

Welcome to J-PARC and Hadron experimental facility

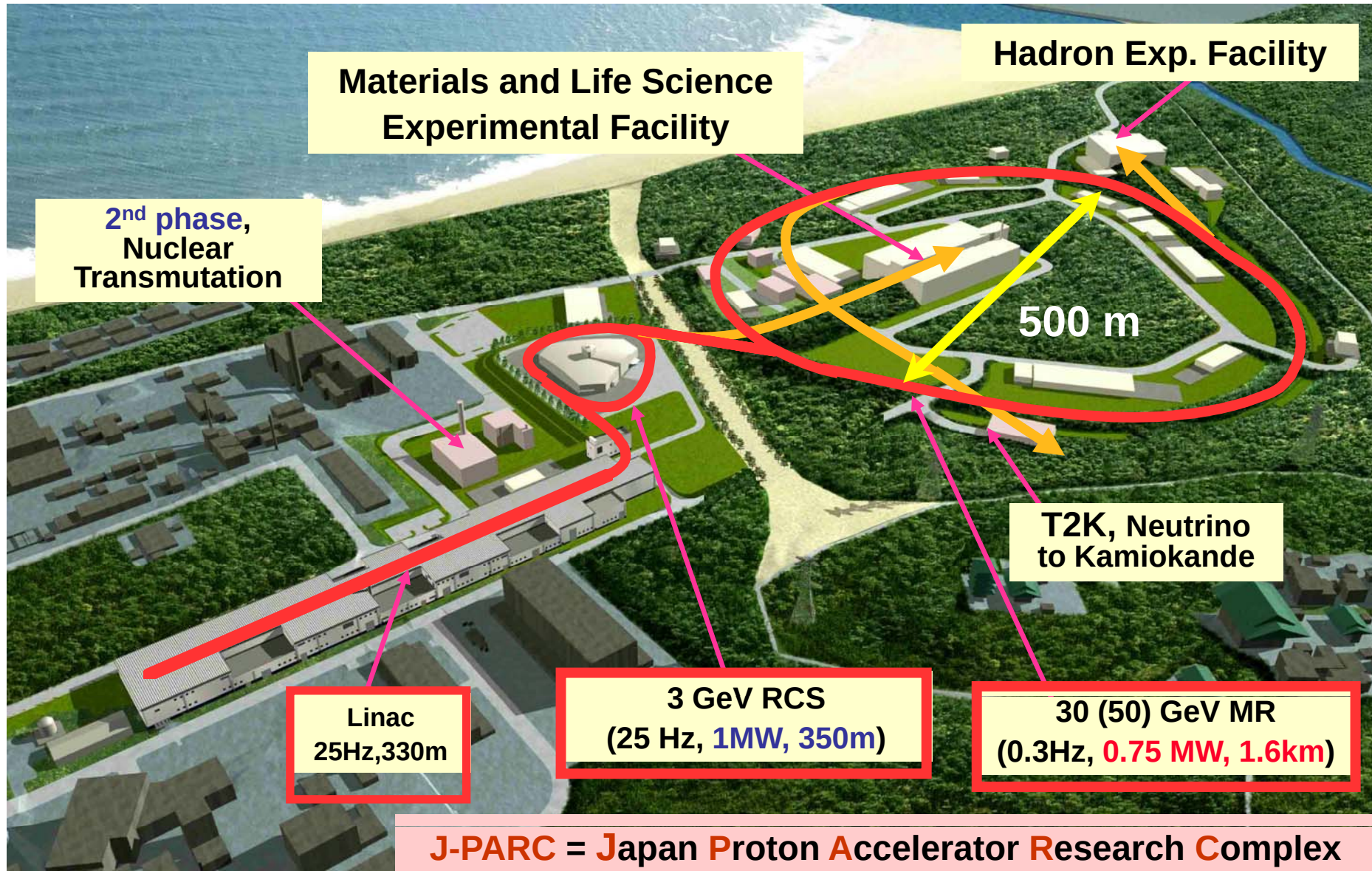
Koichiro Nishikawa

Director, IPNC

Sep.15, 2009

J-PARC

Joint Project between KEK and JAEA

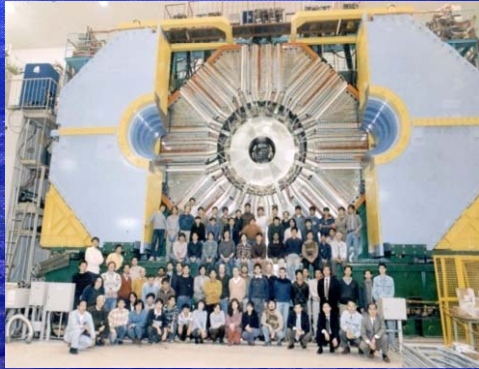


JAEA, KEK and IPNS

- JAEA
 - Japan Atomic Energy Agency
- KEK (High Energy Accelerator Research Organization)
 - IPNS (Institute of Particle and Nuclear Studies)
 - IMSS (Institute of Material Structure Studies)
- J-PARC is a joint project of two independent organizations
- JAEA is responsible for LINAC and RCS
- KEK is responsible for Main Ring
- Particle, nuclear physics program (Hadron expt. facility and Neutrino facility) is hosted by IPNS
- Material and Life Science (Spallation Neutron) is hosted by JAEA and IMSS
- Muon physics program is hosted by IMSS

KEK Current Core Activities

J-PARC



KEKB-Factory



Photon Factory



ILC Test Facility



ATF

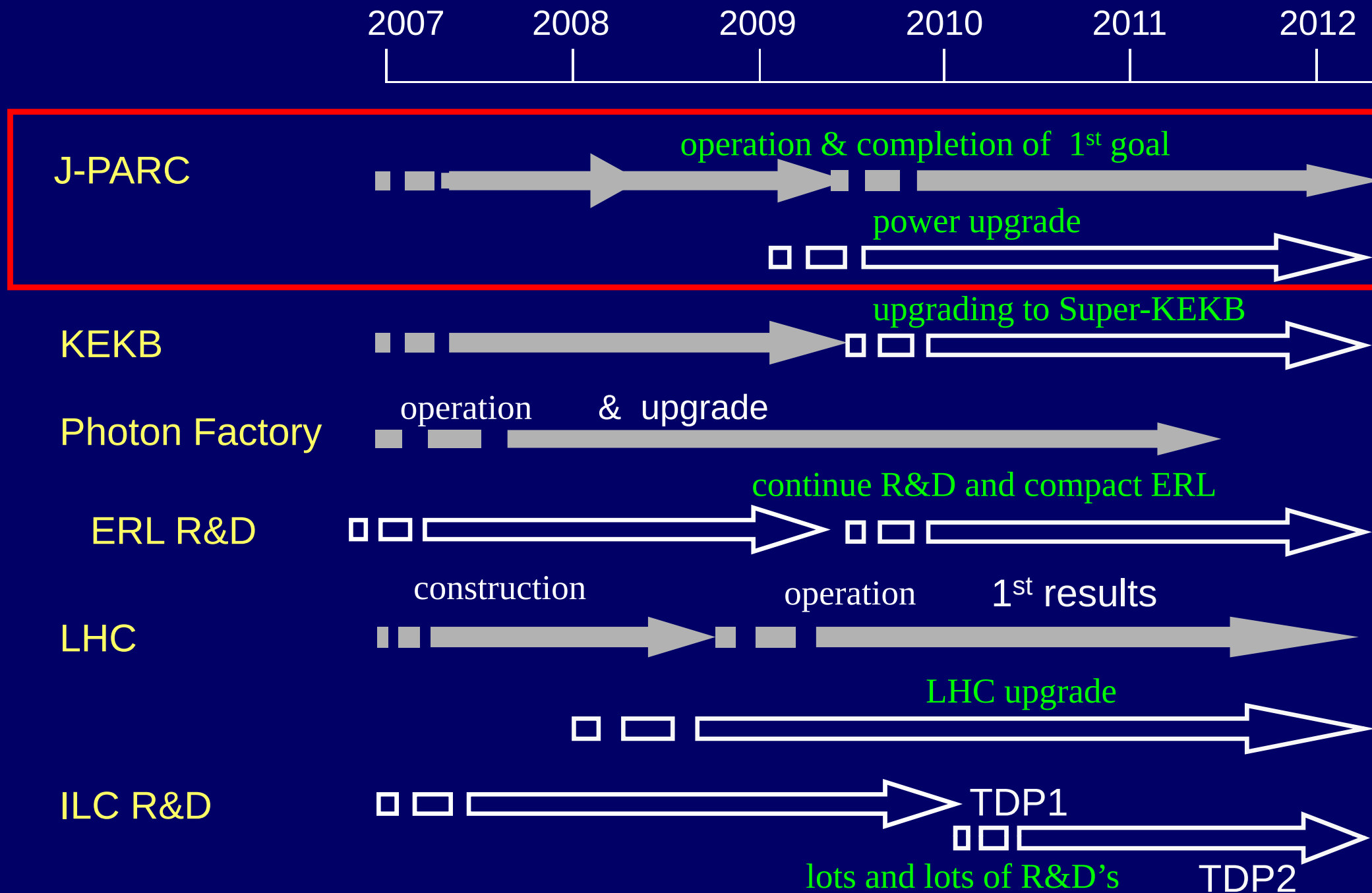
STF



LHC at CERN



Summary of KEK Roadmap



Congratulate
construction team!

J-PARC Facility
(KEK/JAEA)

South to North

Linac

3 GeV
Synchrotron

Neutrino Beams
(to Kamioka)

Materials and Life
Experimental
Facility

MR

Hadron Exp.
Facility

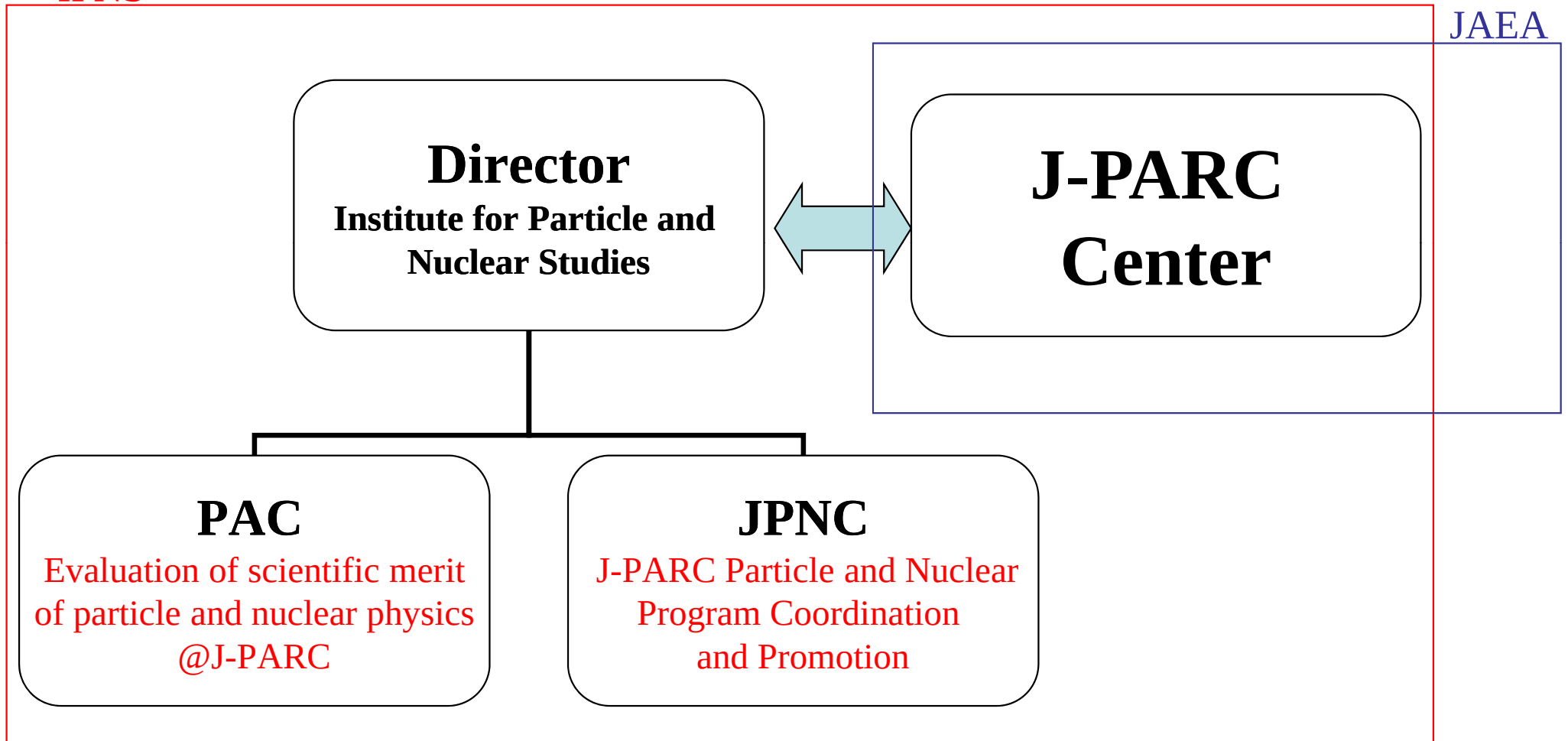
— JFY2007 Beams
— JFY2008 Beams
— JFY2009 Beams

Bird's eye photo in January of 2008

Particle and Nuclear Physics Program

IPNS

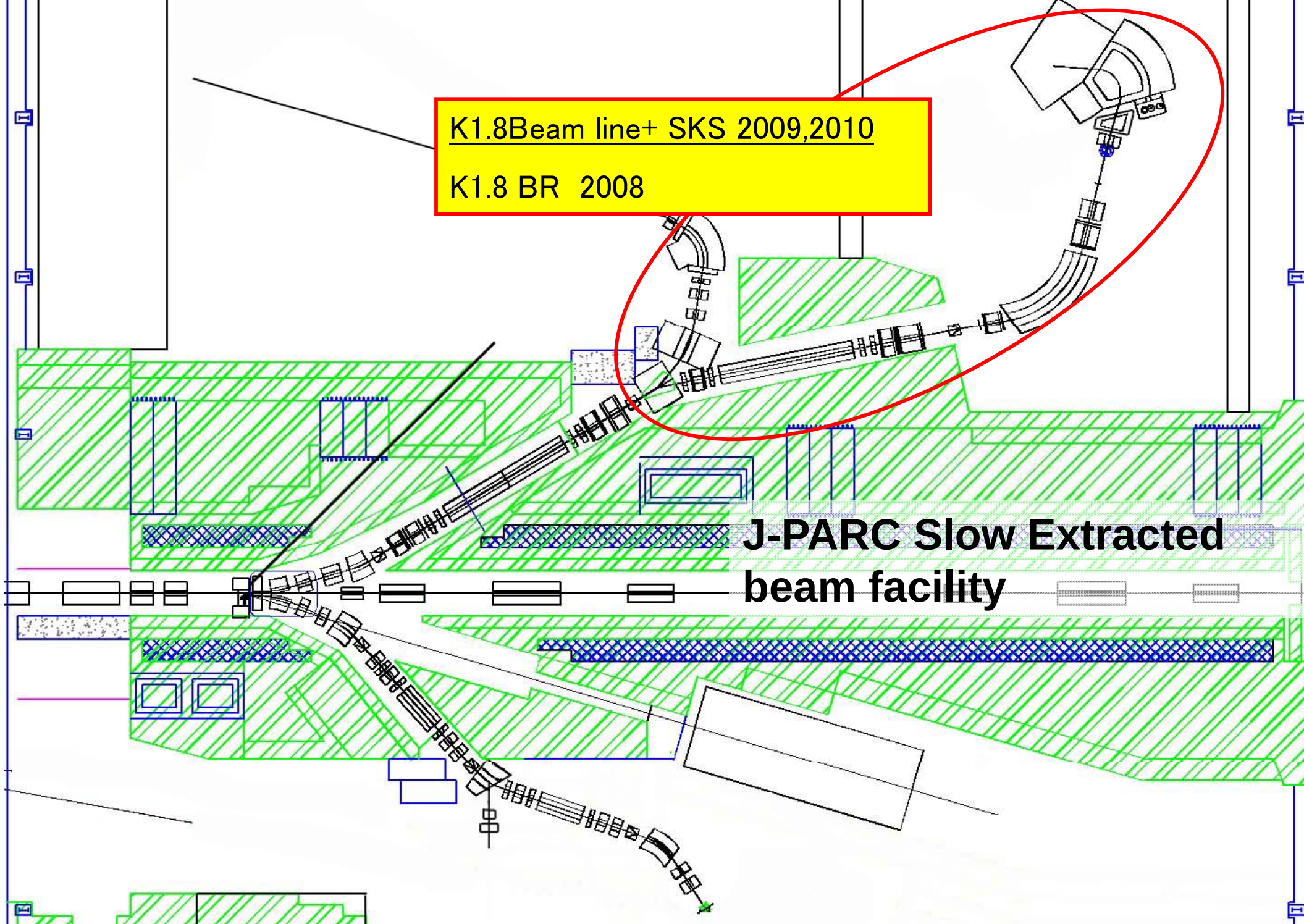
JAEA



K1.8Beam line+ SKS 2009,2010

K1.8 BR 2008

**J-PARC Slow Extracted
beam facility**



Elec. Water Facility

Test Beam line

09,10

K1.1BR
Upstream

09,10

K1.1BRDown
Stream Suppl.

Experimental
Facility

**J-PARC Slow Extracted
beam experimental facility**

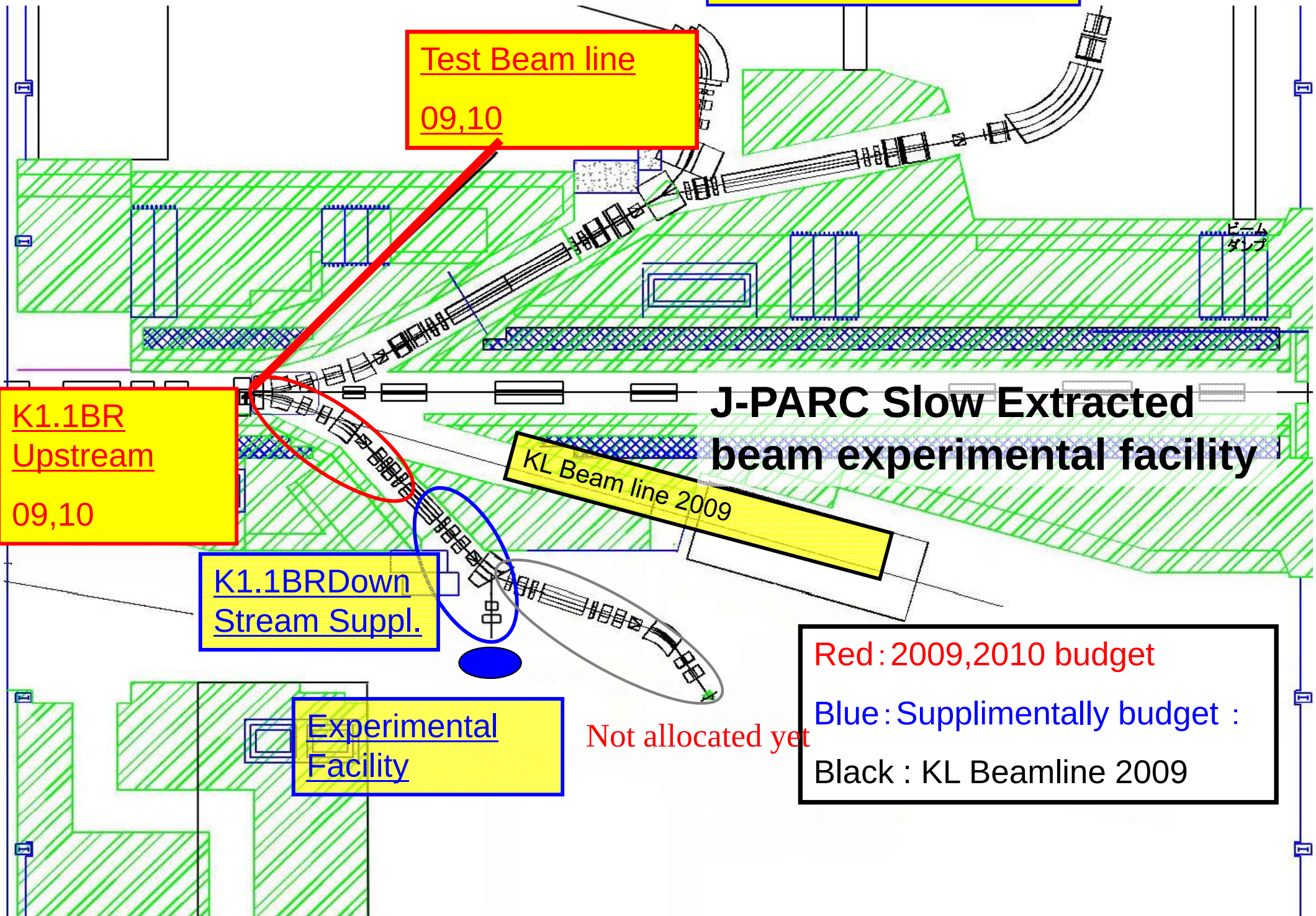
KL Beam line 2009

Red : 2009,2010 budget

Blue : Supplimentally budget :

Black : KL Beamline 2009

Not allocated yet



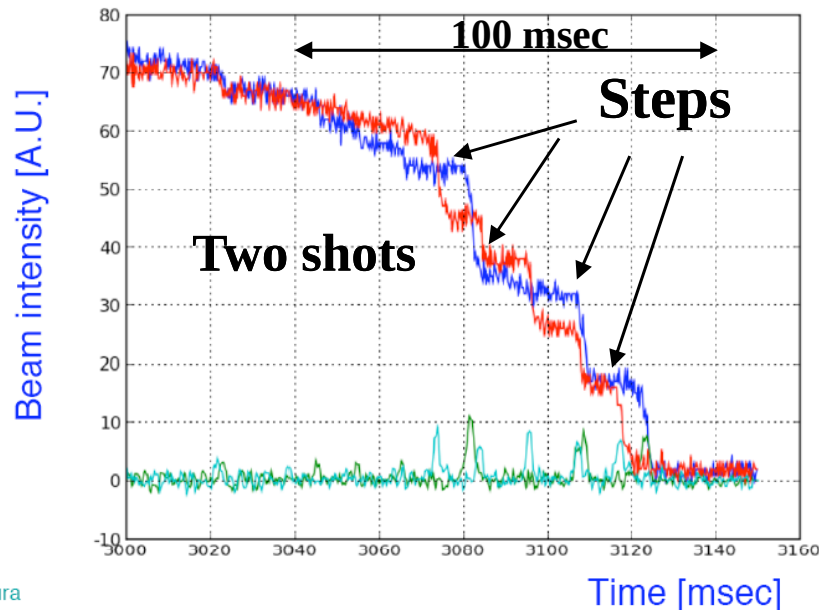
J-PARC PAC Approval summary after the 8th meeting

Proposals

	(Co-)Spokespersons	Affiliation	Title of the experiment	Approval status (PAC recommendation)	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 Urbana-Champaign; KEK	Measurement of High-Mass Dimuon Production at the 50-GeV Proton Synchrotron	Deferred			Primary
E05	T. Nagae	KEK	Spectroscopic Study of Ξ -Hypernucleus, $^{12}_{\Xi}\text{Be}$, via the $^{12}\text{C}(K^-, K^+)$ Reaction	Stage 2	Day1	1	K1.8
E06	J. Imazato	KEK	Measurement of T-violating Transverse Muon Polarization in $K^+ \rightarrow \pi^0 \mu^+ \nu$ 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	K. Nishikawa	KEK	Tokai-to-Kamioka (T2K) Long Baseline Neutrino Oscillation Experimental Proposal	Stage 2			neutrino
E13	T. Tamura	Tohoku U.	Gamma-ray spectroscopy of light hypernuclei	Stage 2	Day1	2	K1.8
E14	T. Yamanaka	Osaka University	Proposal for $K_L \rightarrow \pi^0 \nu \bar{\nu}$ Experiment at J-PARC	Stage 2			K0
E15	M. Iwasaki	RIKEN, KEK	A Search for deeply-bound kaonic nuclear states by in-flight $^3\text{He}(K^-, n)$ reaction	Stage 2	Day1		K1.8BR
E16	S. Yokkaichi	RIKEN	Electron pair spectrometer at the J-PARC 50-GeV PS to explore the chiral symmetry in QCD	Stage 1			High pt
E17	R. Hayano, H. Ota	U. Tokyo, RIKEN	Precision spectroscopy of Kaonic ^3He $3d \rightarrow 2p$ X-rays	Stage 2	Day1		K1.8BR
E18	H. Bhang, H. Ota, H. Park	SNU, RIKEN, KRISS	Coincidence Measurement of the Weak Decay of $^{12}_{\Lambda}\text{C}$ and the three-body weak interaction process	Stage 1			K1.8
E19	M. Naruki	RIKEN	High-resolution Search for Θ^+ Pentaquark in $\pi^+ p \rightarrow K^+ X$ Reactions	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 omega mass modification in $A(\pi^- n)\omega$ reaction and omega $\rightarrow \pi^0$ gamma decays	Deferred			K1.8
E27	T. Nagae	Kyoto U	Search for a nuclear Kbar bound state $K^- pp$ in the $d(\pi^-, K^+)$ reaction	Stage 1			K1.8
P28	H. Fujioka	Kyoto U	Study of isospin dependence of kaon-nucleus interaction by in-flight $^3\text{He}(K^-, n/p)$ reactions	approved as a part of E15			K1.8BR
P29	H. Ohnisi	RIKEN	Study of in medium mass modification for phi meson using phi meson bound state in nucleus	Deferred			K1.1
P30	T. Suzuki	U. Tokyo	The investigation of $\Lambda(1405)$ state via the $d(K^- \text{stopped}, n) (\Sigma \pi^0)$ reaction	Rejected			K1.8BR
P31	M. Noumi	Osaka U	Spectroscopic study of hyperon resonances below KN threshold via the $(K^- n)$ reaction on Deuteron	Deferred			K1.8

3 major problems
RFQ discharge,
RF core development
Power supply ripple/noise
Requires more money and hard work

Beam intensity during extraction



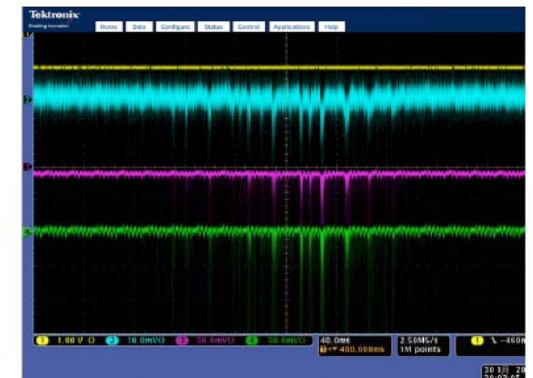
Beam loss studies remain to be done

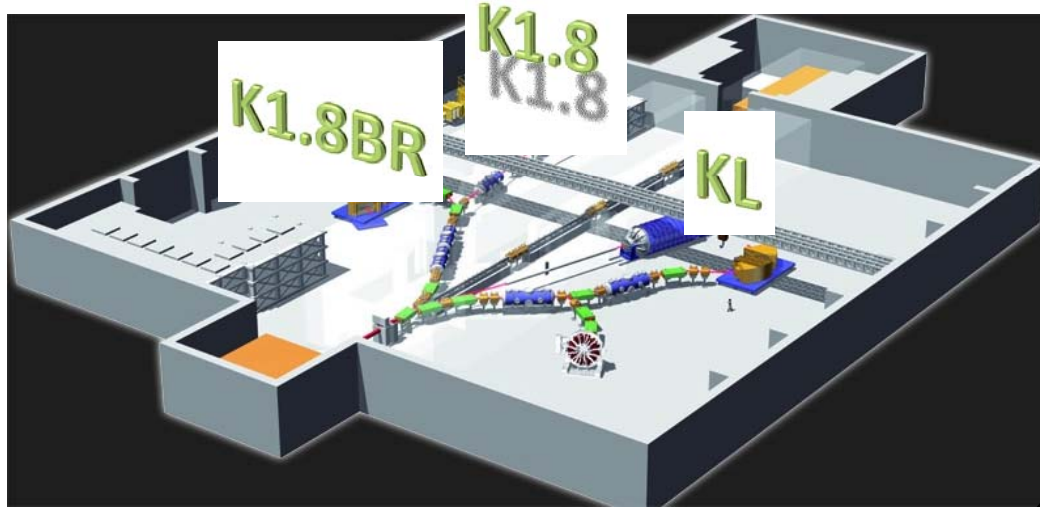
Spill measurement in HD beamline

RF off, $\xi \sim 0$

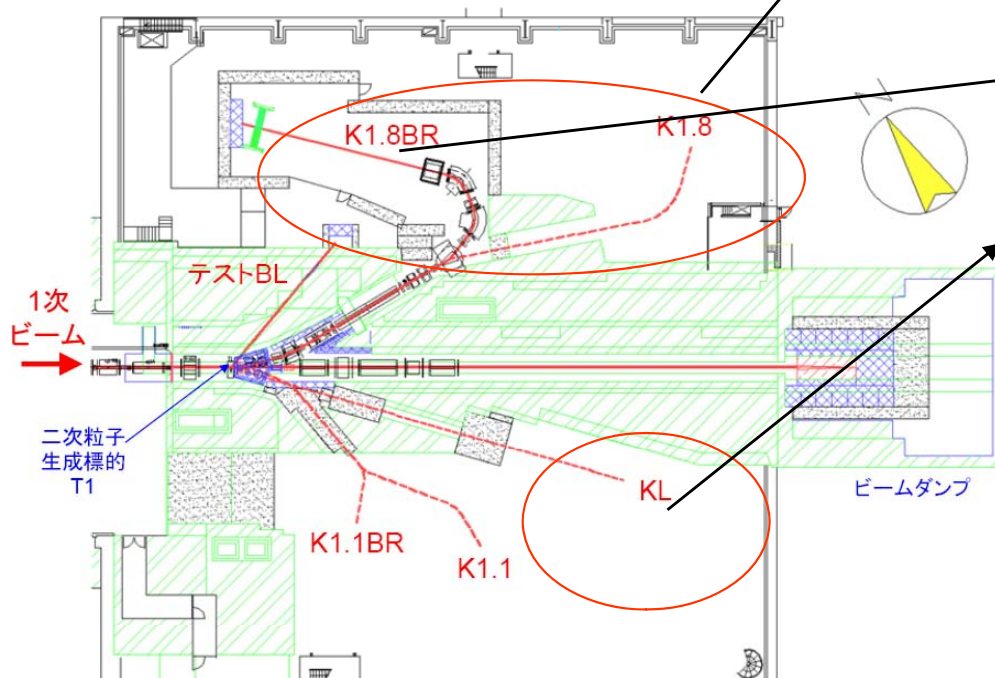


RF off, $\xi \sim -2$





A possible layout of the beam lines at Hadron Facility.
K1.8, K1.8BR, and KL are implemented as of July, 2009.



K1.8

- (E05): Spectroscopic study of hypernuclei
- (E13): Gamma-ray spectroscopy of light hypernuclei
- (E19): Pentaquark search in $pp \rightarrow K-X$*
- (E03): Measurement of X-rays from X Atom
- (E07): Double strangeness system
- (E27): Search for a K nuclear bound state*

K1.8BR

- 2 (E15): Search for deeply-bound kaonic nuclear states
- (E17): Precision spectroscopy of kaonic ${}^3\text{He}$*

KL

- (E14): $K_L \rightarrow \pi^0 + \nu\nu$

K1.1BR

Test beam

K1.1BR (stage-1)

- (E06): Measurement of T-violation in $K^+ \rightarrow \pi^0 + \mu^+ + \nu$

High-P (stage-1)

- (E16): Chiral symmetry in QCD

Muon beam line (stage-1)

- (E28) μ -e conversion experiment at sensitivity of 10^{-16}

- We need our understanding and patience
- We hope hearing exciting physics cases from this workshop