

Status of KEK E391a そのII

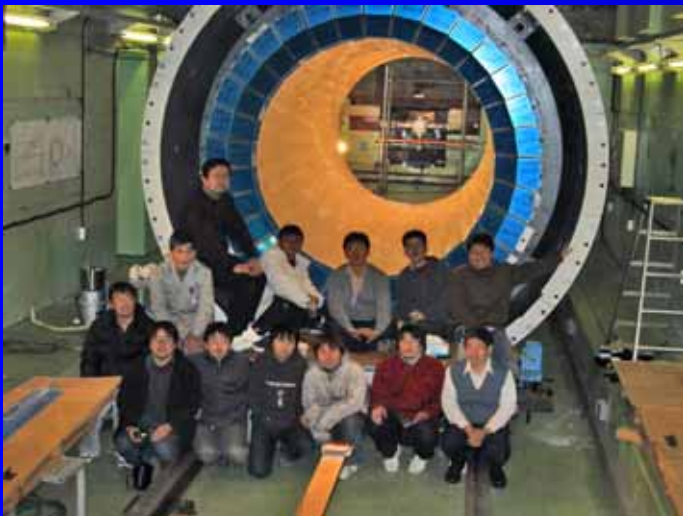
2005年3月8日科研費特定領域 第二回研究会

Dec/26/2003

つくば国際会議場エポカル

阪大:菅谷頼仁

Jan/21/2004



Run summary - Total 300 shift-

- 2/17: Beam start
- 2/17-2/22 Beam commissioning, detector turning
- 2/23-3/4 trigger study and data taking
- 3/10- physics Run

Check list

① Vacuum

- Low vacuum: <1 Pa
- High vacuum: $<10^{-4}$ Pa

✓ Detector tuning

- Cosmic run
- muon beam run

✓ Beam line

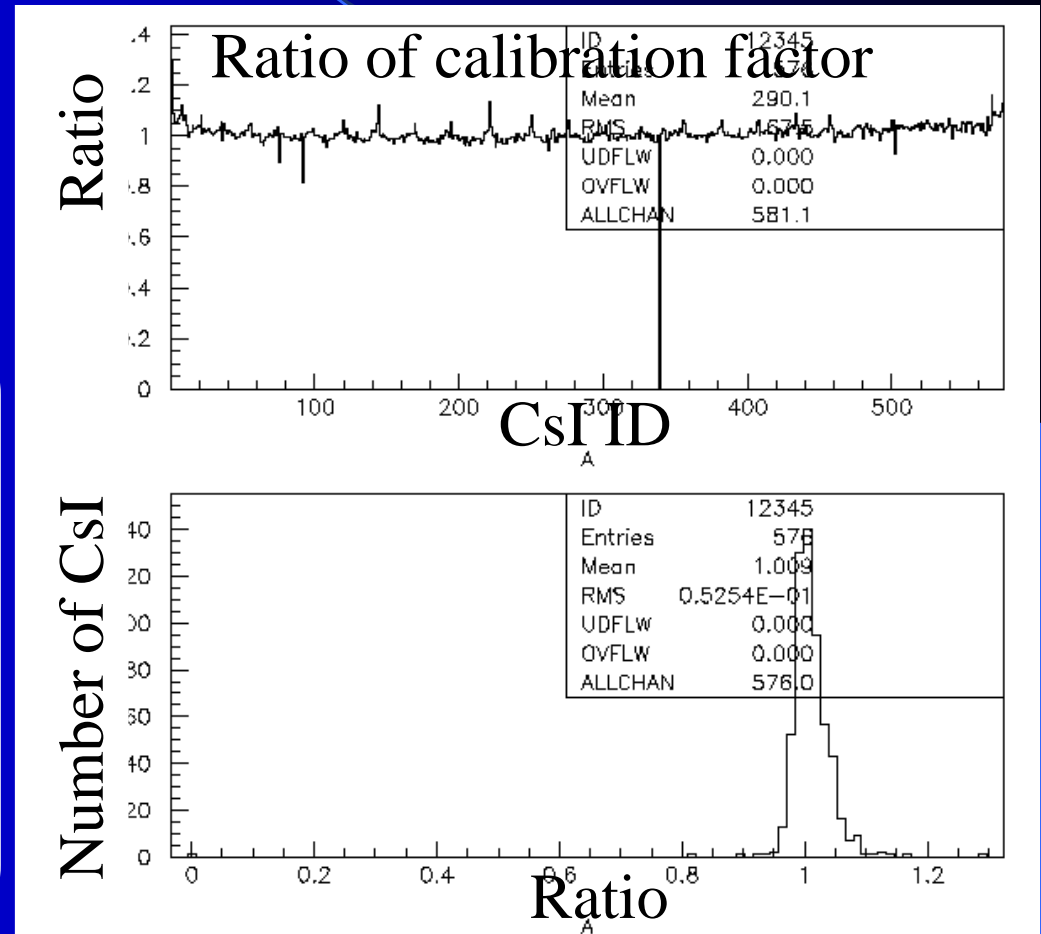
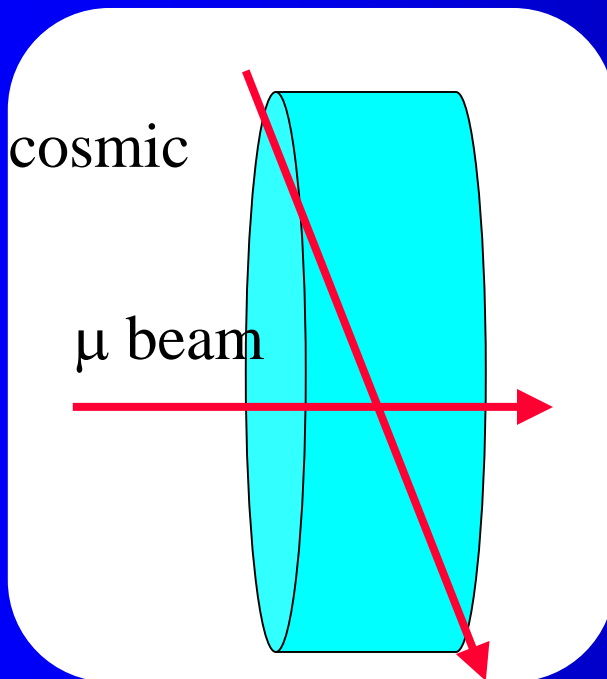
- Kaon beam position. shape
- Kaon yield

✓ Trigger study

- rate
- acceptance

CsI energy calibration

- Cosmic
- muon beam



KL decay measurement

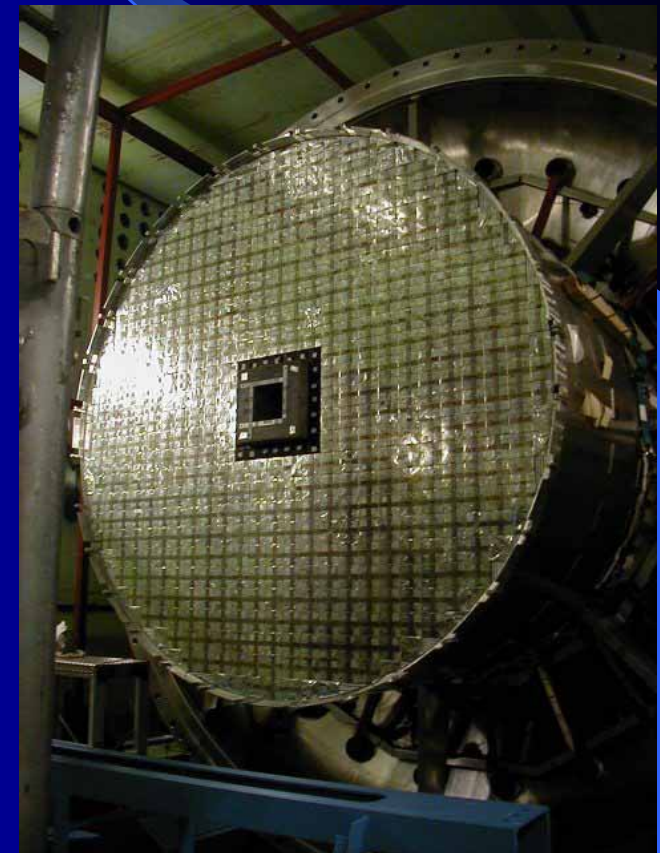
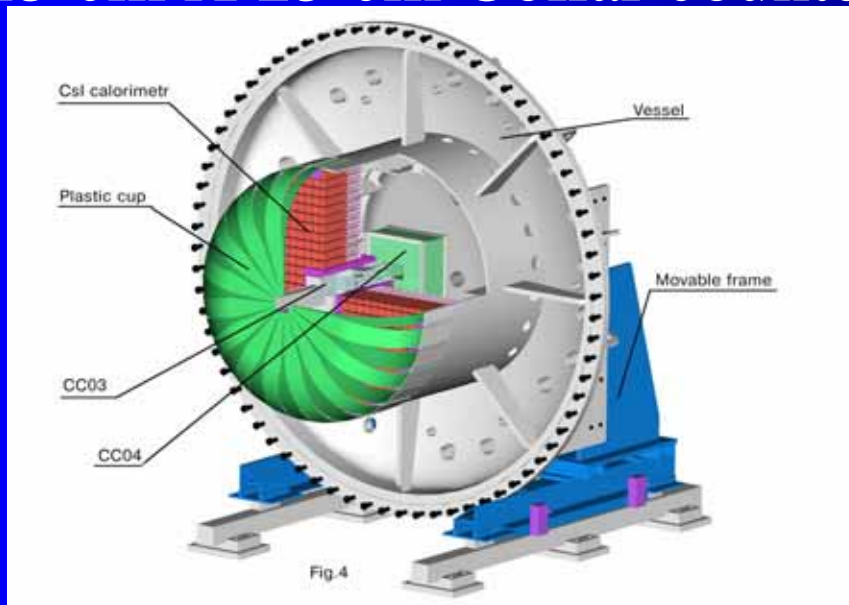
- $K\pi^3$, $K\pi^2$, $K\gamma\gamma$ -

- KL beam information
 - yield
 - momentum
 - shape
- Detector acceptance
- Analytical efficiency
- Inefficiency of the detectors
- Background estimation

decay mode	branch
$\pi^0\pi^0\pi^0$	21 %
$\pi^0\pi^0$	0.09 %
$\gamma\gamma$	0.06 %

CsI calorimeter

- 7 cm X 7 cm CsI
- 5 cm X 5 cm CsI
- 25 cm X 25 cm Collar counter



Take kaon data

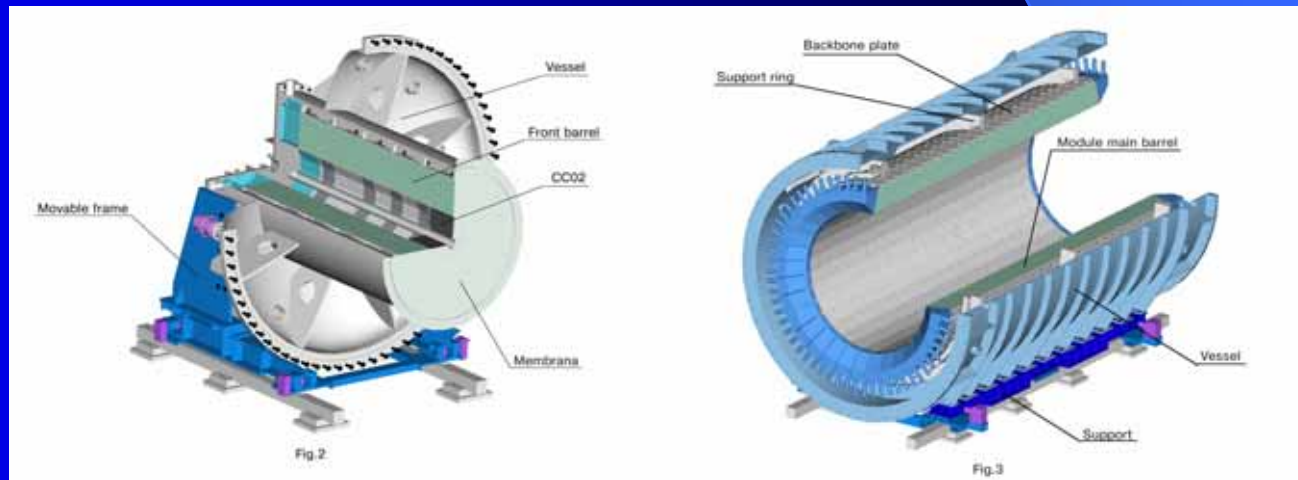
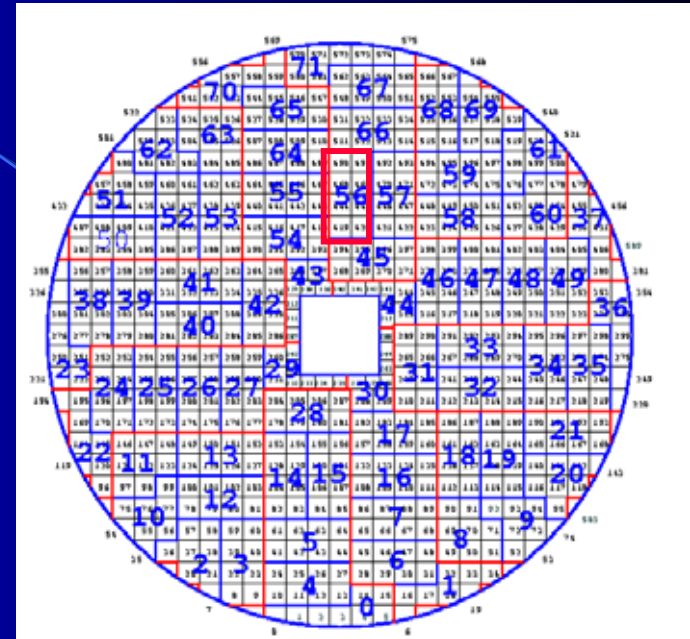
- Number of cluster

- $\pi^0\nu\nu$: 2 n 5

- $K\pi^2, K\pi^3$: 4 n

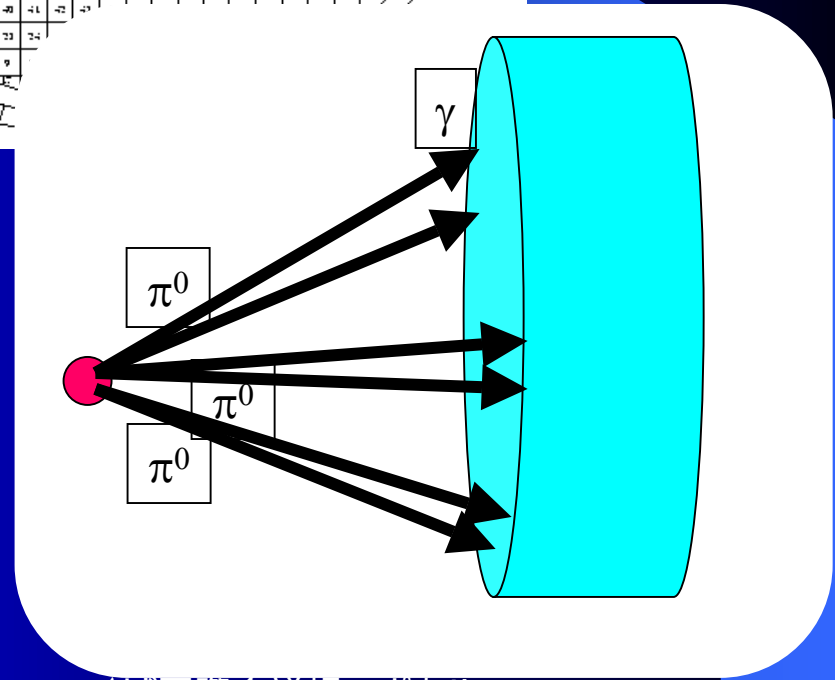
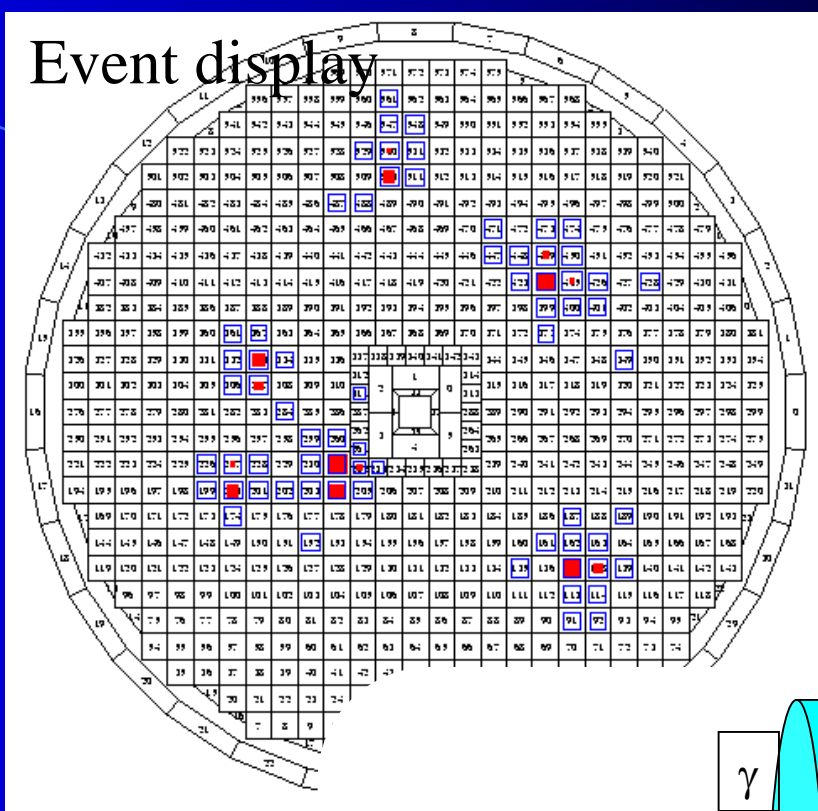
- Vetos

- charged
- collar counter
- barrel



$K\pi^3$

- Find 6 cluster on CsI
- Determine vertex of $3\pi^0$
- Obtain mass



$K\pi 2$

- 4 cluster

- 6 γ from $K\pi 3$, only 4 γ on CsI

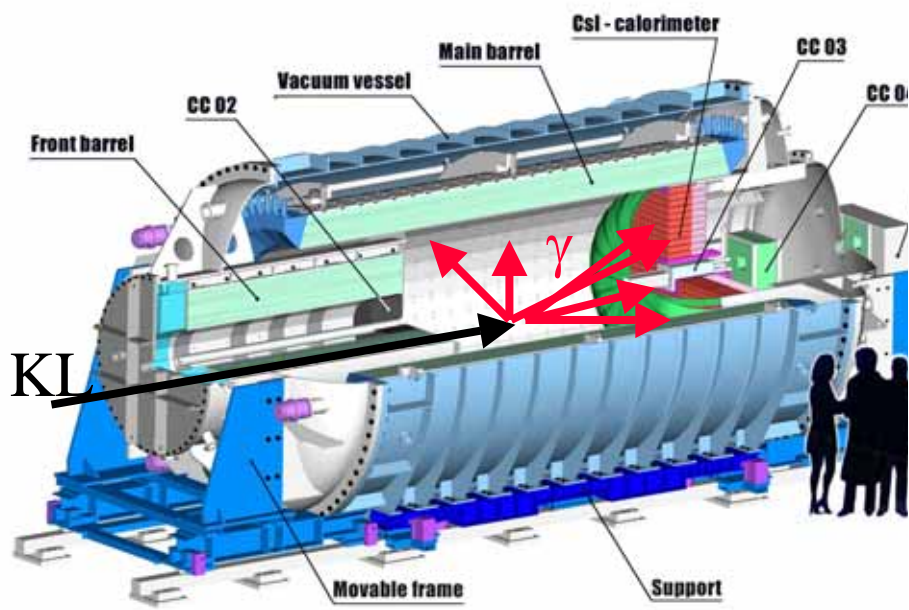
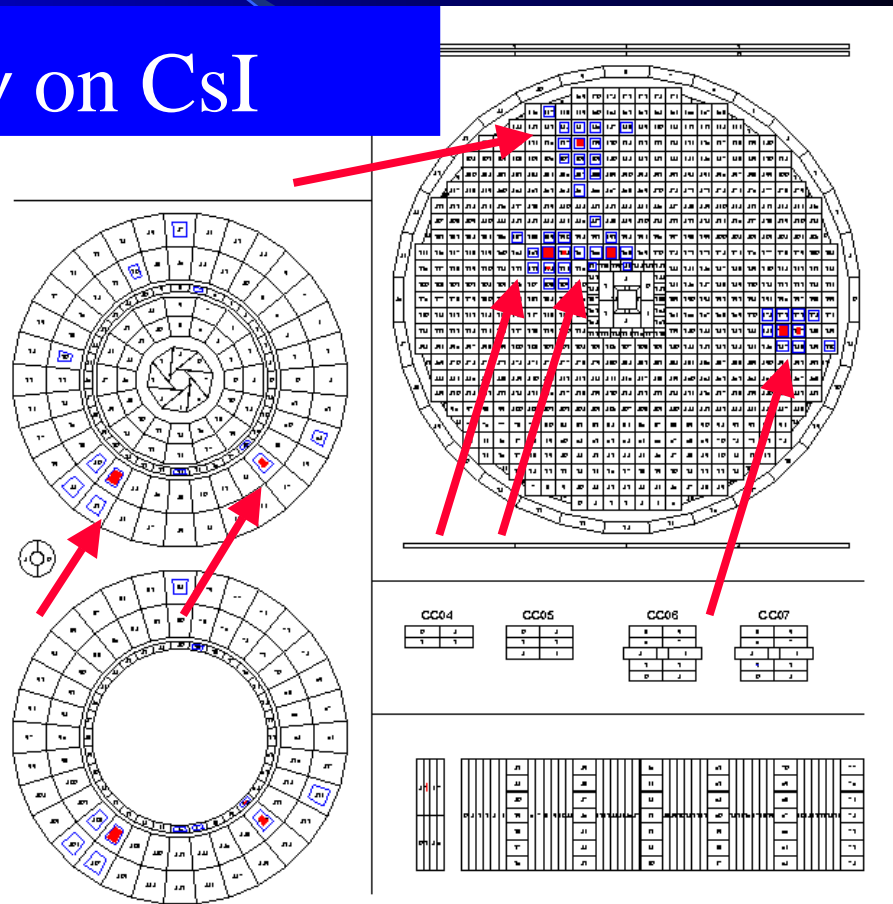


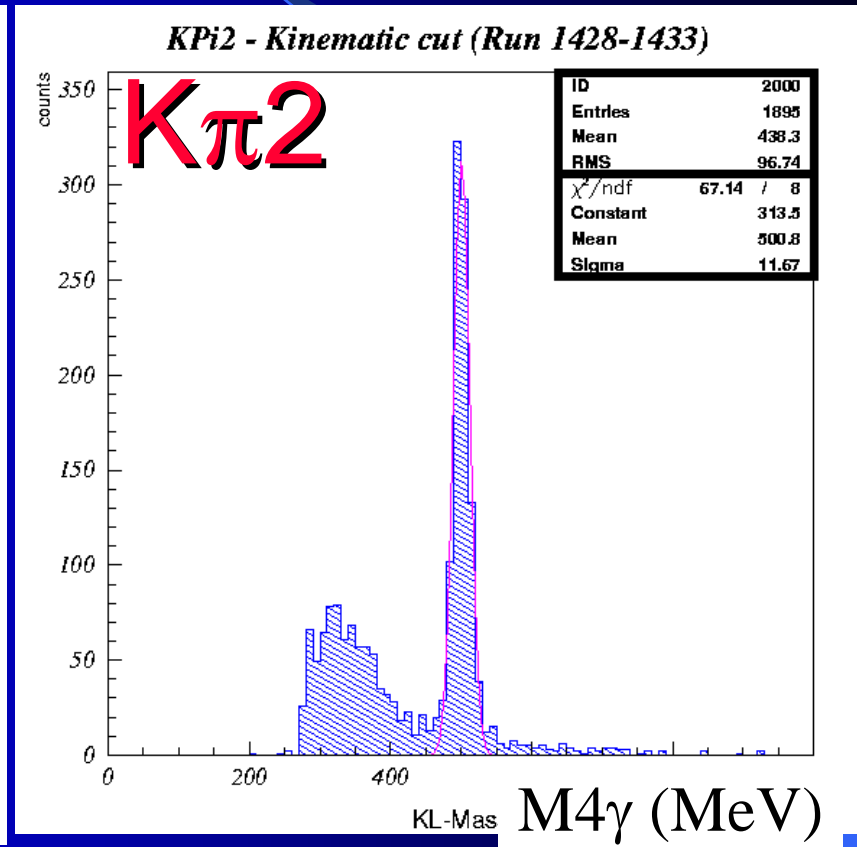
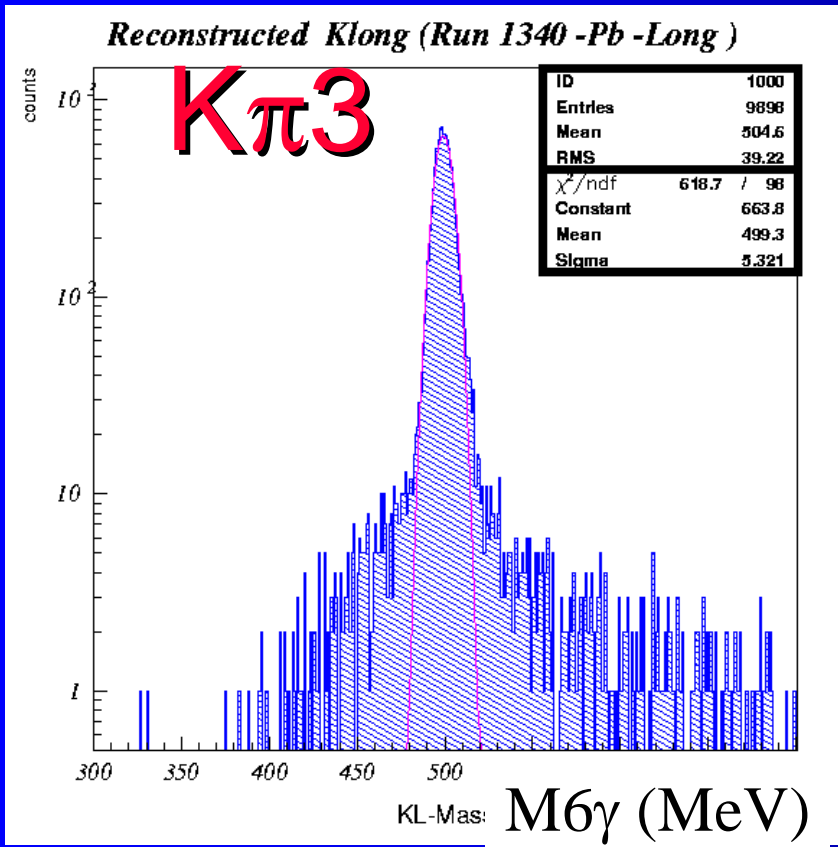
Fig.1



CC04	CC05	CC06	CC07
1 2	1 2	1 2 3 4	1 2 3 4
3 4	3 4	5 6 7 8	5 6 7 8
5 6	5 6	9 10 11 12	9 10 11 12
7 8	7 8	13 14 15 16	13 14 15 16

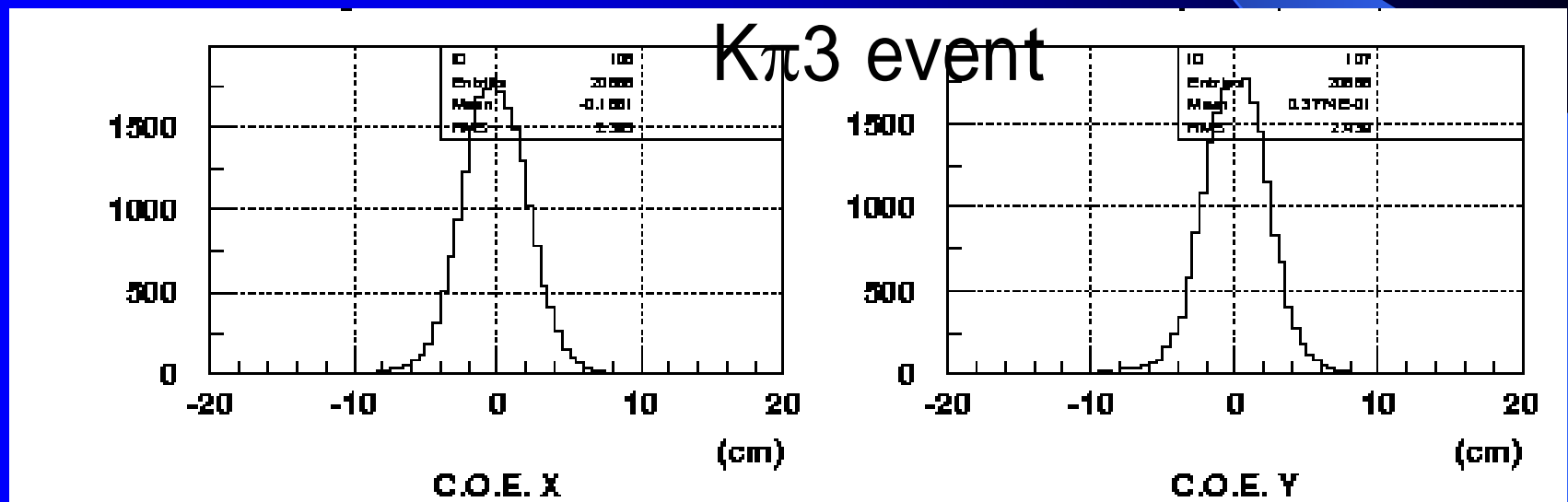
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100
---	---	---	---

Mass spectrum of $K\pi 3$, $K\pi 2$



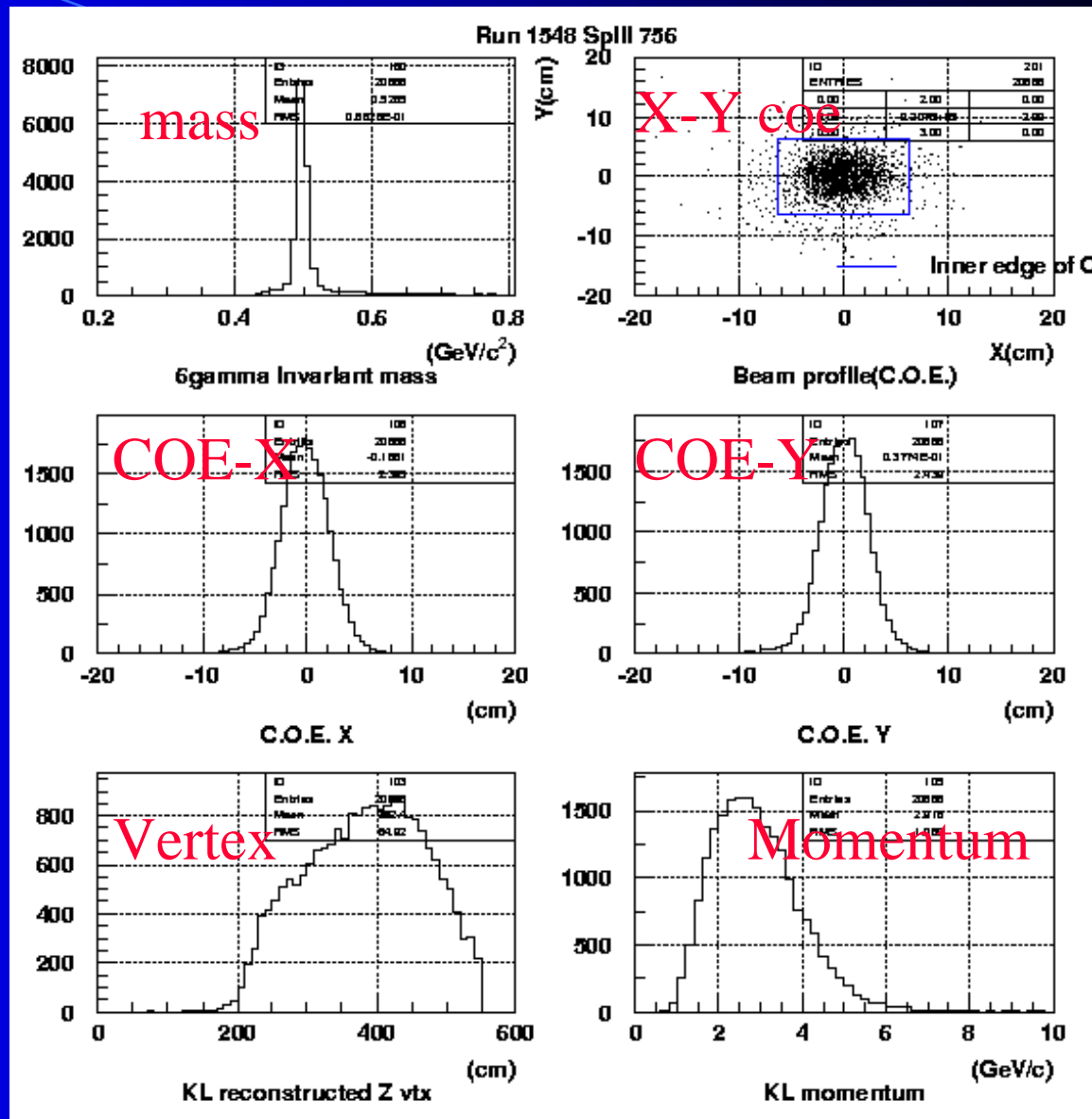
Beam position

- Center of Energy: $COE = \sum x_i E_i / \sum E_i$



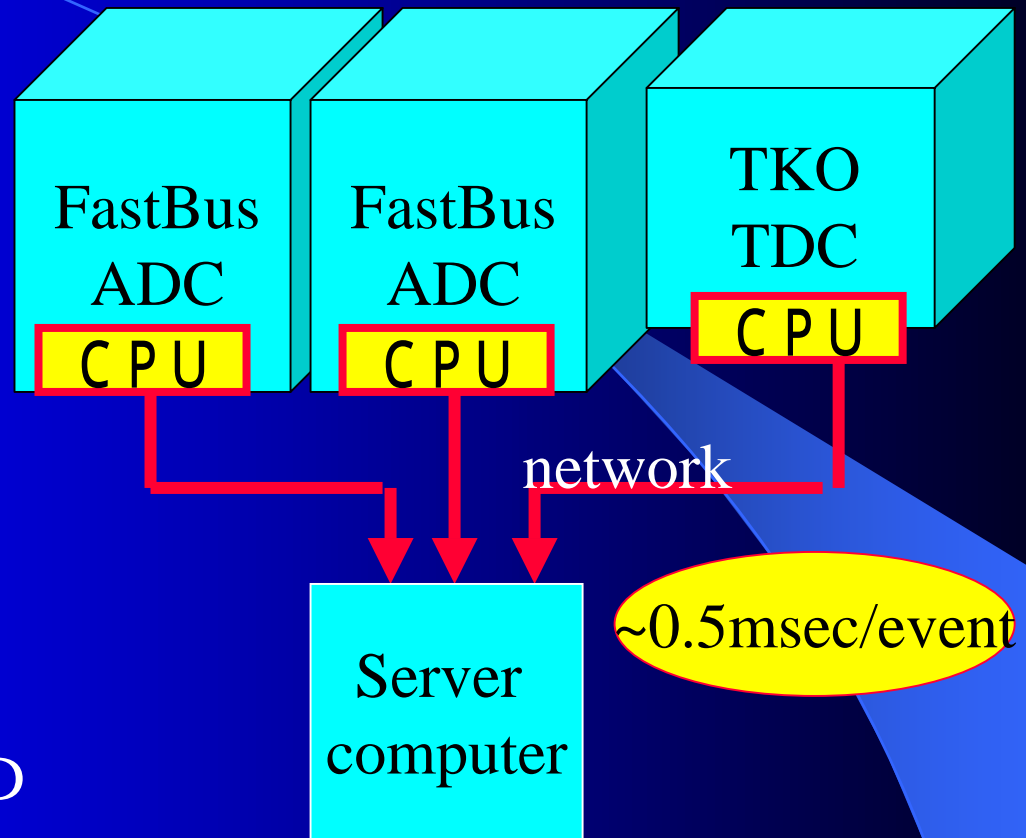
Online monitor

- $K\pi^3$ event
- Beam line turning



Trigger

- π^0 data
 - only 2γ on CsI
 - 40% deadtime
- normalization
 - $K\pi^3$ and $K\pi^2$
- stable operation
 - cosmic
 - Xe lamp and LED
 - muon
- Accidental background
 - clock
 - accidental trigger



Summary

- Experiment start from Feb.17
 - Vacuum is ready
 - Detector tuning by cosmic and μ beam is done
 - Beam line turning is ongoing
 - Trigger study by offline analysis
- Data taking
 - clear peak of $K\pi 2$ and $K\pi 3$
- Physics Run will be start from Mar. 10

Good job!

- **KEK :** M. Dorochenko, T. Inagaki, N. Ishimura, T. Komatsubara, G. Y.Lim, T. Morimoto, H. Okuno, K. Omata, T. Sato, M. Sekimoto, M. Yamaga, Y. Yoshimura
- **Osaka University :** S. Ajimura, Ishii, T.Ikei, Y. Ikemoto, Komatsu, T. Mizubashi, Nishi, M. Nonachi, T. Oba, K.Sakashita, Y.Shibata, Y. Sugaya, E. Tanaka, T. Yamanaka
- **Yamagata University :** M. Itaya, T. Iwata, T.Hariu, M. Moriya, Sato, Y. Tajima, M. Yamamoto, H. Yoshida, Y. Yoshida
- **University of Chicago :** A.Lednev, J. Nix, G. Perdue, E. Pod, M. Raftajizak, Y. Wah, H. Watanabe
- **JINR :** V. Baranov, N. Khomoutov, A. Kurilin, G. Macharashvili, A. Moiseenko, Z. Samalaidze
- **Saga University :** Y. Akune, Y. Fujioka, Ishibashi, N. Kawakubo, S. Kobayashi, T. Kojima
- **PNU :** J.K.Ahn, H.S.Lee, S.Y.Lee
- **NDA :** T. Shinkawa
- **FNAL:** Y.B.Hsiung
- **RCNP:** T. Nakano
- **Kyoto University:** Nomura, Sumida

