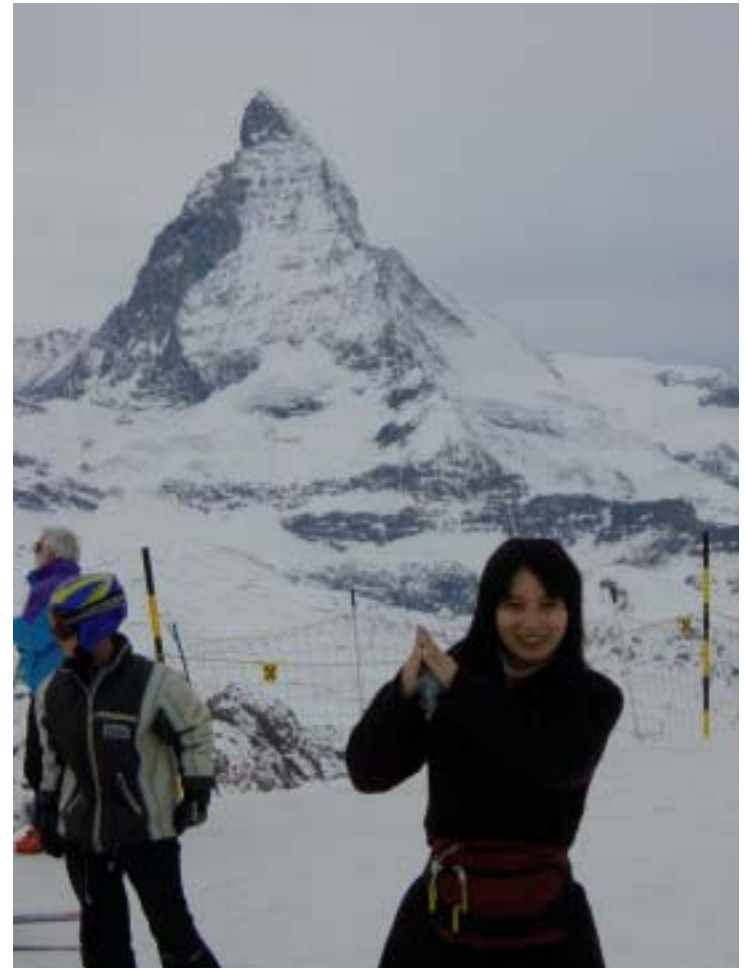


# Development of radiation resistant magnet in KEK

E. Kusano,  
K. H. Tanaka,  
BCG





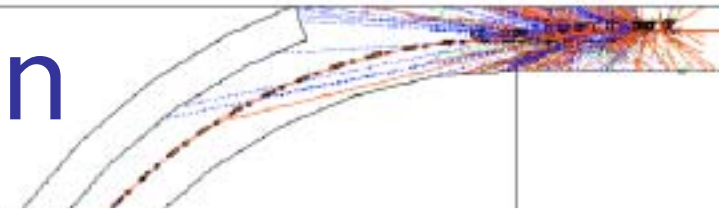
# Contents

---

- Motivation
- MIC (Mineral Insulation Cable) Magnet
- Quick Disconnect System
- Summery

By Ichikawa-san

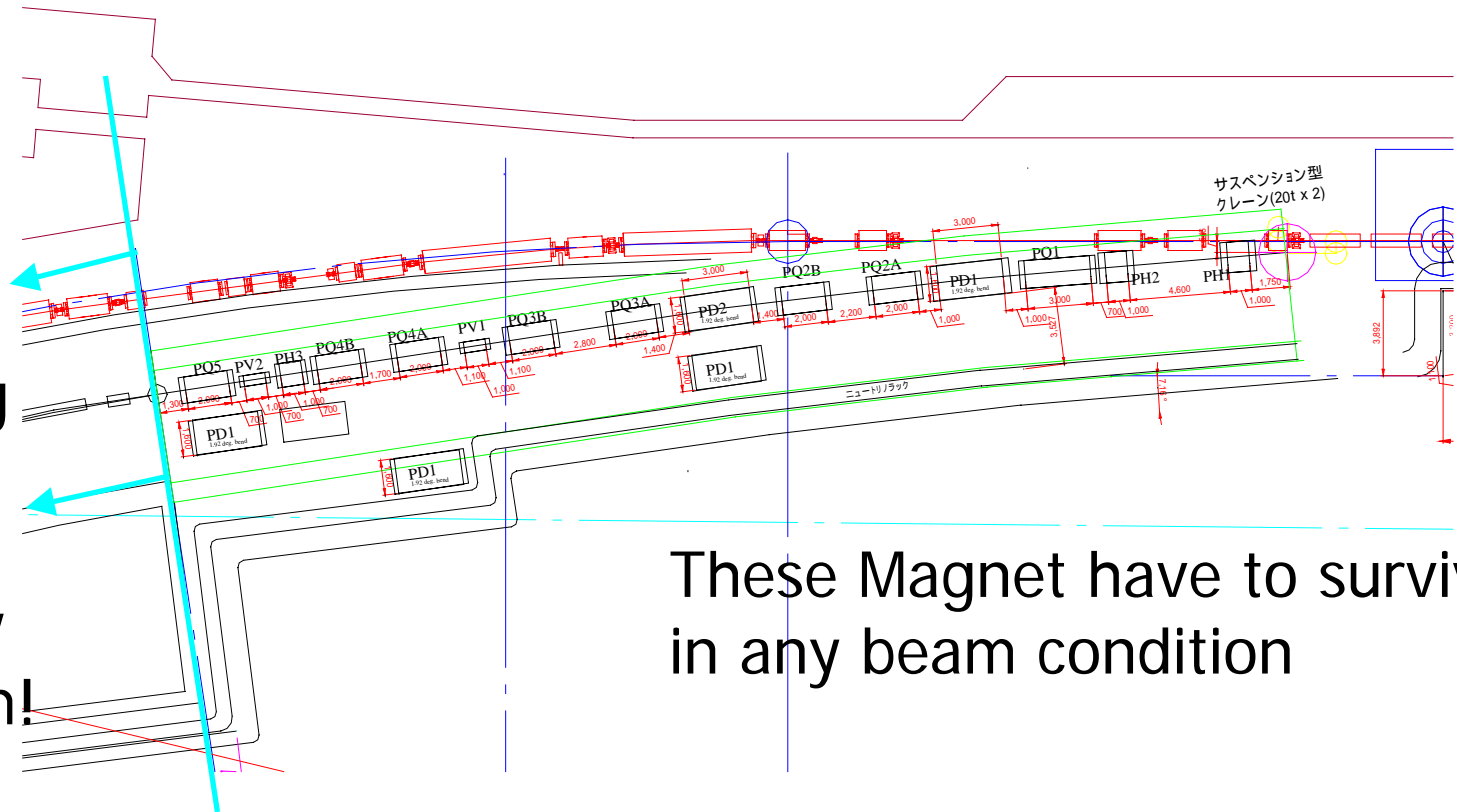
# Preparation Section



Unexpected beam

Super  
Conducting  
Magnets

Completely  
clean beam!

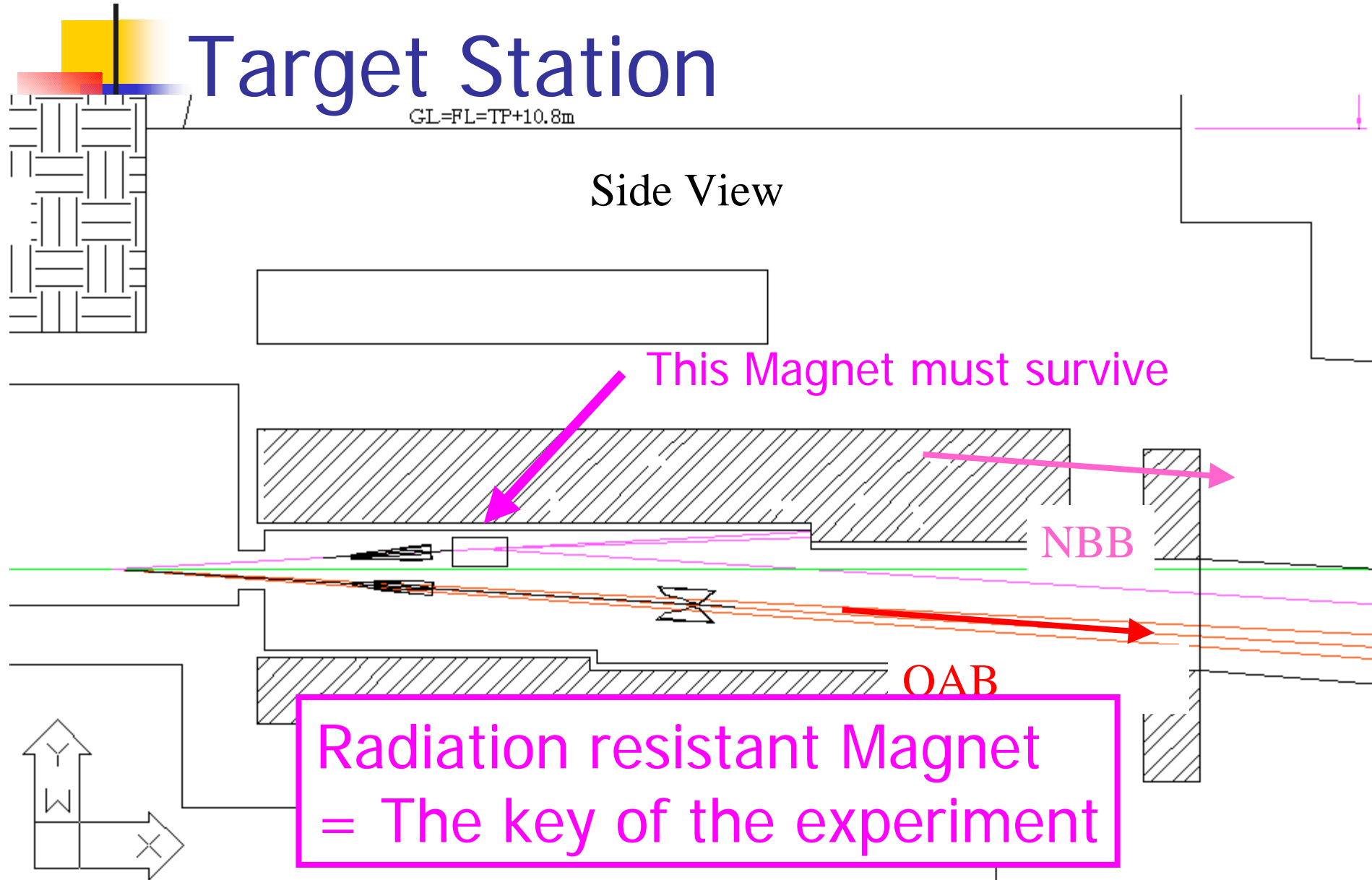


These Magnet have to survive  
in any beam condition

# Target Station

GL=FL=TP+10.8m

Side View



This Magnet must survive

NBB

OAB

Radiation resistant Magnet  
= The key of the experiment

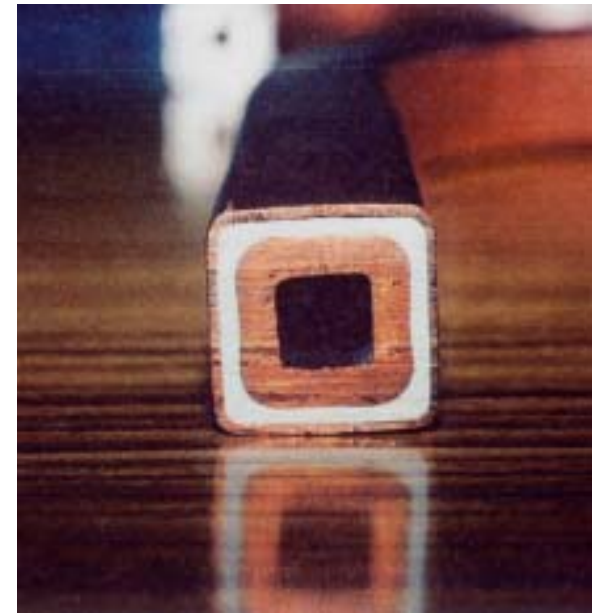
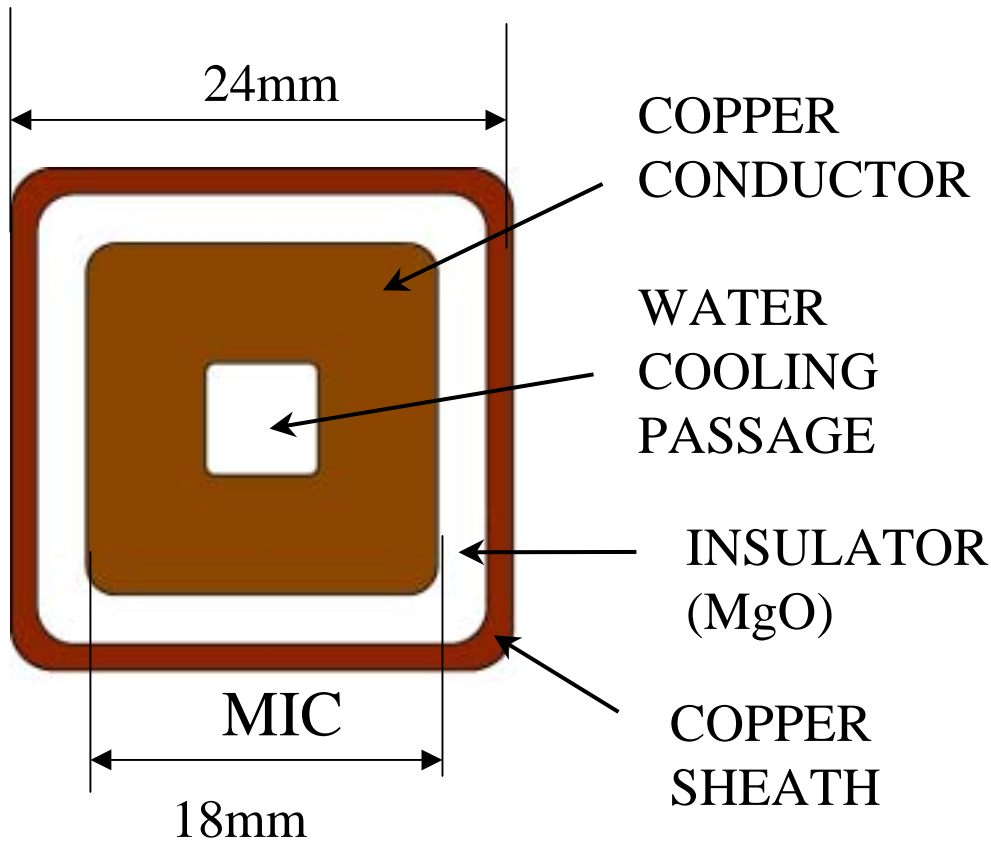


# Radiation Resistant Magnet

---

- Epoxy Magnet  $\sim 10^7$ Gy
  - cannot be used
- Polyimide Magnet  $\sim 10^8$ Gy
  - Down-stream of Preparation Section
  - Final Focus section
- MIC(Mineral Insulation Cable)  $\sim 10^{11}$ Gy
  - Target Station
  - Up-stream of Preparation Section

# 2500A-class MIC (Mineral Insulation Cable)



# Insulator



MgO  
Powder  
(95%Mg  
O+oil)



Press Machine

MgO block

The external  
diameter:80mm  
The  
thickness:8mm



Left:Before baking  
Right:After baking  
(oil is removed)



# 60m Drawing



Initial pipe  
The external  
Diameter: 90mm  
The length: 8m



Insert MgO to  
Copper tube



60m drawing

Accuracy = 70 ~ 130%

<-High-Pot. Leak test



# Winding



Left:  
Coil Winding



Right:  
The coil end  
treatment



# MIC Magnet (60m, 2500A Coils)

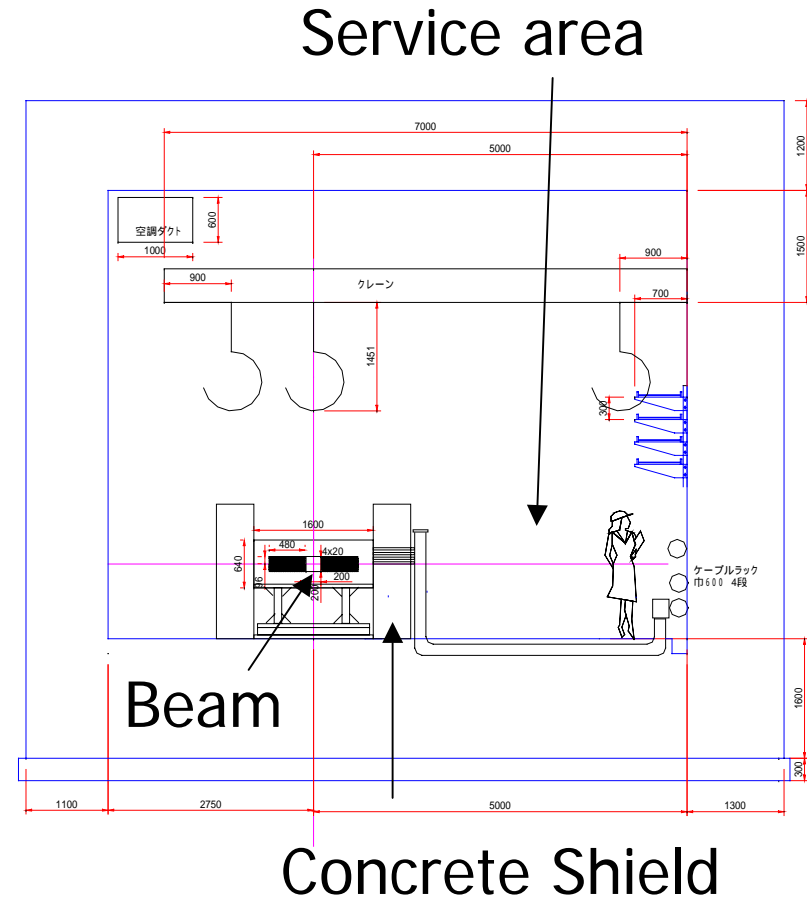
- Nominal: 3000A/34V
  - $T_{\text{water}} = 37$   
(10kg/cm<sup>2</sup>, 35Lit./m)
- Max: 3600A/41V
  - $T_{\text{water}} = 60$   
(10kg/cm<sup>2</sup>, 35Lit./m)

Already prepared  
2000A class MIC  
1000A class MIC



# Next Step

- Maintenance quickly from the distant location.
- quick disconnect
- quick alignment
- We started the quick disconnect system test.





# Summery

---

- MIC magnet technology was established
  - Length of 2500A-MIC is extended to 60m
  - Test magnet assembled with 60m-2500A MIC can be operated up to 3600A(Nominal 3000A)
  - Ready for the construction of JHF facility
- Next step is to establish the quick disconnect system from distant location