Prototype test Experiment for Upgrades in the BGOegg Gamma Spectrometer at SPring-8

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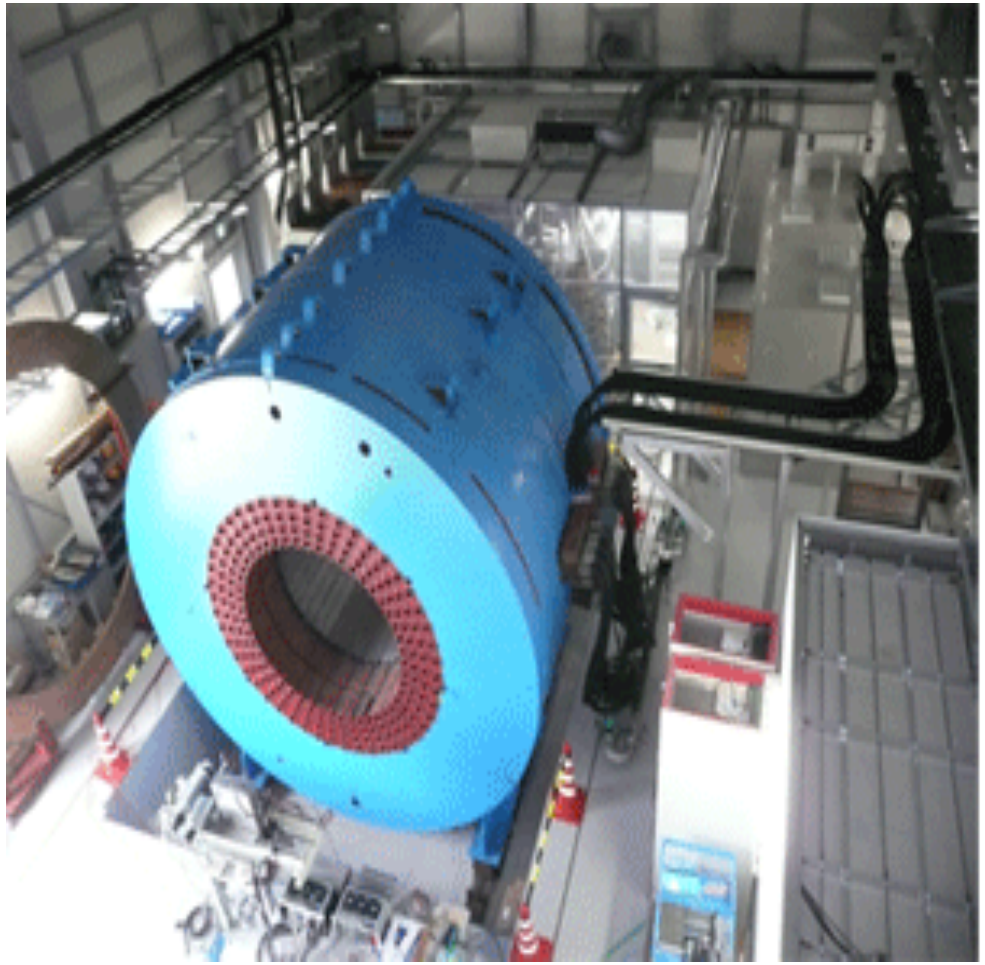
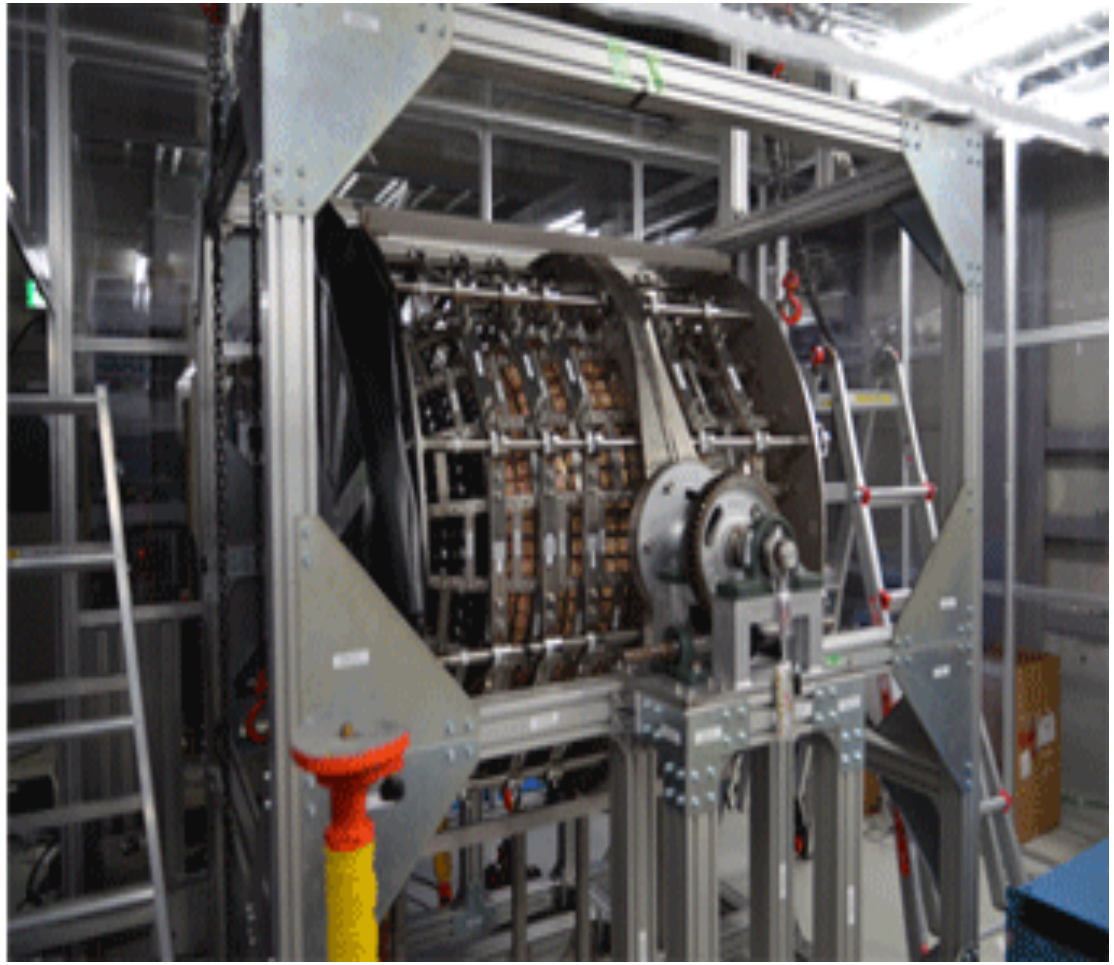
SPring-8 LEPS2/BGOegg

- Synchrotron radiation facility located in Hyogo prefecture, Japan

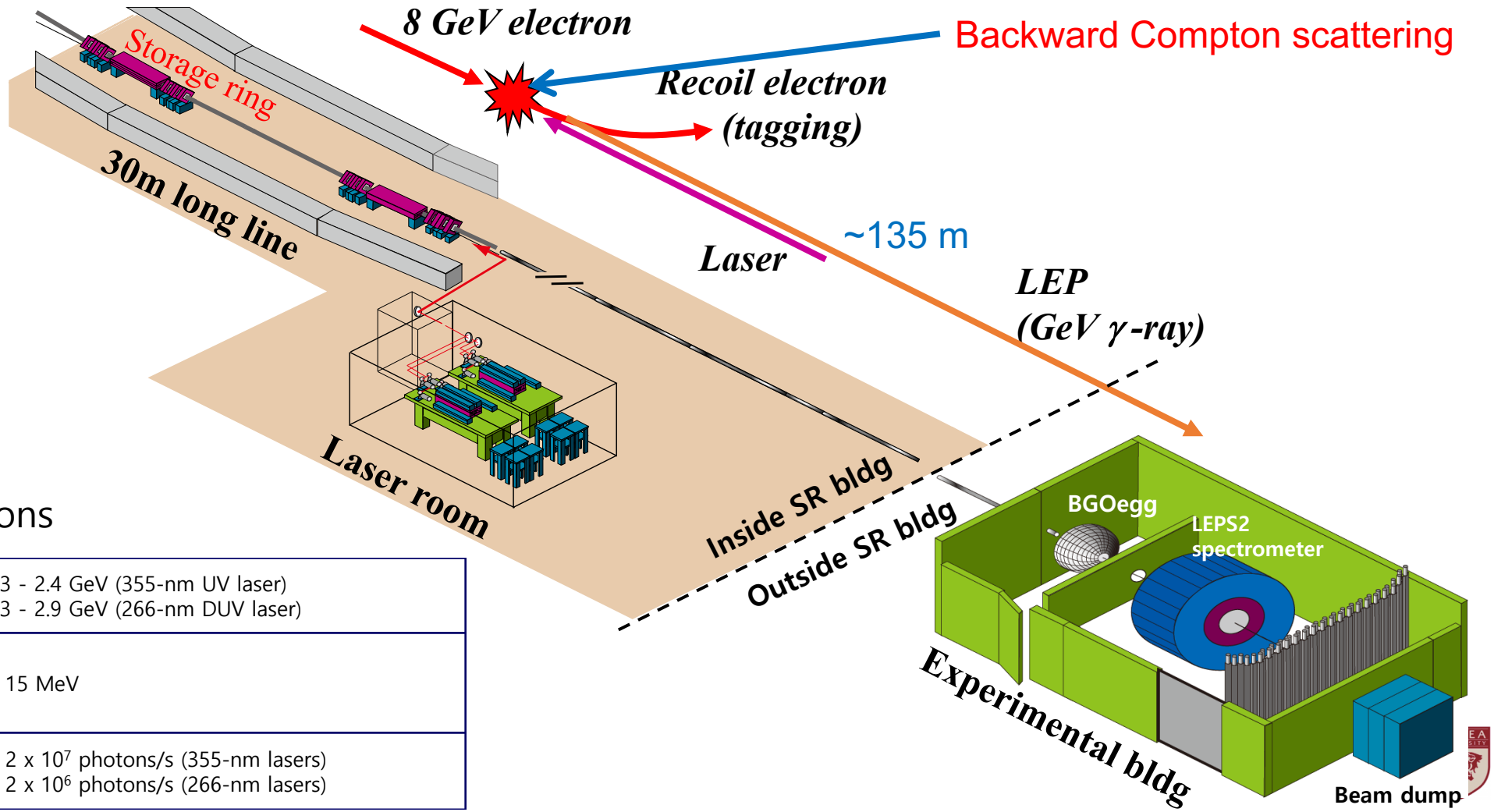
LEPS2 Experimental Building





- LEPS2 E949 solenoid(former BNL) magnet & BGOegg calorimeter

Outline of LEPS2 beamline



Beam conditions

Energy range	1.3 - 2.4 GeV (355-nm UV laser) 1.3 - 2.9 GeV (266-nm DUV laser)
Energy Resolution	< 15 MeV
Beam intensity	< 2 x 10^7 photons/s (355-nm lasers) < 2 x 10^6 photons/s (266-nm lasers)

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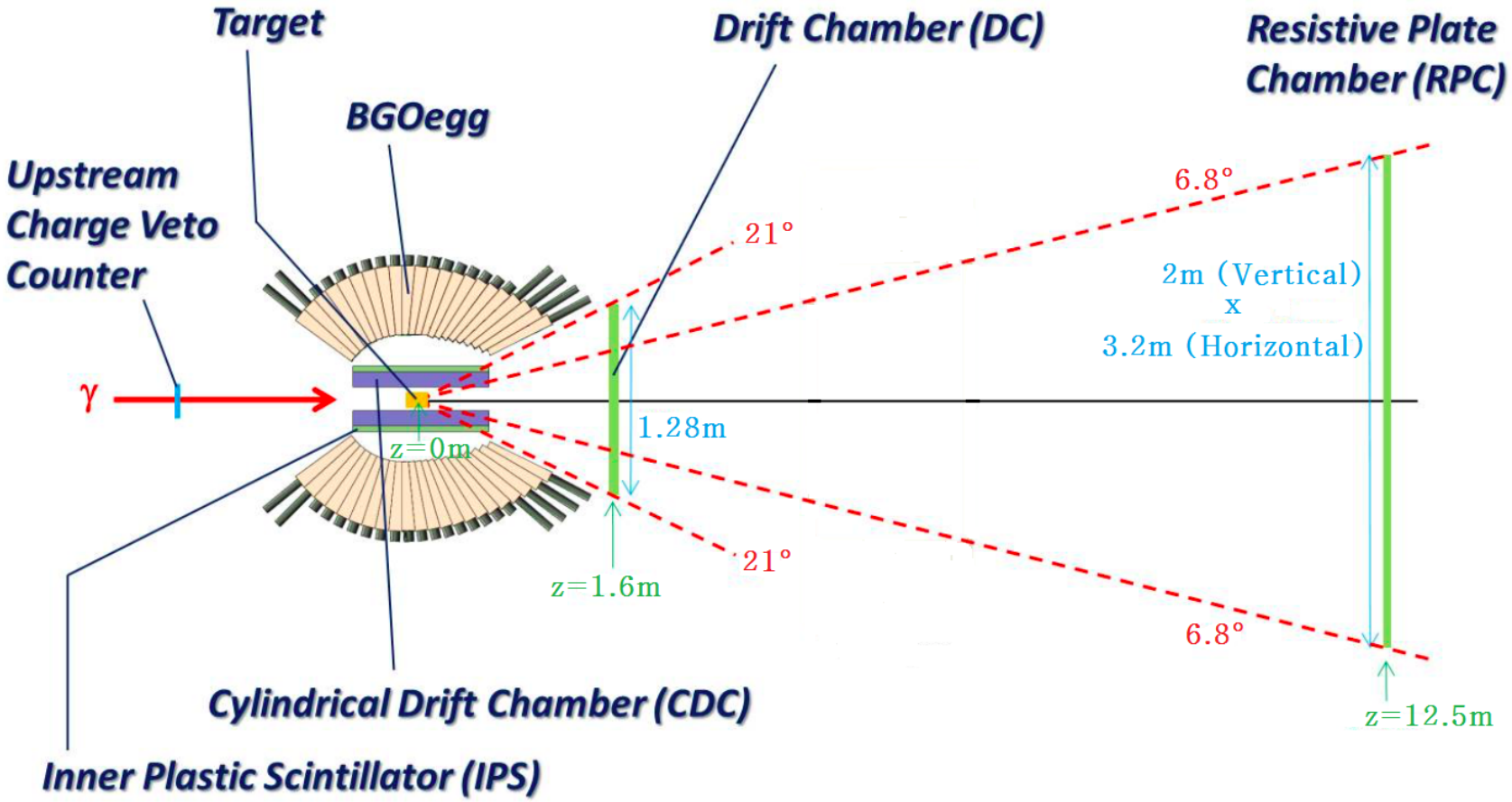
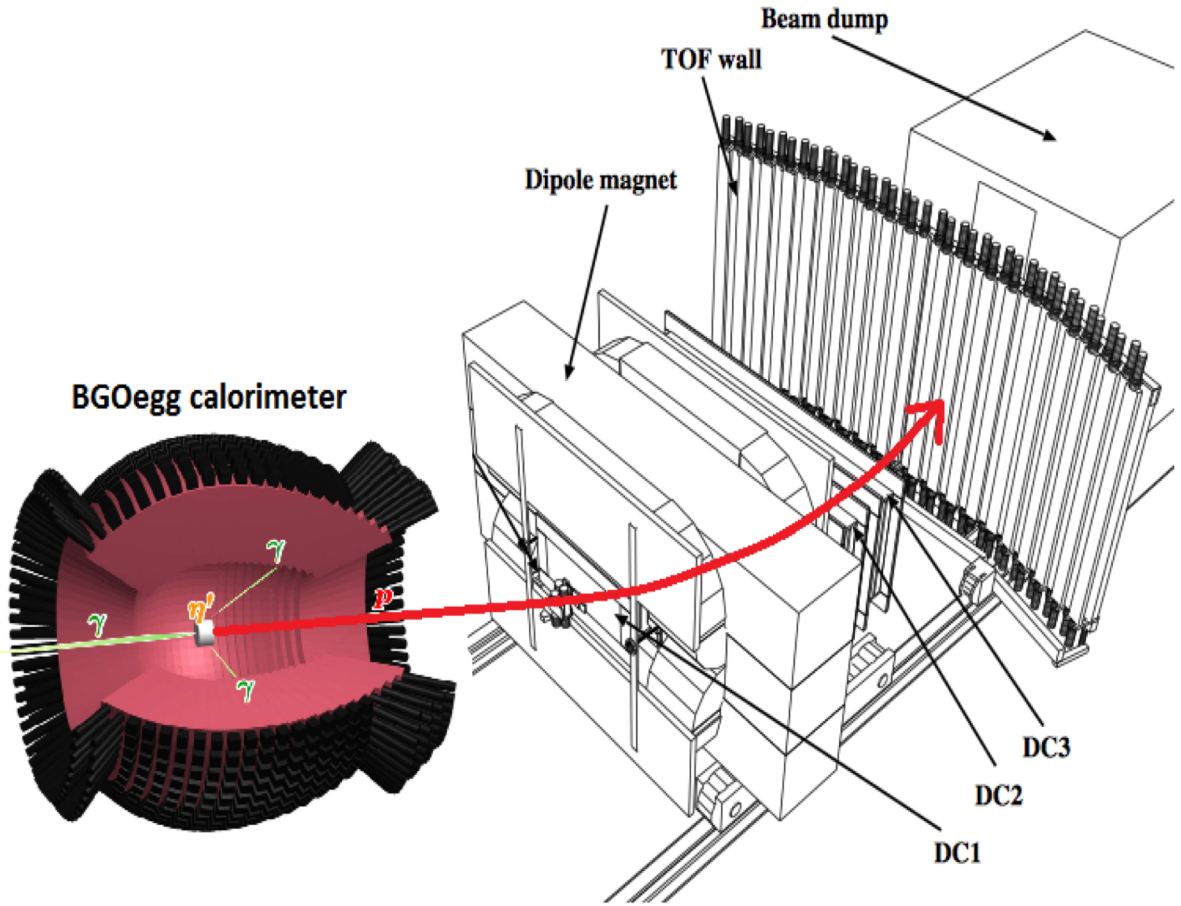
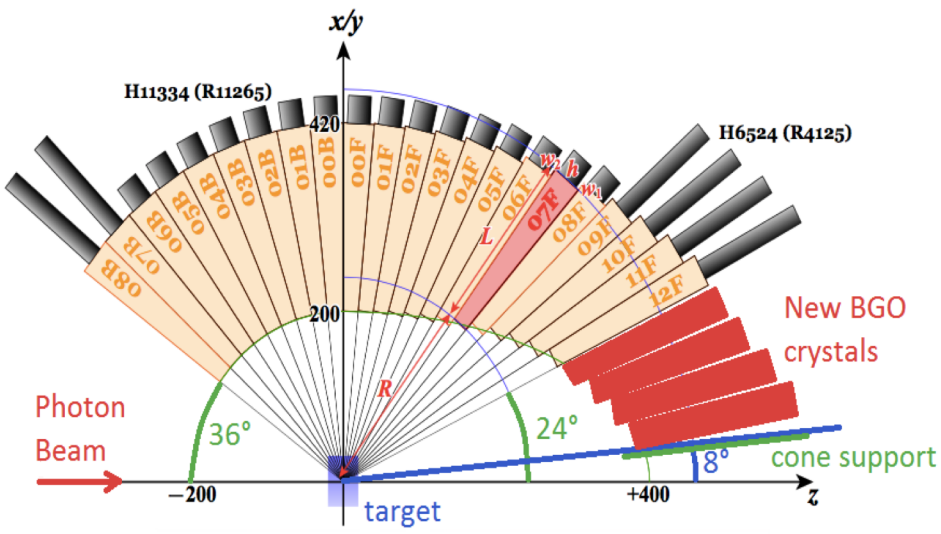
BGOegg Experiment at SPring-8



- Recoil protons are now measured using time-of-flight information with RPC at LEPS2

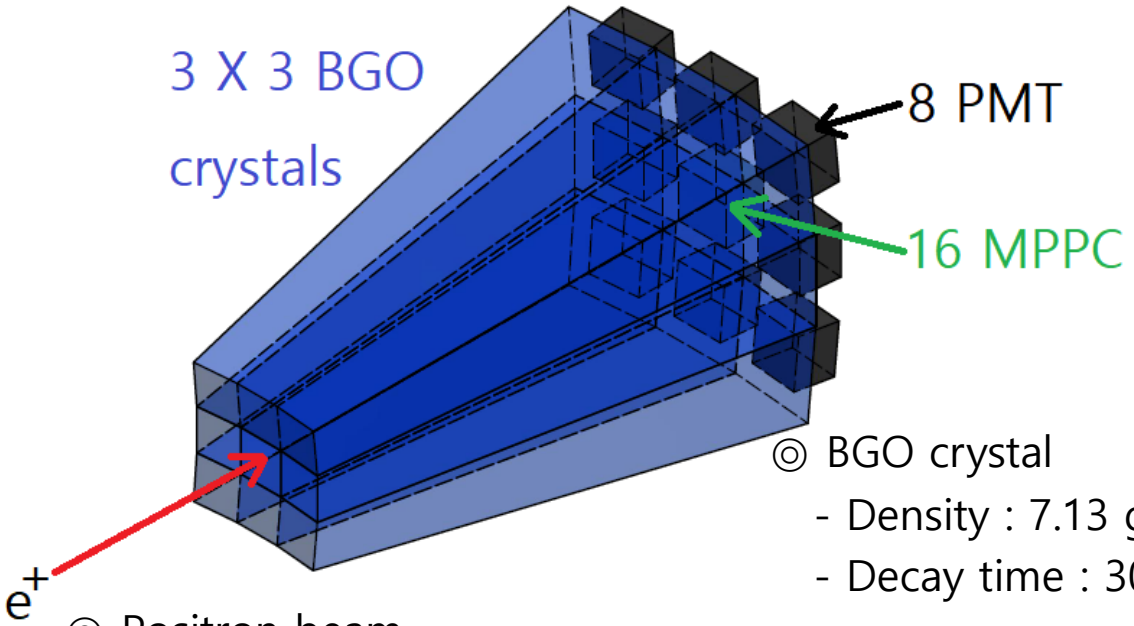
BGO upgrade





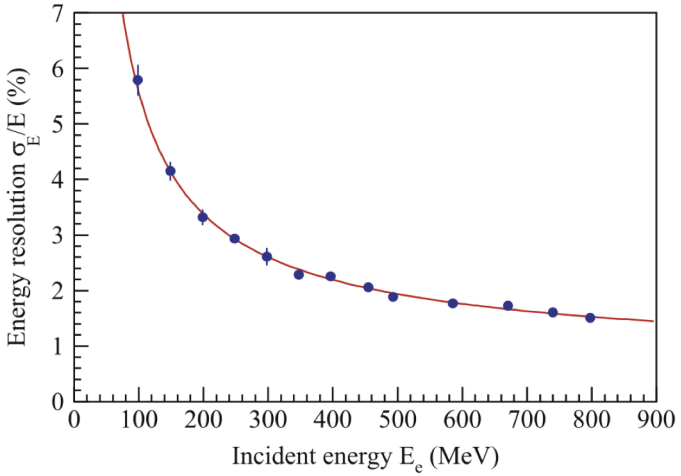
- Recoil proton momentum will be measured using a dipole magnet at LEPS, as well as BGOegg updates with 120 additional crystals

Prototype test for BGOegg Upgrade



◎ BGO crystal
- Density : 7.13 g/cm^3
- Decay time : 300ns

◎ Positron beam
- Energy range : 50 ~ 800MeV



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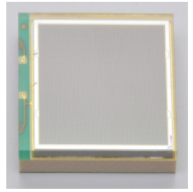
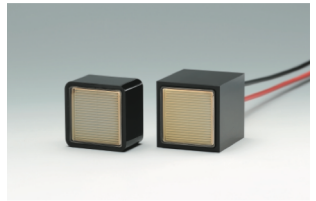
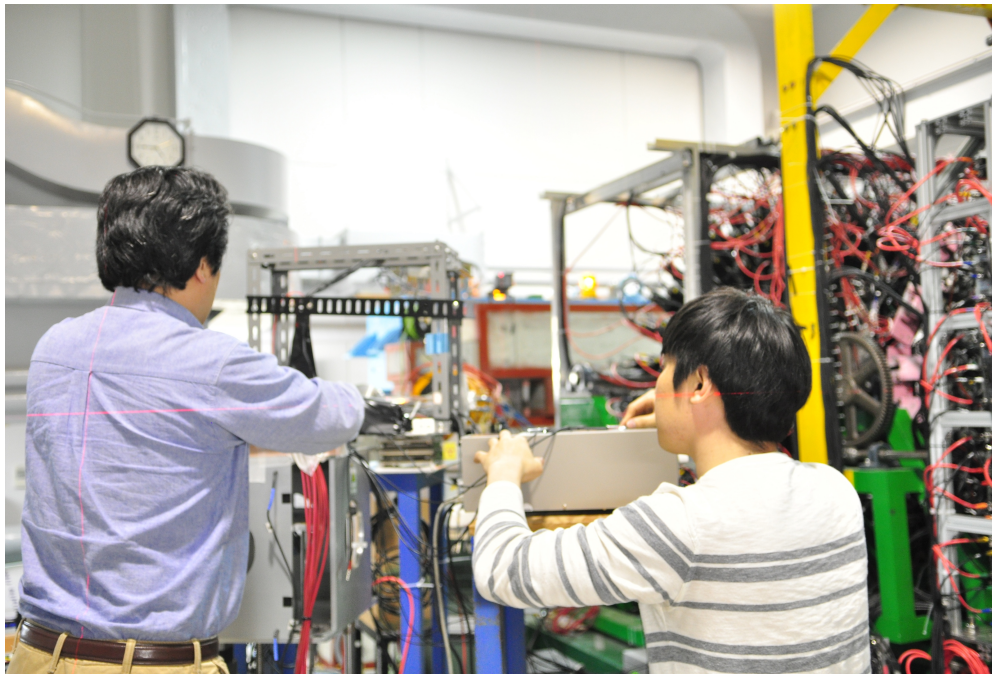


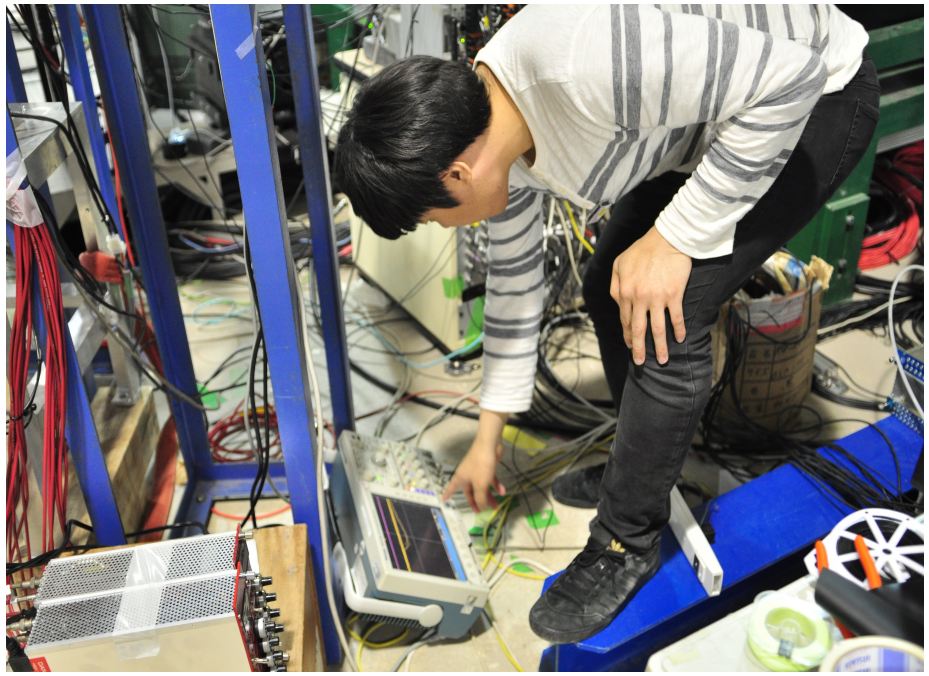
◎ S13360-6025PE
- $V_{op} \cong 57V = V_{br} + 5V$



◎ PMT
- H11334(R11265)
- Effective area : 23 X 23mm

Prototype test for BGOegg Upgrade





- We use a BPM(Beam Position Monitor) kind of fiber tracker for the trigger
- We received four kinds of data during the experiment.

  - 9 PMT
  - 8 PMT + 16 MPPC
  - 8 PMT + 16 MPPC + wider gate
  - 8 PMT + 16 MPPC + filter

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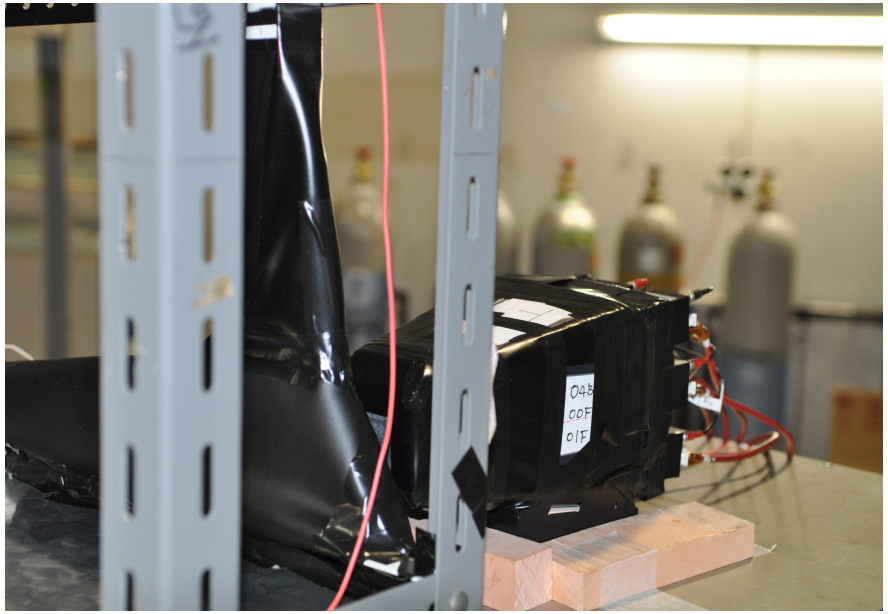
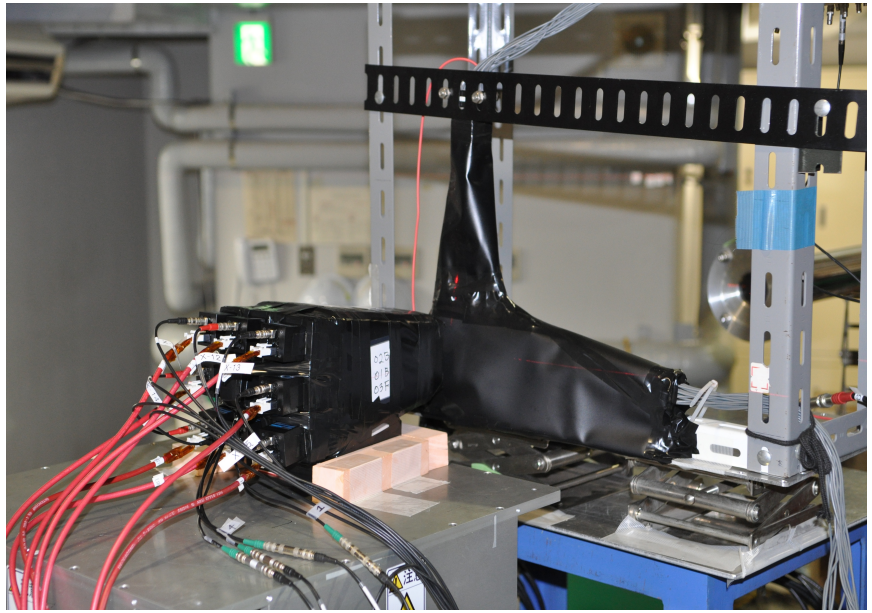
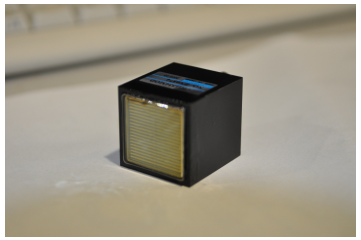
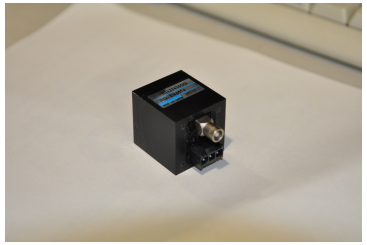
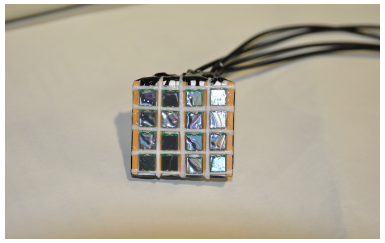
Prototype test for BGOegg Upgrade

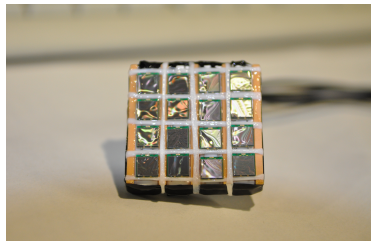






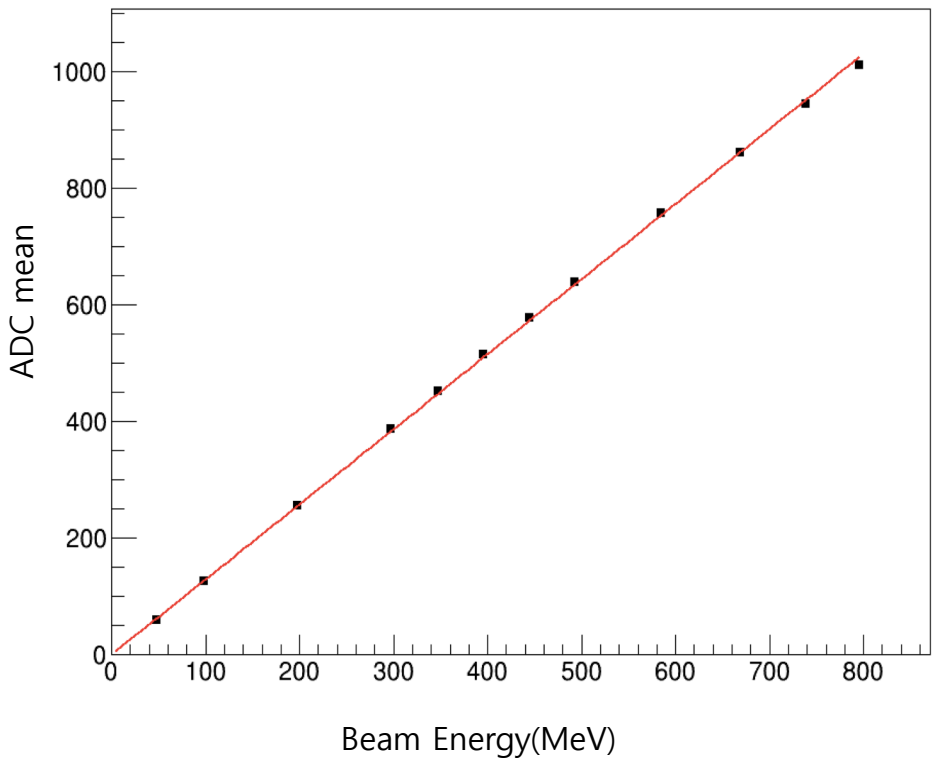




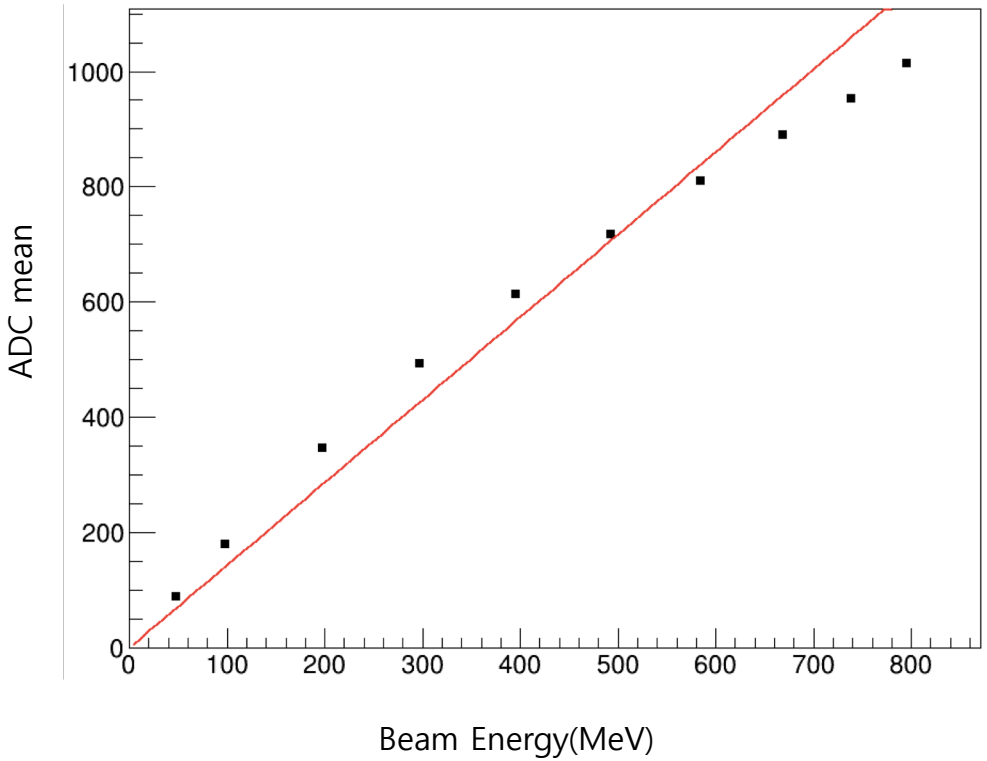


- Pictures for after the setting & PMT, MPPC

Results of the Prototype test

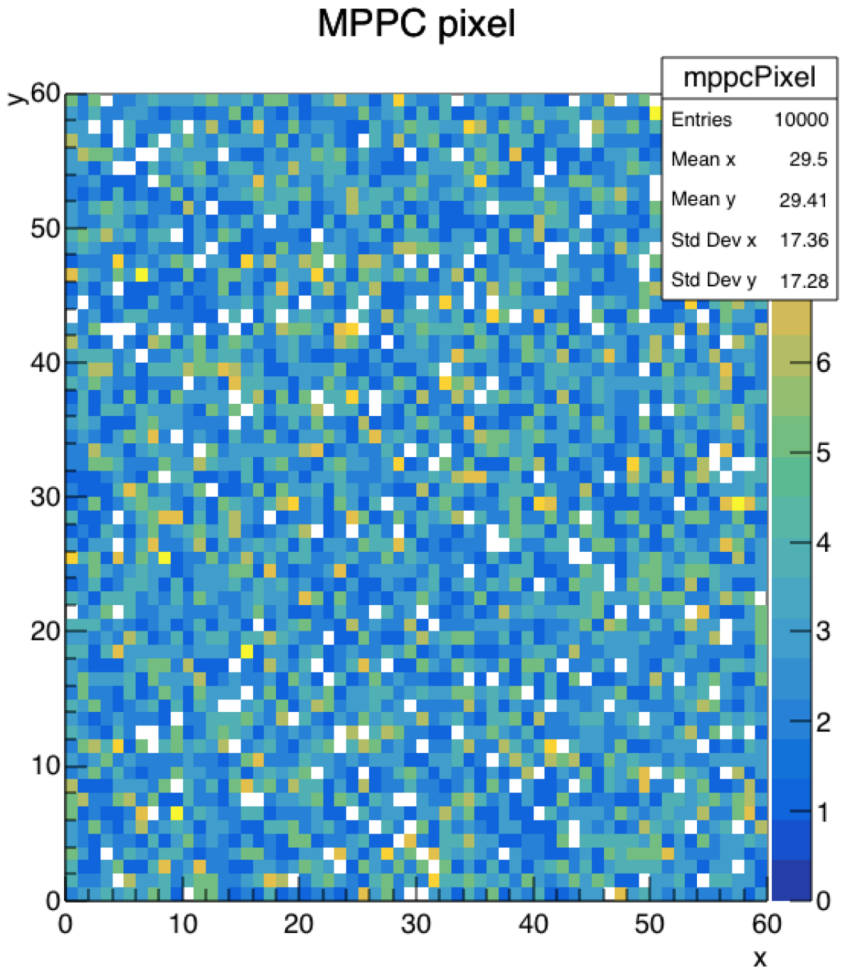


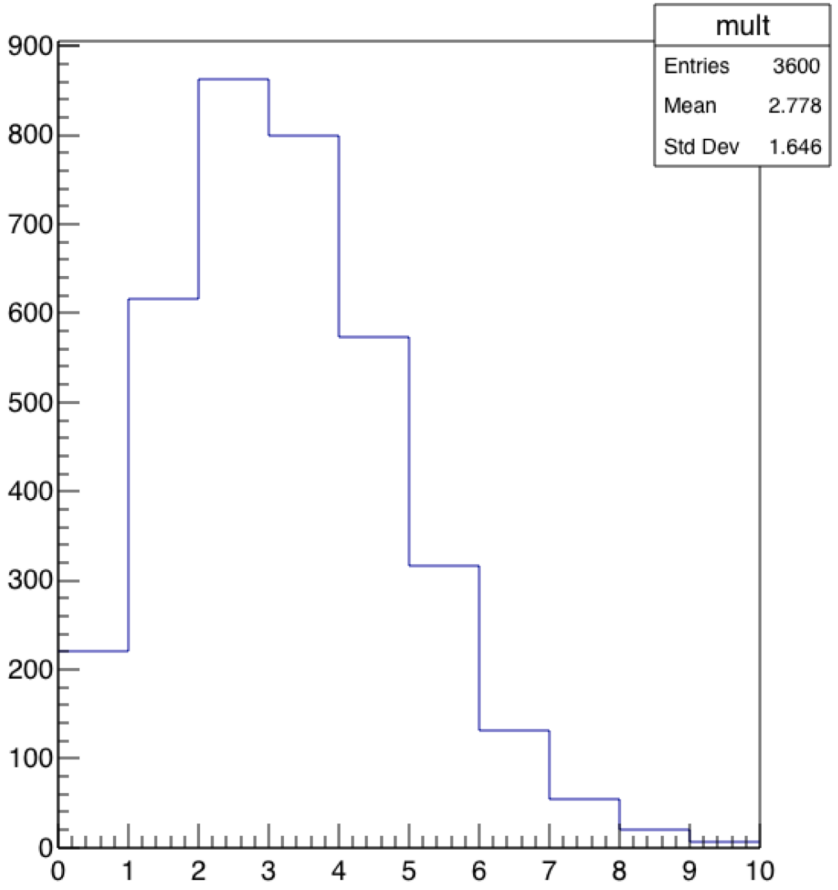
- ADC vs Beam E graph for PMT data



- ADC vs Beam E graph for MPPC data

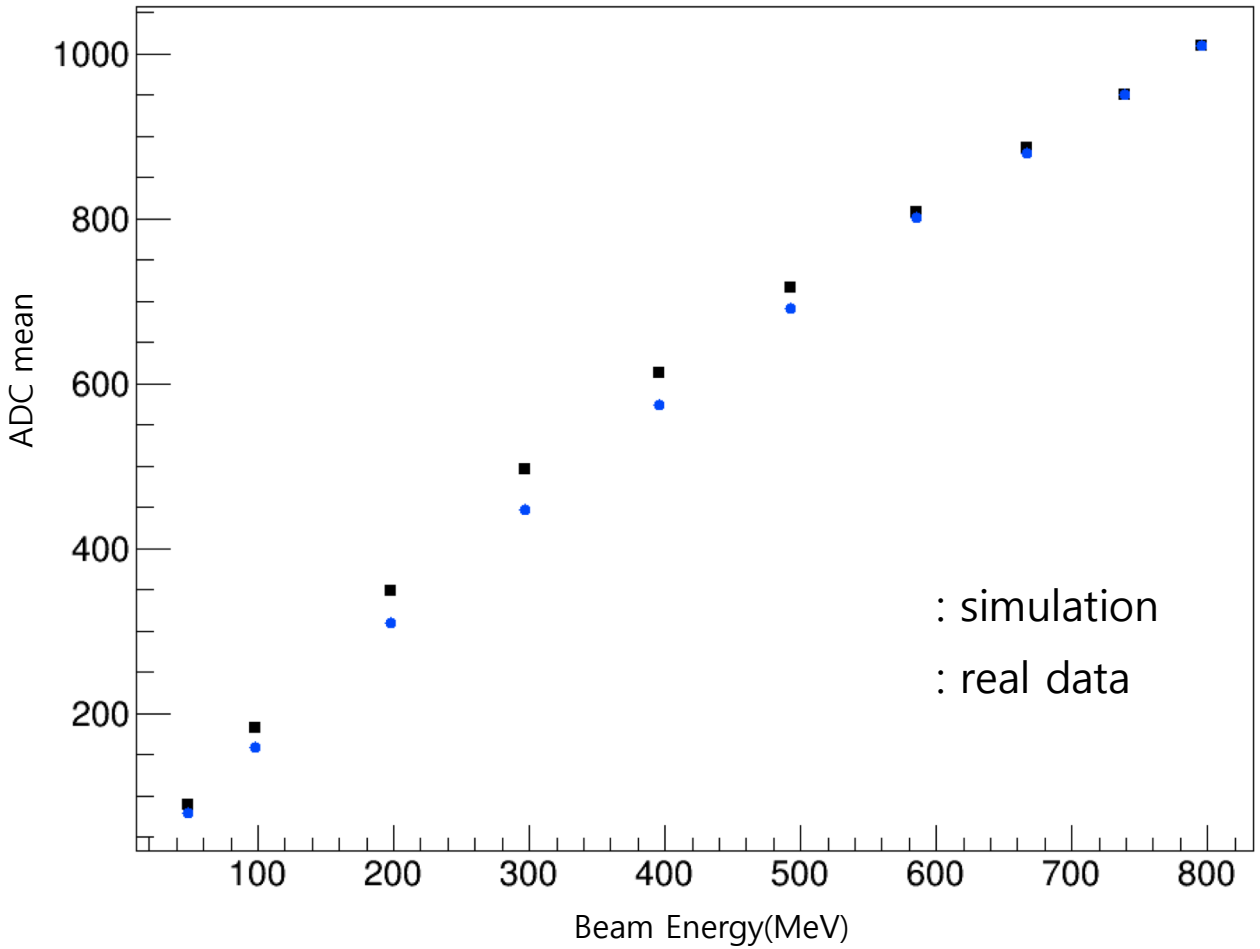
Results of the MC Simulation





- The test result of the MC simulation

Results of the MC Simulation



- A saturation also can be seen on the simulation

Summary

- BGOegg experiment was operating at SPring-8/LEPS2 for the searching η'N bound state which is one of the main topic of the BGOegg experiment
- For the upgrade of the BGOegg, the prototype test had done at ELPH
- There is a saturation on results therefore, we need to modify the detector setup.

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