher power operation
4. Status report of experiments
5. Mandate

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January 14, 2011

JFY 2011 J-PARC related KEK budget

(Approved at Cabinet and to be discussed at Congress)

	JFY2010	JFY2011	
• Total Budget	298 oku¥	294 oku¥	↓ 4 oku¥
• J-PARC	68 oku¥	66 oku¥	↓ 2 oku¥
• muon beam line		5.4 oku¥	

KEK will make every effort to secure ≥ 24 days/month for 9 month
MR operation in FY2011

Summary of SX status

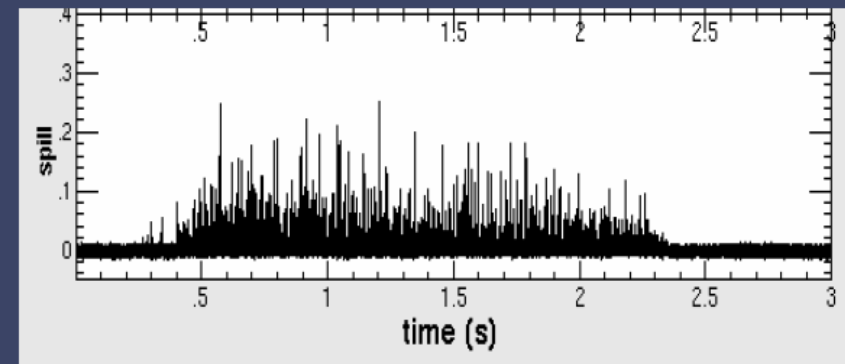
Oct. 2010 Run

Spill Structure

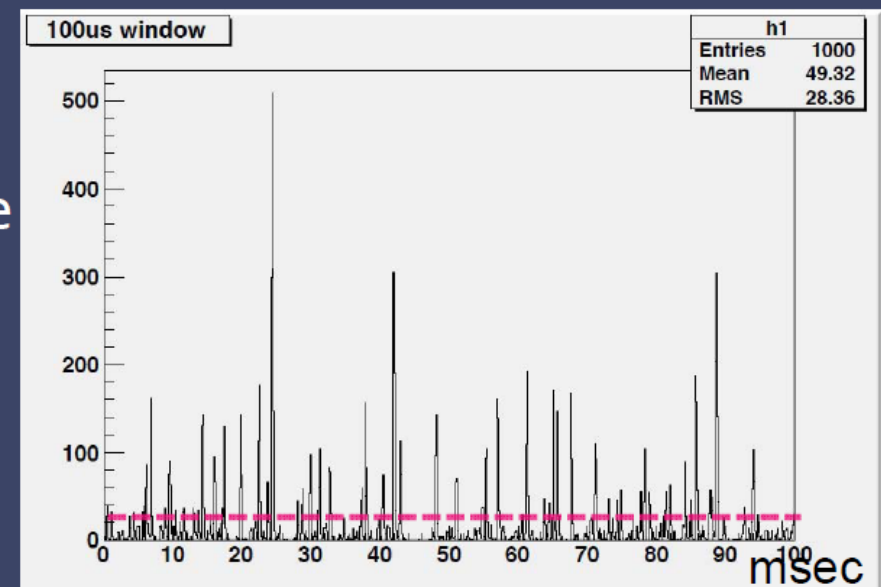
- duty factor (D.F) = effective spill length
 - acceptable beam intensity = $10M * D.F.$
 - needs $1/D.F$ times beamtime
- spill structure has been improved.
 - Feb. 2010 : 8%
 - Oct. 2010 : 12%
 - Nov. 2010 : 16%
- duty has been very stable during the data taking
- acceptable beam rate is **1.1M π /spill** with duty of **16%**.

From E19 report by M. Naruki
on 2010 Oct run

measured on 2010/10/31 0:55



cf. duty factor ~ 80% at KEK-PS



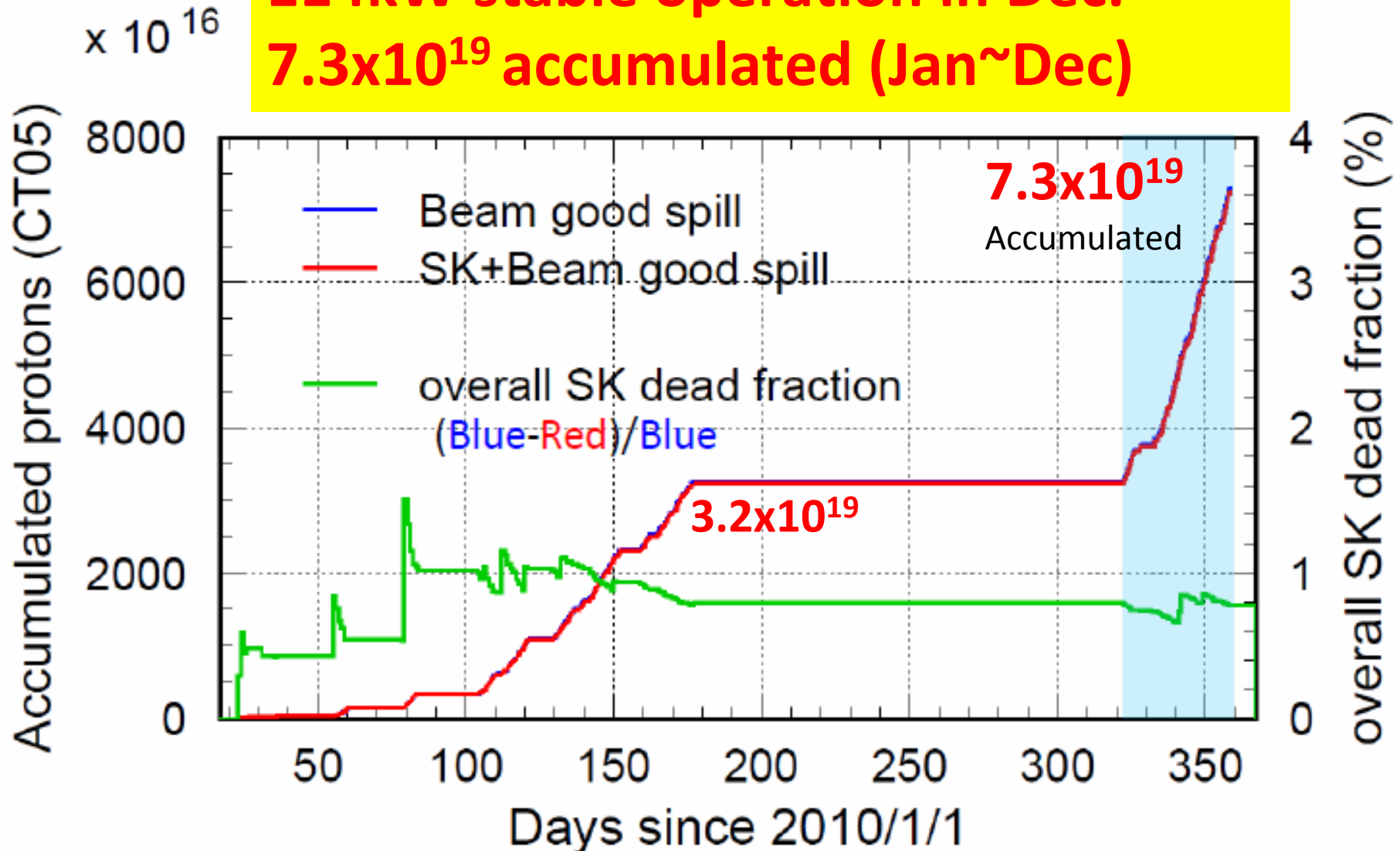
Summary of FX status

Nov.2010- Now

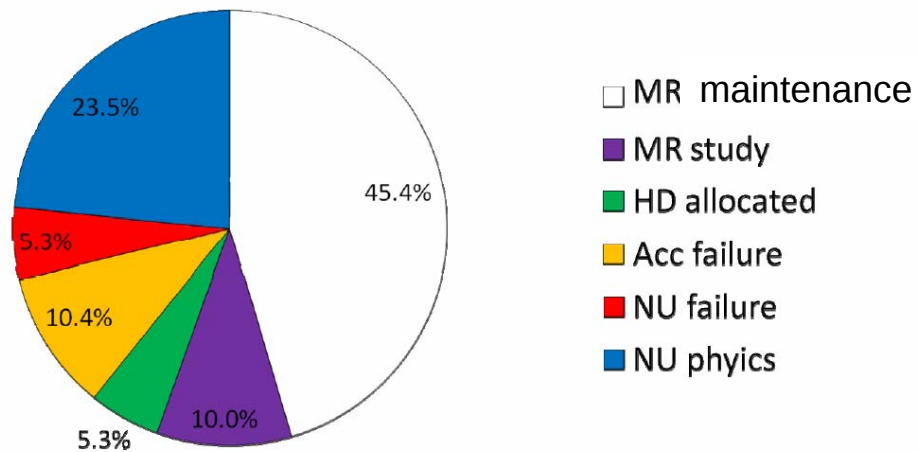
Accumulated protons

T2K collaboration

**114kW stable operation in Dec.
 7.3×10^{19} accumulated (Jan~Dec)**



Run time summary (Jan.1~June30)



Scheduled for physics data taking
for FX

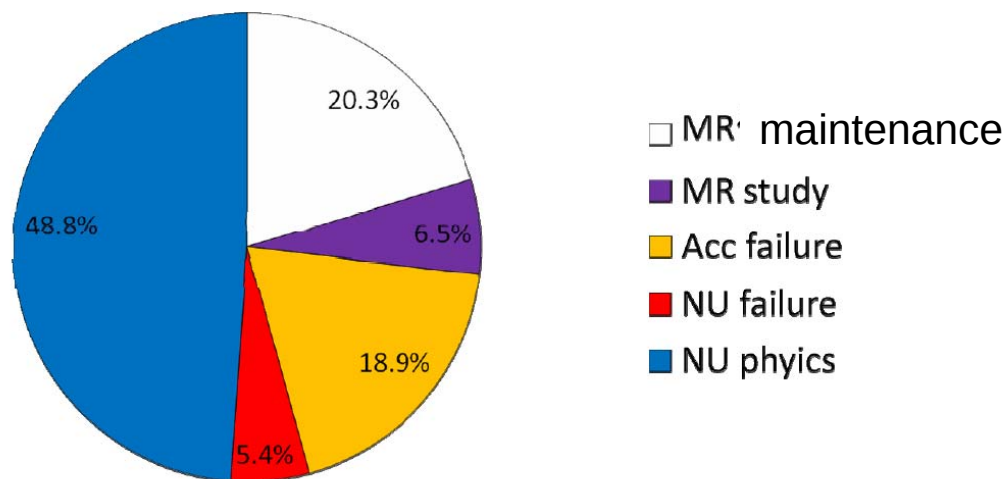
44.5% (Jan.1-June 30)



73.2%(Nov.16-Dec.31)

- Scheduled down time has been greatly decreased
- Failure rate remain to be improved
- Intensity should be increased

Run time summary (Nov.16~Dec.31)



Response to the previous PAC

In the longer term, the PAC considers that it is essential to set realistic milestones for the expected MW-levels for fast extraction and hundreds of kW levels for slow extraction. The PAC recommends that this work be done by the collaboration of the accelerator and experimental groups to optimize the physics priority in each period. The PAC would like to hear the progress on this exercise at the next meeting.

- Task force for higher power at the fast extraction beam
- Task force for improving slow extraction beam

Task force to realize high intensity formed for fast extraction

- Under
 - KEK accelerator lab director
 - IPNS director
- Joint group of IPNS and Accelerator lab.
- # of protons/pulse and repetition rate
- Sub working groups to study critical issues
 - Beam dynamics – space charge
 - High power trial ($2 \cdot 10^{13}$ protons/bunch and 8 bunches operation) is essential for future planning
 - Power supply – fast ramping, precision control of magnets
 - Improve repetition rate from 3.52 sec $\rightarrow$ 2.2 sec $\sim$ 2.64 sec with present power supply
 - Design new power supply
 - Conventional facility – cooling RF core etc. for stable operation
 - RF – maintenance free operation, higher field for faster accel.

Task force for slow extraction improvement

- Examination of data obtained in Oct run
 - spill structure and usable intensity of the MR
- Short term efforts

For beam power:

By T. Koseki

Reduction of residual activation

- Collimators installed in downstream of ESS's
- Ti chambers in the SX section
- Local shielding

For duty factor:

- Transverse RF with frequency larger than ~ 20 MHz
- Upgrade of RQ power supply (higher output voltage)
- Coil short / ripple cancellor
- Replace the main magnet power supplies

- Specification for new possible power supply for their ripple
Combined effort of FX and SX for possible new power supply

Mandate to the committee

Some boundary conditions by accelerator status

- Last Nov. , dumping resisters in the MR magnet power supplies, which added in order to suppress ripple, have blown off (effects on slow extraction spill structure)
 - replacement cannot be done before April
 - beam line work in the summer shut down
- MR injection kickers have ‘reflection’, causing major beam loss and limit FX operation to 115kW – being worked on to go higher intensity
- RCS has problem in painting bump magnet – need for high power test
 - Painting bump magnet problem has been fixed
- Starting up of the accelerator proceed with several days delay

Mandate for this PAC

- Evaluation of the progress of experiments and beam allocation
 - T2K
 - SX run period and which experiment(s) should be run
- references

 - A staging strategy of E15 experiment with 30 kW·week operation
 - Realistic Plans to Carry Out the Approved Experiments at K1.8 Beam Line in the Coming Few Years
- Proposals to be evaluated for the scientific merit
 - P40 (Measurement of the cross sections of Σ p scatterings)
 - P41 (An Experimental Search for μ - e Conversion in Nuclear Field at a Sensitivity of 10^{-14} with Pulsed Proton Beam from RCS)
 - Scientific merit evaluation by itself
 - manpower
 - Addendum to Proposal P36: Measurement of $\Gamma(K^+ \rightarrow e^+ \nu) / \Gamma(K^+ \rightarrow \mu^+ \nu)$ and Search for heavy sterile neutrinos using the TREK detector system
- Proposal seeking for stage-2 approval
 - Report on Technical Issues for J-PARC E18 Experiment: Coincidence Measurement of the Weak Decay of ${}_{\Lambda}^{12}\text{C}$ and The Λ Three-Body Weak Interaction Process

Reports

I have recommended the proponents to make full
report at the next PAC

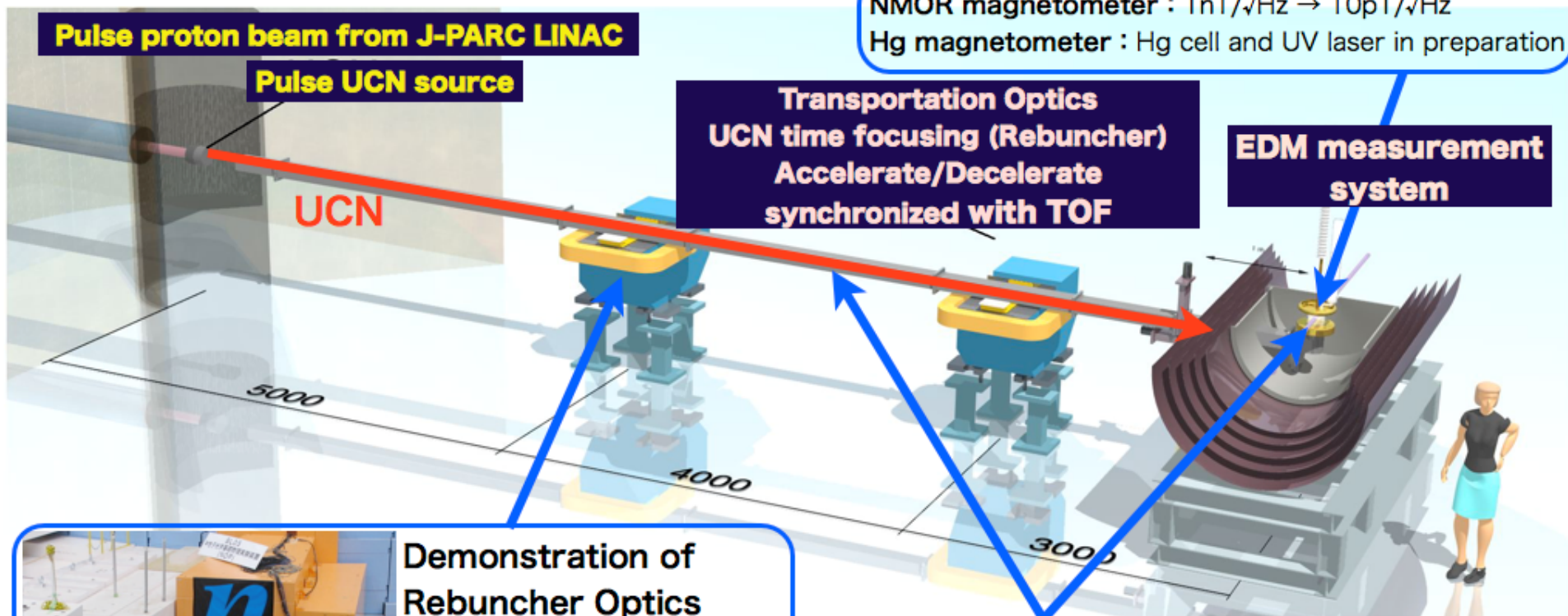
P33 Measurement of neutron EDM at J-PARC

Recommendation in the last PAC

The PAC strongly urges that the proponents work with laboratory management to develop a competitive, yet realistic schedule with key R&D milestones laid out prior to any consideration of scientific approval.

The collaboration is in the process of setting up the test equipments

Measurement of neutron EDM (J-PARC P33)

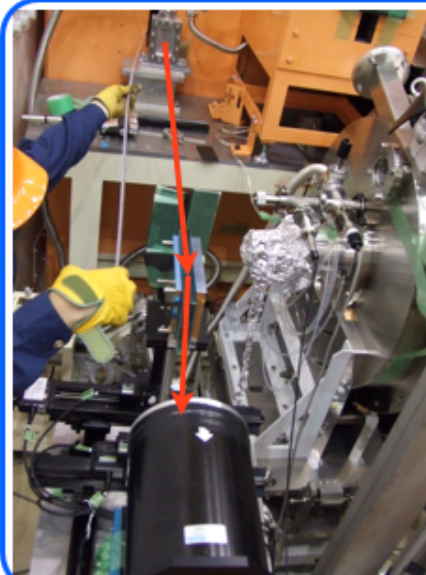
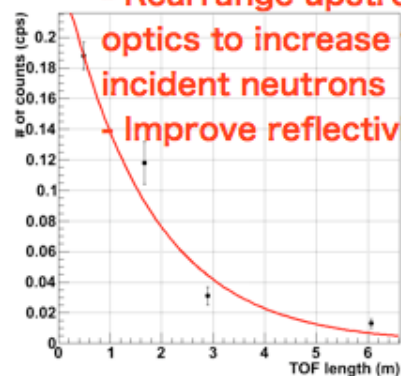


Demonstration of Rebuncher Optics

- Static field Magnet : ○
- RF System and PLL circuit : ○
- UCN transportation : x

- Rearrange upstream optics to increase the incident neutrons

- Improve reflectivity

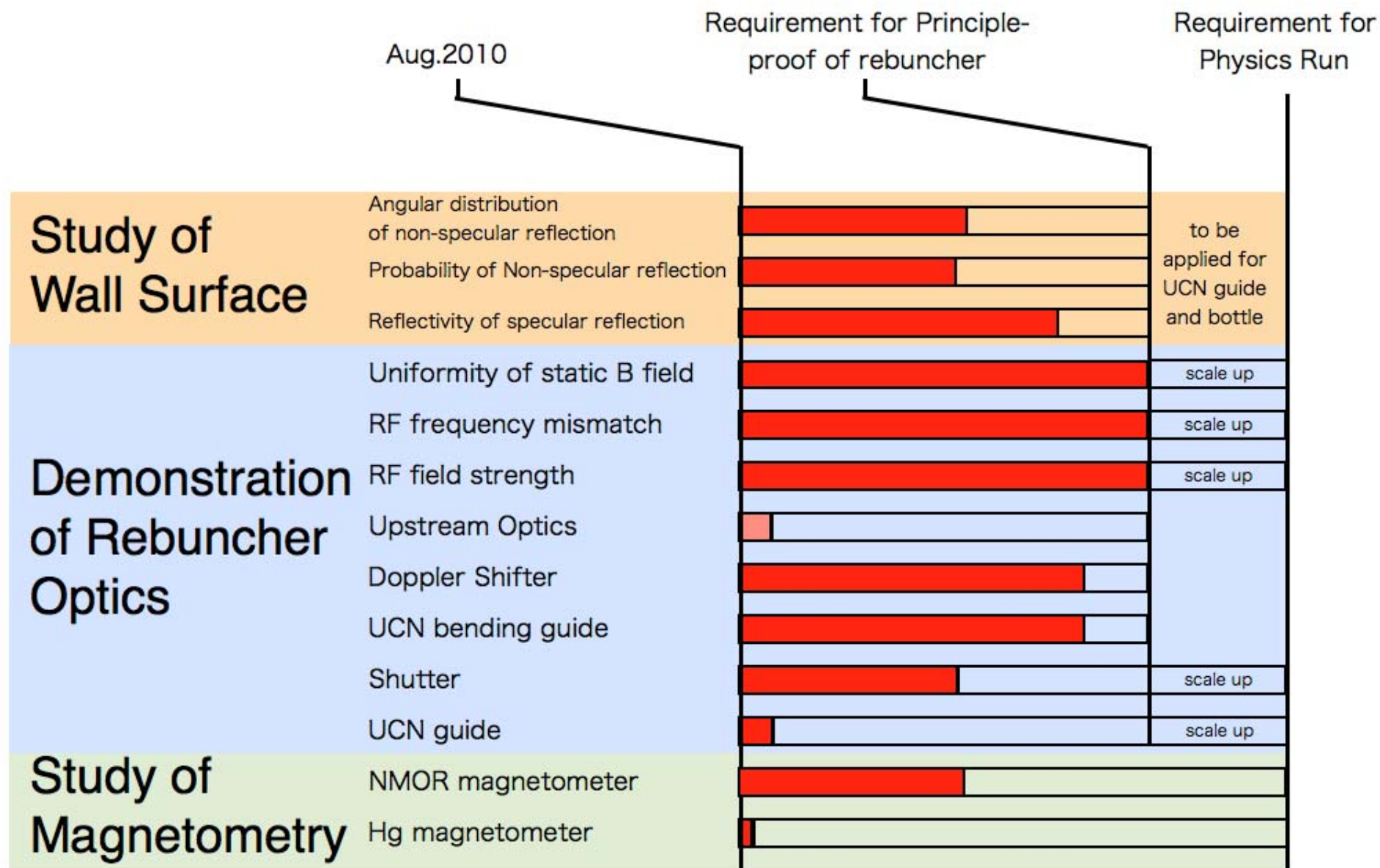


Study of wall surface for UCN guide and cell

- Angular distribution of non-specular reflection
- Probability of non-specular reflection
- Reflectivity of specular reflection

→Test experiment has been carried out at BL05 and BL16. Analysis on-going.

P33 R&D status (Jan. 2011)



	Requirement	Current Status		Problem, Future Plan
Angular distribution of non-specular reflection	3.5mrad	analysis on-going	△	Preparation of analysis tool
Probability of non-specular reflection	90% Transmission	analysis on-going	△	Preparation of analysis tool
Reflectivity of specular reflection	Accuracy < 10 ⁻³	98.6±0.2% @1200sec	△	Suppression of systematic error (introduce beam monitor)
Uniformity of static B field	P-V < 20%	P-V 5%	◎	
RF frequency mismatch	< 20%	10%	◎	
RF field strength	1mT (K ² >6.5)	0.5mT@0.5kW (K ² =2.5)	○	0.5mT is enough for rebuncher test. Further test is required for 1kW operation.
Upstream Optics	UCN Intensity x 10			VCN focusing(x 2) replace 12m-16m guide (x 10)
Doppler Shifter	Reproduce intensity/spectrum	Intensity -30%	△	misalignment
UCN bending guide	65% Transmission	50% Transmission	△	redesign with shutter
Shutter	1pulse transport with 0.5Hz operation	3pulse transport with 0.5Hz operation	△	installation position was not proper
UCN guide	74% transmission with 6m transportation	3.6% transmission with 6m transportation	×	Current transmission efficiency corresponds to 98.9% reflectivity. Aiming 10 times larger transmission. →99.7% reflectivity Will try IBS, DLC
NMOR magnetometer	100aT/√Hz	9pT/√Hz Coherent time 8ms		Coherence time 1s Stabilization of laser wavelength Magnetic shield →1fT/√Hz
Hg magnetometer	100aT/√Hz	Just started. Research @ PSI		Preparing the Hg magnetometer using Hg lamp. →will introduce laser to suppress the systematic error

- P33 (measurement of neutron EDM at J-PARC) has made solid progress in preparing the critical R&D equipments
 - wall surface
 - demonstration of rebuncher optics
 - study of magnetometry
- Complete results of R&D will be reported at the next PAC, seeking for stage-1 approval of the experiment

Test experiments

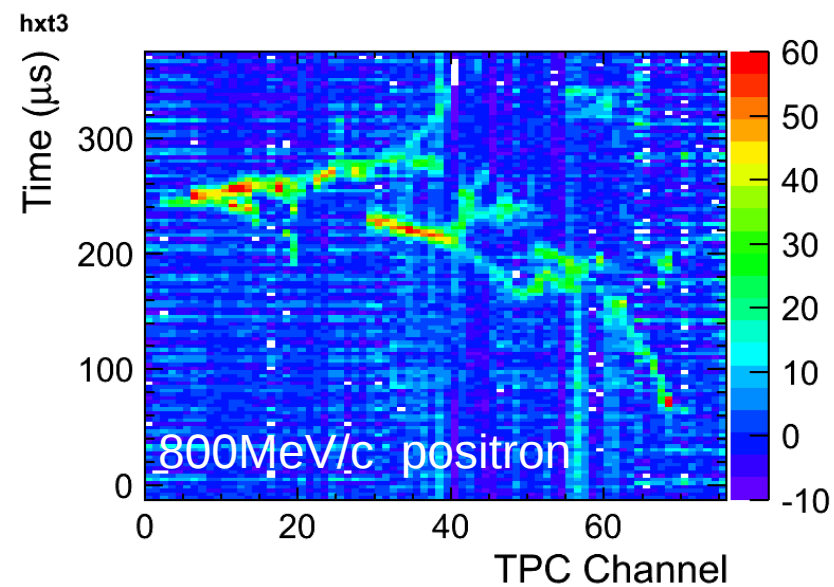
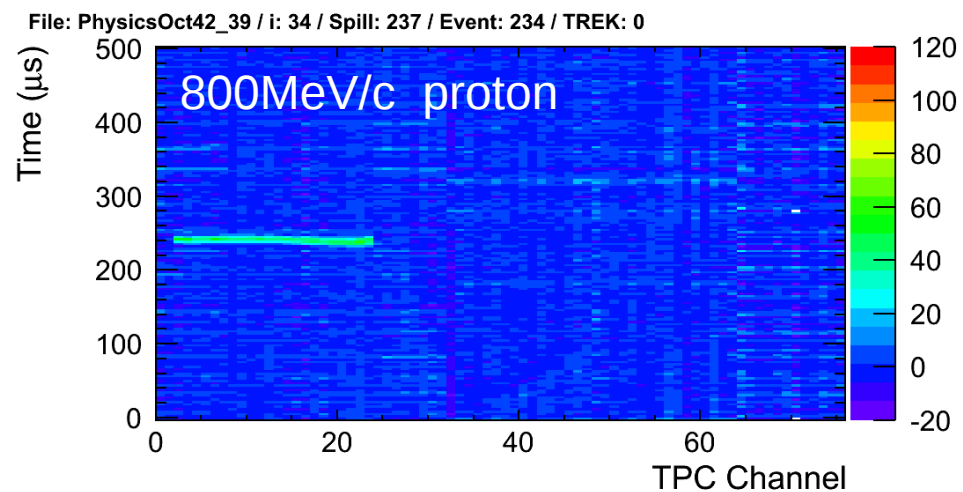
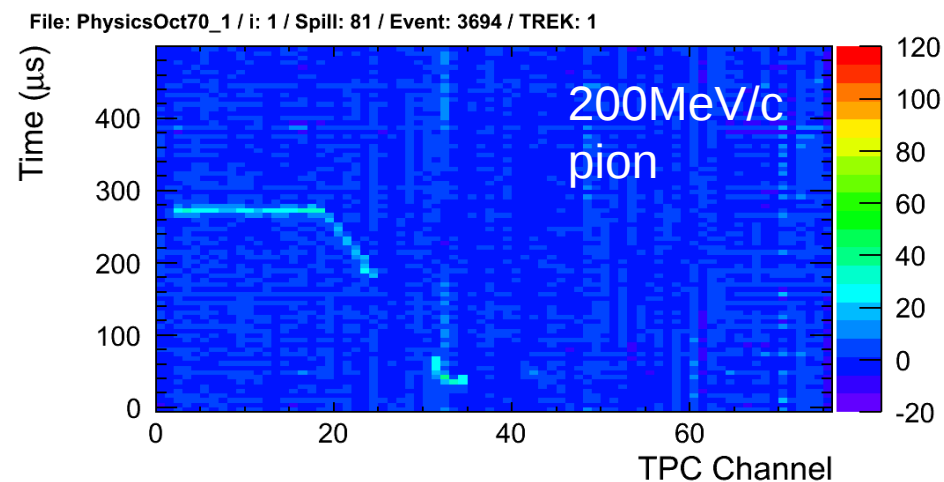
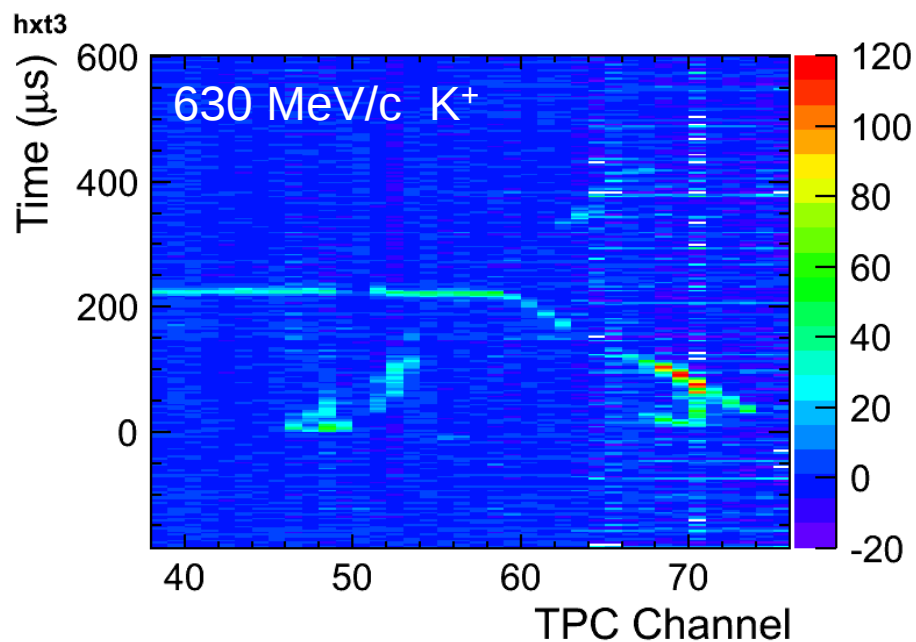
T32 LAr detector beam test

T32: Accumulated No. of Events

24-Oct — 1-Nov

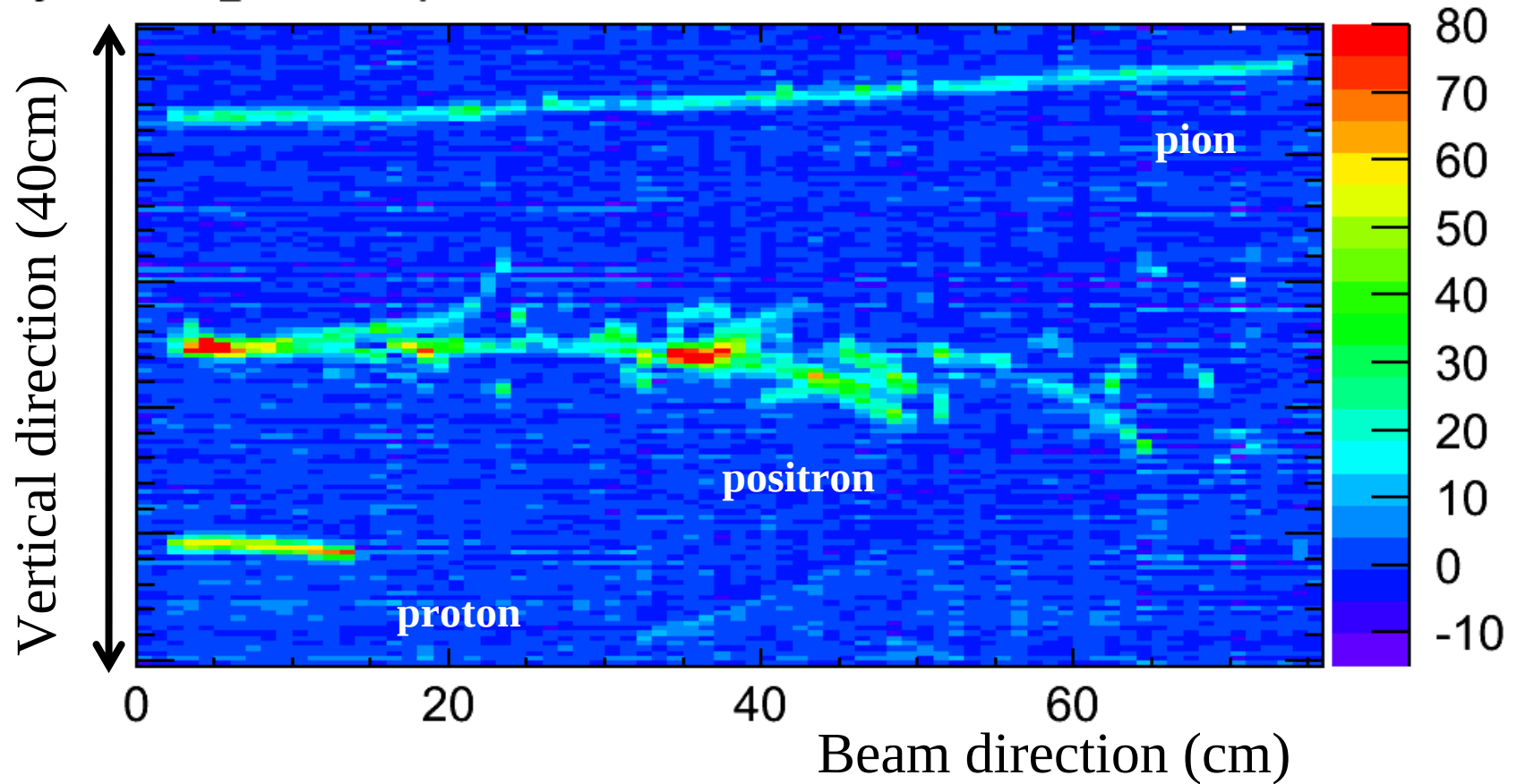
Event Category		No. of events
K^+	800 MeV/c with degrader $\rightarrow$ 540 MeV/c	7,000
K^+	800 MeV/c with degrader $\rightarrow$ 630 MeV/c	40,000
K^+	800 MeV/c with degrader $\rightarrow$ 680 MeV/c	35,000
π^+	200 MeV/c	70,000
e^+	800 MeV/c	2,500
P	800 MeV/c	1,500
e^+	200 MeV/c	10,000
π^+ dominant 800 MeV/c		$\sim 3,000$
total		$\sim 170,000$

Event samples



Accidentally pile up event (800 MeV/c beam setting)

File: physicsoct12_1 / i: 25 / Spill: 27 / Event: 2949

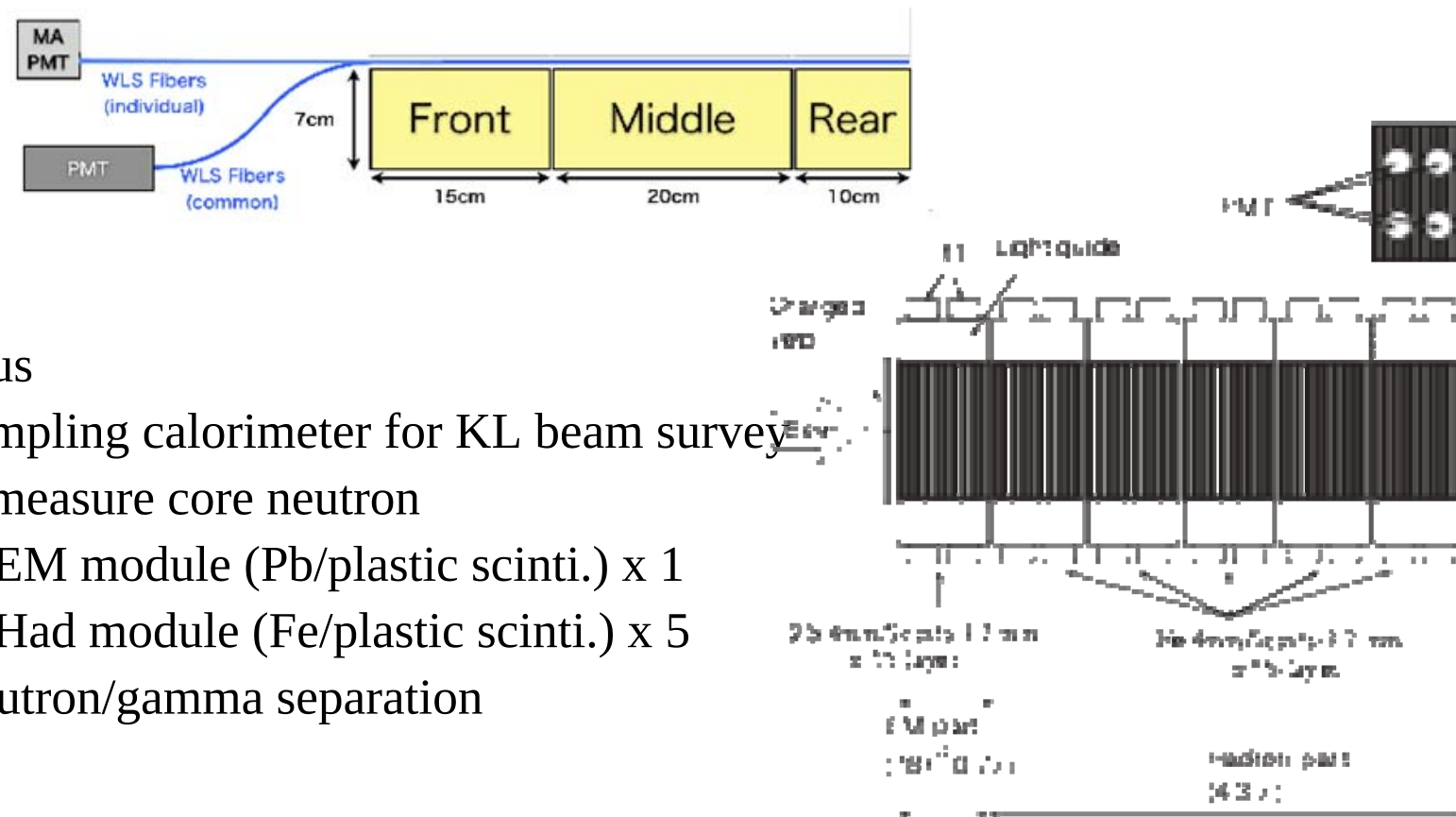


Quantitative analysis results of 0.17 M
triggers will be reported at the next PAC

T38 Beam test of detector for KOTO experiment

Motivation

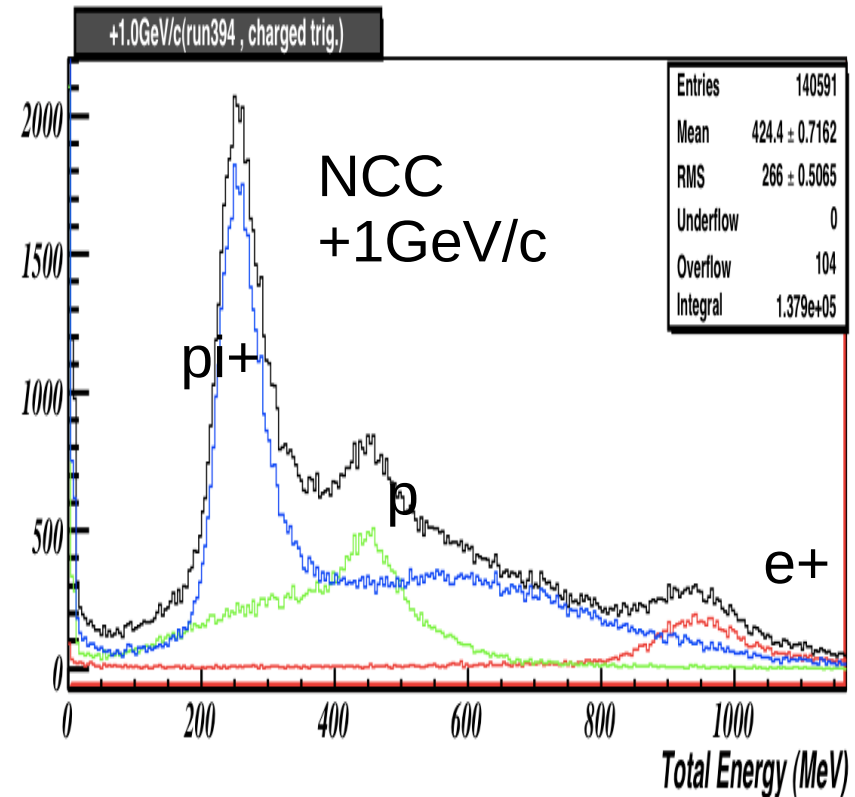
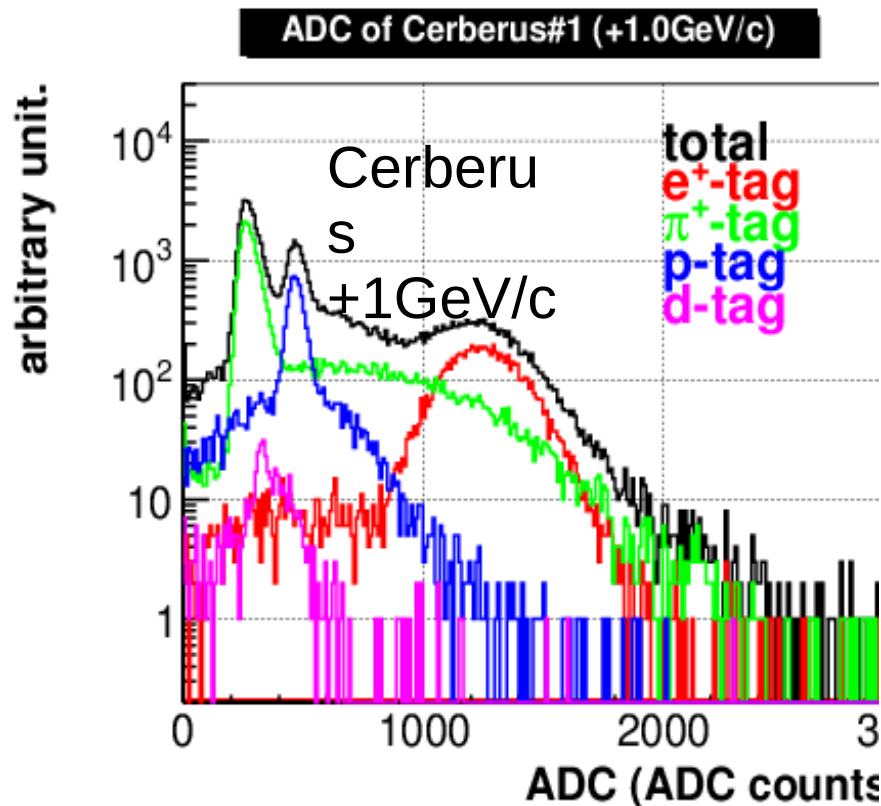
- NCC (Neutron Collar Counter)
 - Gamma veto detector near the beam core in KOTO detector
 - Segmented pure CsI with WLS-fiber readout
 - Neutron measurement with neutron/gamma separation



- Cerberus
 - Sampling calorimeter for KL beam survey to measure core neutron
 - EM module (Pb/plastic scinti.) x 1
 - Had module (Fe/plastic scinti.) x 5
 - Neutron/gamma separation

Detector response

- Observed hadronic response
for proton and pion with K1.1BR test beam.
 - Further analysis is on going.

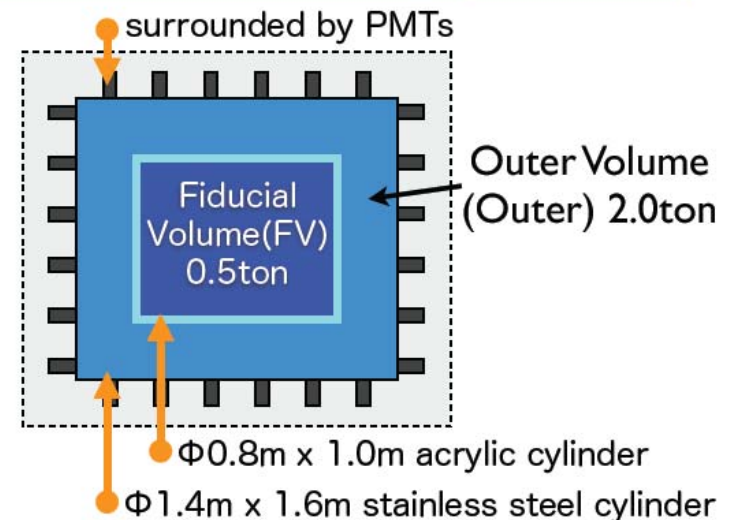
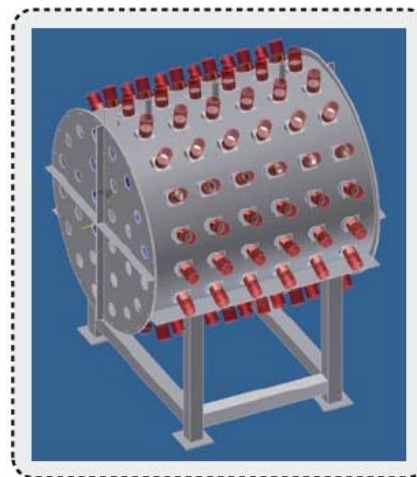


T39(Mizuche) status report

Experimental principle

- Measure # of neutrino interactions in the fiducial volume (FV) by measuring difference in # of events with and without water in FV

$$N_{FV}^{obs} = N_{Tank, w/FV water}^{obs} - N_{Tank, w/o FV water}^{obs}$$



Status of preparation and plan

- Status of preparation
 - Detector
 - construction of water tank, initial test of water filling were completed
 - calibration of all the PMTs was completed
 - scintillators for through-going muons are in preparation
 - electronics/DAQ
 - installation(elec., network etc..) was completed
 - calibration of electronics is in progress
 - water circulation system
 - installation was almost completed
 - commissioning is in progress
- Plan
 - detector constructions will be completed in the end of Feb.
 - aim to start commissioning and data taking from March

