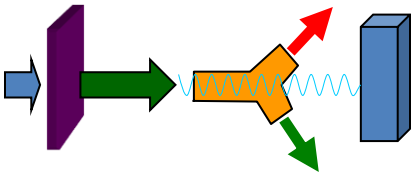


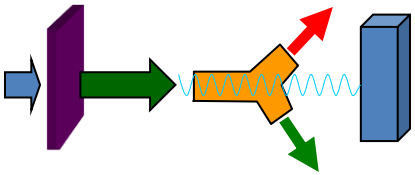
Status of Hybrid target R&D at KEK-LINAC

T.Takahashi

Hiroshima University

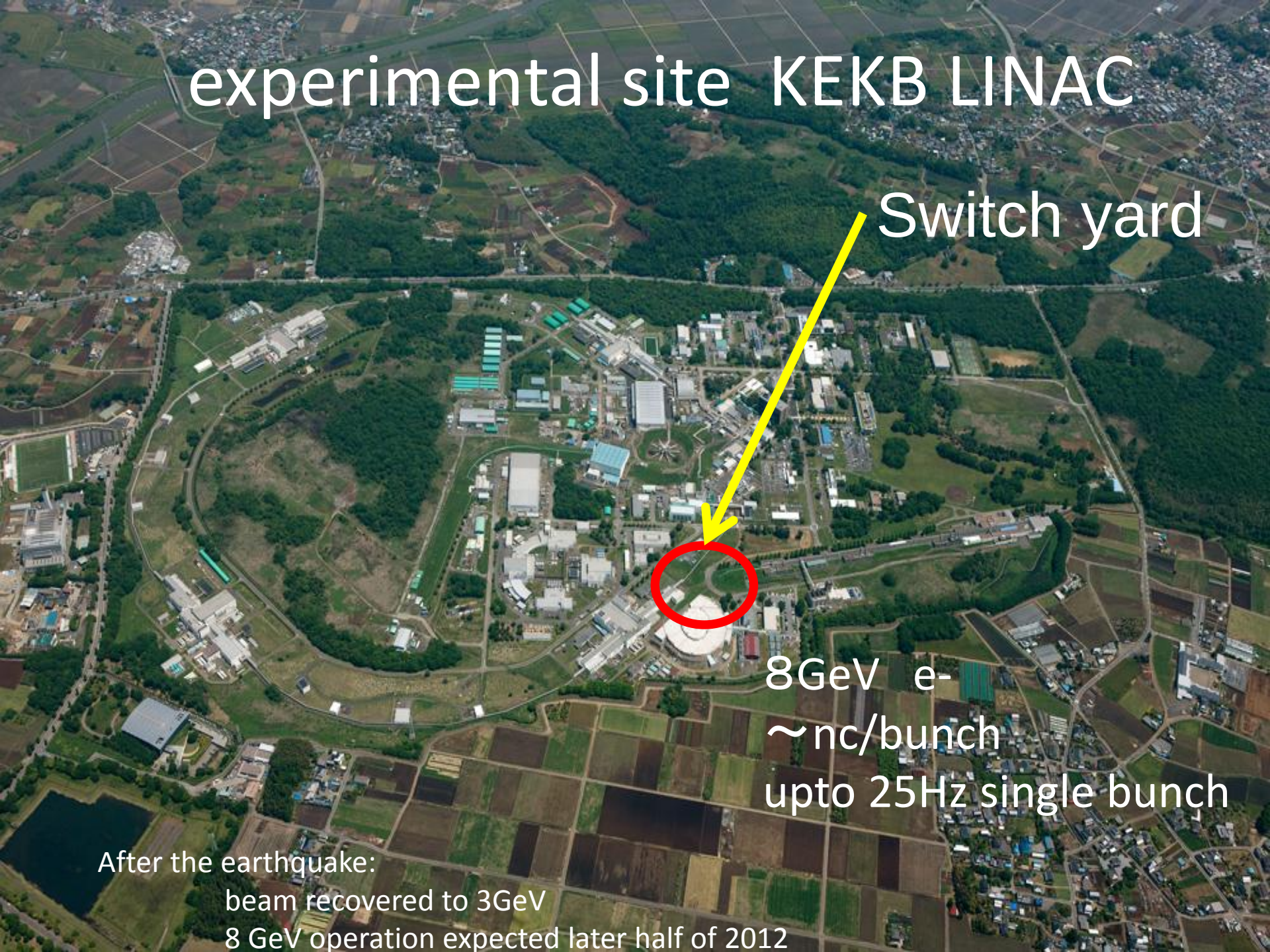
April 25 2012
KILC12 大邱廣域市

Collaborators:
V. Strakhovenko O. Dadoun, R. Chehab, A.Variola, L. Rinolfi, O. Dadoun,T.Kamitani, T.Suwada, T.Omori, J.Urakawa,K.Furukawa, K.Umemori,M.Satoh,T.Sugimura,S.Kawada, T.Akagi, Y. Uesugi

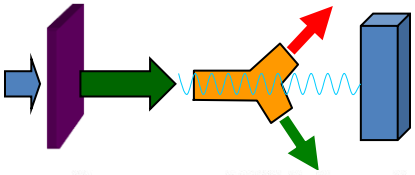


Contents

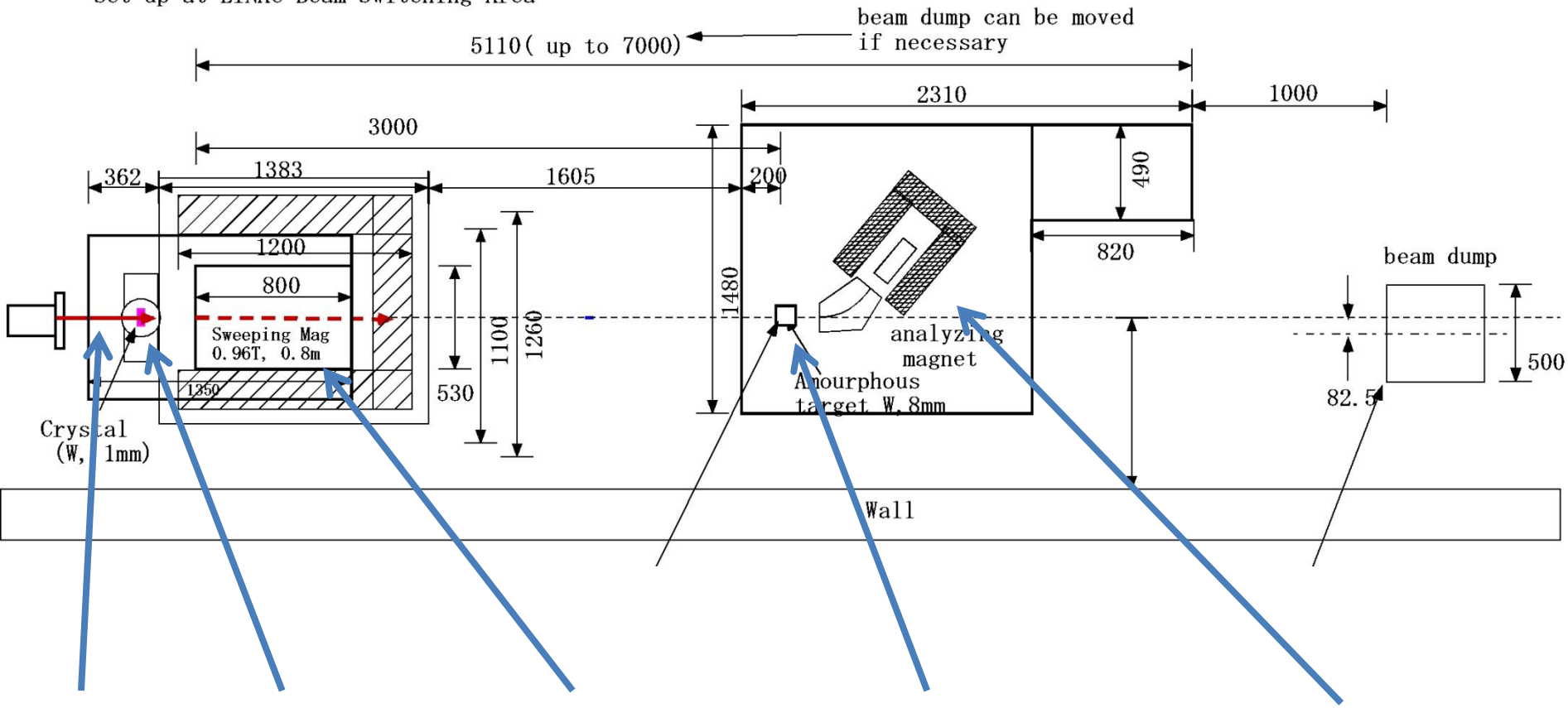
- Status of previous experiments
  - ～same as LCWS2011
- Temperature measurement 2012 January
- Prospects


experimental site KEKB LINAC
Switch yard
8GeV e-
～nc/bunch
upto 25Hz single bunch
After the earthquake:
beam recovered to 3GeV
8 GeV operation expected later half of 2012

Setup



Set up at LINAC Beam Switching Area



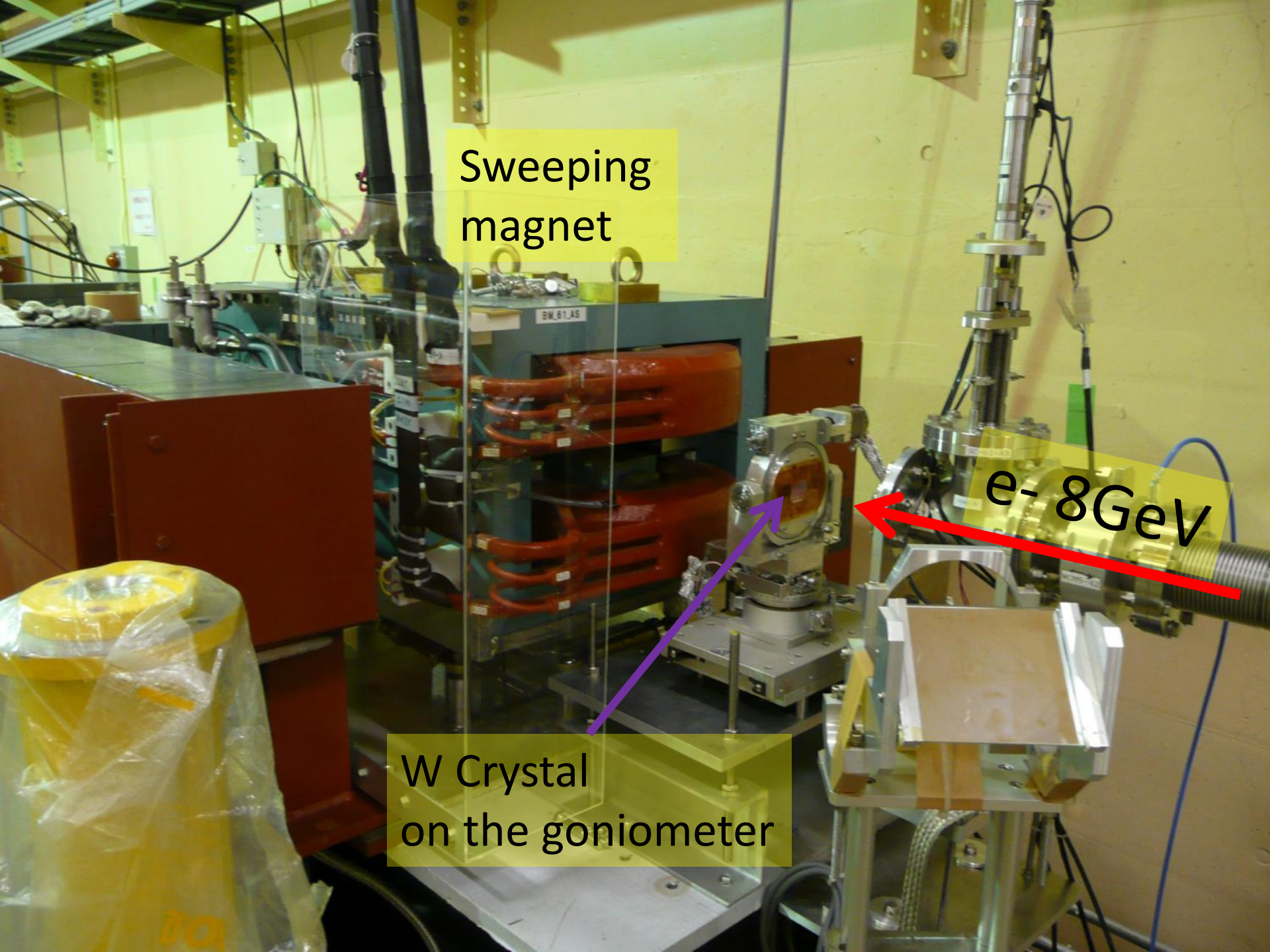
8GeV e-

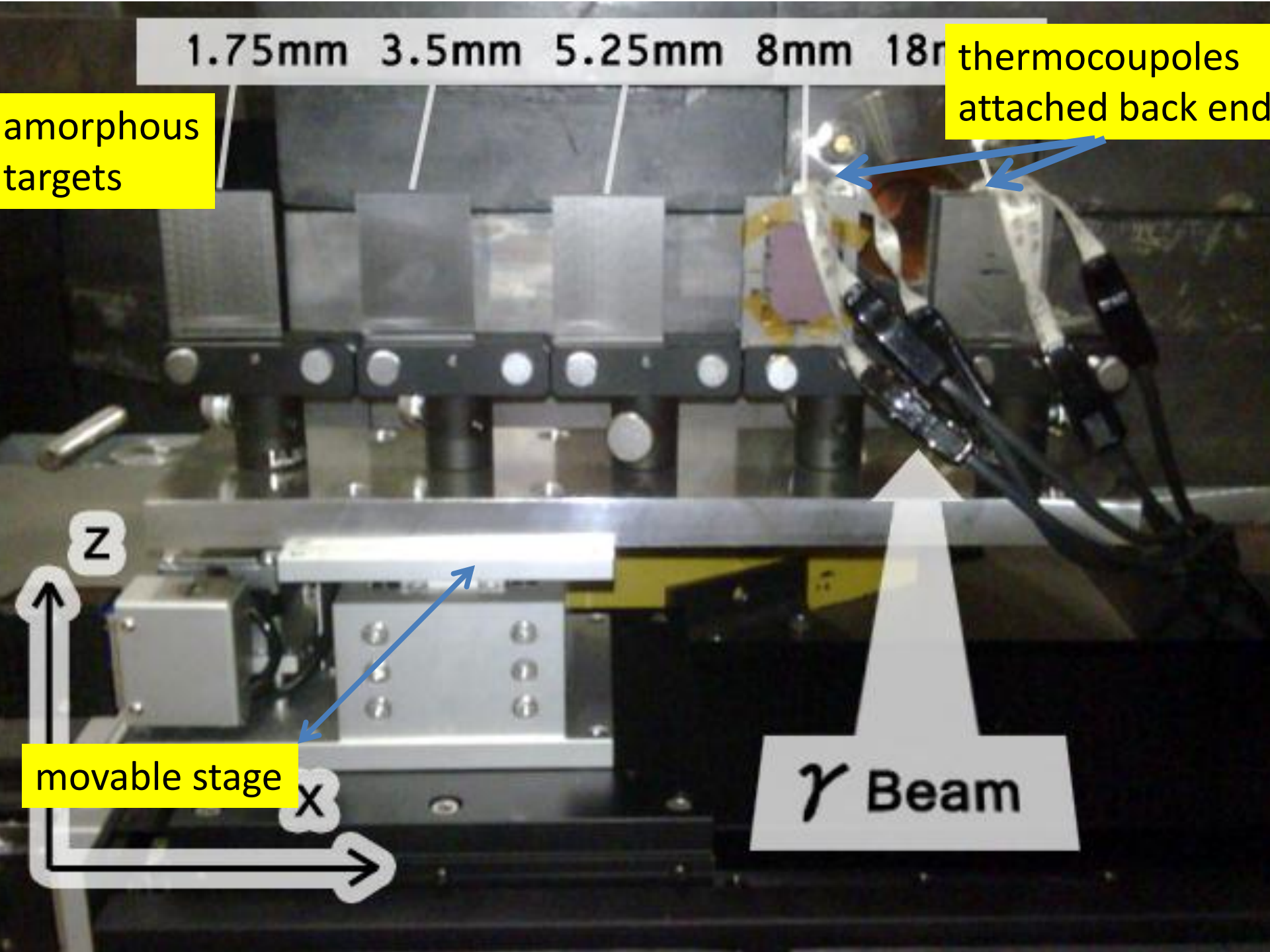
1mm
W crystal

Sweeping Magnet
0.96T 0.75m

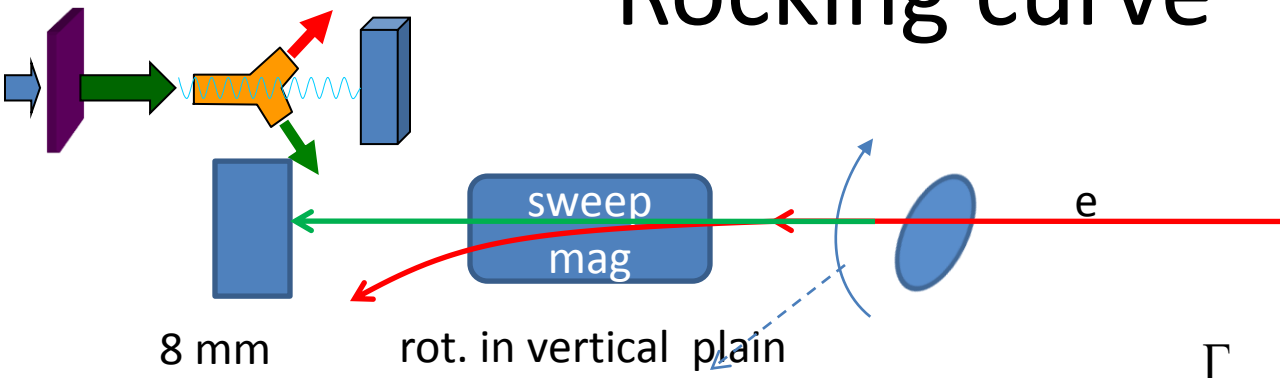
amorphous W
8 mm
18 mm

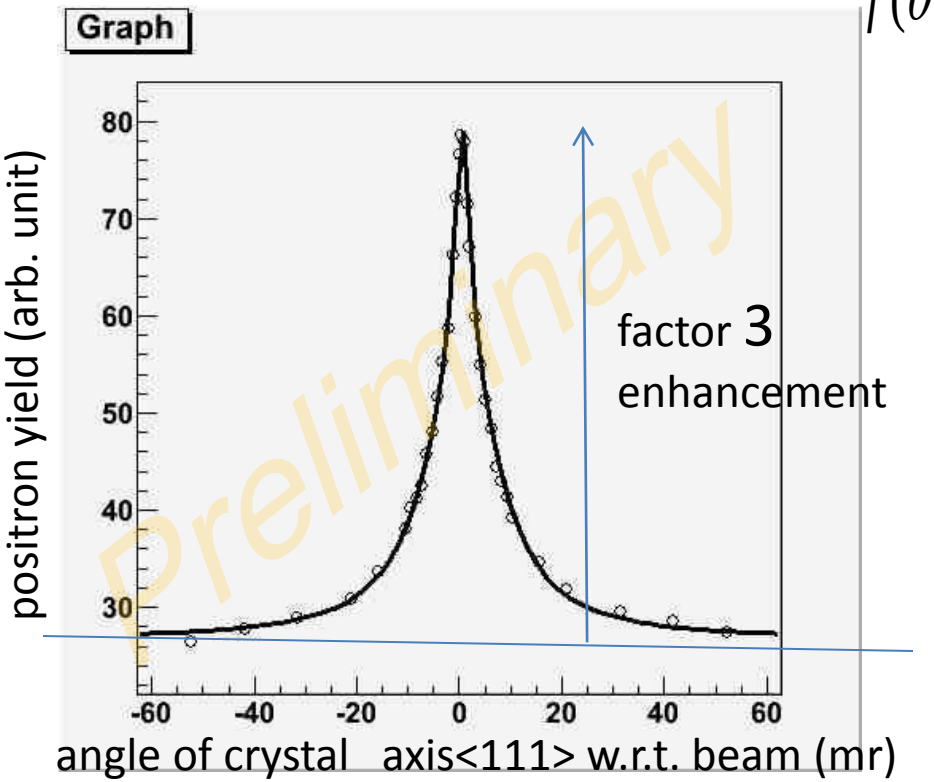
Analyzing magnet
5 ~ 30MeV


Sweeping
magnet
e- 8GeV
W Crystal
on the goniometer


1.75mm 3.5mm 5.25mm 8mm 18r
thermocoupoles attached back end
amorphous targets
movable stage
Z
X
γ Beam

Rocking curve



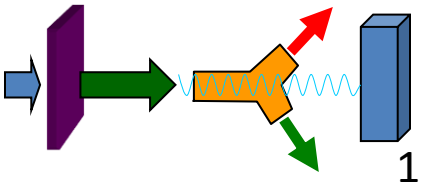


$$f(\theta) = A\frac{\Gamma_1}{\left(\theta - \langle\theta\rangle\right)^2 + \Gamma_1^2} + B\frac{\Gamma_2}{\left(\theta - \langle\theta\rangle\right)^2 + \Gamma_2^2} + Const$$

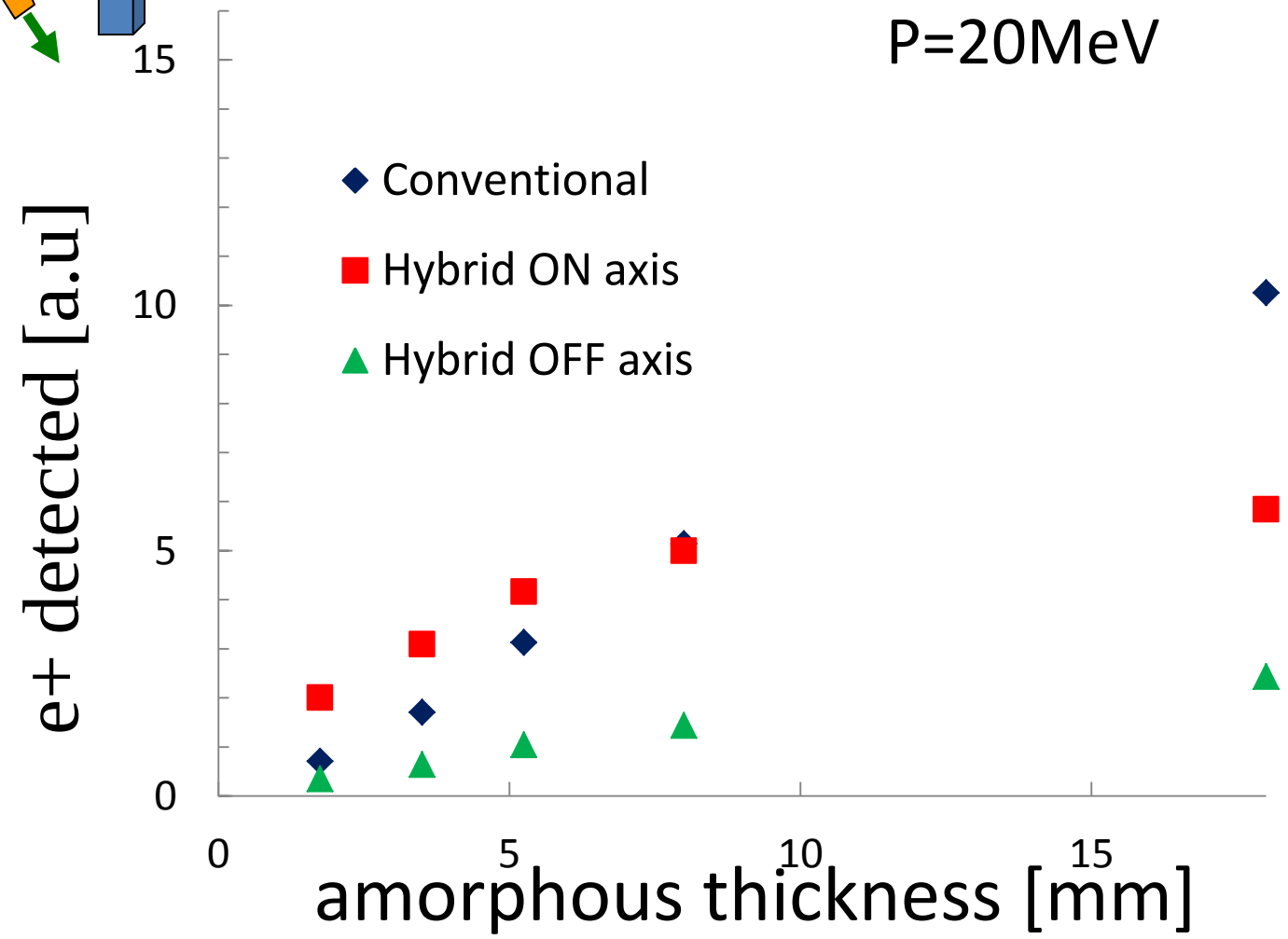
$$\Gamma_1 = 3.4 \pm 0.1$$

$$\Gamma_2 = 17.7 \pm 0.4$$

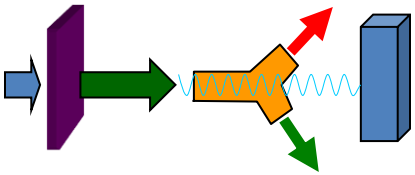
same for horizontal rotation



e+ yield

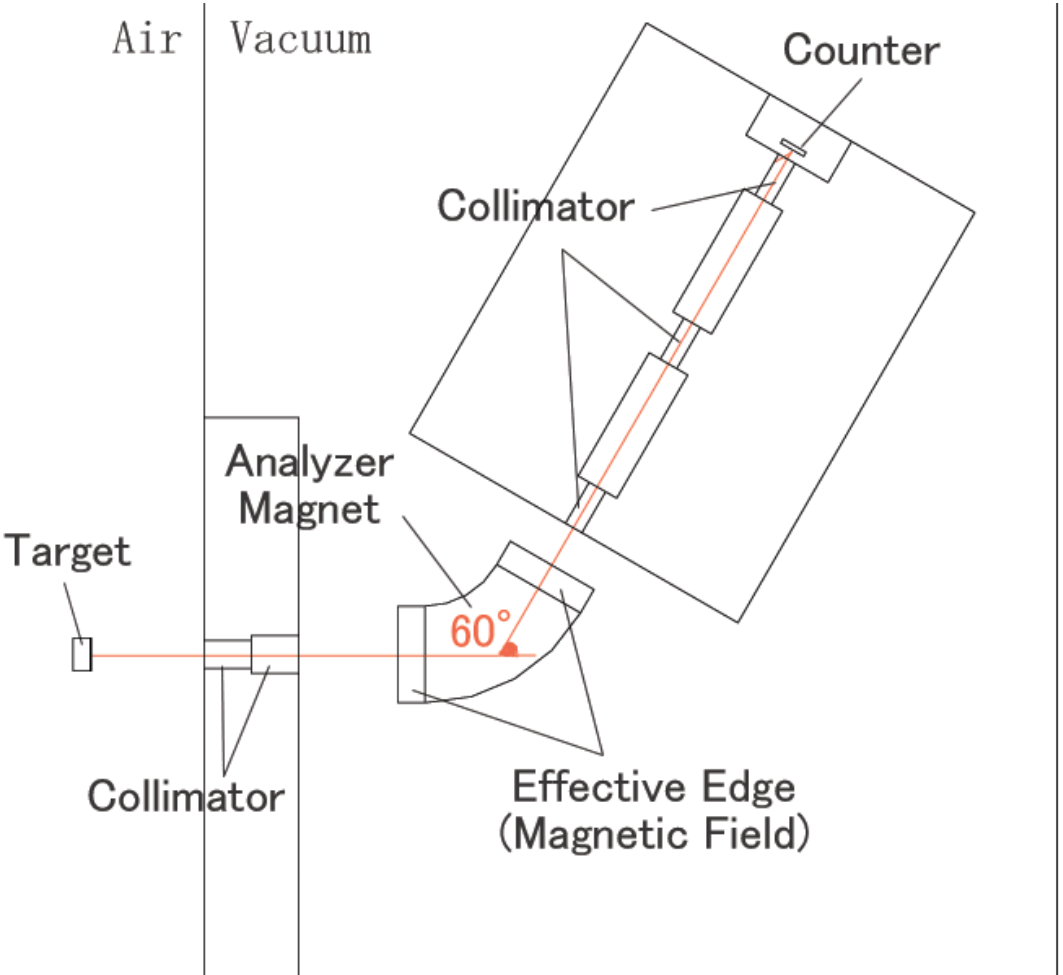


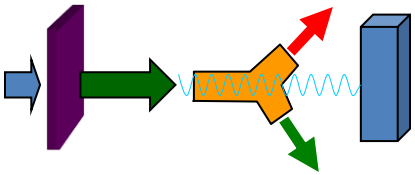
Need simulation for analyzing the magnet collimator , detector to evaluate e+ yeilds



Detector acceptance

- Simulation of the is in progress by Y.Uesugi





Detector acceptance

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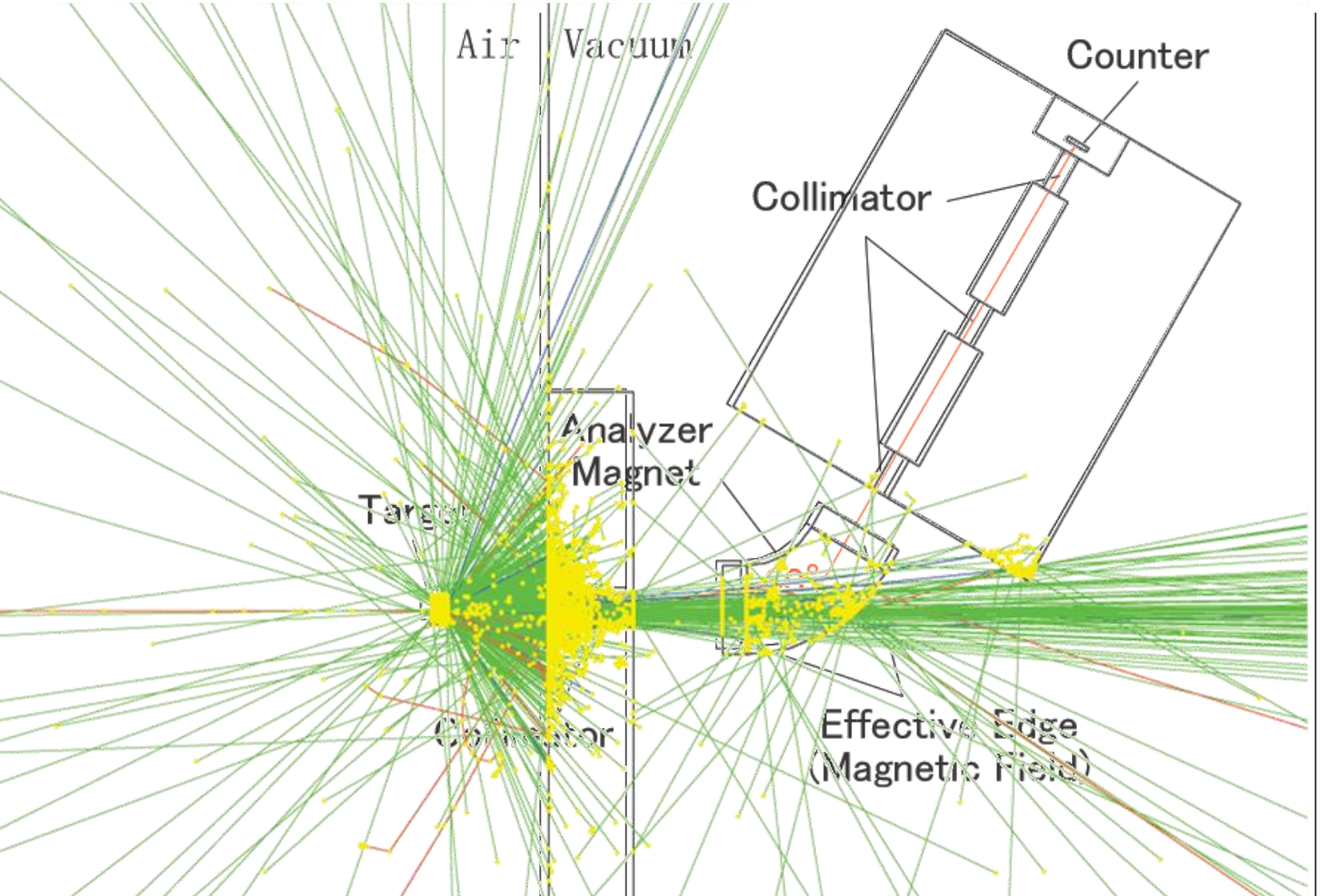
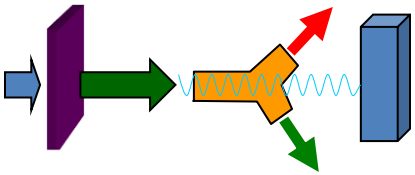
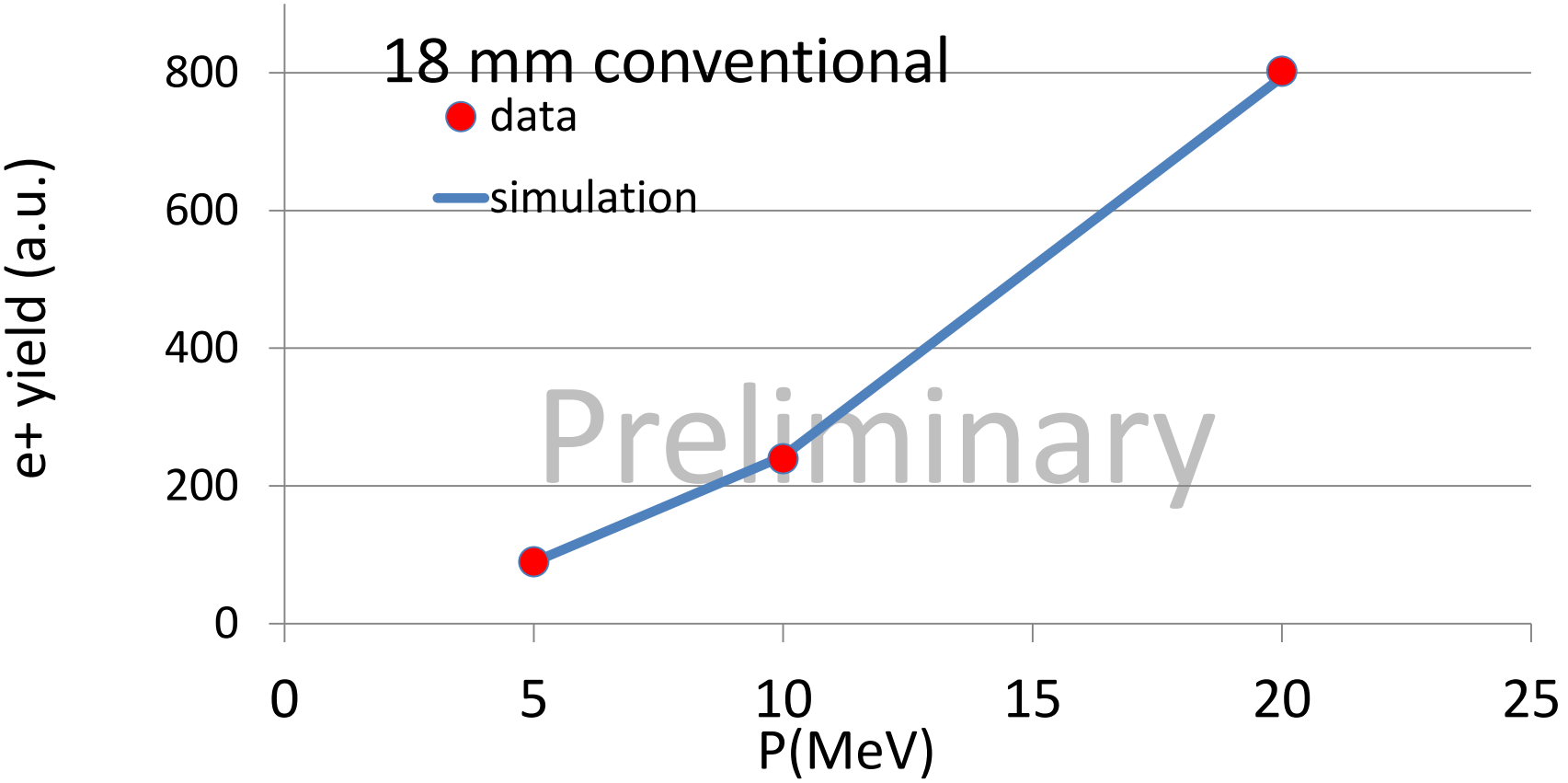


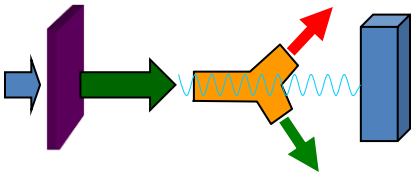


simulation in progress



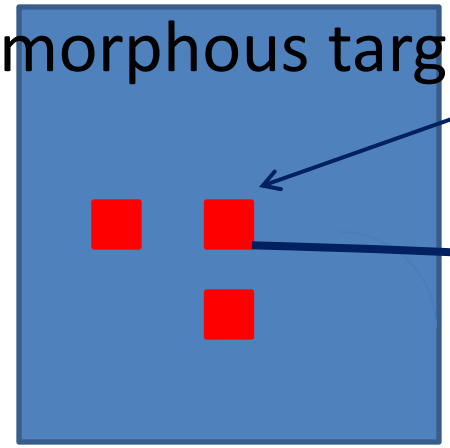
agreement of data and simulation look fine

low acceptance 0.0005e+/e- takes time for simulation



Temperature measurement w/ thermocouples

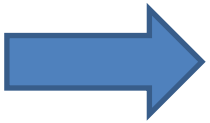
back plane of amorphous target



thermocouple approximately 1mm x 1mm

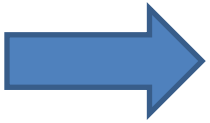
to fast data logger read temperature each 10ms

temperature at equilibrium

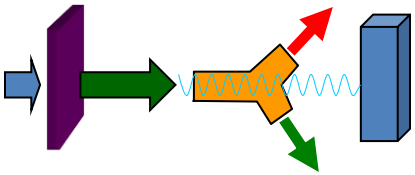


total energy deposit

bunch by bunch temperature variation



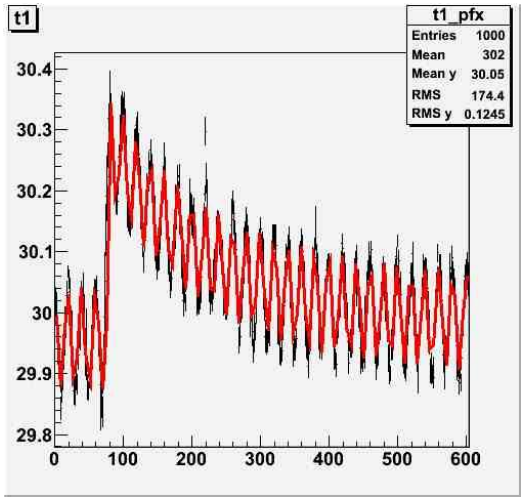
PEDD information by thermocouple

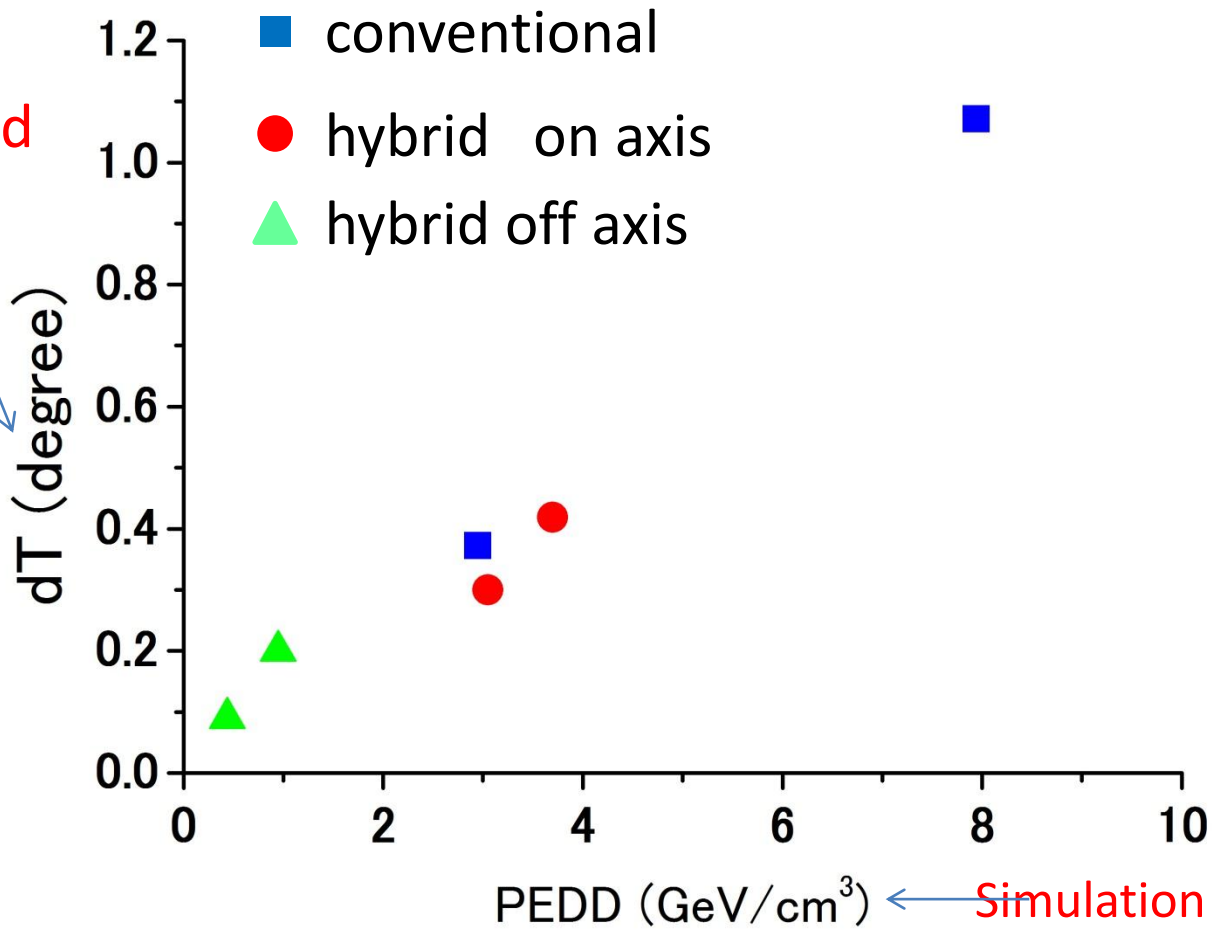


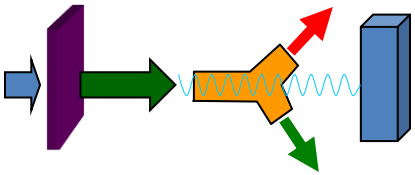
bunch by bunch temp.

- dT provides a measure of PEDD

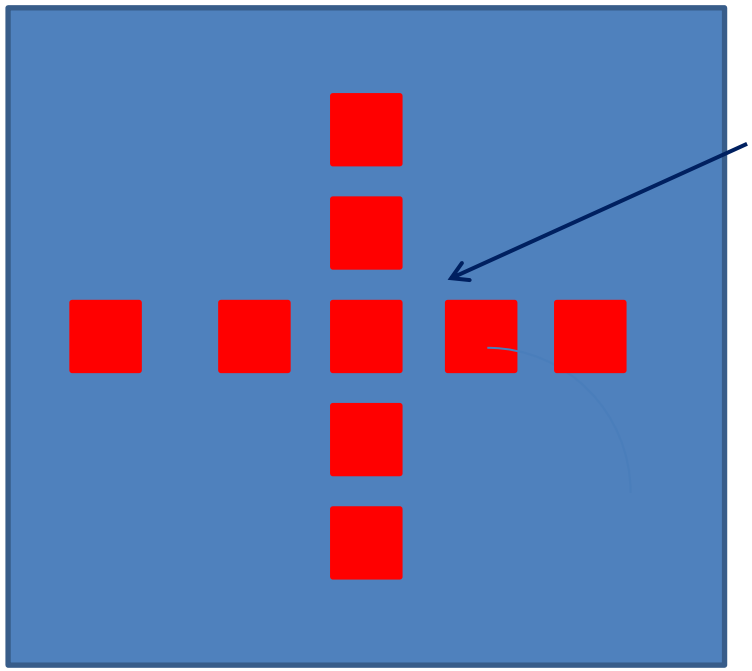
Measured





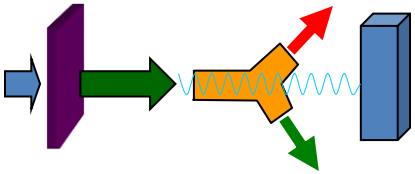


Making thermo couple array

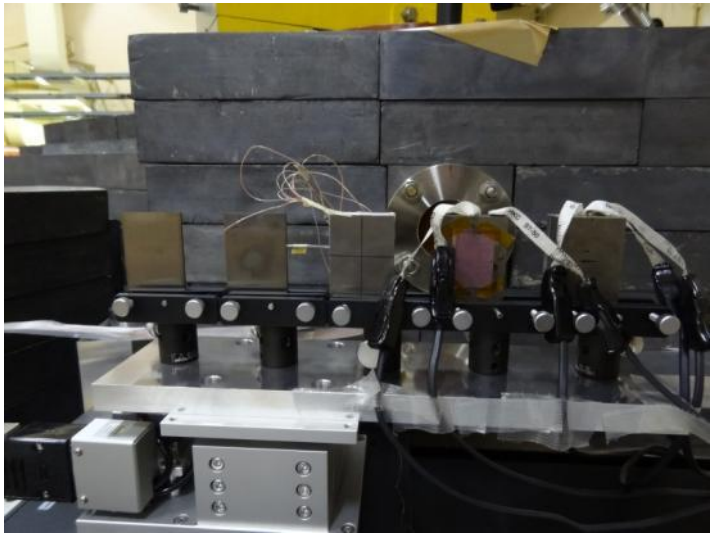


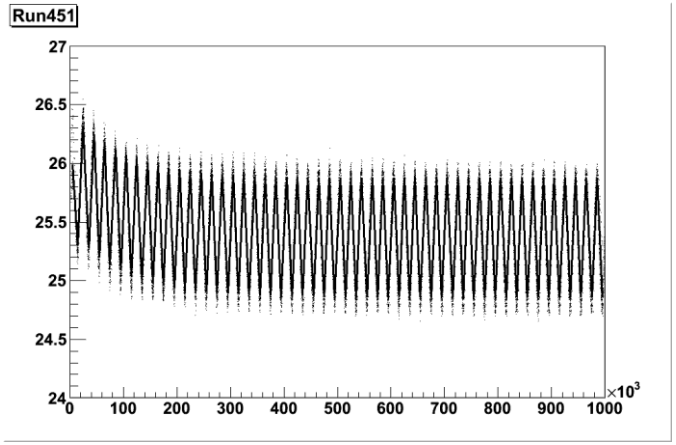
temperature distribution of amorphous target bunch by bunch bases

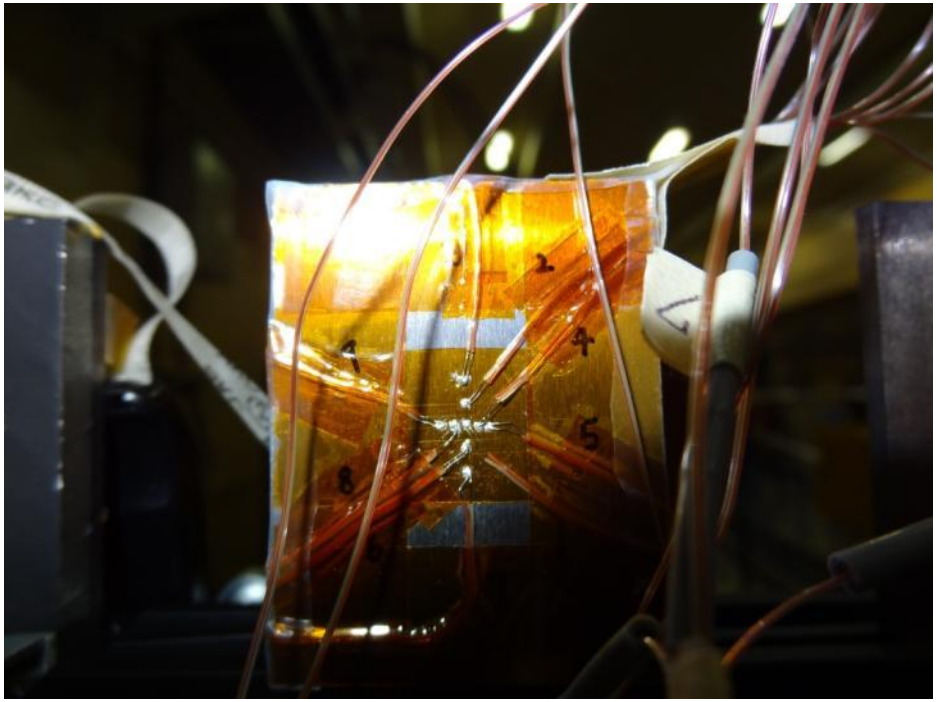
design in progress at Hiroshima

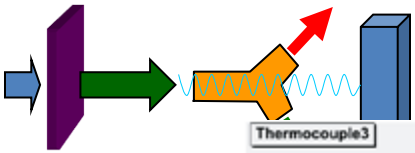


temperature measurement January 2012

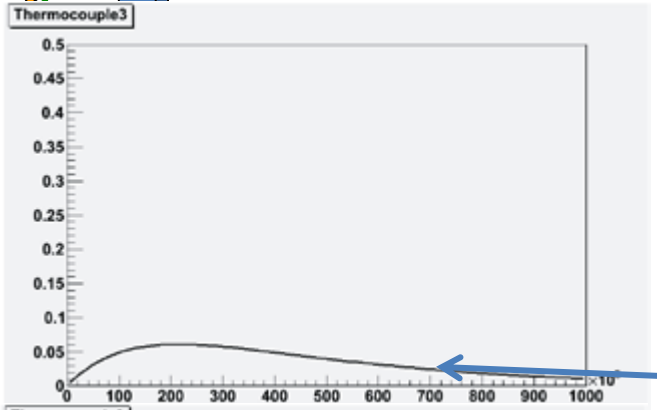


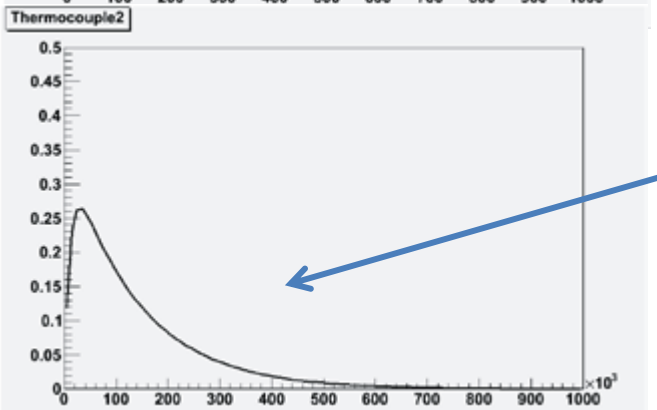


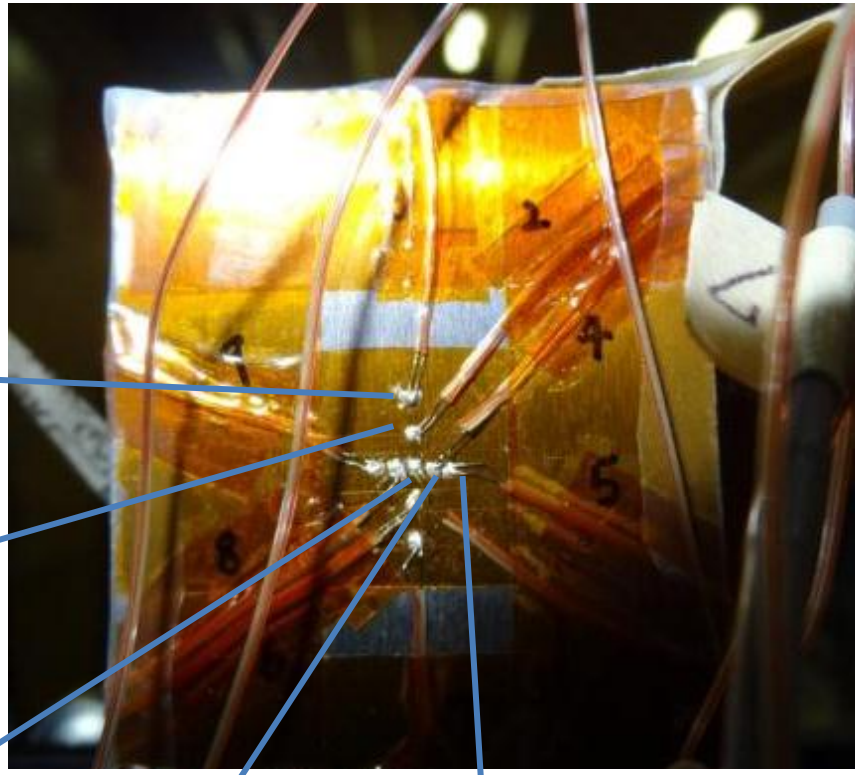


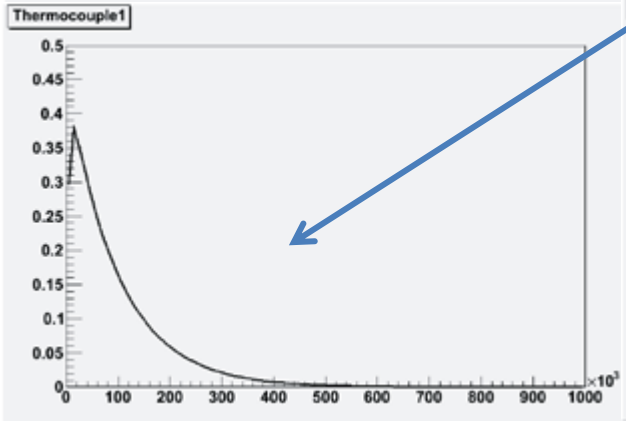


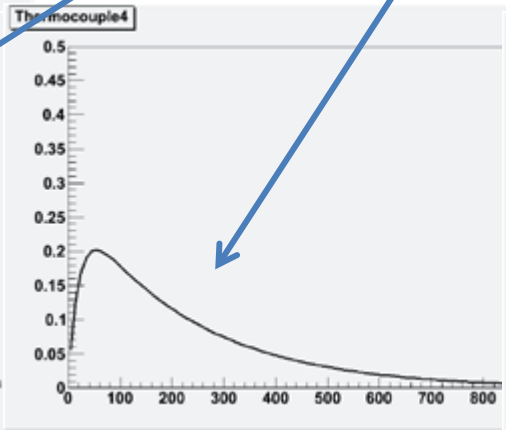
temperature measurement

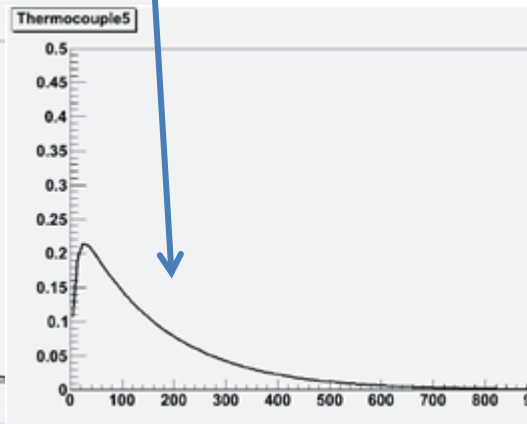


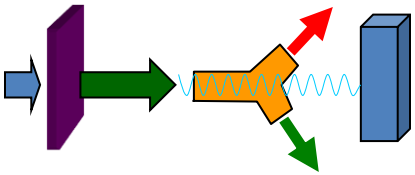












summary

- Systematic data for hybrid target R&D
  - yield from various target thickness
  - momentum 5, 10, 20 MeV

→ G4 Simulation in progress

- energy deposit/temperature
  - Thermocouple array works
  - in progress. G4 simulation is ready.

→ Systematic data in next experiments

  - (but we need to wait for full recovery of KEKB LINAC)