

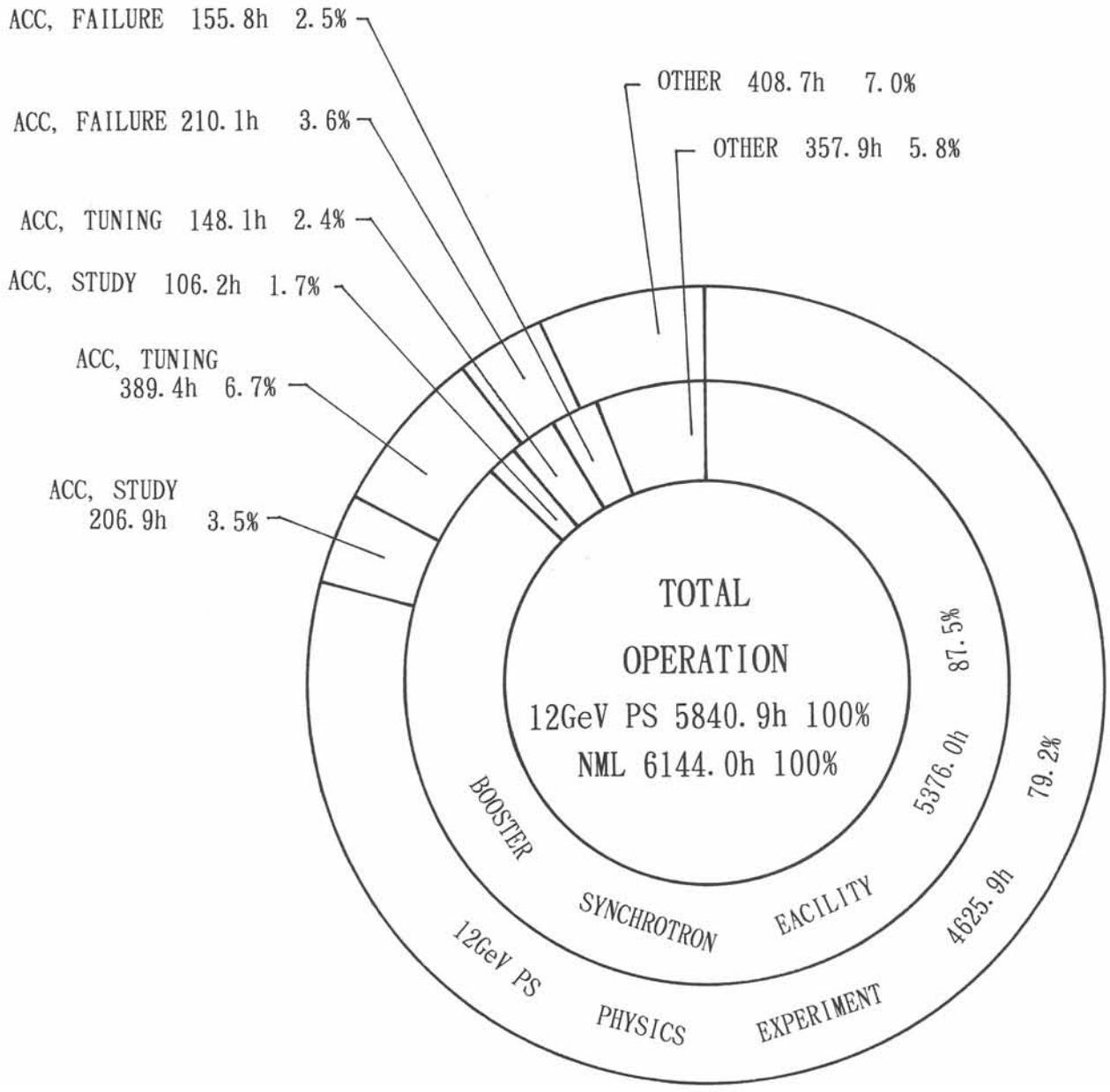
# Part I

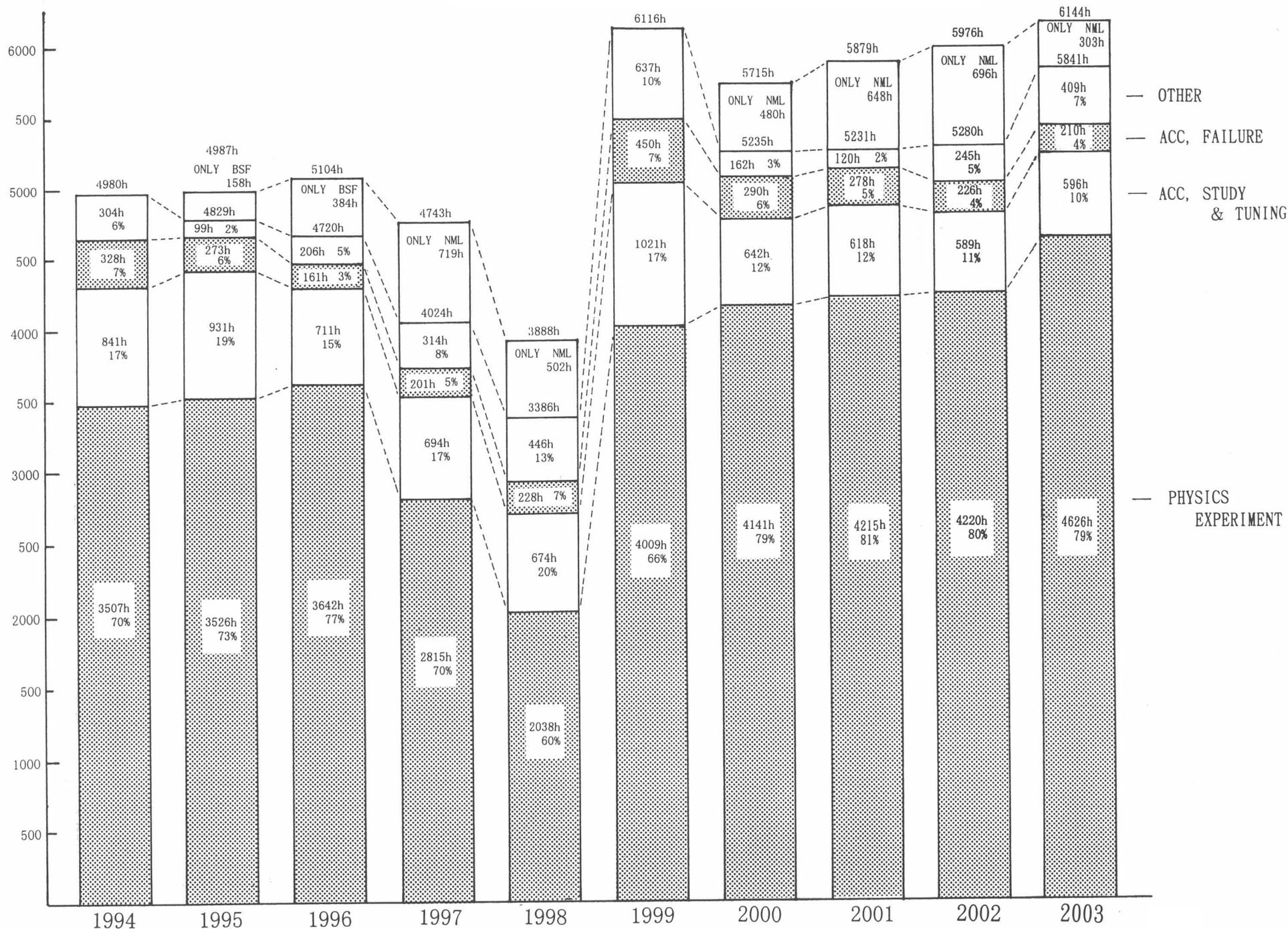


# Executed Experiments at the KEK 12 GeV PS (1998-2004)

Year	1998				1999				2000				2001				2002				2003				2004									
Fiscal Year	FY1998				FY1999				FY2000				FY2001				FY2002				FY2003													
Month	4	7	10	1	4	7	10	1	4	7	10	1	4	7	10	1	4	7	10	1	4	7	10	1	4	7	10	1	4	7				
12GeV-PS Operation Cycle	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	1	2
EP1	K5	E246				E246				E246				E470		E509		E471				E471												
	K6	E419				E438				E462				E462		E508		E521		E518		E521												
	EP1B	E325				E325				E325				E325																				
	$\nu$					E362				E362		E362						E362				E362												
EP2	K0									E391a				E391a				E391a				E391a												
	K2	E373				E373				E373		E452		E452				E522				E522												
	$\pi\mu$	E360																								E546								
	$\pi^2$	E417								E443																								

Slow extraction
  Fast extraction
  Executed Time





## Lists of Experiments in 2000-2004

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Exp.No.: Spokesperson; Approved shifts; Status  
 Title of Experiment

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E246/E470(T-Violation): J. Imazato; 450/80; Completed  
 Search for T violation in the  $K^+ \rightarrow \pi^0 \mu^+ \nu$  decay / Measurement of direct photon emission in  $K^+ \rightarrow \pi^+ \pi^0 \gamma$

E288/E337/E393(MULTI): T. Murakami; 10/76/72; Completed  
 Target Multifragmentation by GeV Energy Proton

E289(SigN): M. Ieiri; 200; Completed  
 Hyperon-Nucleon Scattering Experiments (2)

E307: H. C. Bhang; 120; Completed  
 Lifetimes and Weak Decay Widths of Light and Medium-Heavy  $\Lambda$  Hypernuclei

E325( $\phi$ ) H. En'yo; 360+80; Completed  
 Study of Chiral Property of Dense Nuclear Matter through Measurement of Meson Mass Modification in Medium

E352: R. J. Petersen; 50; Completed  
 Quasielastic  $\pi$  Meson Scattering

E360/E546: A. Shinohara; 45/35 ; Completed  
 $\pi$  Mesonic Hydrogen Atoms / Measurement of Electronic X rays correlated with Pionic X rays

E362(K2K): K. Nishikawa;  $10^{20}$  protons; Data-Taking  
 Long Baseline Neutrino Oscillation Experiment

E369: T. Nagae; 100; Completed  
 Structure of  $^{89}_{\Lambda}Y$  via the  $(\pi^+, K^+)$  Reaction

E373: K. Nakazawa; 230; Completed  
 Study of Double Strange Nuclei by Emulsion-Scintillating fiber Hybrid Methods

E391a: T. Inagaki ; 300; Data-Taking  
 Measurement of the  $K_L \rightarrow \pi^0 \nu \bar{\nu}$  Decay

E419: H. Tamura; 70; Completed  
 Measurement of B(E2) Transition Rate in  $^7_{\Lambda}Li$  Hypernucleus

E438: H. Noumi; 75; Completed  
 Study of  $\Sigma$ -Nucleus Potential by the  $(\pi^-, K^+)$  Reaction on Heavy Nuclei

E443(PXN): N. Shigyo; 60; Completed  
 Neutron-Production Differential Cross Sections in the (p,nx) Reaction at Forward Angle

E452: K. Nakai; 100+100; Completed  
 Spin-dependent Interactions in  $\Sigma^+ - p$  Scattering

E462/E508: H. Outa; 65/80; Completed  
Exclusive Measurement of the Non-Mesonic Weak Decay of  ${}^5_{\Lambda}\text{He}$  / Coincidence  
Measurement of the Weak Decay of  ${}^{12}_{\Lambda}\text{C}$

E471: M. Iwasaki; 80+40; Completed  
Search for Strongly Bound Kaonic Nuclear State

E509: K. Tanida; 40; Completed  
 $\gamma$ -ray Spectroscopy of Hyperfragments using stopped  $\text{K}^-$  method

E518: H. Tamura; 80; Completed  
High-Precision  $\gamma$  Spectroscopy of  ${}^{11}_{\Lambda}\text{B}$

E521: T. Fukuda; 40+45; Completed  
Production of Neutron-rich  $\Lambda$  Hypernuclei by the  $(\pi^-, \text{K}^+)$  Double-charge Exchange  
Reaction

E522: K. Imai; 100; Completed  
Search for H-dibaryon Resonance via  ${}^{12}\text{C}(\text{K}^-, \text{K}^+ \Lambda \Lambda)$  and Study of  $\Xi\text{N}$  Interactions

E548: T. Kishimoto; 33; Preparation  
Study of Kaonic Nuclei by the  $(\text{K}^-, \text{p})$  Reactions/Search for  $\text{K}\pi$  Bound State in the Kaon  
Induced Reaction

E549: M. Iwasaki; Conditionally Approved; Preparation  
Confirmation of Nuclear Kaonic State and Search for its Excited State

E559: K. Imai; Conditionally Approved; Preparation  
High Resolution Spectroscopy of Penta-quark  $\Theta^+$

## Beam Lines in the E-Hall 2004

### [Secondary Beam Lines]

Beam Line	Particles	Momentum Range (GeV/c)	Momentum Bite [ $\Delta p/p$ ] (%)	Typical Intensity (particles / $10^{12}$ protons)
K0	$K_L$	1-8	-	$3.0 \times 10^7$
K2	$K^+$	1-2	$\pm 3$	$5.0 \times 10^5$ @ 2 GeV/c
	$K^-$			$1.0 \times 10^5$
	$\pi^+$	0.5-2	$\pm 3$	$2.2 \times 10^7$
	$\pi^-$			$1.5 \times 10^7$
	p			$1.5 \times 10^4$
$\pi 2$	$\pi^+$	1-4	$\pm 1$	$2.0 \times 10^5$ @ 3 GeV/c
	$\pi^-$			$1.0 \times 10^5$
$\pi \mu$	$\pi^+$	0.1-0.26	$\pm 4$	$1.2 \times 10^6$ @ 0.23 GeV/c
	$\pi^-$			$1.0 \times 10^6$
T1	$\pi^+$	0.5-2	$\pm 5$	$5.0 \times 10^4$ @ 1 GeV/c
	$\pi^-$			$4.0 \times 10^4$

### [Primary Beam Line]

Beam Line	Particles	Energy Range (GeV)	Momentum Spread [ $\Delta E/E$ ] (%)	Typical Intensity (particles/ sec)
P1	pol.p	3.5	$\pm 0.5$	$4.0 \times 10^8$ pol. = 40 %
	p	2-12.0		$4.0 \times 10^8$
	d	2-11.2		$2.0 \times 10^8$
	n	1-5.6		$4.0 \times 10^8$

## Beam Lines in the N-Hall 2004

### [Secondary Beam Lines]

Beam Line	Particles	Momentum Range (GeV/c)	Momentum Bite [ $\Delta p/p$ ] (%)	Typical Intensity (particles / $10^{12}$ protons)
K5	$K^+$	0.3-0.6	$\pm 3$	$5.0 \times 10^4$ @ 0.55 GeV/c
	$K^-$			$1.0 \times 10^4$
	$\pi^+$			$3.5 \times 10^7$
	$\pi^-$			$2.8 \times 10^7$
	$p$			$2.6 \times 10^2$
K6	$K^+$	0.5-2	$\pm 2.8$	$8.7 \times 10^3$ @ 1 GeV/c
	$K^-$			$3.3 \times 10^3$
	$\pi^+$			$6.5 \times 10^6$
	$\pi^-$			$5.0 \times 10^6$
	$p$			$1.6 \times 10^3$

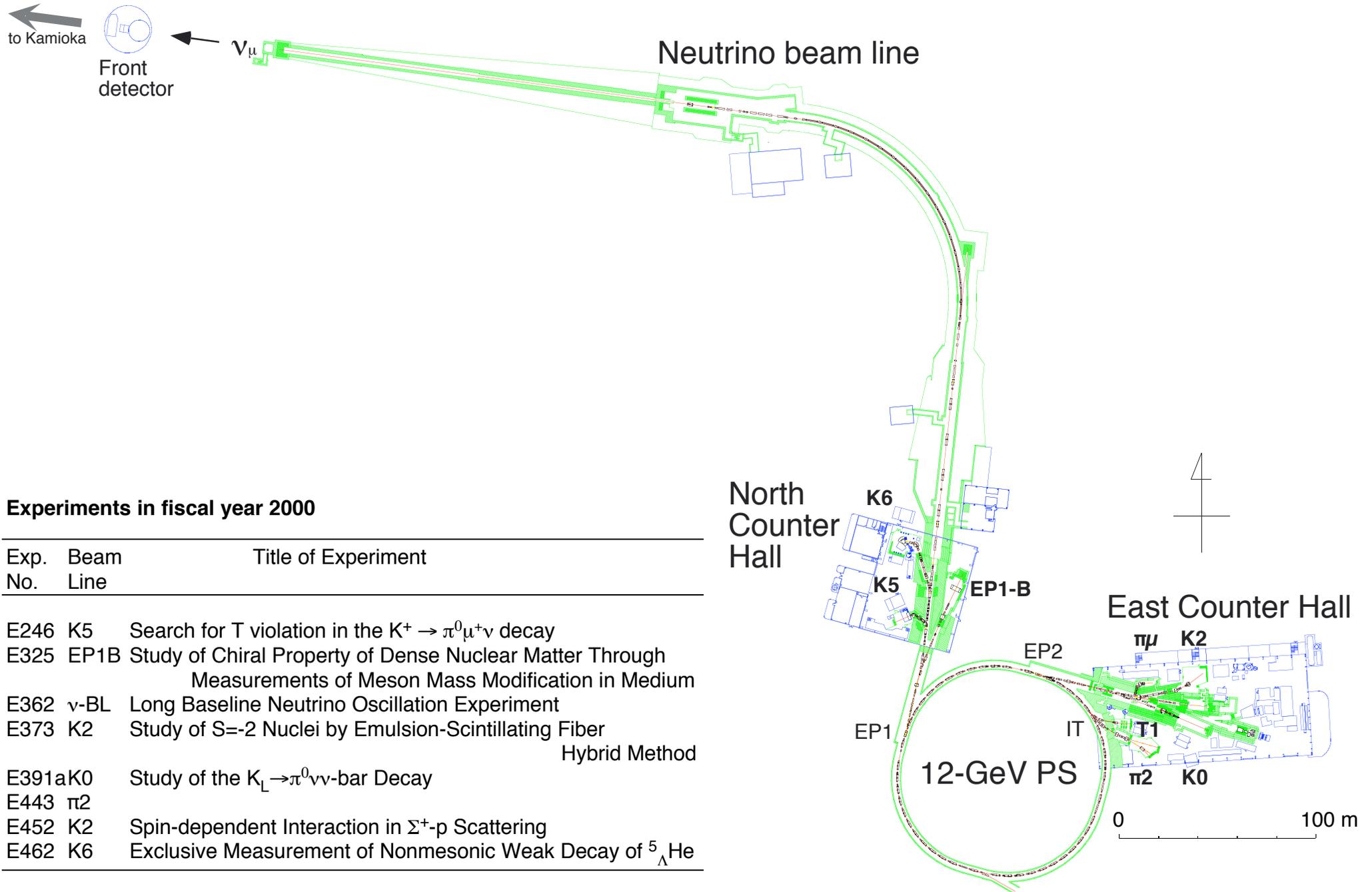
### [Primary Beam Line]

Beam Line	Particles	Energy Range (GeV)	Momentum Spread [ $\Delta E/E$ ] (%)	Typical Intensity (particles/ sec)
EP1B	p	2-12.0		$4.0 \times 10^8$
	d	2-11.2		$2.0 \times 10^8$

## Neutrino Beam Line for Long Baseline Oscillation Experiment

- 12 GeV fast extracted proton beam
- Proton on target  $6.0 \times 10^{12}$  /pulse
- Magnetic Horn system & 200-m long decay volume

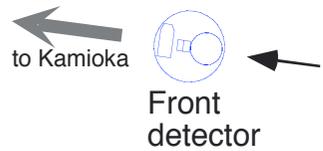
# Layout of Experimental Areas in September 2000



## Experiments in fiscal year 2000

Exp. No.	Beam Line	Title of Experiment
E246	K5	Search for T violation in the $K^+ \rightarrow \pi^0 \mu^+ \nu$ decay
E325	EP1B	Study of Chiral Property of Dense Nuclear Matter Through Measurements of Meson Mass Modification in Medium
E362	$\nu$ -BL	Long Baseline Neutrino Oscillation Experiment
E373	K2	Study of S=-2 Nuclei by Emulsion-Scintillating Fiber Hybrid Method
E391a	K0	Study of the $K_L \rightarrow \pi^0 \nu \bar{\nu}$ Decay
E443	$\pi 2$	
E452	K2	Spin-dependent Interaction in $\Sigma^+ - p$ Scattering
E462	K6	Exclusive Measurement of Nonmesonic Weak Decay of $^5_\Lambda \text{He}$

# Layout of Experimental Areas in September 2001

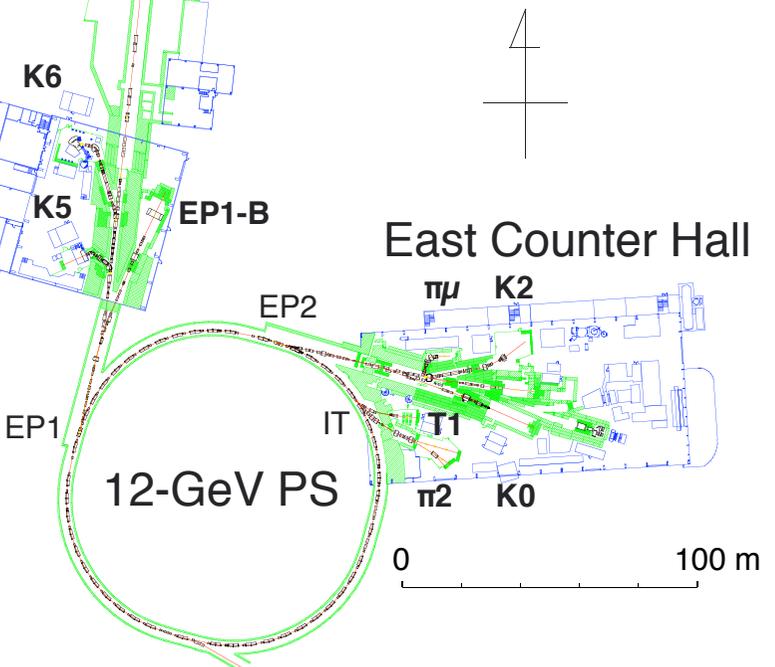


$\nu_\mu$  Neutrino beam line

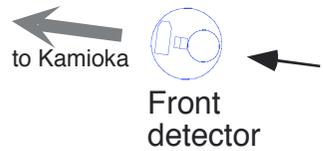
## Experiments in fiscal year 2001

Exp. No.	Beam Line	Title of Experiment
E325	EP1B	Study of Chiral Property of Dense Nuclear Matter Through Measurements of Meson Mass Modification in Medium
E362	$\nu$ -BL	Long Baseline Neutrino Oscillation Experiment
E391a	K0	Study of the $K_L \rightarrow \pi^0 \nu \bar{\nu}$ Decay
E452	K2	Spin-dependent Interaction in $\Sigma^+ - p$ Scattering
E462	K6	Exclusive Measurement of Nonmesonic Weak Decay of ${}^5_\Lambda \text{He}$
E470	K5	Measurement of direct photon emission in $K^+ \rightarrow \pi^+ \pi^0 \gamma$

North Counter Hall



# Layout of Experimental Areas in September 2002



$\nu_\mu$  Neutrino beam line

## Experiments in fiscal year 2002

Exp. No.	Beam Line	Title of Experiment
E362	$\nu$ -BL	Long Baseline Neutrino Oscillation Experiment
E391aK0		Study of the $K_L \rightarrow \pi^0 \nu \bar{\nu}$ Decay
E471	K5	A Search for Deeply Bound Kaonic Nuclear State
E508	K6	Coincidence Measurement of the Weak Decay of C
E509	K5	$\gamma$ -ray spectroscopy of hyperfragments using stopped $K^-$ method
E518	K6	$\gamma$ -ray spectroscopy of $^{11}_\Lambda B$
E521	K6	Production of neutron-rich $\Lambda$ hypernuclei by the $(\pi^-, K^+)$ double-charge exchange reaction
E522	K2	Search for H-dibaryon resonance via $^{12}C(K^-, K^+)$ and Study of $\Xi$ -N interactions

North Counter Hall

K6

K5

EP1-B

East Counter Hall

$\pi\mu$

K2

EP2

EP1

IT

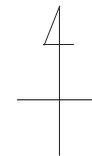
T1

$\pi^2$

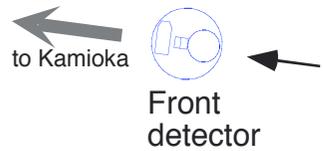
K0

12-GeV PS

0 100 m



# Layout of Experimental Areas in September 2003



$\nu_\mu$  Neutrino beam line

## Experiments in fiscal year 2003

Exp. No.	Beam Line	Title of Experiment
E362	$\nu$ -BL	Long Baseline Neutrino Oscillation Experiment
E391a	K0	Study of the $K_L \rightarrow \pi^0 \nu \bar{\nu}$ Decay
E471	K5	A Search for Deeply Bound Kaonic Nuclear State
E521	K6	Production of neutron-rich $\Lambda$ hypernuclei by the $(\pi^-, K^+)$ double-charge exchange reaction
E522	K2	Search for H-dibaryon resonance via $^{12}\text{C}(K^-, K^+)$ and study of $\Xi$ -N interactions
E546	$\pi\mu$	Measurements of Electronic X rays correlated with Pionic X rays

North Counter Hall

