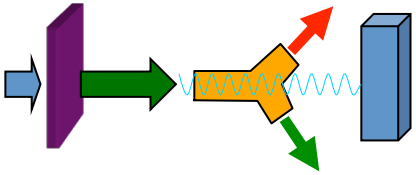
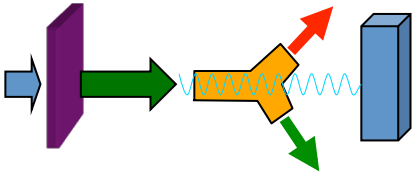


Brief Report on Hybrid target experiment at KEK-LINAC

T.Takahashi

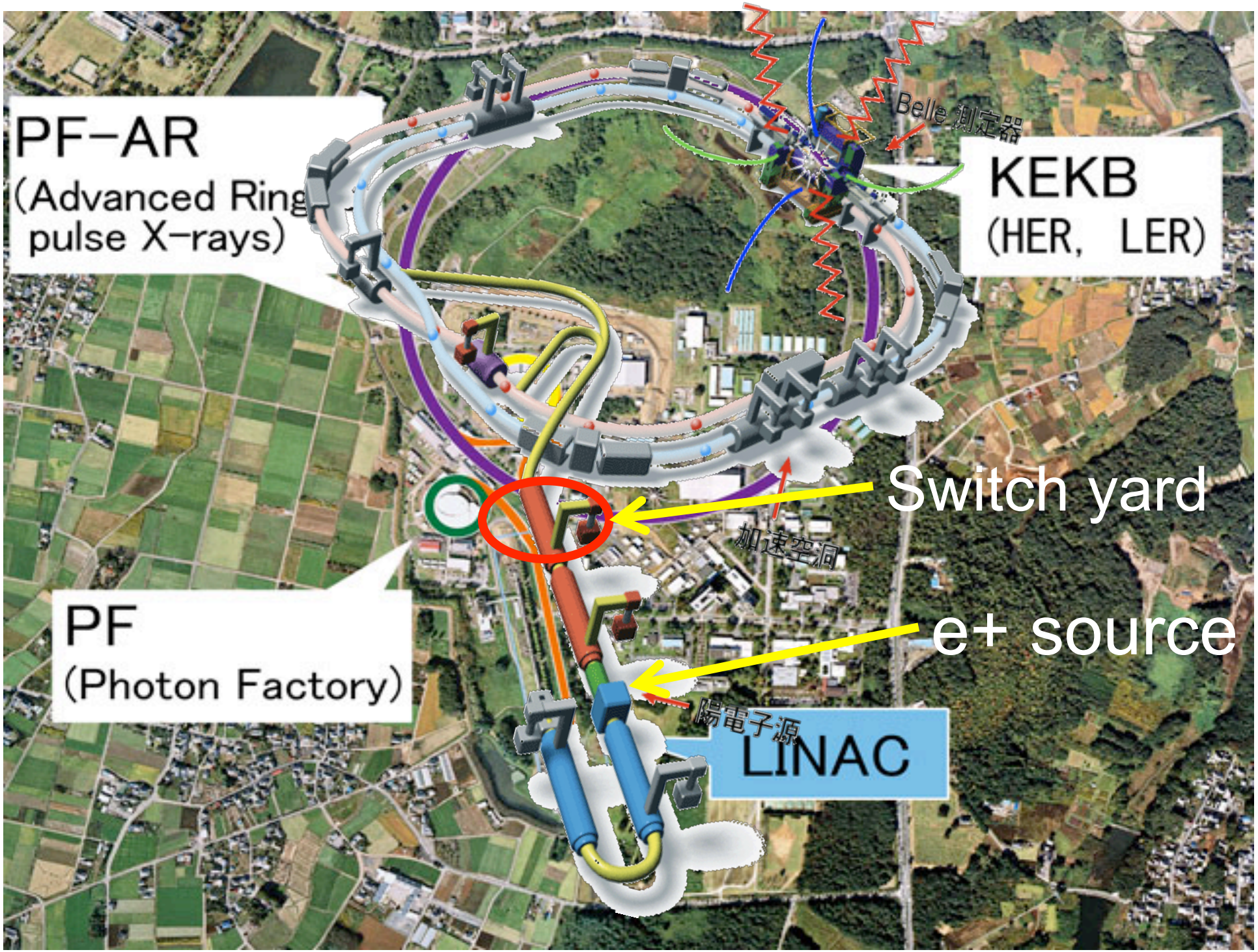
Hiroshima University

14 January 2010

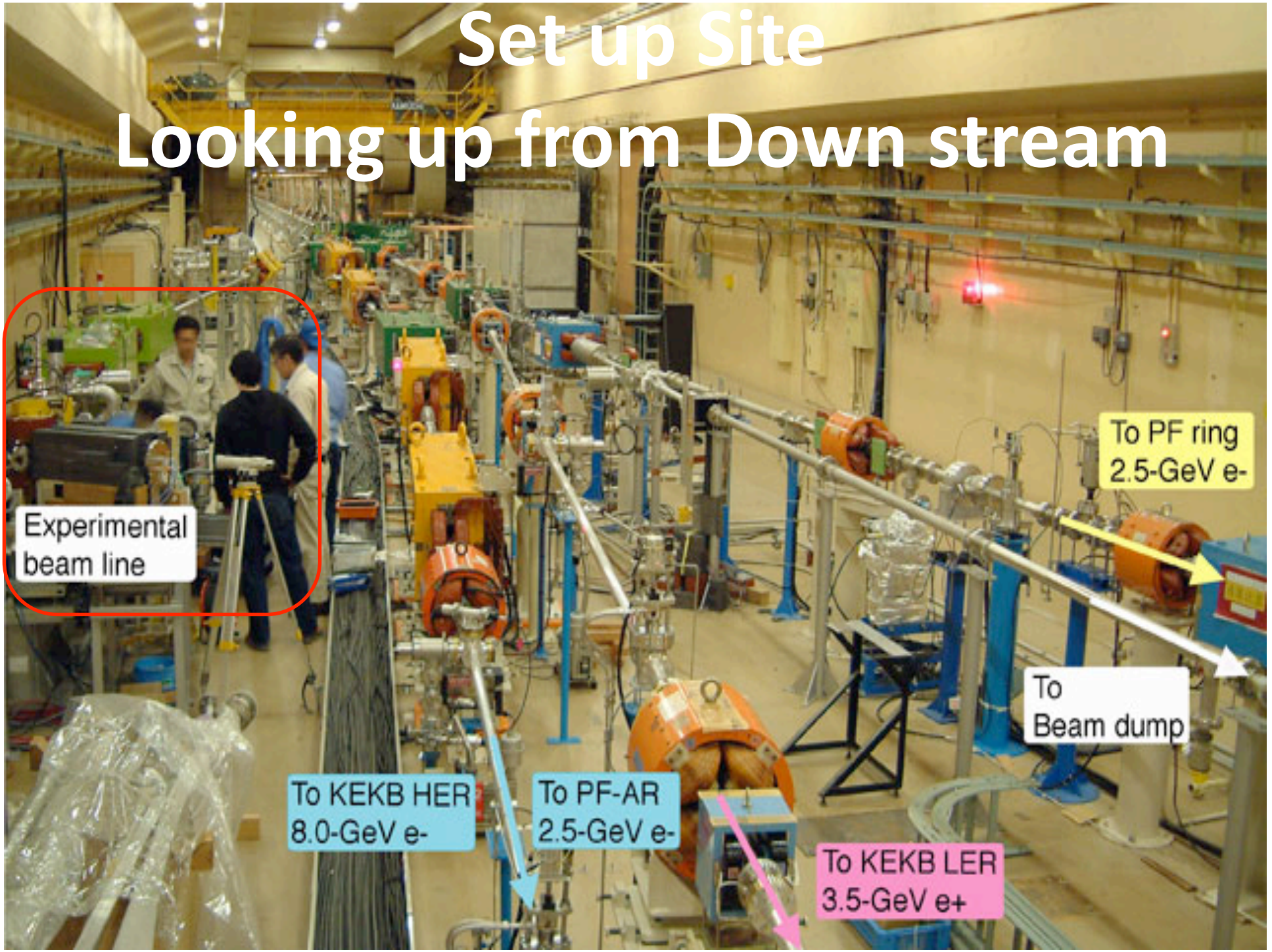


2nd Hybrid Experiment

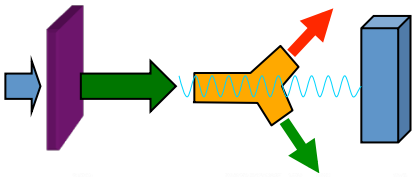
- 10 January – 11 January at KEKB LINAC
  - E(beam) : 8GeV
  - Bunch Charge: ~nC
  - Repetition : up to 50Hz
- Purpose of 2nd experiment
  - confirm results of previous experiment (Sep 2009)
  - measure temperature of amorphous targets
    - 8mm tungsten with hybrid configuration
    - 18mm tungsten with conventional configuration
    - changing beam repetition rate


PF-AR
(Advanced Ring
pulse X-rays)
Belle 測定器
KEKB
(HER, LER)
Switch yard
加速空洞
e+ source
PF
(Photon Factory)
陽電子源
LINAC

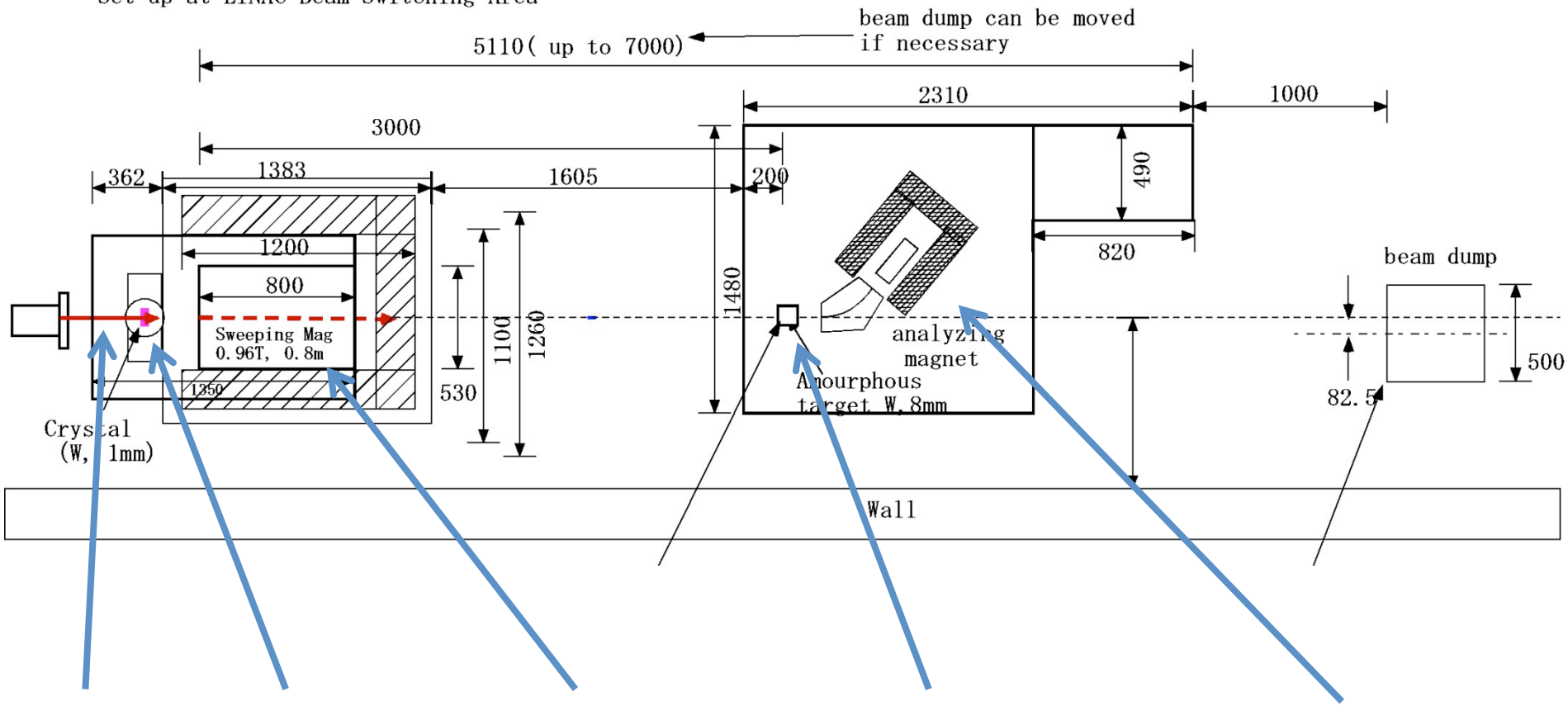
Set up Site
Looking up from Down stream



Setup



Set up at LINAC Beam Switching Area



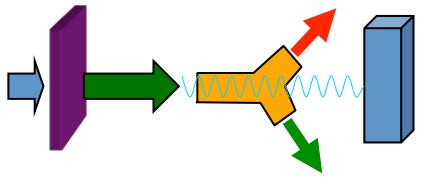
8GeV e-

1mm
W crystal

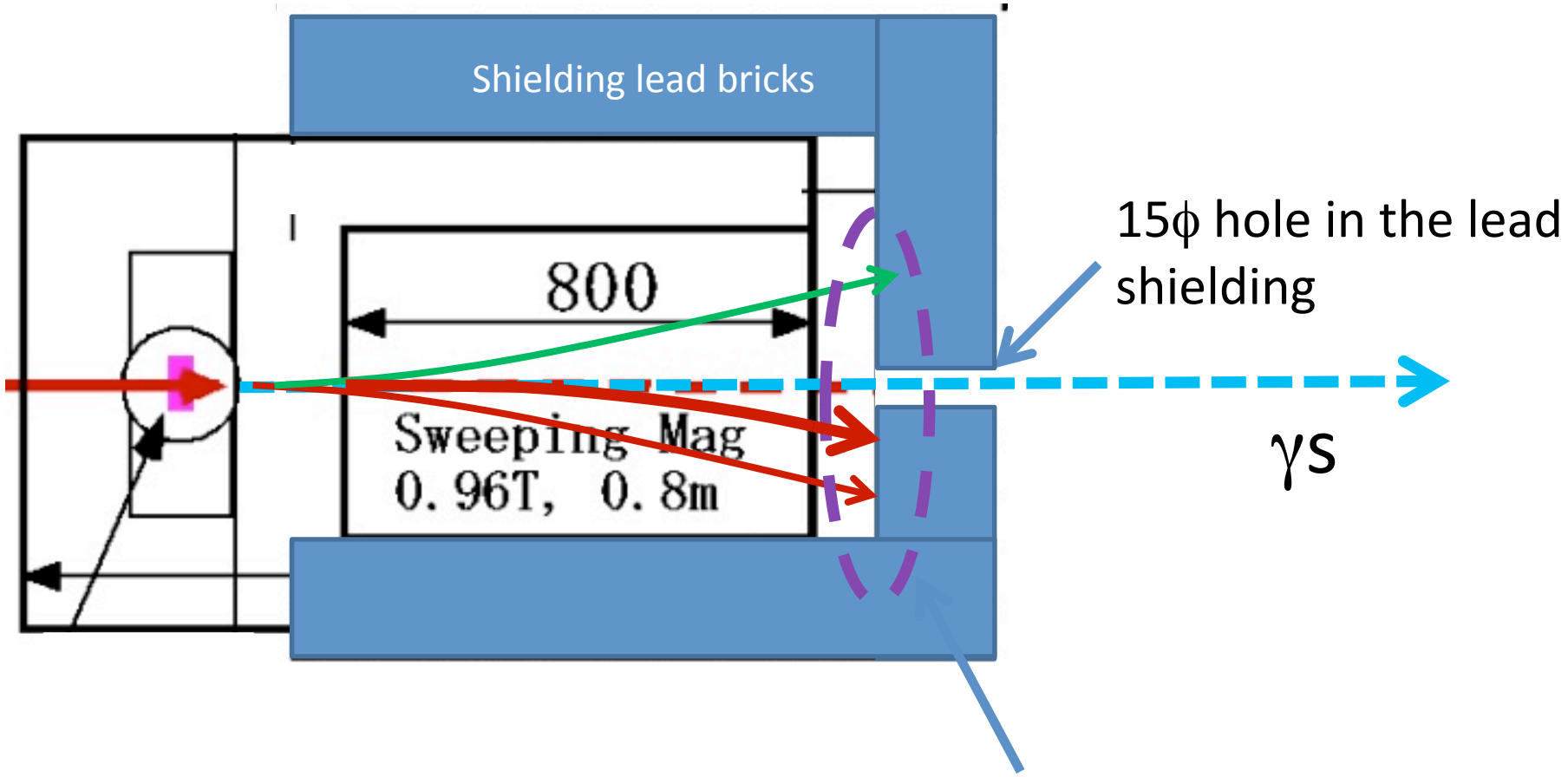
Sweeping Magnet
0.96T 0.75m

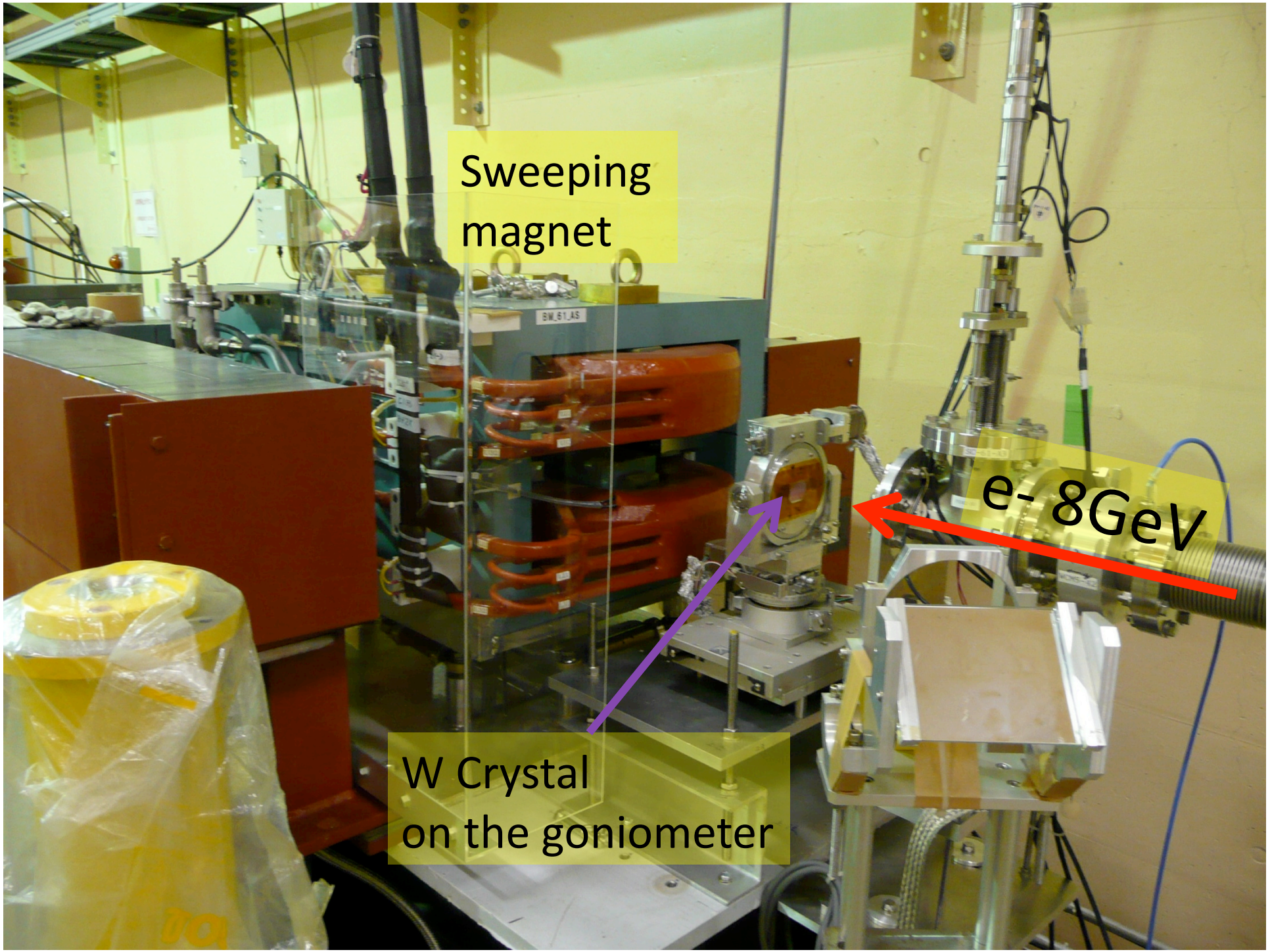
amorphous W
8 mm
18 mm

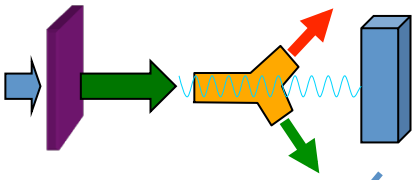
Analyzing magnet
5 ~ 30MeV



Around the crystal target




Sweeping
magnet
e- 8GeV
W Crystal
on the goniometer



at the amorphous target

thermocouples
to measure
temperature

8 mm W

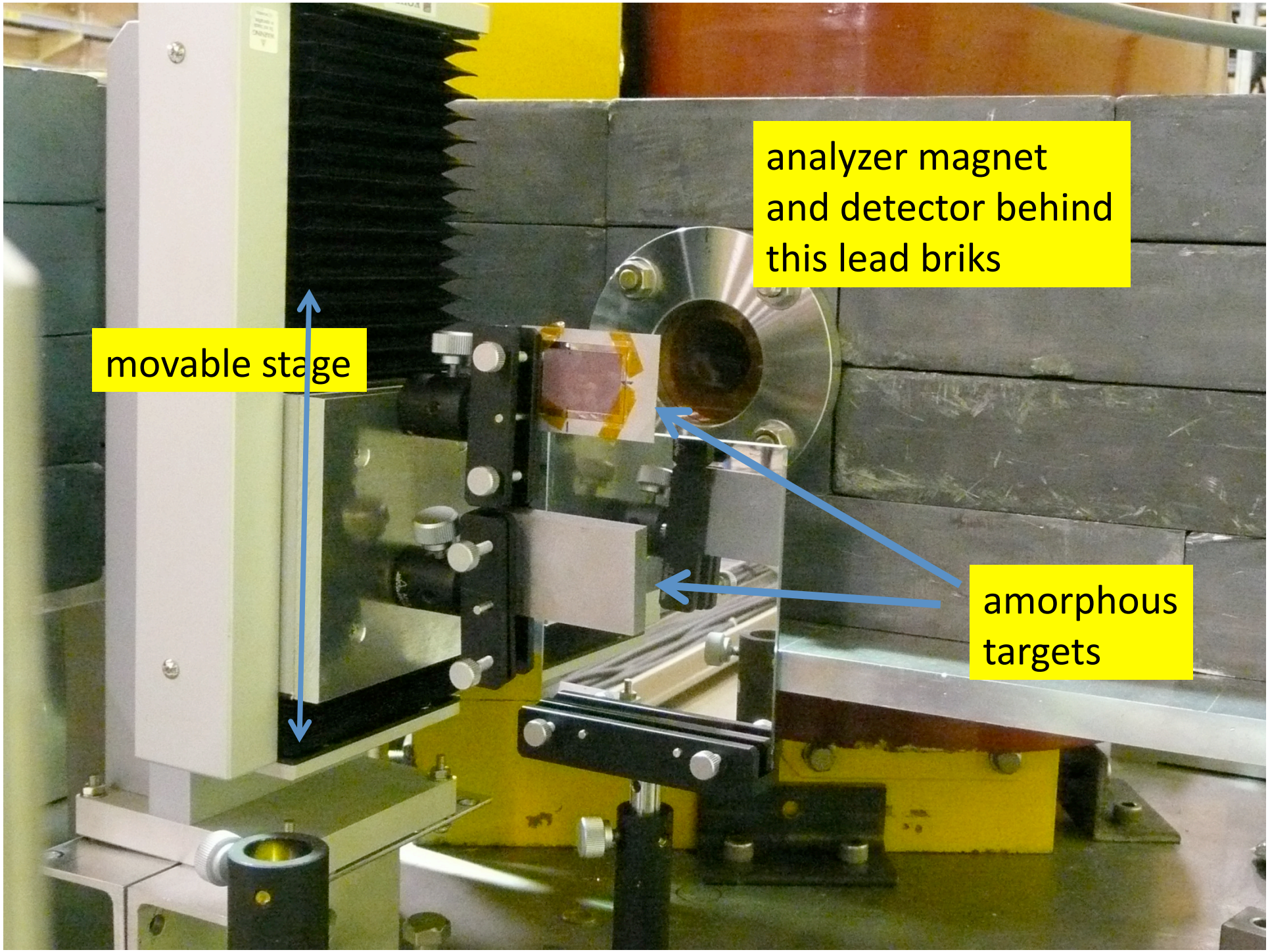
18 mm W

e- or
γ from crystal

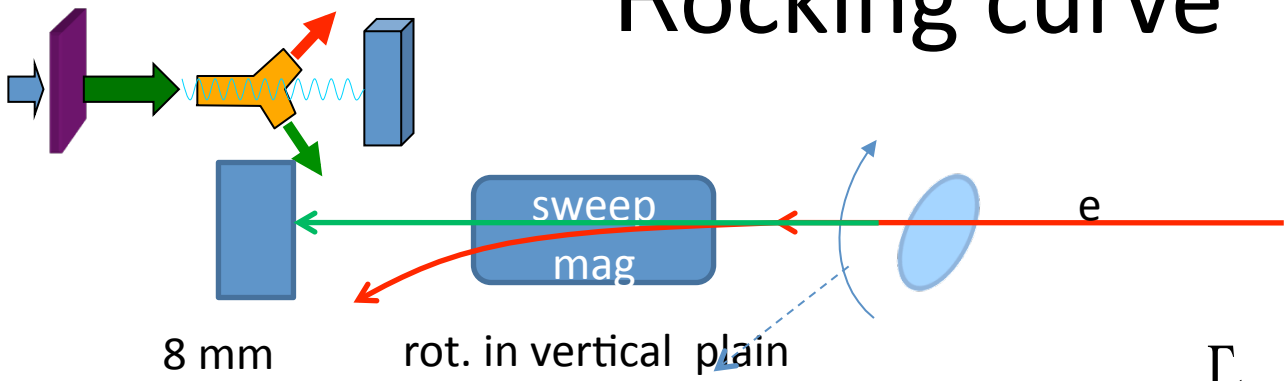
movable table

radiation
thermometer

had to take it off due to radiation
damage


analyzer magnet
and detector behind
this lead briks
movable stage
amorphous
targets

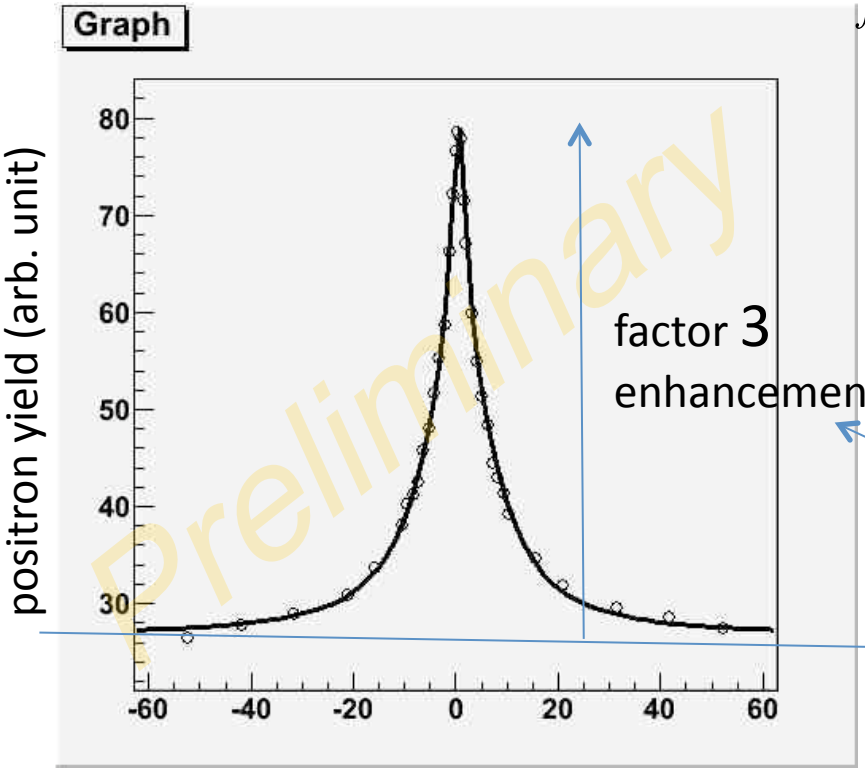
Rocking curve



$$f(\theta) = A\frac{\Gamma_1}{\left(\theta - \langle\theta\rangle\right)^2 + \Gamma_1^2} + B\frac{\Gamma_2}{\left(\theta - \langle\theta\rangle\right)^2 + \Gamma_2^2} + Const$$

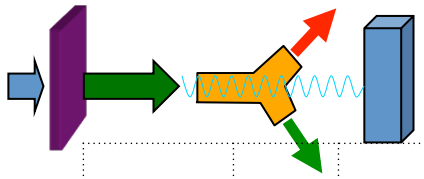
$$\Gamma_1 = 3.4 \pm 0.1$$

$$\Gamma_2 = 17.7 \pm 0.4$$



it was 1.2 in 2009 Sep data
we found the detector was
saturated in previous exp.

same for horizontal rotation

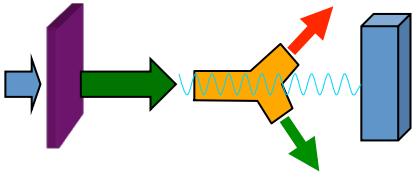


data

hybrid configration

conventional configration

Crystal	axis	amorphous	Sweep mag	beam rep.	momentum	
on	on	8mm	on	25		
off	-	18mm	off	25		
off	-	8mm	off	25		
on	on	8mm	on	25		
on	on	18mm	on	25	20 MeV	temperature measurements
off	-	18mm	off	12.5		
off	-	18mm	off	14		
off	-	8mm	off	12.5		
on	on	8mm	on	12.5		
on	off	8mm	on	25		
on	off	8mm	on		10 MeV	
on	on	8mm	on	25	20MeV	
on	on	18mm	on	25	20MeV	
on	on	8mm	on	25	10MeV	
on	on	18mm	on	25	10MeV	
off	-	8mm	off	25	20MeV	
off	-	18mm	off	25	20MeV	momentum dristribution
off	-	8mm	off	25	10MeV	
off	-	18mm	off	25	10MeV	
on	off	8mm	off	25	20MeV	
on	on	8mm	off	25	20MeV	



Summray and prospect

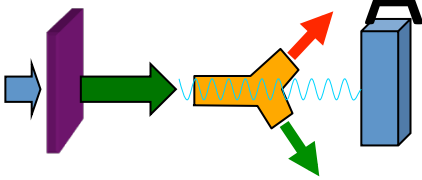
- Accumulate more data for
  - hybrid configuration
  - conventional configration
- with various combination of
  - 1 mm crystal
  - 8mm and 18 mm amorphous targets
  - sweeping magnet on/off
- temperature of amorphous target were measured
- momentum dependence

- data analysis going on
- comparison with simulation is impotant
  - Geant 4 simulation for amorphou is being ready at Hiroshima
  - need crystal part with realistic beam condition

LCWS10 in March 26~30 in Beijing

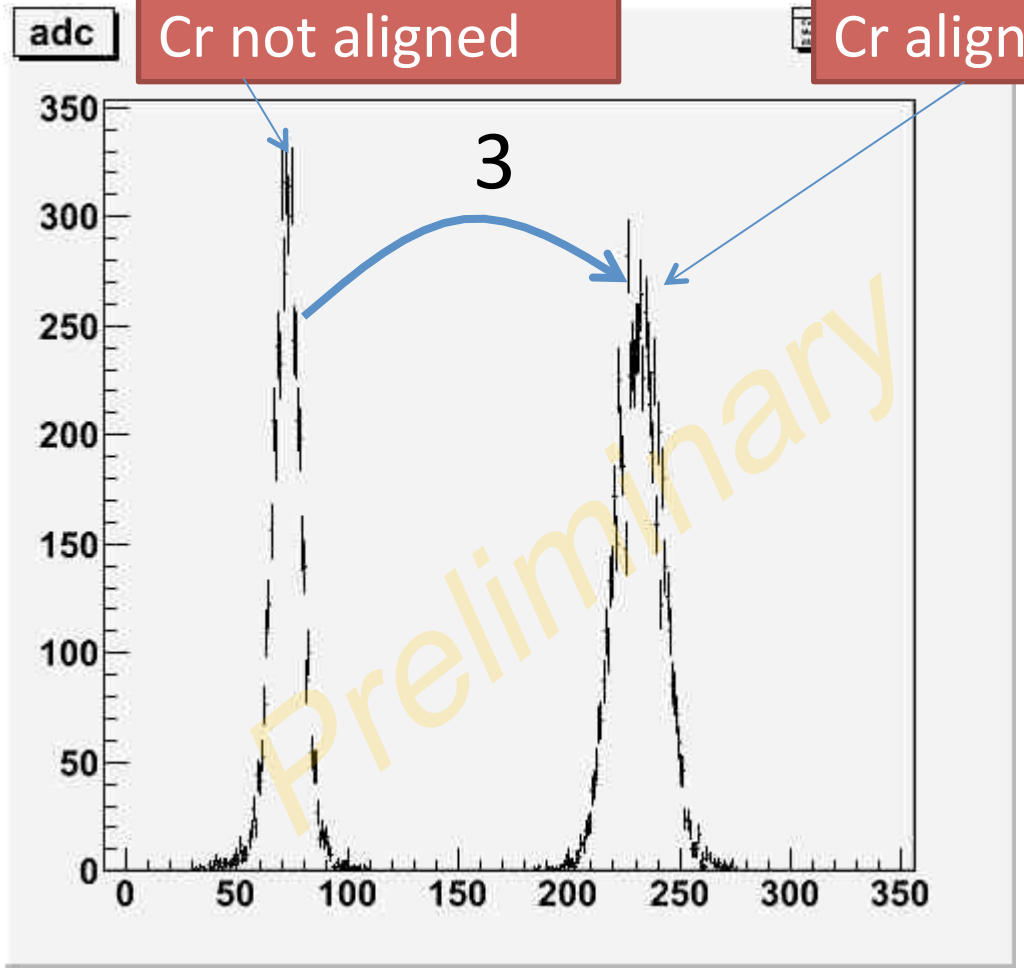
next beam time expected in beginning of July

After BG substraction



amorphous
8mm
Cr not aligned

amorpous
8mm
Cr aligned



number of counts /bin

ADC counts