Perspective from KEK

M.Kobayashi

- Activities of KEK
- Japanese contribution to oversea activities
- Linear Collider

Outline of KEK

- New legal status:

  Inter-University Research Institute Corporation
- Structure

  Institute of Particle and Nuclear Studies

  Institute of Materials Structure Science
- Staff

  physicist ~400, technician ~160
- Budget

  280 10^8Yen + 50 10^8Yen (construction of J-parc)

Belle at KEKB

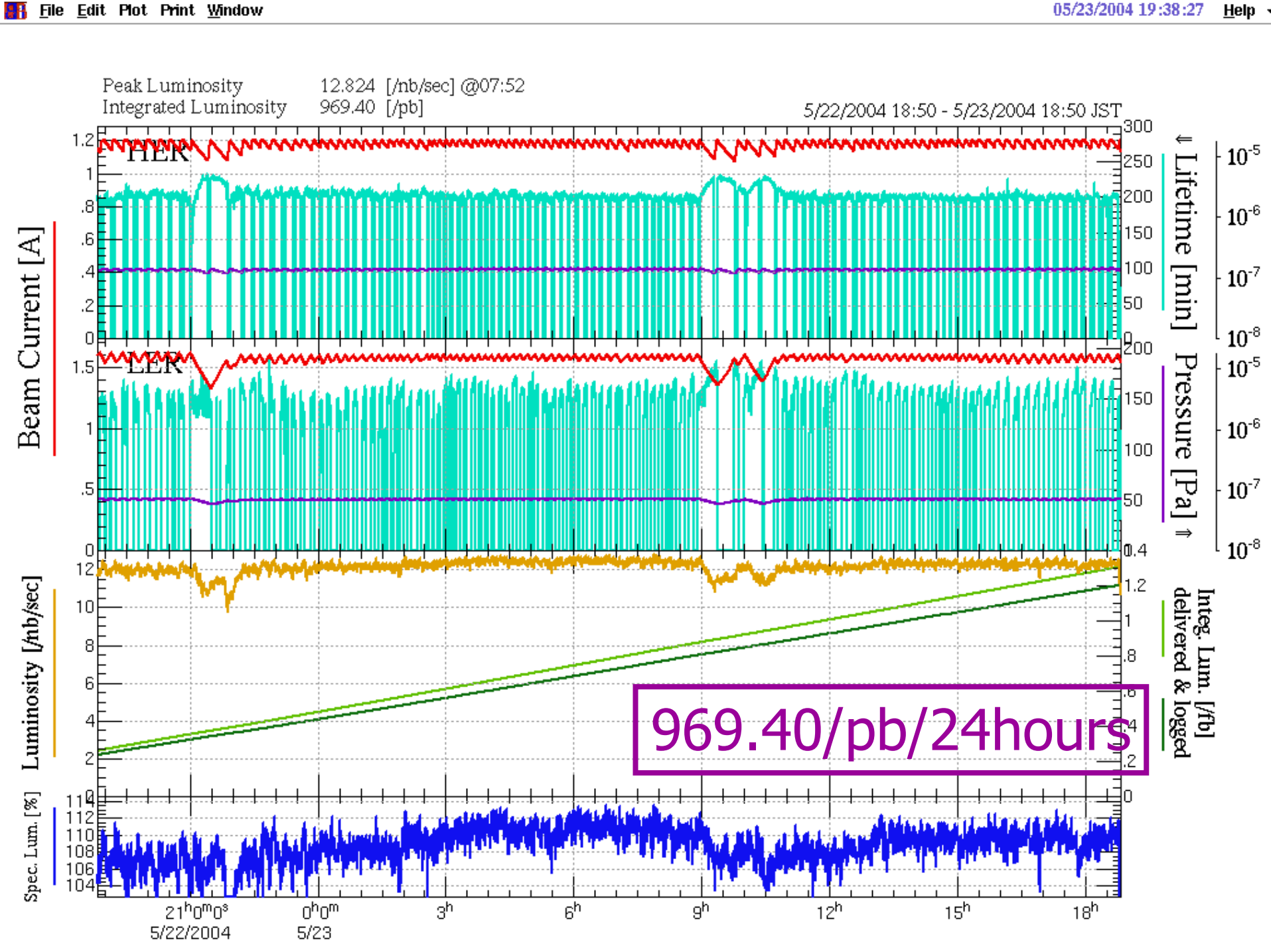
KEKB Performance

(as of May 30)

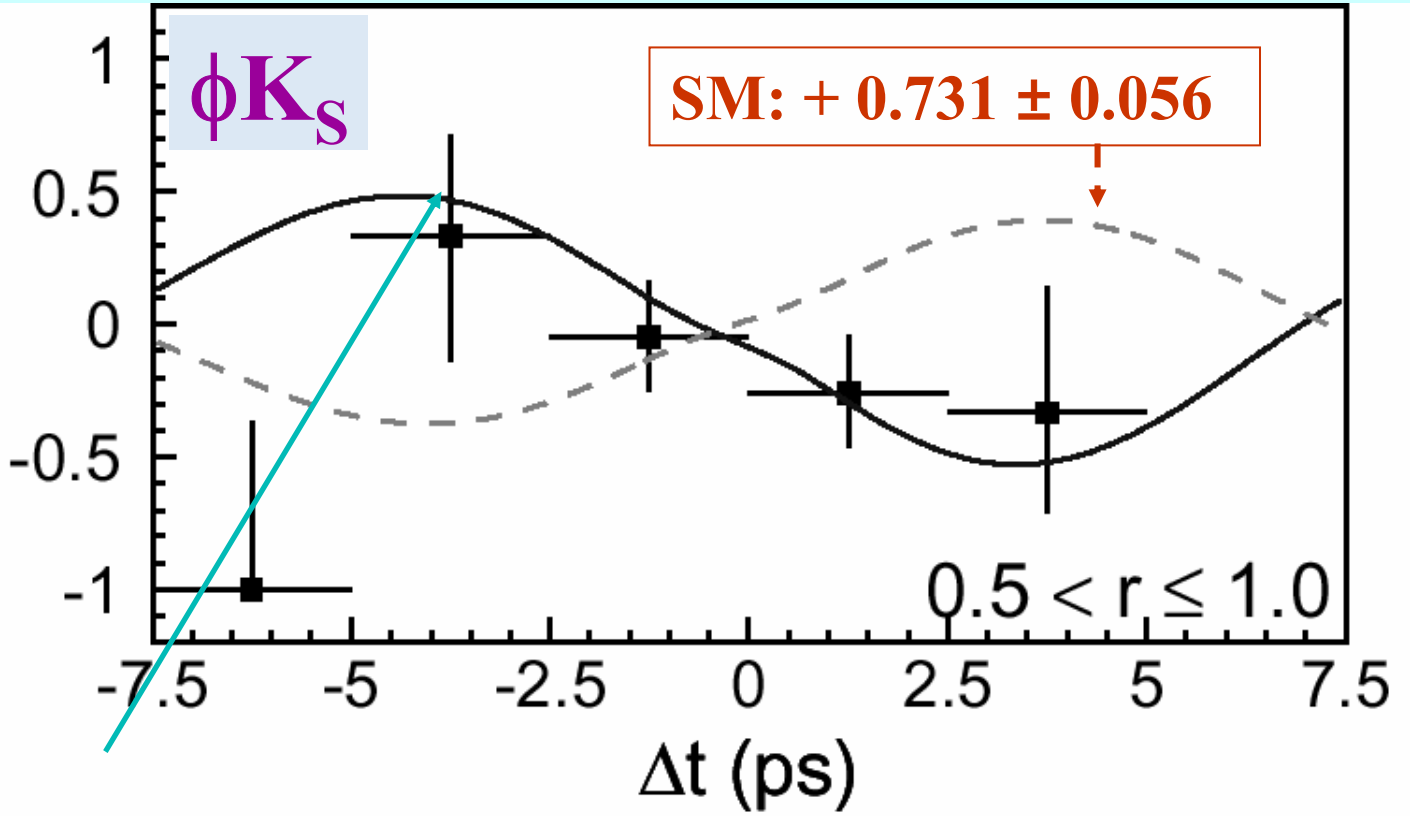
- Highest Peak Luminosity 1.322 $10^{34}cm^{-2}$
- Highest Daily Int. Luminosity 944.2 /pb/day
- Highest Weekly Int. Luminosity 5.939 /fb/week

- **Total Integrated Luminosity 265 /fb**

- Continuous injection is working well for both rings


File Edit Plot Print Window
05/23/2004 19:38:27
Help
Peak Luminosity 12.824 [/nb/sec] @07:52
Integrated Luminosity 969.40 [/pb]
5/22/2004 18:50 - 5/23/2004 18:50 JST
HER
LER
Beam Current [A]
Lifetime [min]
Pressure [Pa]
Luminosity [/nb/sec]
Integ. Lum. [/fb] delivered & logged
Spec. Lum. [%]
969.40/pb/24hours
21h0m0s 5/22/2004
0h0m 5/23
3h
6h
9h
12h
15h
18h

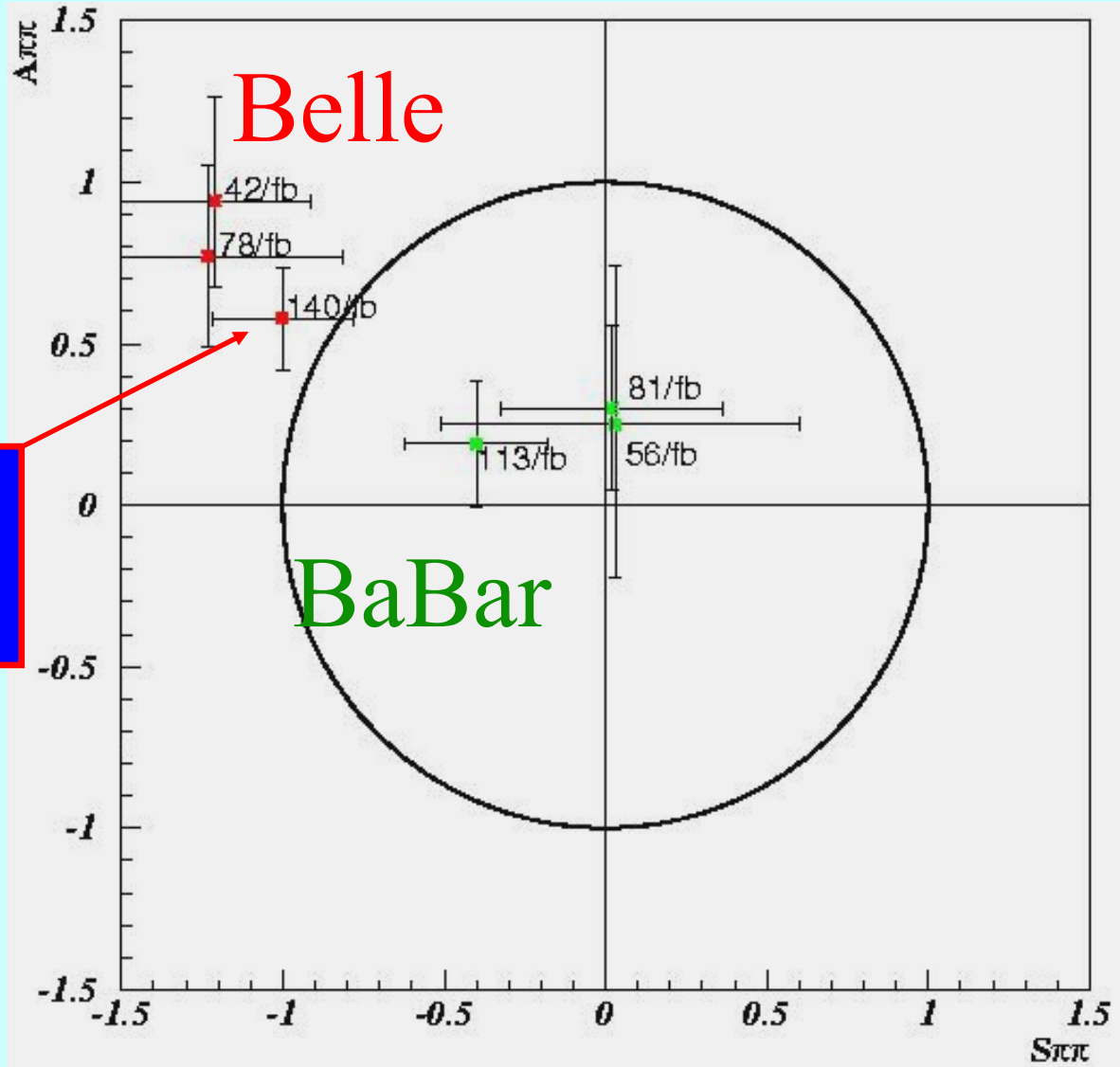
Large (3.5σ) discrepancy for $B \to \phi K_S$



$\sin 2\phi_1^{eff} = -0.96 \pm 0.51$

$B \to \pi^+ \pi^-$

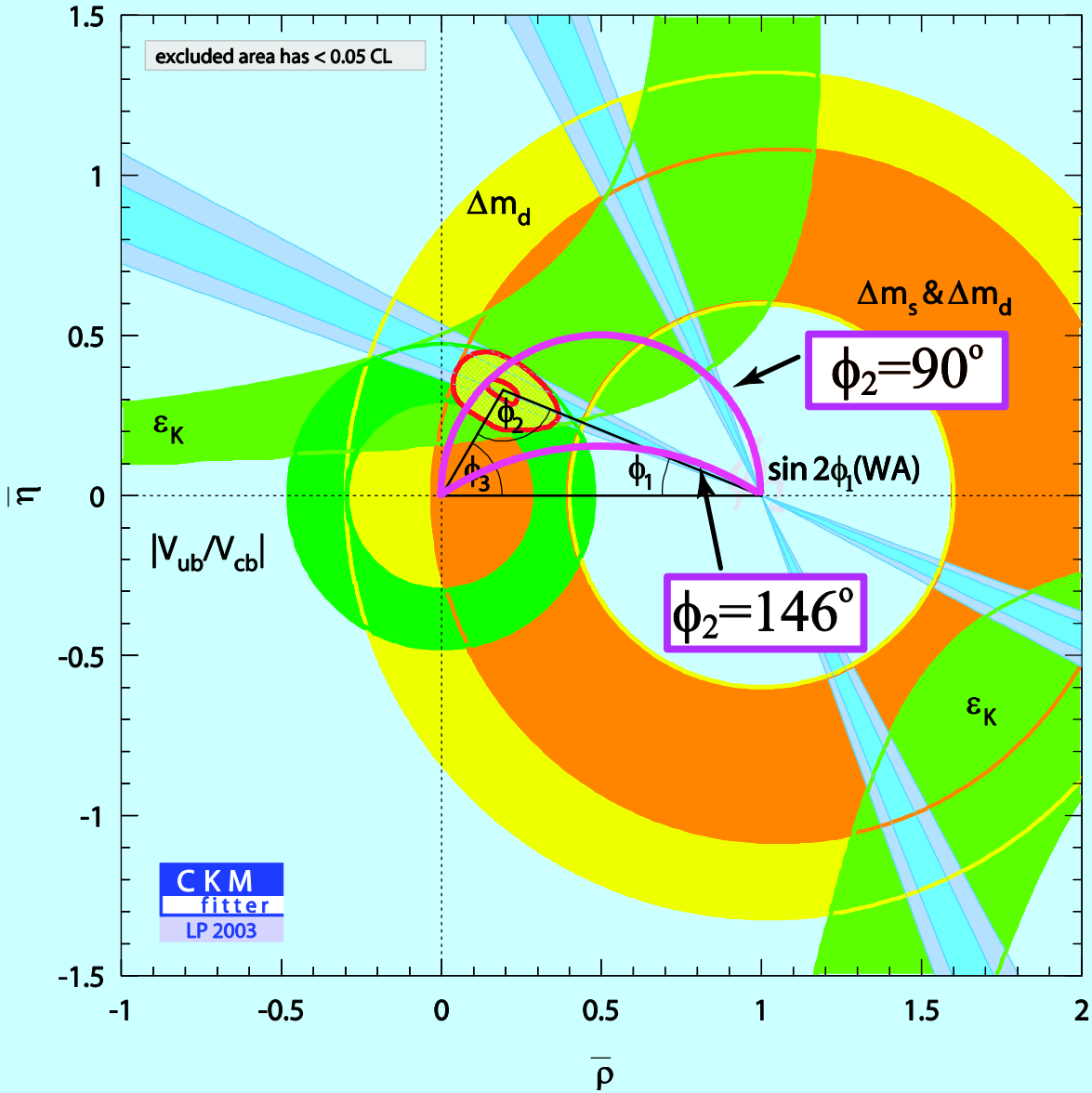
History of $A_{\pi\pi}$ and $S_{\pi\pi}$



This result

Belle 140fb^{-1}

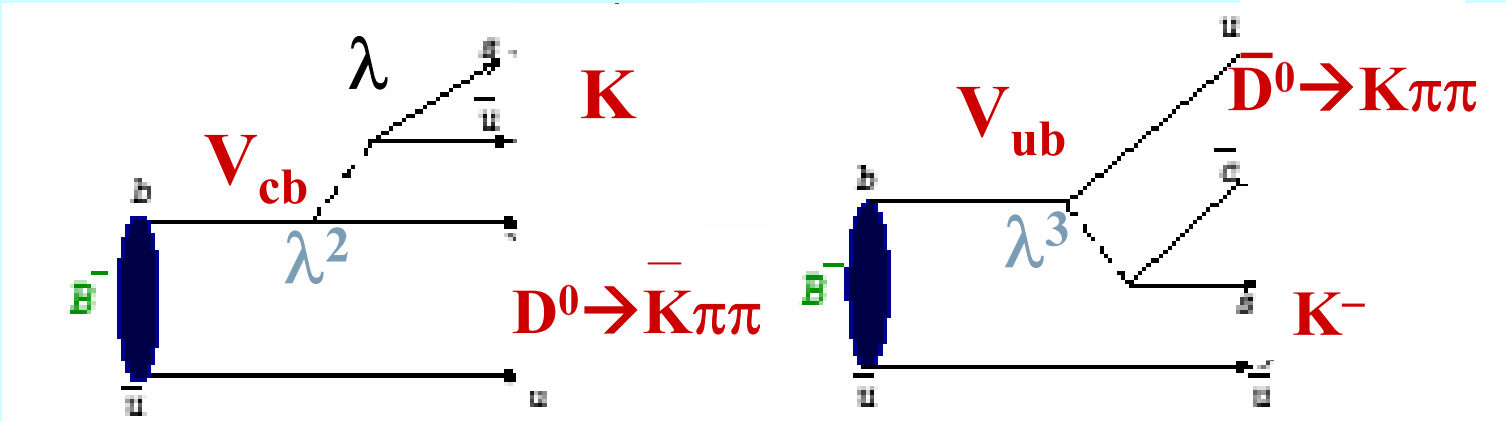
Constraint on ρ-η

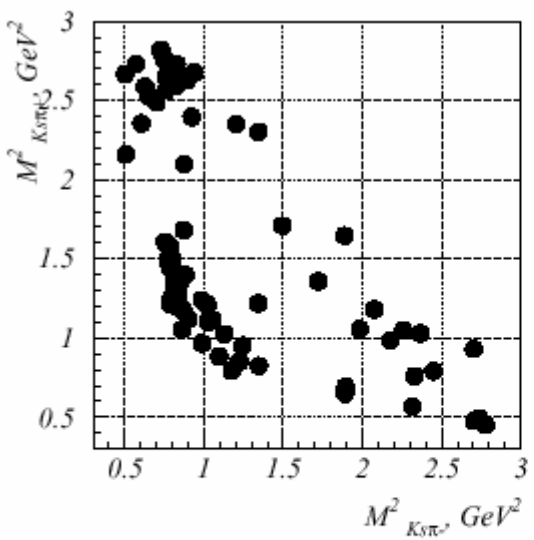


sinϕ_1 (WA) and Belle's ϕ_2 are consistent with other measurements.

ϕ_3 (γ) from $B^{\pm} \to K^{\pm} D^0/\bar{D}^0$ Dalitz plots

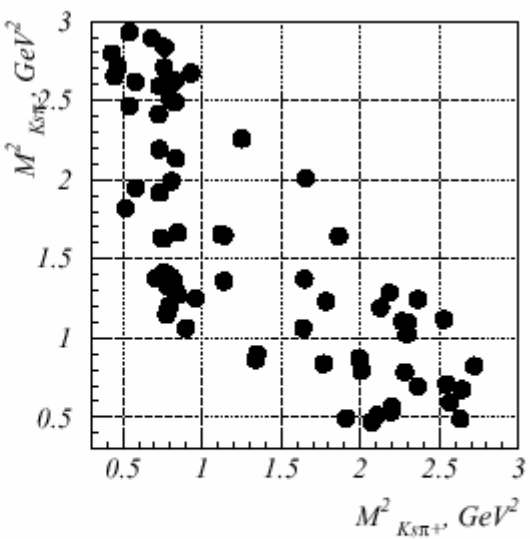
A. Poluektov *et al*





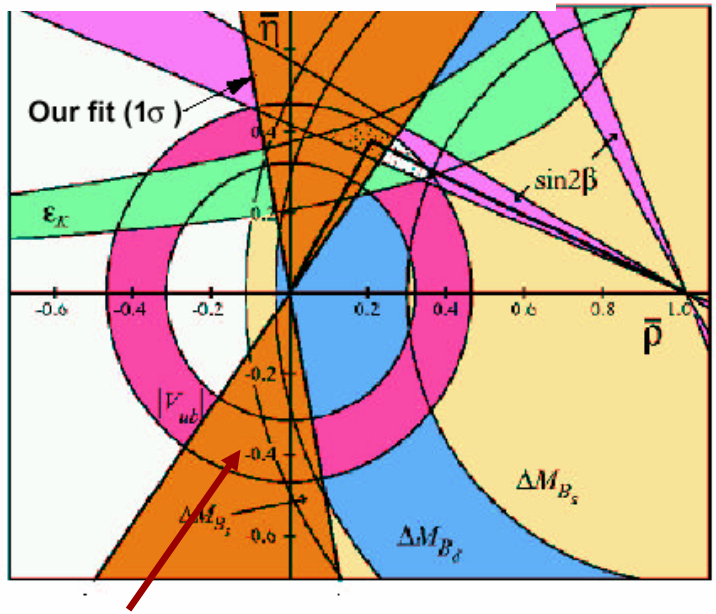
$B^- \to D^0 K^-$

73 events



$B^+ \to \bar{D}^0 K^+$

73 events



$\phi_3 = 81^\circ \pm 19^\circ (45^\circ) \pm 13^\circ \pm 11^\circ$

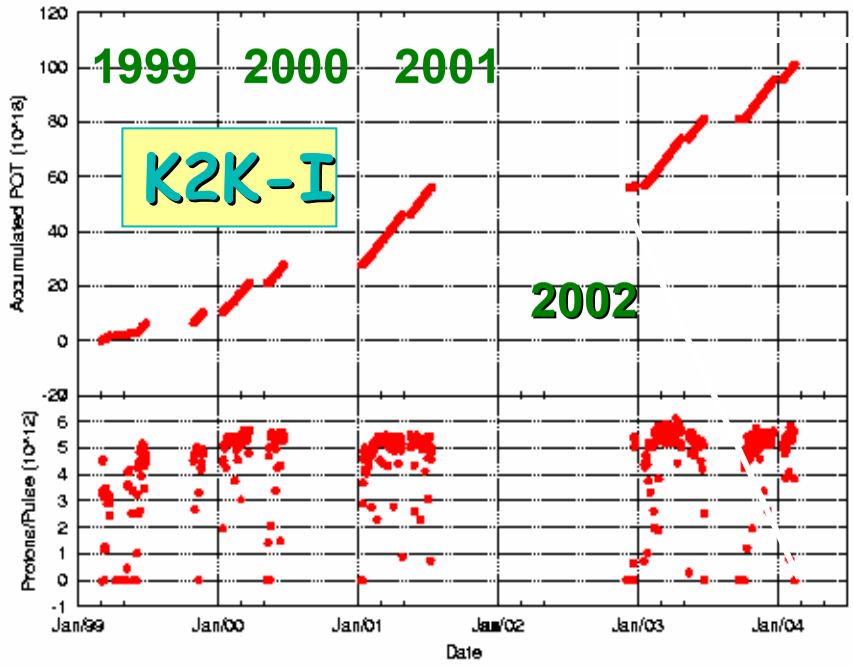
K2K Collaboration

K2K-I: Japan-US-Korea Collaboration
K2K-II: From 2002 (after Super-K accident)

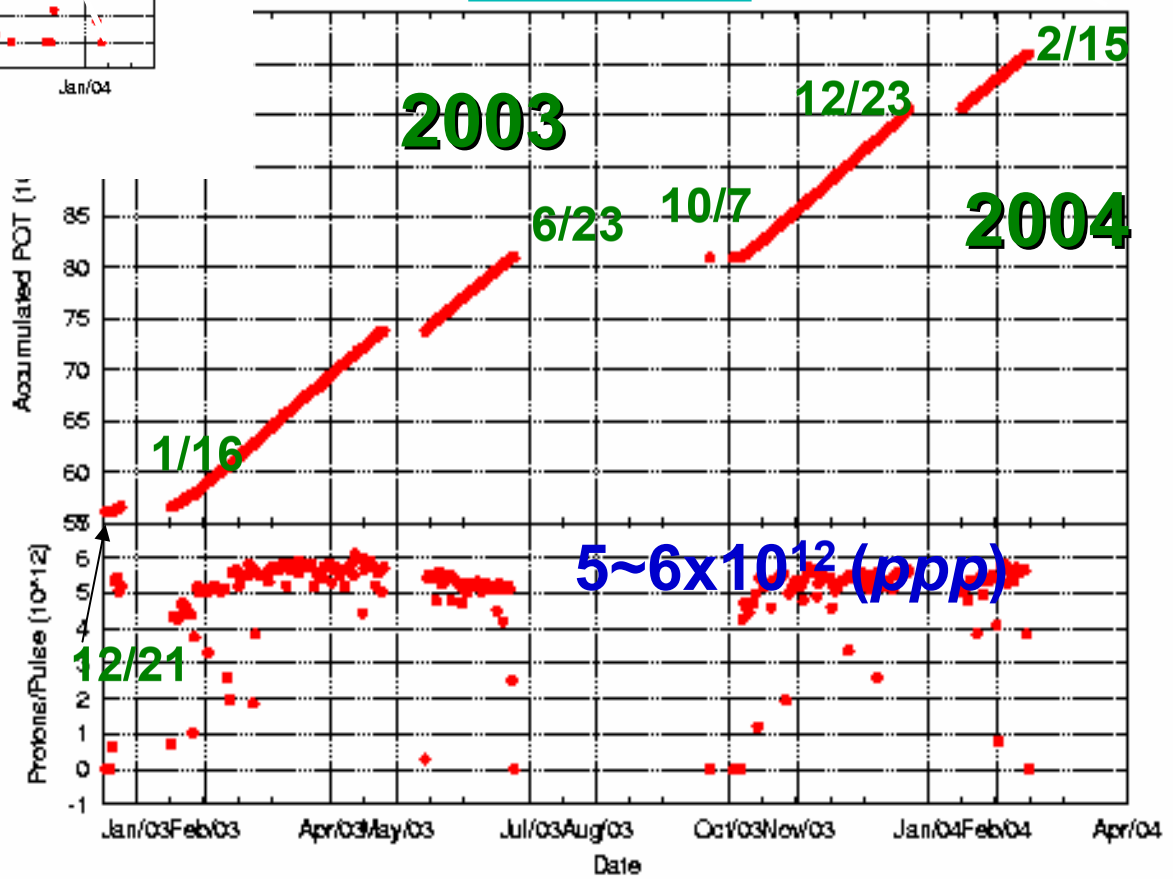
K2K Data Accumulation Status

Delivered P.O.T.

(since March 1999)



K2K-II

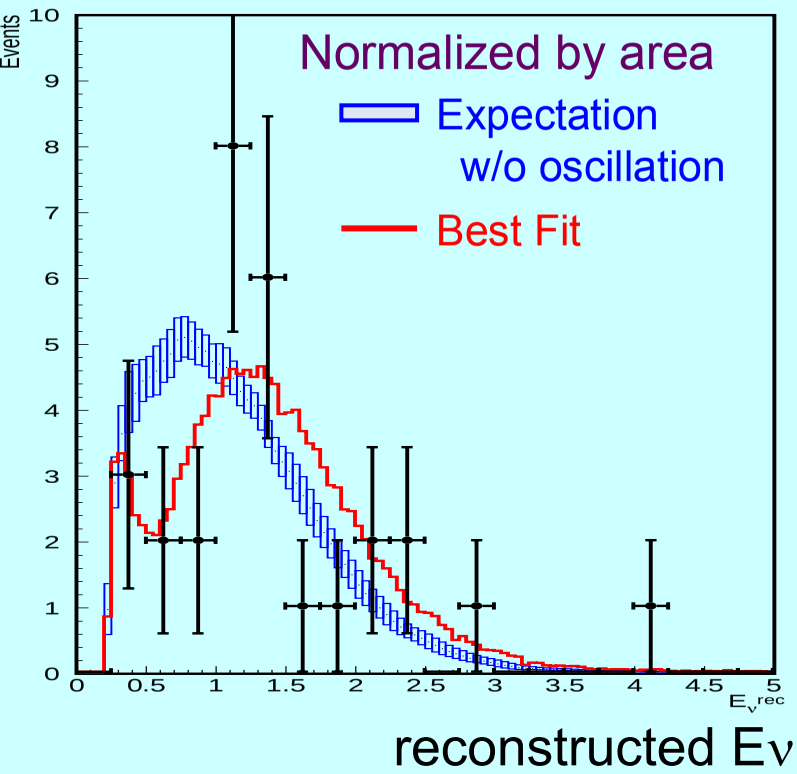


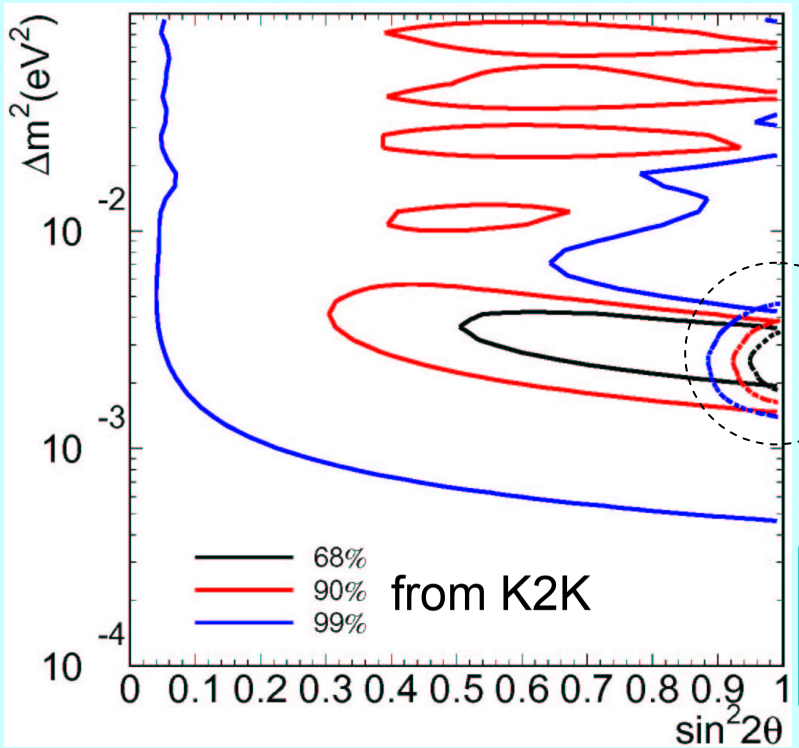
	Delivered POT	Usable POT for analysis
K2K-I	5.6×10^{19}	4.8×10^{19}
K2K-II	4.5×10^{19}	3.8×10^{19}
Total	10.1×10^{19}	8.9×10^{19}

Results from K2K-I

published in PRL90(2003)041801

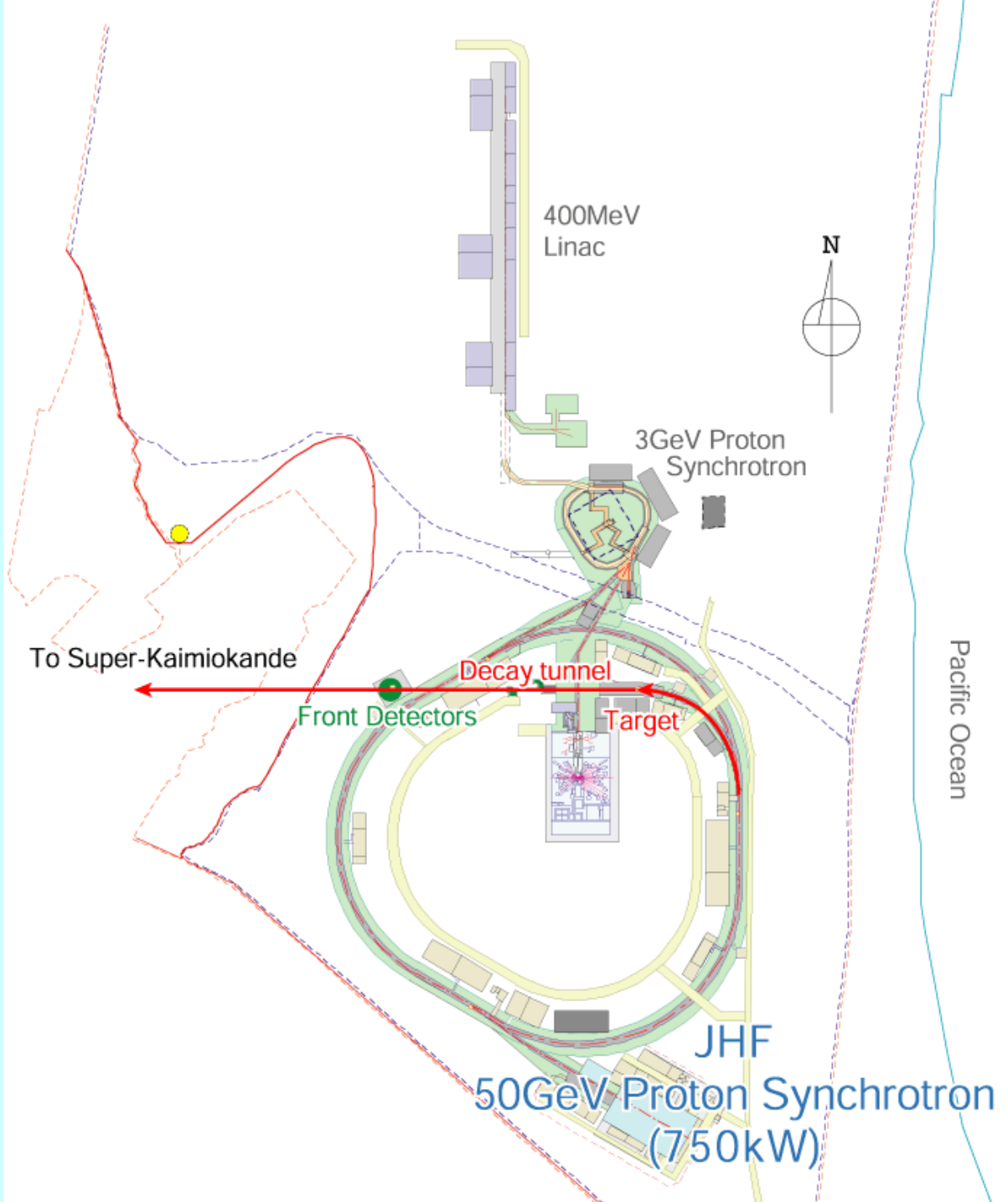
Observed: 56evt v.s. Expected: 80.1+6.2-5.4

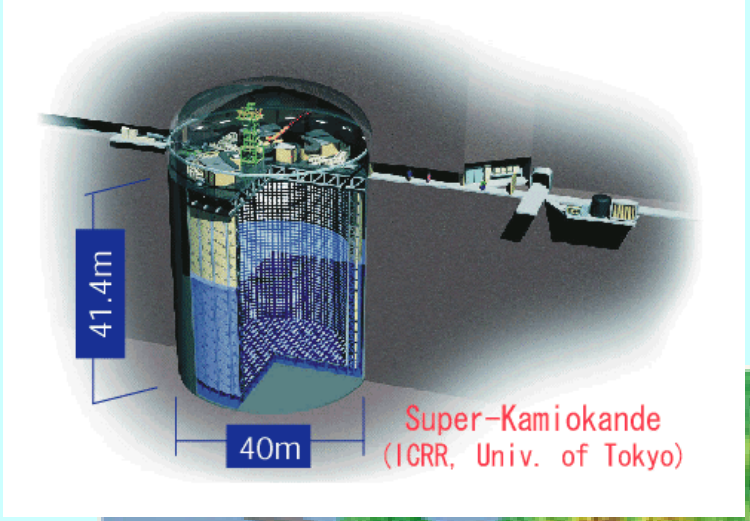


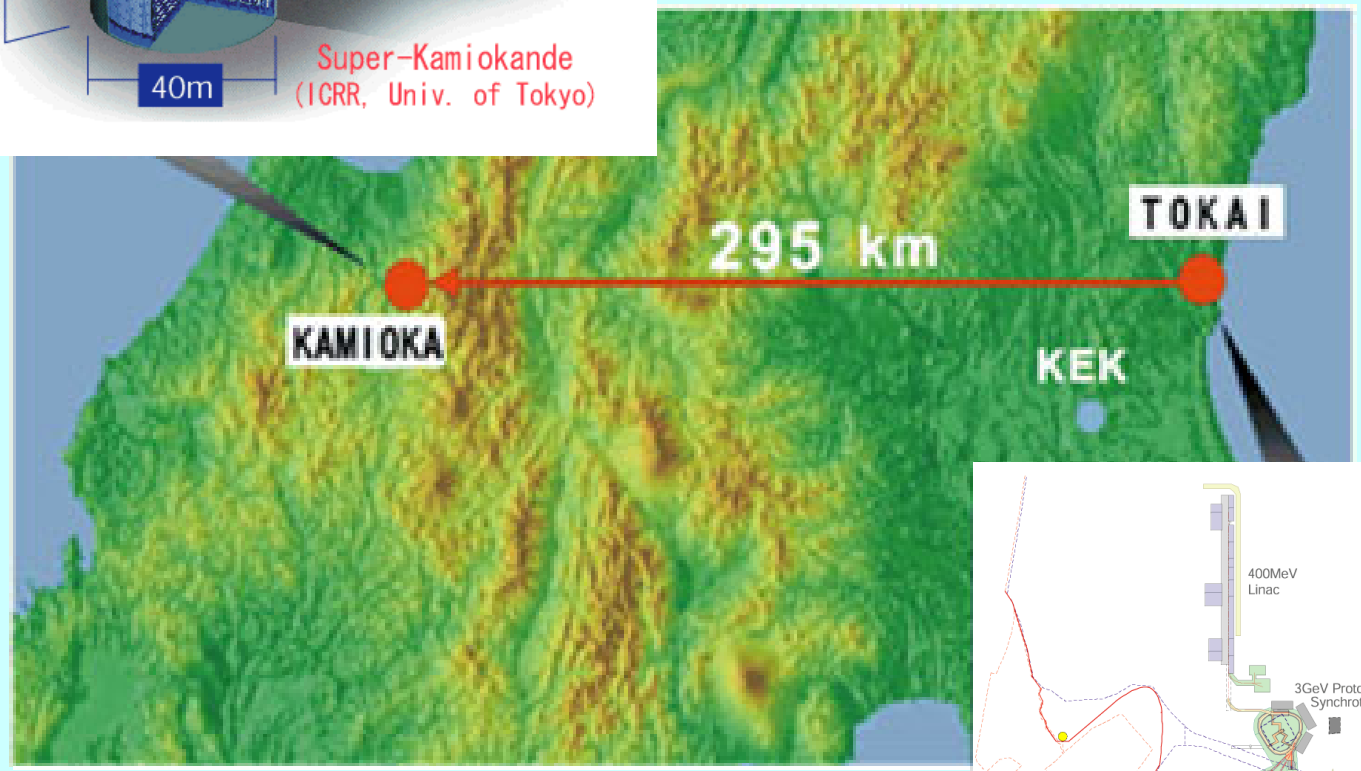


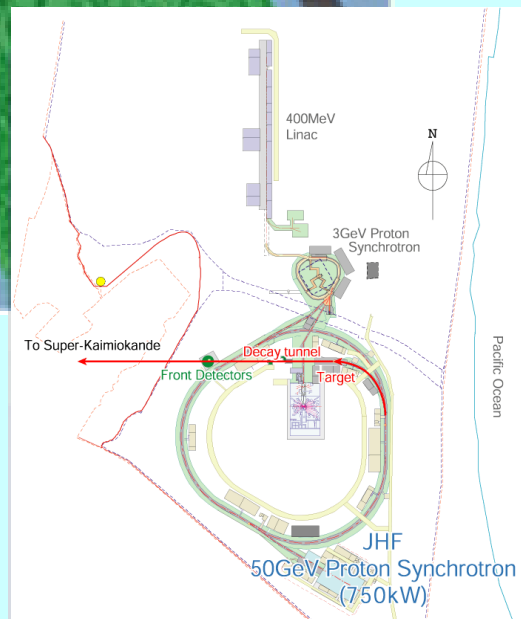
New Results from K2K-I + K2K-II will be released at the NEUTRINO 2004 Conference

J-PARC (Joint project with JAERI)


400MeV
Linac
N
3GeV Proton
Synchrotron
To Super-Kaimiokande
Decay tunnel
Front Detectors
Target
Pacific Ocean
JHF
50GeV Proton Synchrotron
(750kW)





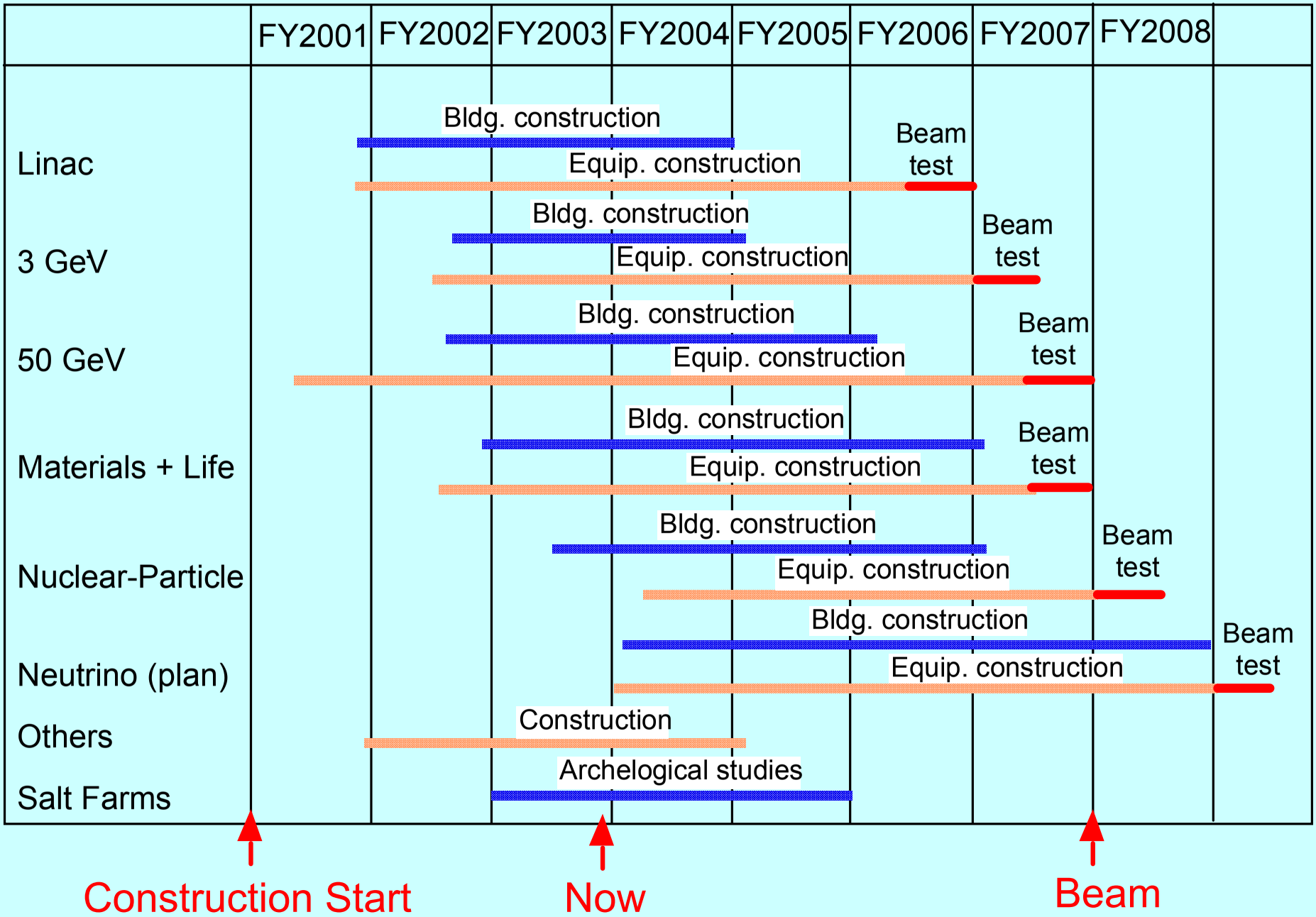


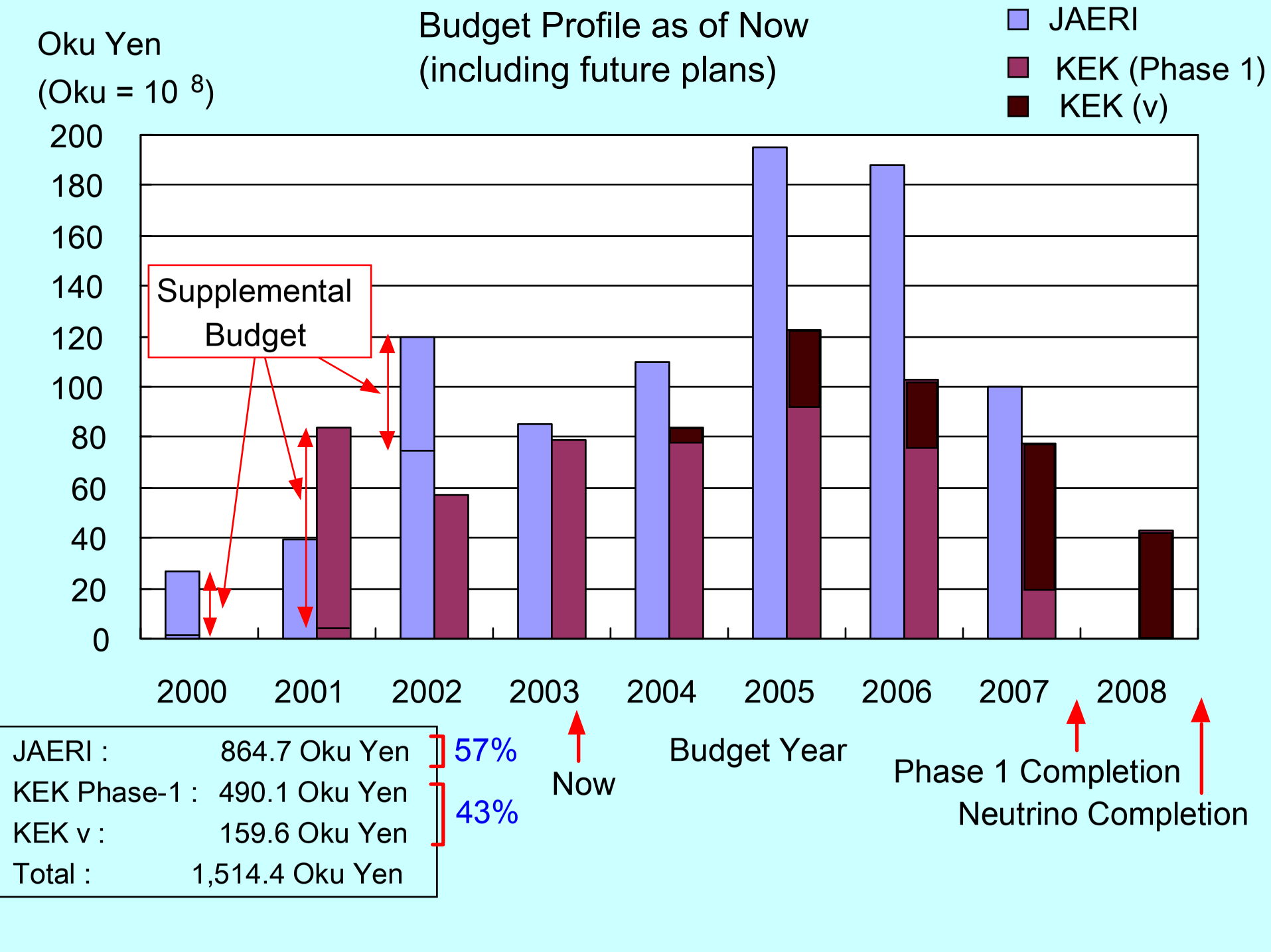
FROM TOKAI TO KAMIOKA

JHF ν long-baseline neutrino-oscillation experiment at J-PARC

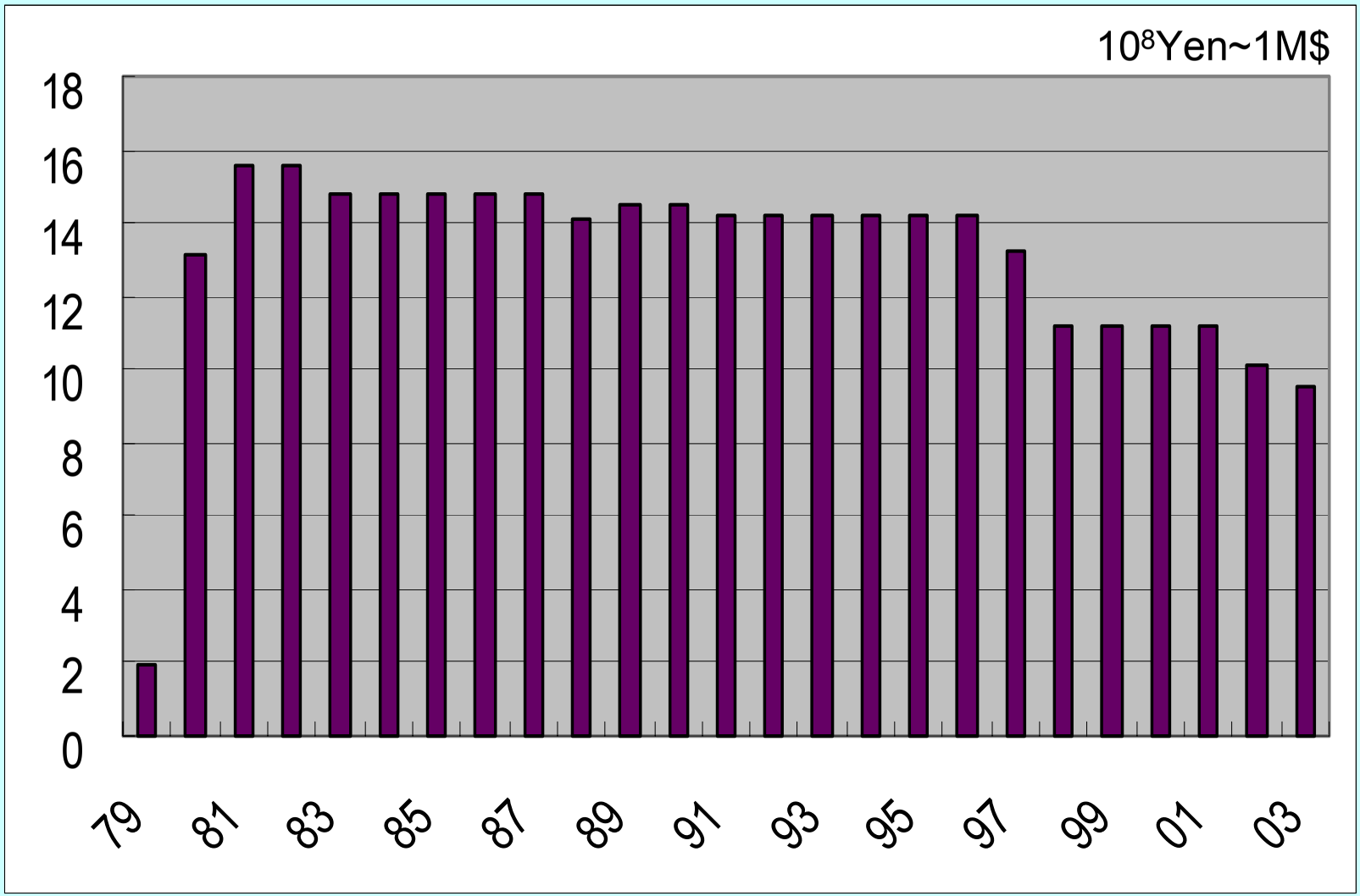
NEXT GENERATION LONG-BASELINE
NEUTRINO OSCILLATION EXPERIMENT

Construction Schedule



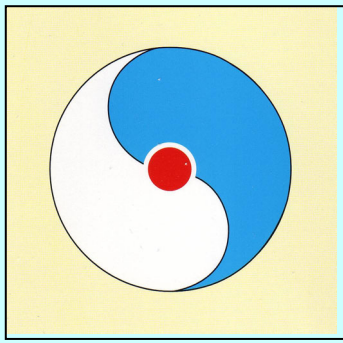

Budget Profile as of Now
(including future plans)
Oku Yen
(Oku = 10 8)
JAERI
KEK (Phase 1)
KEK (v)
200
180
160
140
120
100
80
60
40
20
0
Supplemental Budget
2000
2001
2002
2003
2004
2005
2006
2007
2008
Budget Year
Now
Phase 1 Completion
Neutrino Completion
JAERI : 864.7 Oku Yen
KEK Phase-1 : 490.1 Oku Yen
KEK v : 159.6 Oku Yen
Total : 1,514.4 Oku Yen
57%
43%

U.S./Japan Cooperation Program



U.S./Japan cont.

CDF	65.7 10^8 Yen
RHIC	32.8
Rare K(FNAL)	5.4
LC R&D	49.7
PDG group	22.1



RIKEN BNL Research Center

"A careful review of the Japan/US Cooperation Program in the past quarter century led us to conclude that the success of the Program is outstanding and should be highly appreciated. It should be emphasized that the Japanese researchers owe the success greatly to the US institutions and scientists for their generous cooperation and strong support. We expect that strong tie between the Japanese and US scientists formed through this history of cooperation will lead to further fruitful cooperation in the future"

from Report of Fourth Review Committee of the Japan/US Cooperation

L H C

Contribution from Japan

- **LHC accelerator**

  118.5 10^8Yen

  Super-conducting Q-magnet

- **ATLAS detector**

  32.1 10^8Yen + operation cost

  Solenoid Coil

  Muon Chamber

  Vertex Detector

  Electronics

ZEUS at HERA

- **Funding**

  15.7 108Yen (1988-2003)

- **Human contribution**

  19 (KEK, Tokyo-Met.U, TIT etc.)

- **Detector**

  Global First Level Trigger

  Uranium-Scintillator Calorimeter

  Hadron-Electron Separator

  Silicon Vertex Detector

Linear Collider

- KEK has made R&D efforts since the early 1990's, especially since the mid-1990's.
- In 1996 KEK started a strong collaboration with SLAC on a linear collider, especially on R&D on high power X-band RF sources and accelerating structures.
- In 1997 the Accelerator Test Facility was completed and started experiments on ultra-low emittance beams, electron sources and beam profile monitors.

- Roadmap report (2003)
  - CMS energy: 500 GeV (phase 1), >1 TeV (phase 2)
  - X-band, warm structures, C-band as a backup
  - Commissioning time: ~ 2013
  - In agreement with international consensus

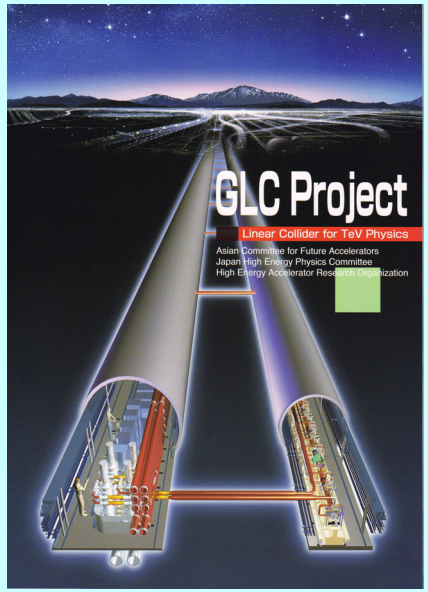
ACFA

Established in 1996

Chair: D.D.Bhawaker (CAT,India)

ALCSC

Chair: Won Namkung (POSTECH, Korea)



ITRP Meeting 4

- Held at KEK on May 25, 26

  →See Totsuka's Closing Talk

- Avoid a slow start-up of the LC
- Otherwise we will have to start new projects before the LC; super-KEKB, multi-MW neutrino beam, Hyper-K, etc.

If the warm technology is chosen

- Present maturity of basic R&D warrants launch of major industrialization efforts
- Some aspects of these have already been an integral part of past R&D, and will be intensified
- We will aggressively promote all three below in parallel for the next 3–4 years.
  - Final stage R&D
  - Further design optimization
  - Industrialization and cost optimization
- KEK will strengthen the R&D efforts with close collaboration and coordination with our old partner SLAC and the GDI Central Team

Cont.

- KEK wishes to host a regional team of GDI
  - Efficient use of (upgraded) ATF and GLCTA
  - Joint work with industry
- KEK wishes to bid for hosting the central team, too

- Even if the cold technology is chosen, KEK will participate in R&D, as KEK has a strong SC group which has evolved since the TRISTAN era

Funding of the LC depends upon several factors

- Fate of ITER
- Japanese future budgetary situation
- Timely completion of J-PARC, etc.
- LC should be a global project with American, European and Asian participation
  - Convince Japanese people
  - Reduce budget/country
- (Much) less if LC is built offshore
  - We wish to keep domestic HEP activity, though more discussion will be needed
- Less for the cold option, as a fewer number of accelerator people may participate in construction

Conclusion

- Activities of high energy physics in Japan is in good shape
- Community wishes to share the responsibility in the future international collaboration
- KEK is willing to be an Asian center of the accelerator science, if requested