

JLab Hypernuclear Collaboration Meeting

# Status of new water Cherenkov detector

December 8, 2021

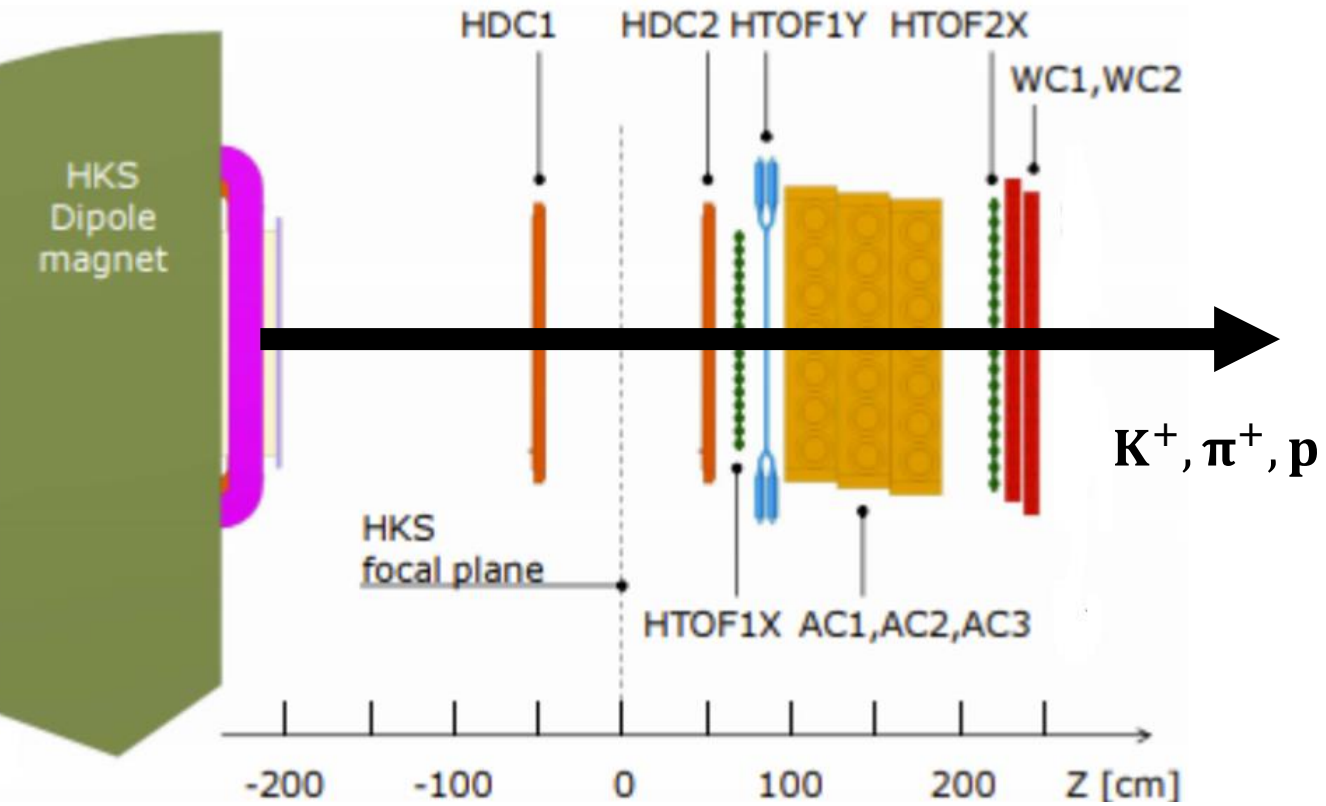
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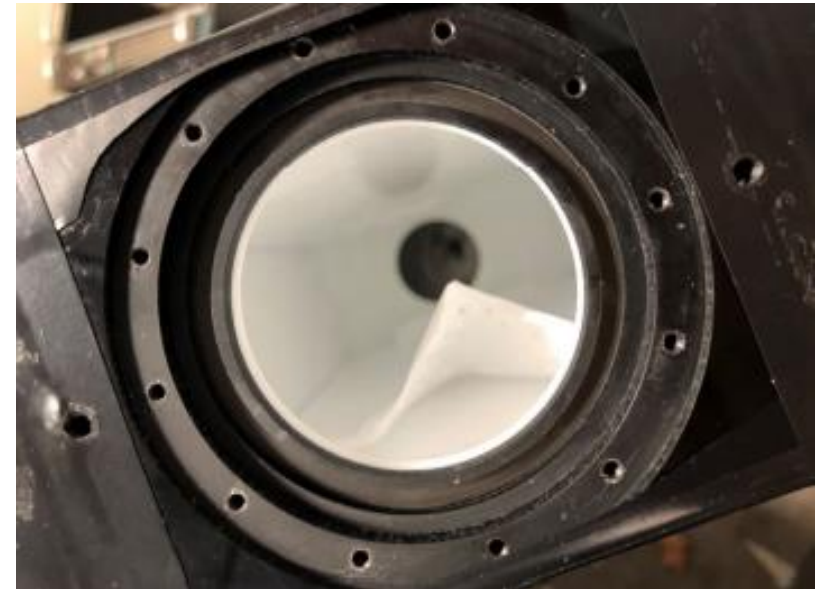
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# Background of the study

## HKS setup

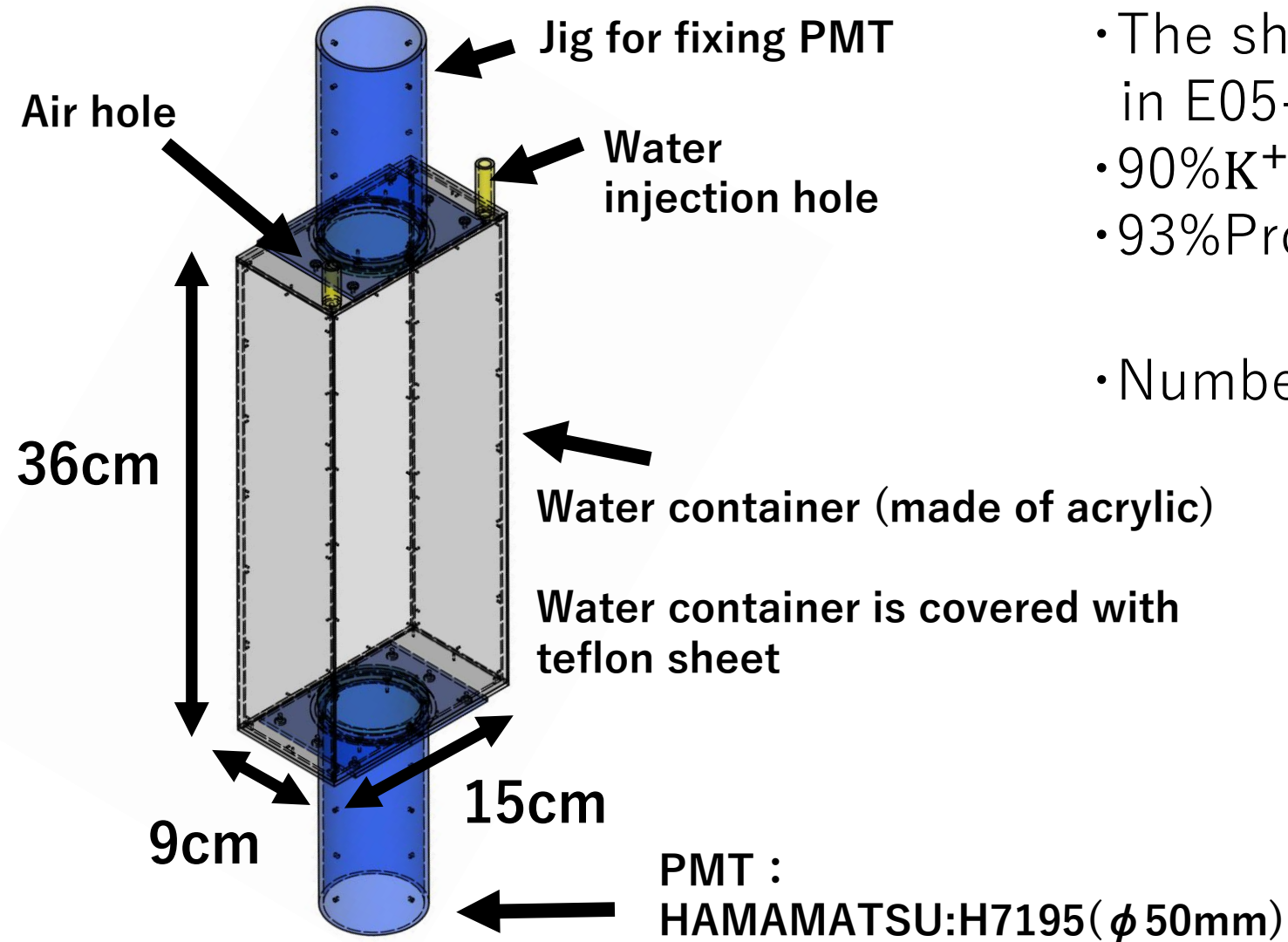


WC detector used in E05-115



# Outline of the new Water Cherenkov being produced

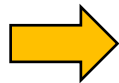
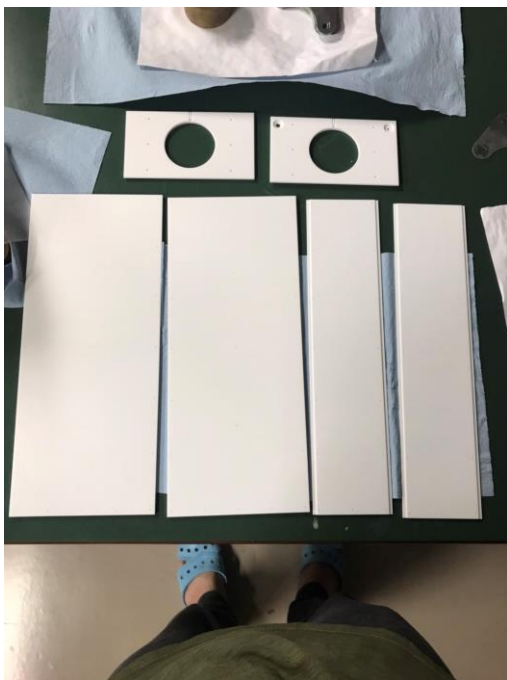
## Single segment shape of WC detector



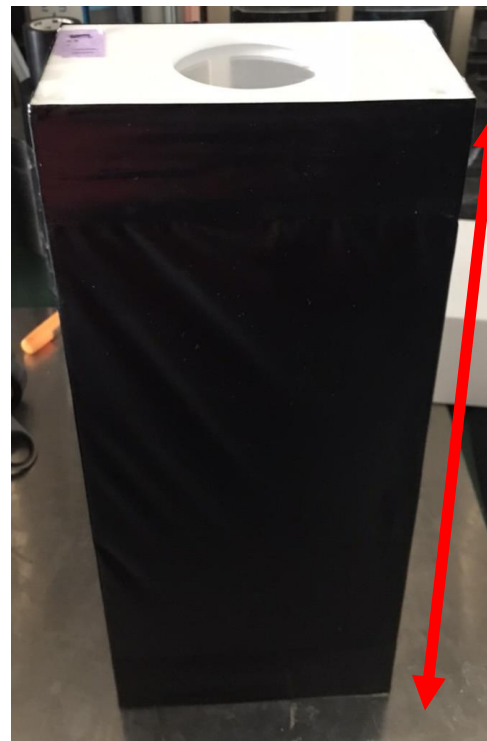
## Requirements

- The shape is the same as the WC used in E05-115.
  - 90%K<sup>+</sup> survival ratio
  - 93%Proton suppression
- ↓
- Number of photoelectrons :120 or more

# Photos making WC



Completed WC detector

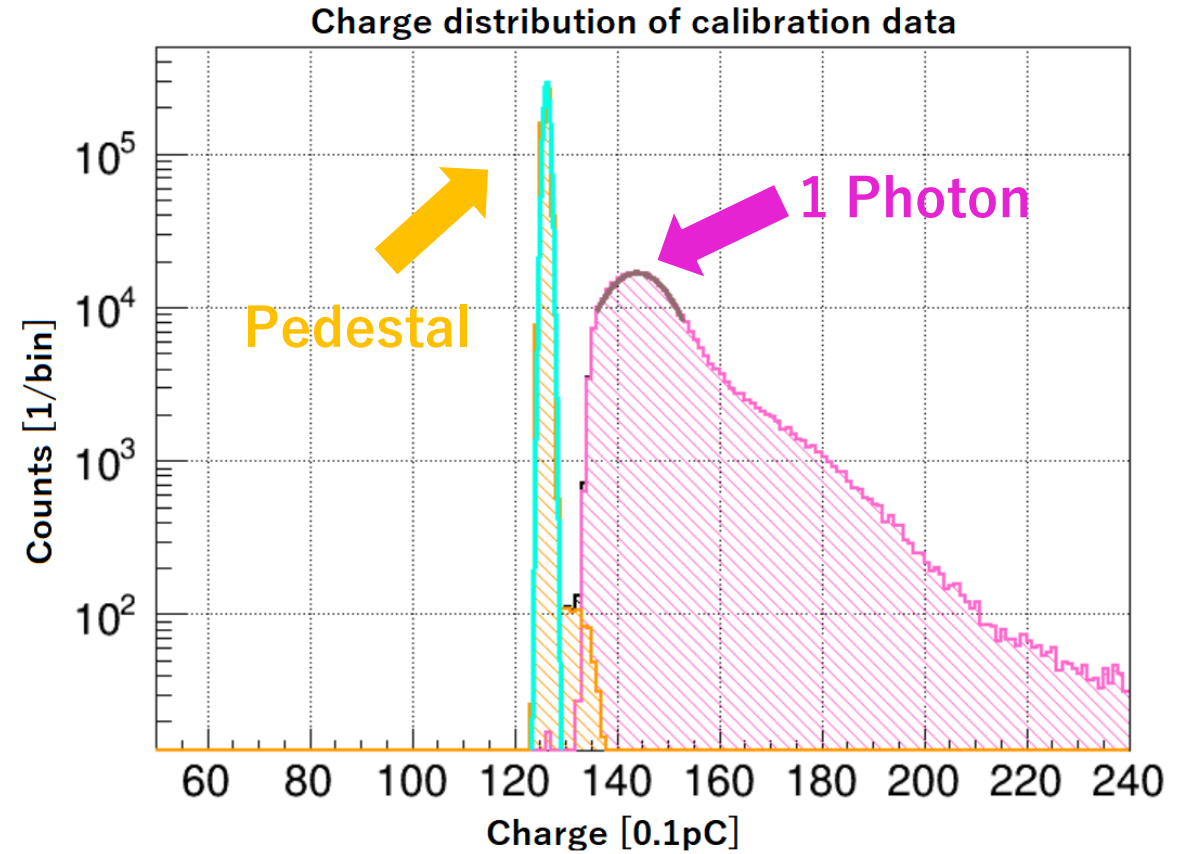
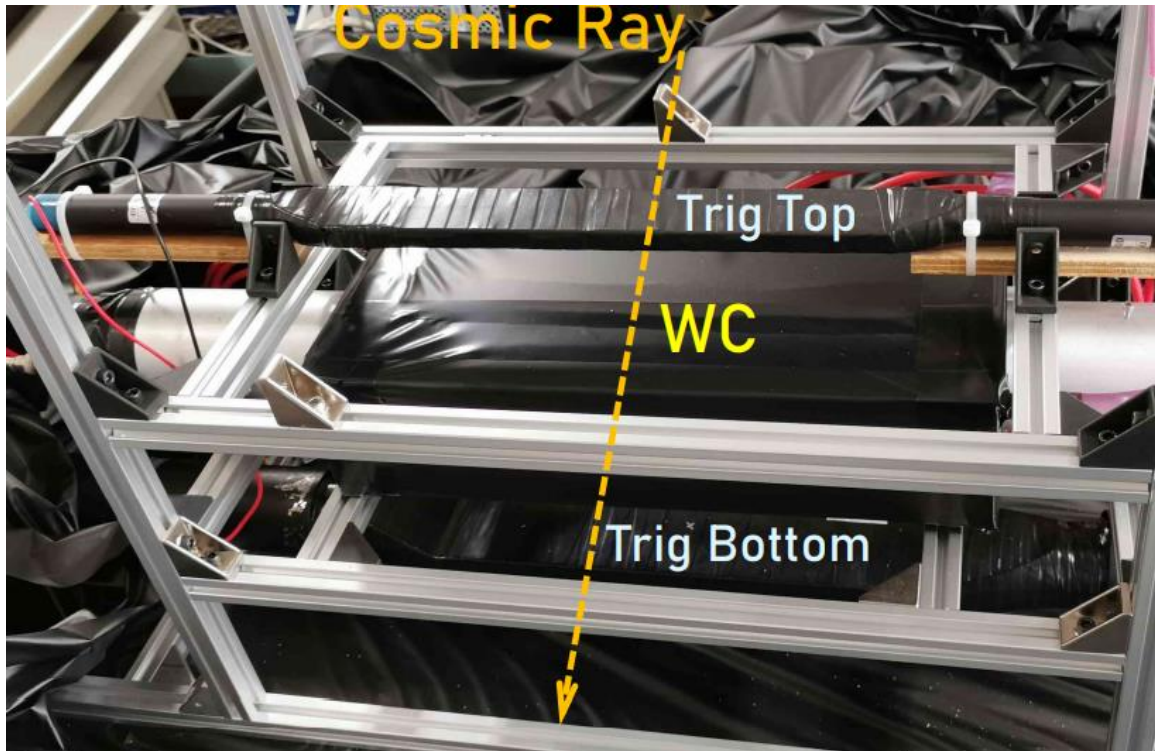


36cm

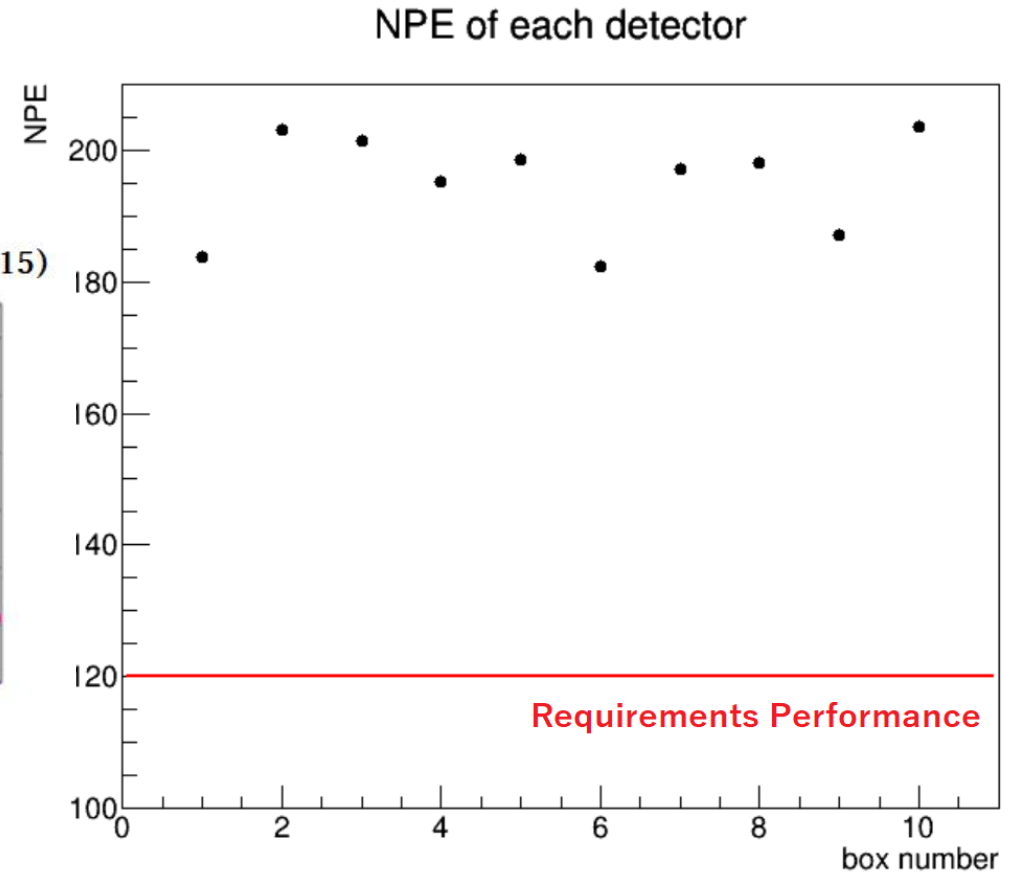
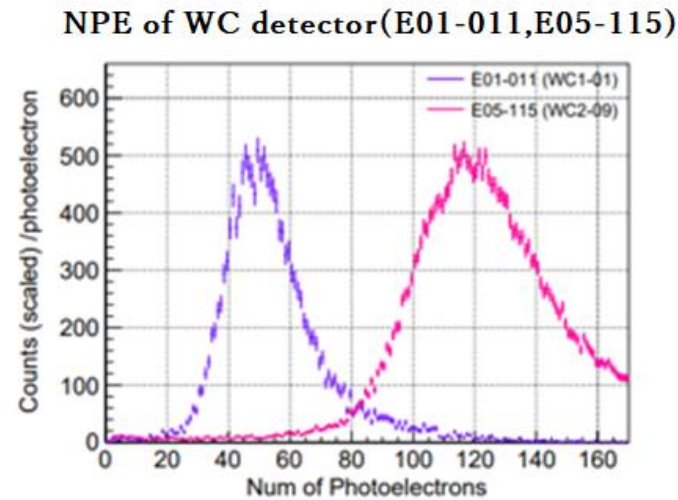
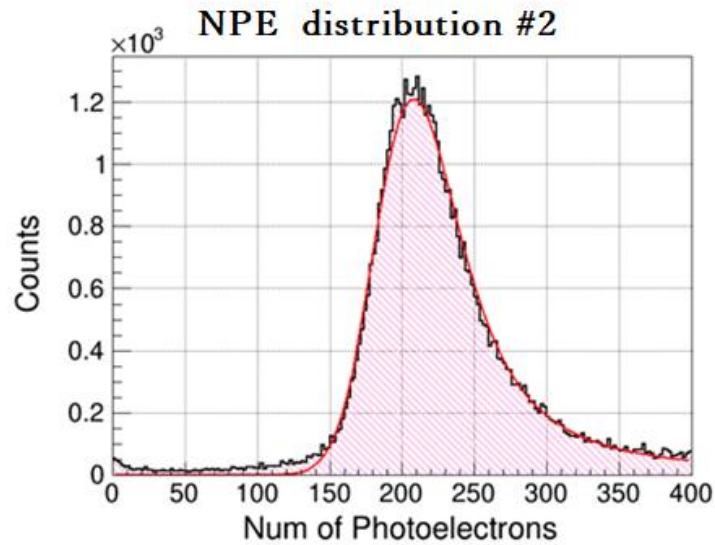


# Setup of cosmic ray test

The number of photoelectrons of WC detectors were evaluated with cosmic rays.



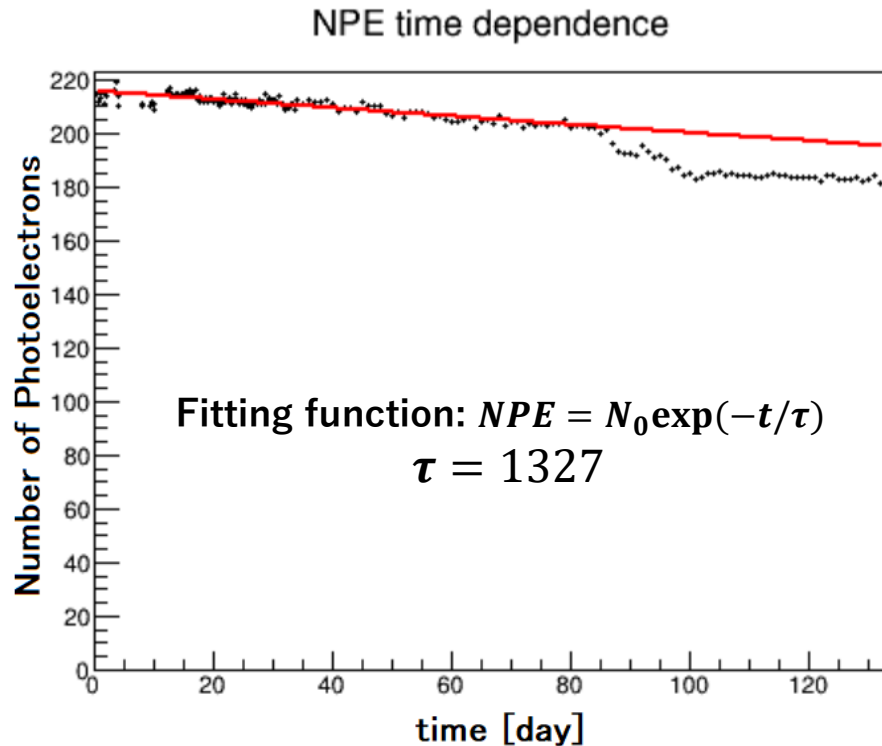
# NPE of each detector



- The number of photoelectrons was about 180 to 200.
- Number of photoelectrons of the new detector was about 1.6 times higher than that used for E05-115.

# Time dependence on NPE

NPE was evaluated 4 months using cosmic rays with a WC detector.



- NPE is expected to be decreased about 91% in 4 months.
- By refreshing de-ionized water and changing the way putting on the Teflon sheet, the decrease in NPE can be suppressed.



The Teflon sheet peels off



# Summary

- The WC detector in the previous experiment broke, so a new WC detector is needed.
- Mass-production of the new WC detectors and evaluating their performance.
- The NPE of the new WC detector is 180-200, which is 1.6 times that of E05-115.
- NPE decreases to 91% after 4 months of use.
- By refreshing de-ionized water and changing the way putting on the Teflon sheet, the decrease in NPE can be suppressed.