Updates on MICE

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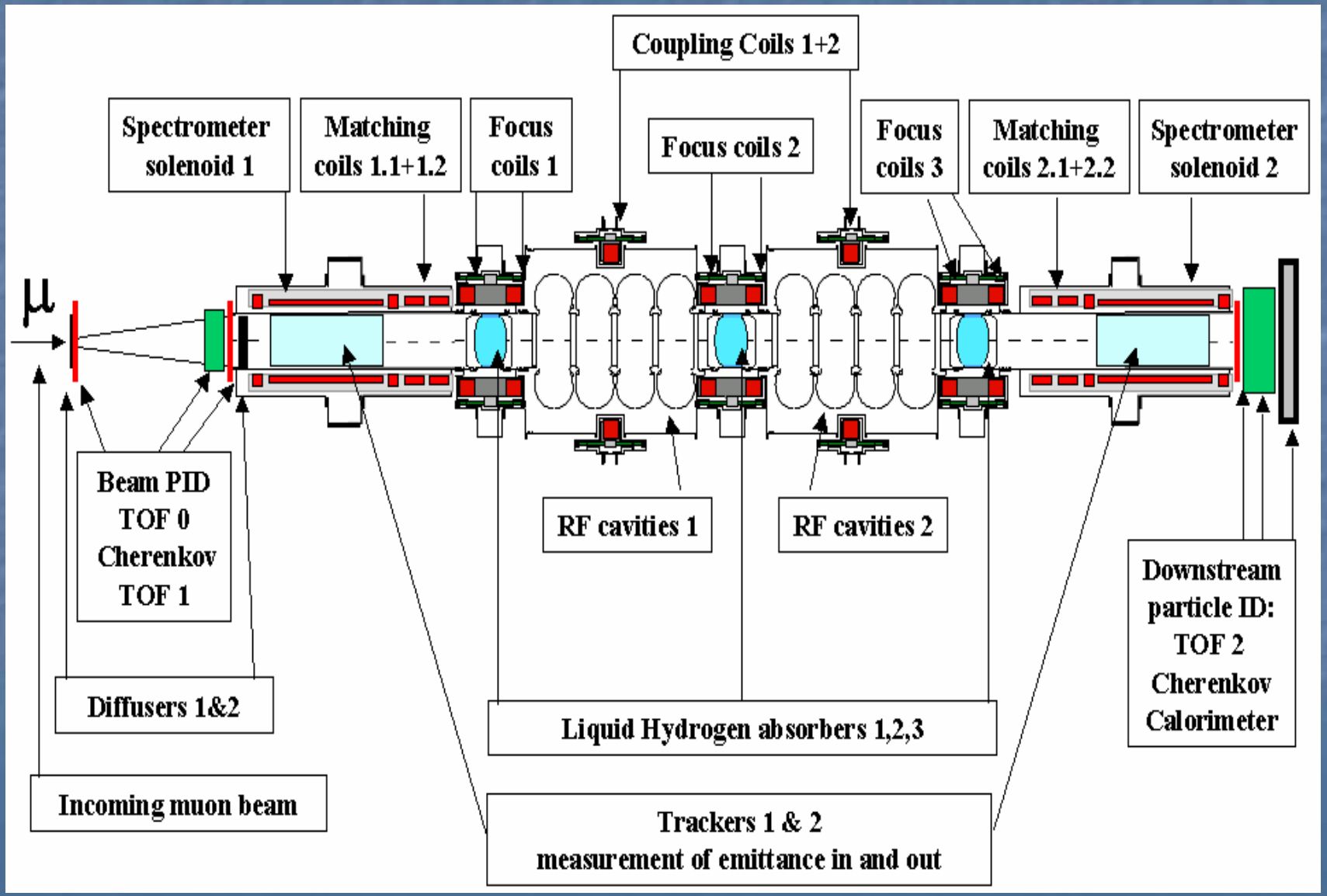
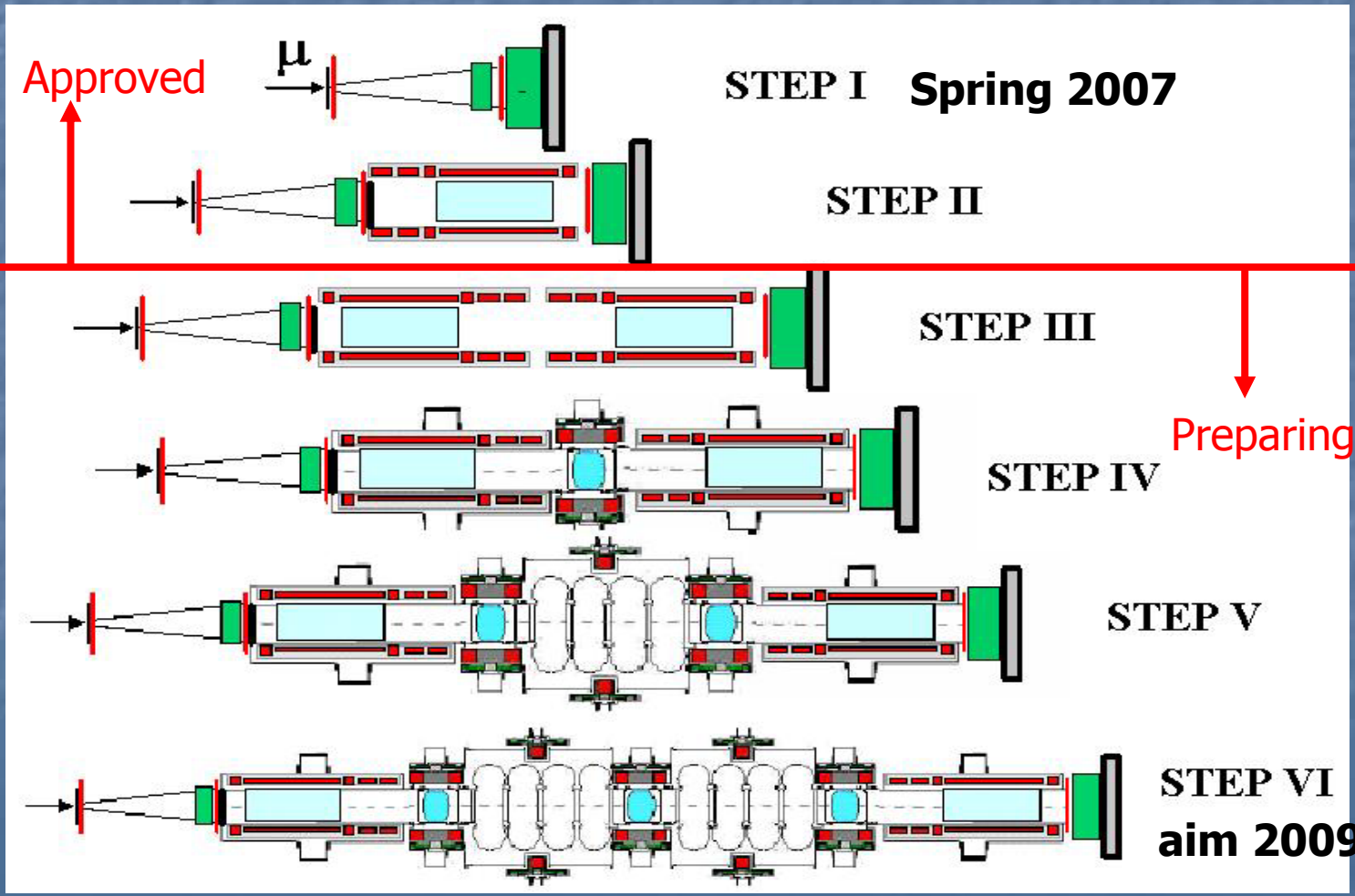
Intl Scoping Study meeting @KEK
2006.1.24

MICE setup


Coupling Coils 1+2
Spectrometer solenoid 1
Matching coils 1.1+1.2
Focus coils 1
Focus coils 2
Focus coils 3
Matching coils 2.1+2.2
Spectrometer solenoid 2
μ
Beam PID
TOF 0
Cherenkov
TOF 1
RF cavities 1
RF cavities 2
Downstream particle ID:
TOF 2
Cherenkov
Calorimeter
Diffusers 1&2
Liquid Hydrogen absorbers 1,2,3
Incoming muon beam
Trackers 1 & 2
measurement of emittance in and out

MICE Step

- Check systematics of components step-by-step



Topics

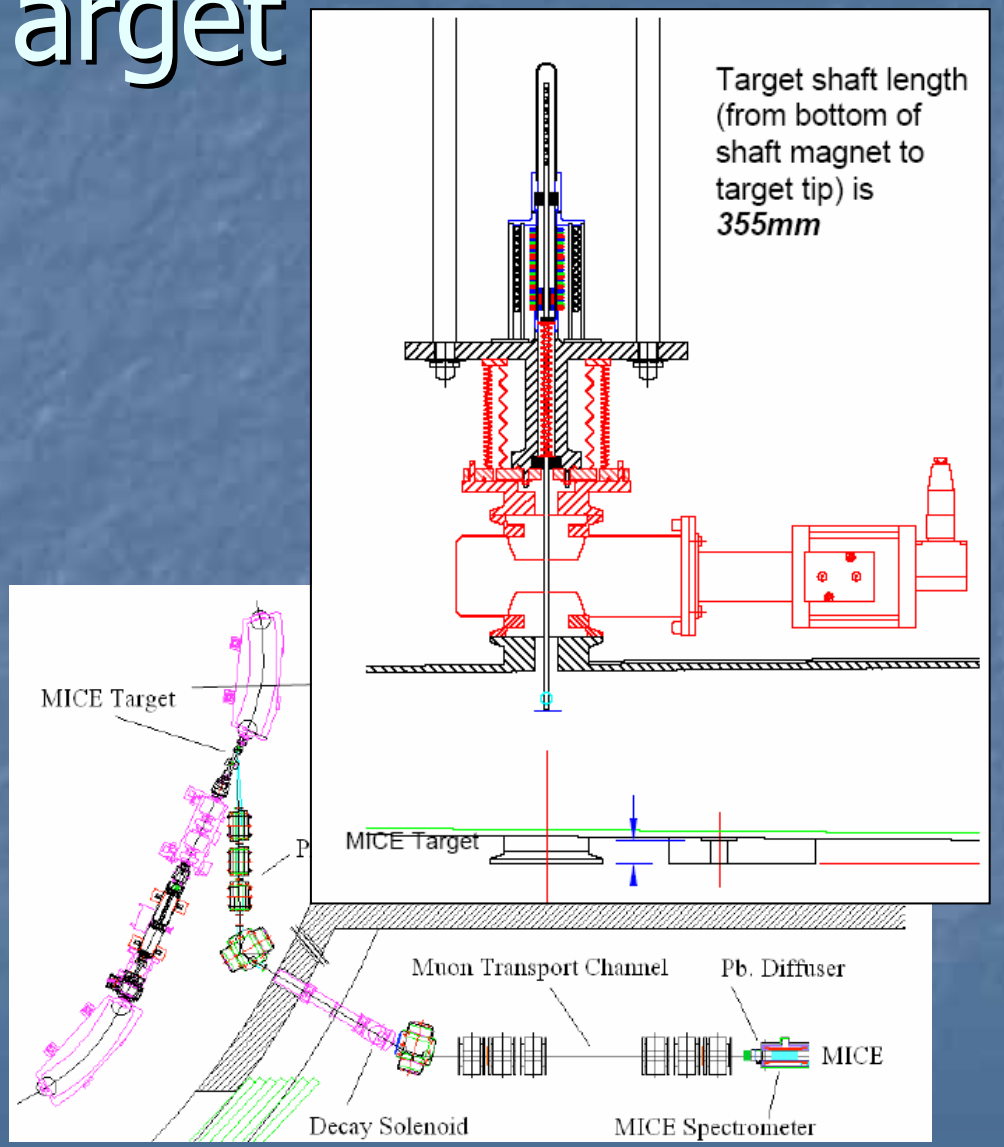
- SciFi tracker prototype test
  - KEK test beam
  - Oct. 2005
  - Improved prototype
  - Newly-designed cryostat with cryocooler
- Design and Safety Review of the MICE Cryogenic Hydrogen System
  - RAL
  - Nov. 2005
- Test cryostat with MICE LH absorber
  - MTA in FNAL
- Plan to test MICE target in ISIS
  - Preparation work for June 2006
  - building target
- Test plan for detectors
- Procurement
  - scintillating / clear fiber
  - 2slot VLPC cryostat
  - superconductor
- Go for construction

MICE hall at RAL

Solenoid arrived on 21st Dec. 2005

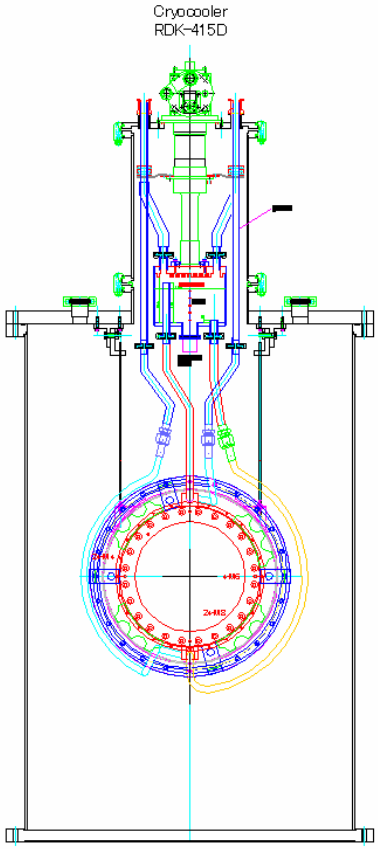
MICE Target

- Target moved by linear actuator scrapes halo of ISIS beam
  - On demand
  - 1 – 3 Hz operation
- Testing the target is planed
  - June 2006
  - background measurement
  - building target

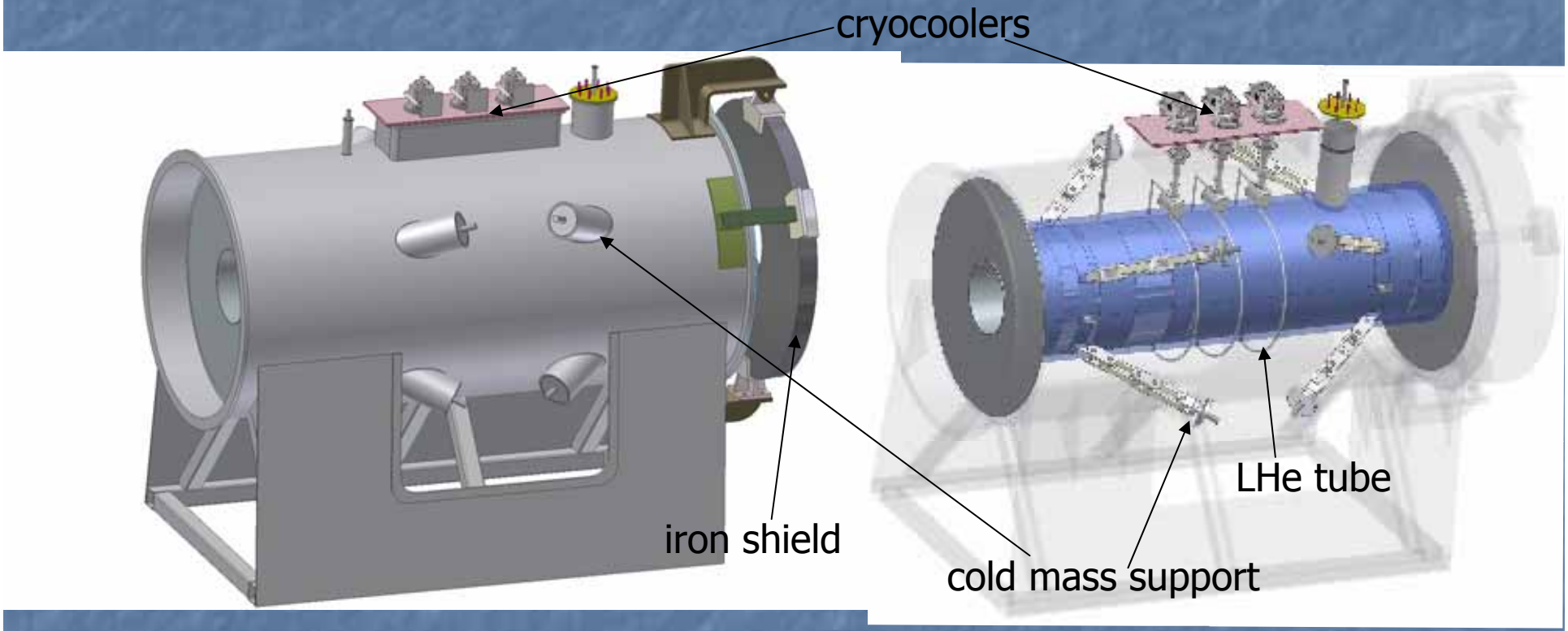


Test cryostat for MICE absorber

- Test cryostat with cryocooler for MICE LH2 absorber
- test at MTA in FNAL



Spectrometer solenoid

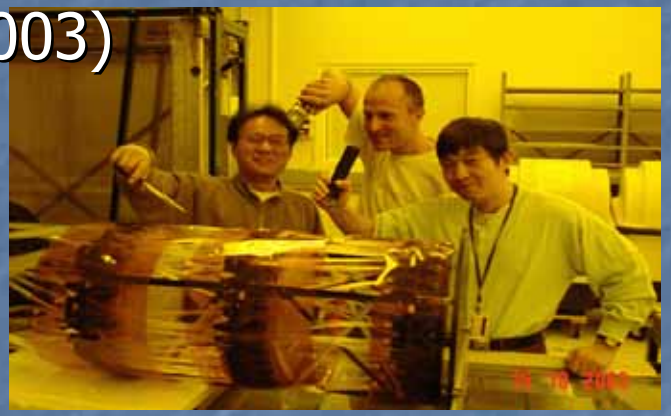


Conceptual design and draft of build-to-spec completed

- field uniformity +-3%
- 3 cryocoolers

SciFi tracker

- Prototype for cosmic-ray test (Oct. 2003)
  - enough high light yield ~ 10 p.e.
  - few dead channels ~ 0.5%
- Prototype with 4 stations
  - new connector design
  - almost final design of waveguide

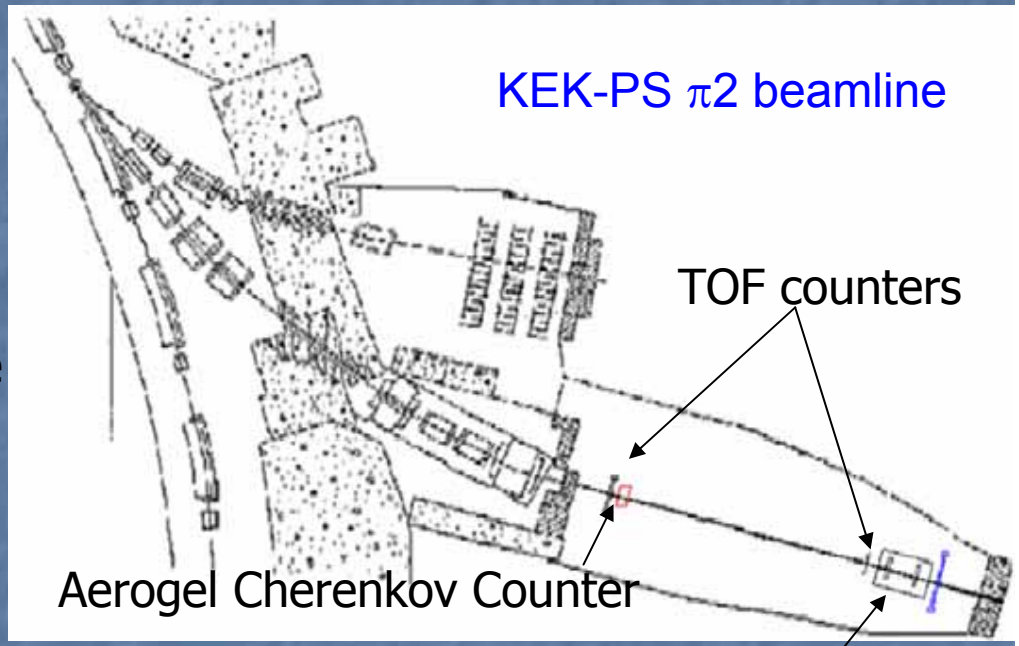


Tracker front-end electronics

- 2-slot Cryostat with Sumitomo cryocooler
  - developped for MICE
- Two VLPC cassettes and prototype AFE II boards borrowed from D∅
- Experience in operation
  - moisture on lid due to high humidity in Japan
  - Pumps were brought far from magnet
  - good long term stability for more than 1 month

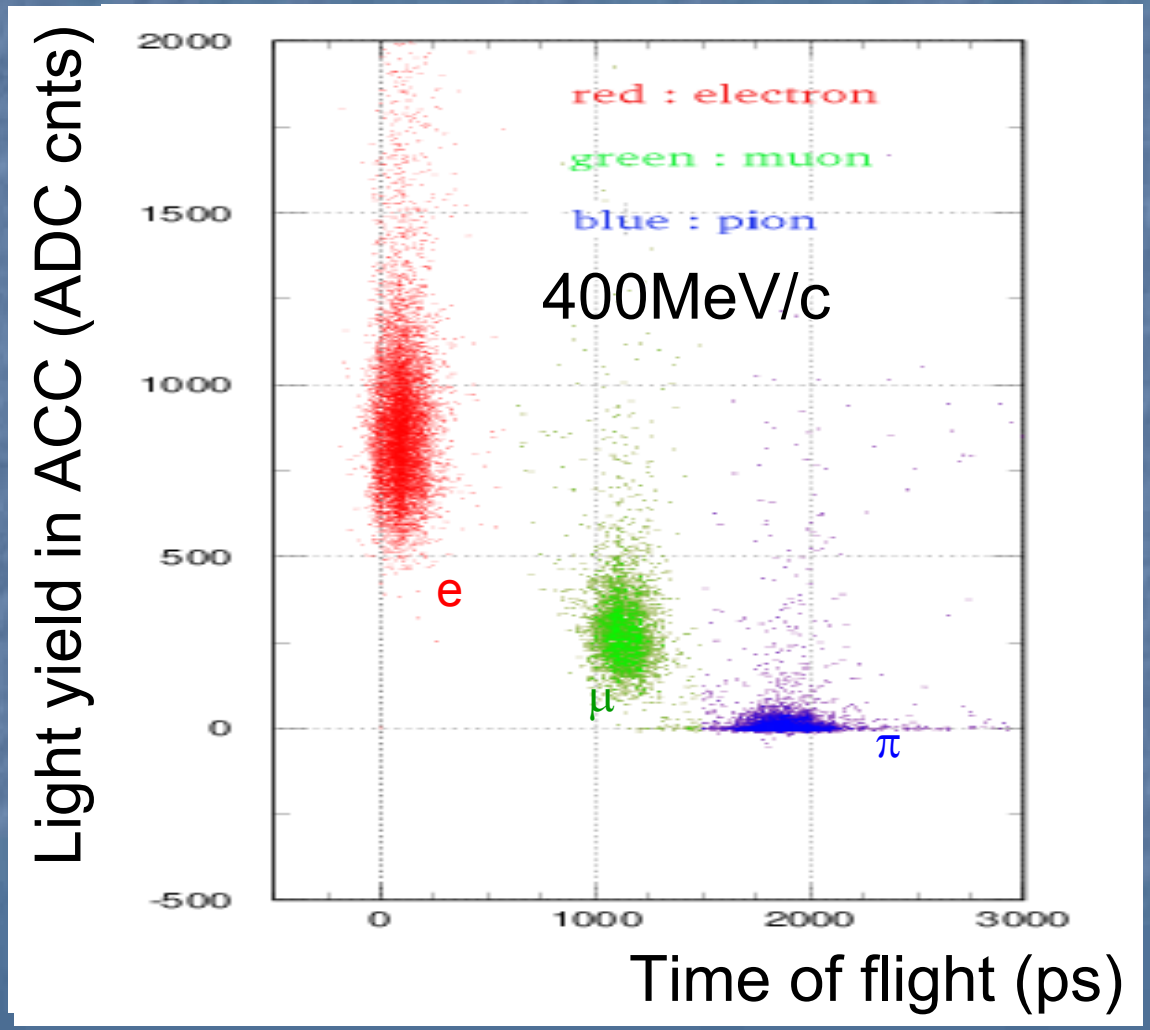
Tracker prototype test in KEK KEK-PS T585

- MICE SciFi tracker group planed testing prototype to check basic performance in 1 Tesla solenoid magnet.
- KEK-PS T585 was performed in Sept. – Oct. 2005 by world-wide collaboration.
- Participants: more than 20 people joined.
  - M. Yoshida, K. Yoshimura, H. Sakamoto, A. Horikoshi, K. Sakai, Yoshi Kuno, A. Sato and several students
  - Aron. Fish, Roger. Hare, K. Long, M. Ellis
  - Amit Klier, Kwame. Bowie, Xiofeng Yang, Alan Bross , P. Rubinov
  - J.S. Graulich



Tracker installation

Particle identification by TOF & ACC

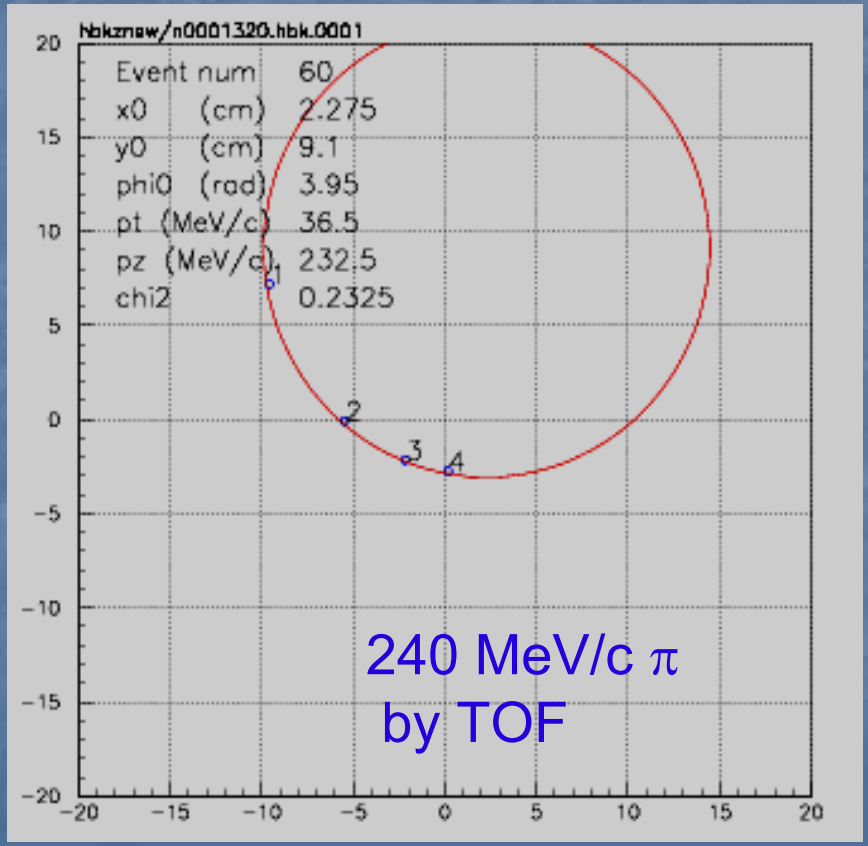


- Good PID performance for e/μ/π
- TOF resolution ~ 60 ps
- Light yield in ACC ~ 30 p.e.

Tracker performance

- Succeeded to observe particle track in 1Tesla magnetic field
- Light yield in old stations are stable.
- Detail analysis on going to drive the performance

First reconstructed track in magnetic field



Summary

- MICE phase-I has been approved, and preparing for Phase-II
  - MICE will start in spring next year (2007)
- Tracker test successfully preformed
- Hydrogen absorber cooled by cryocooler is tested
- Target in ISIS will be tested
- Moving on construction phase
  - fiber procurement
  - superconducting solenoid
  - etc…