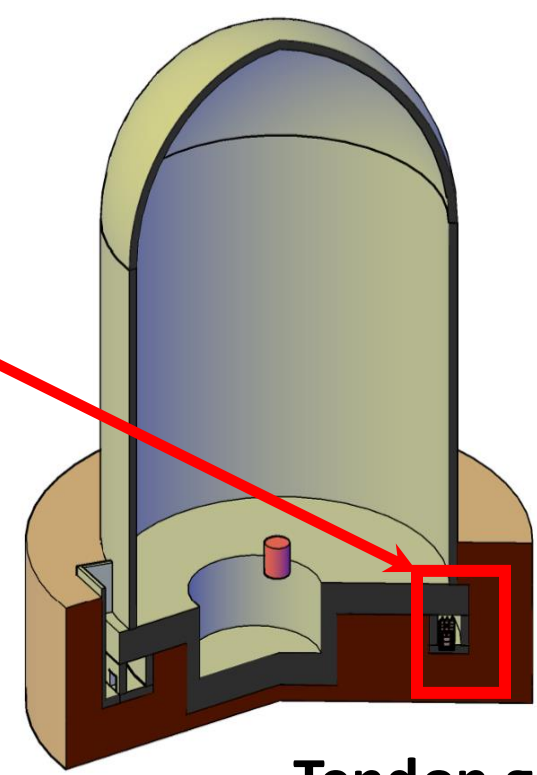
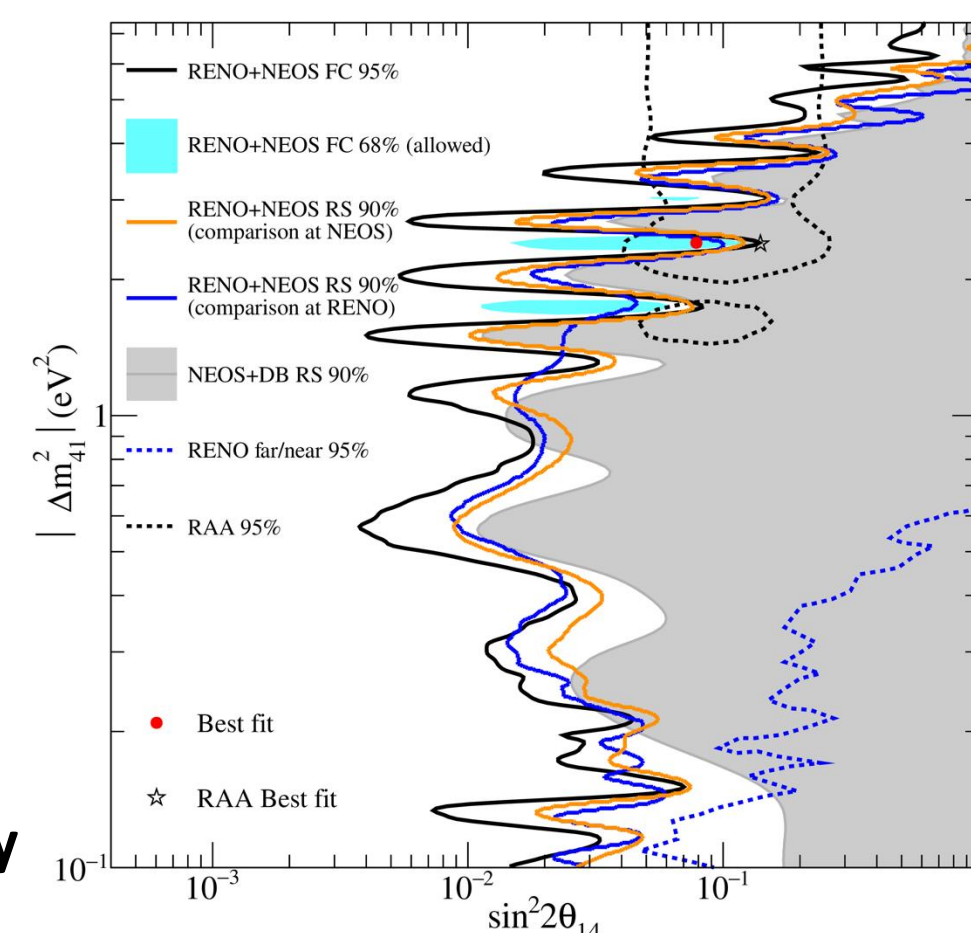


Introduction



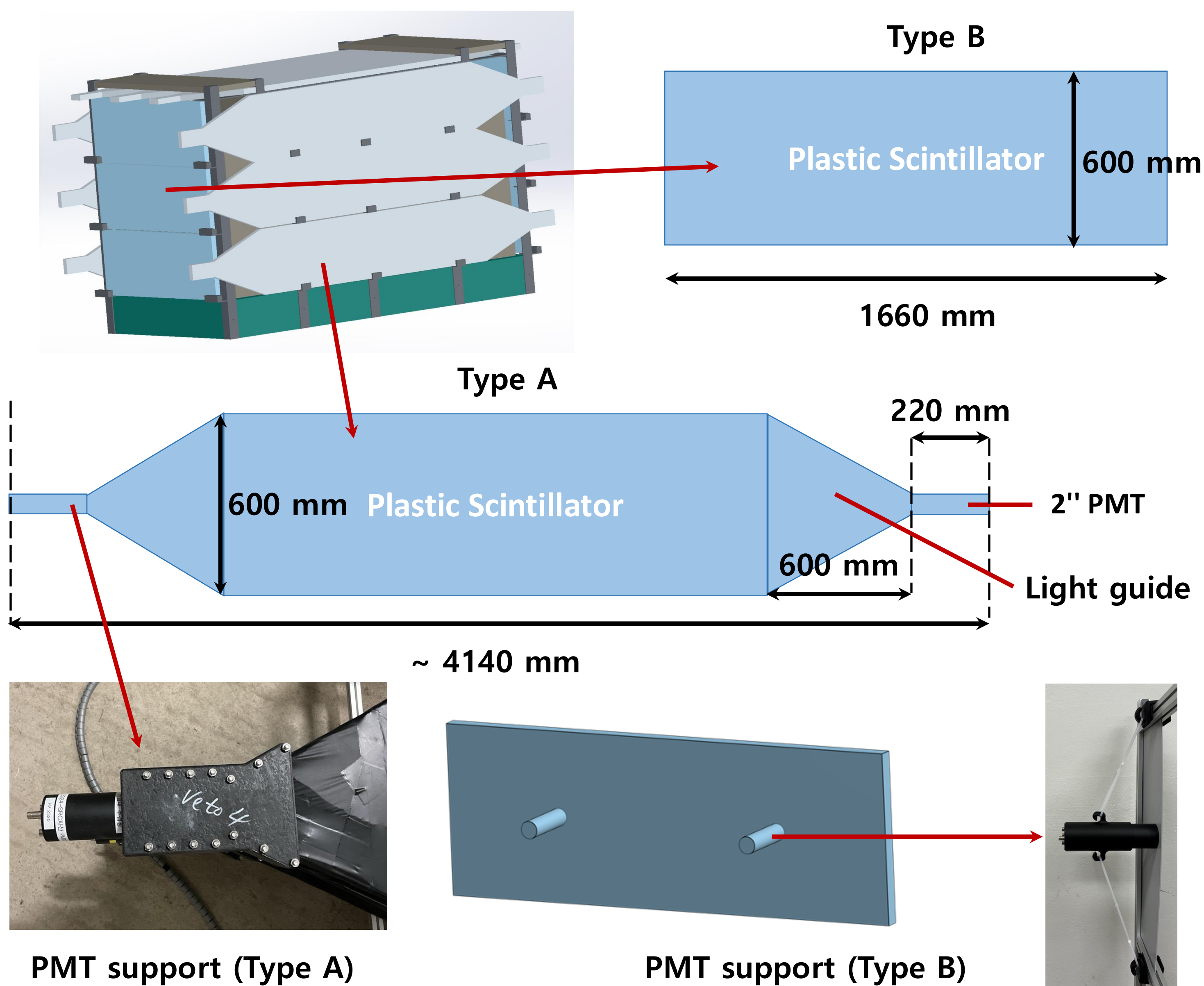
Tendon gallery

PRD 105, 111101



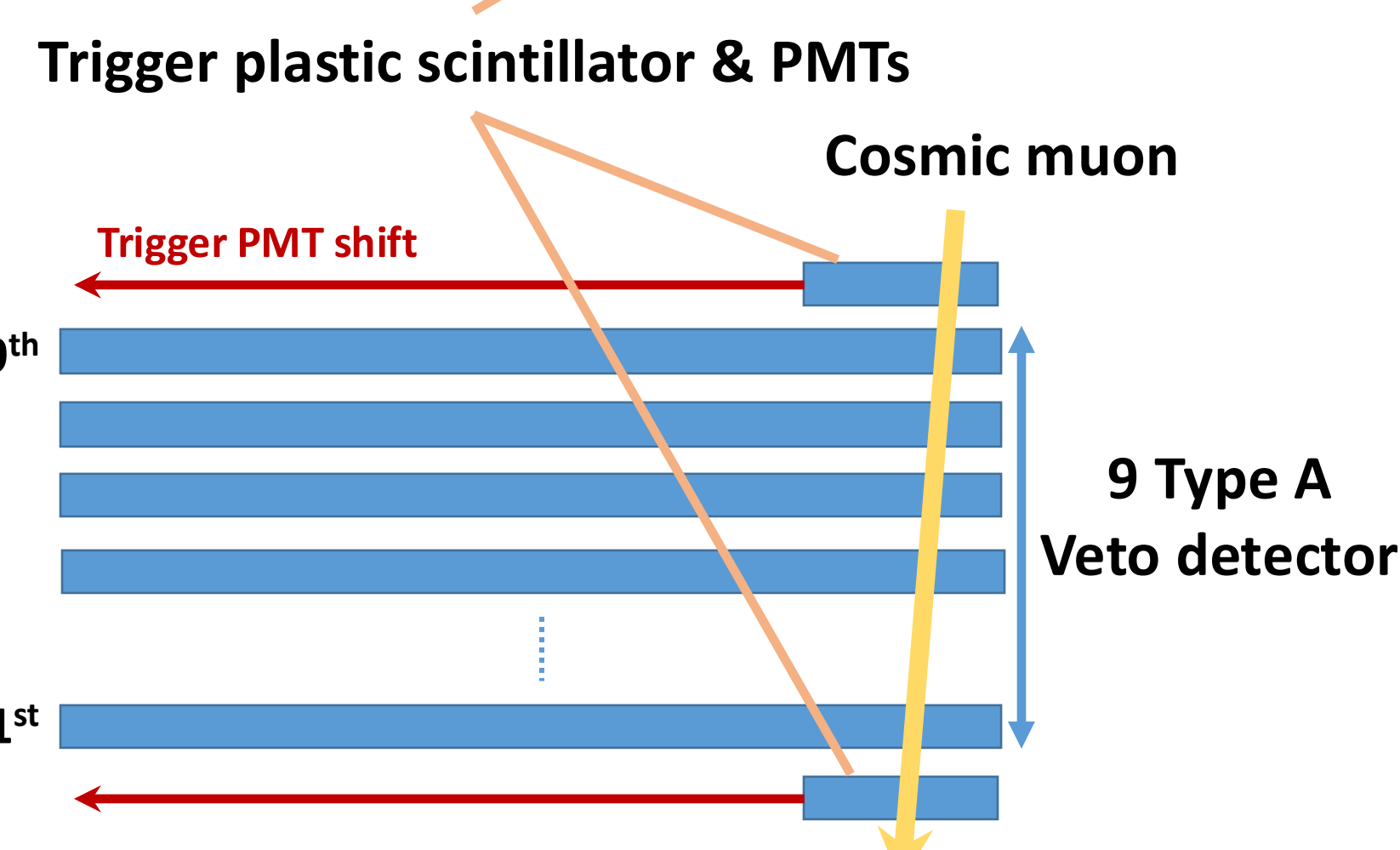
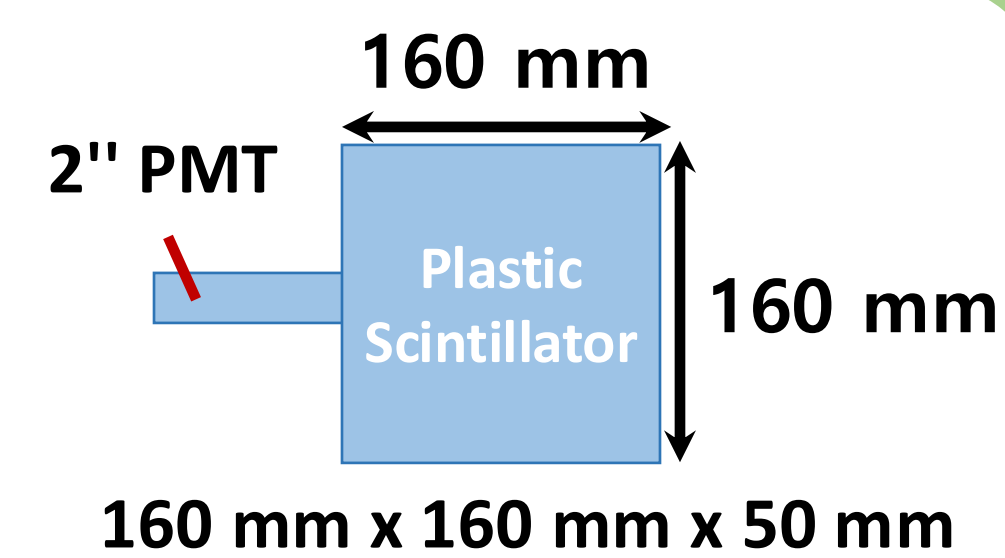
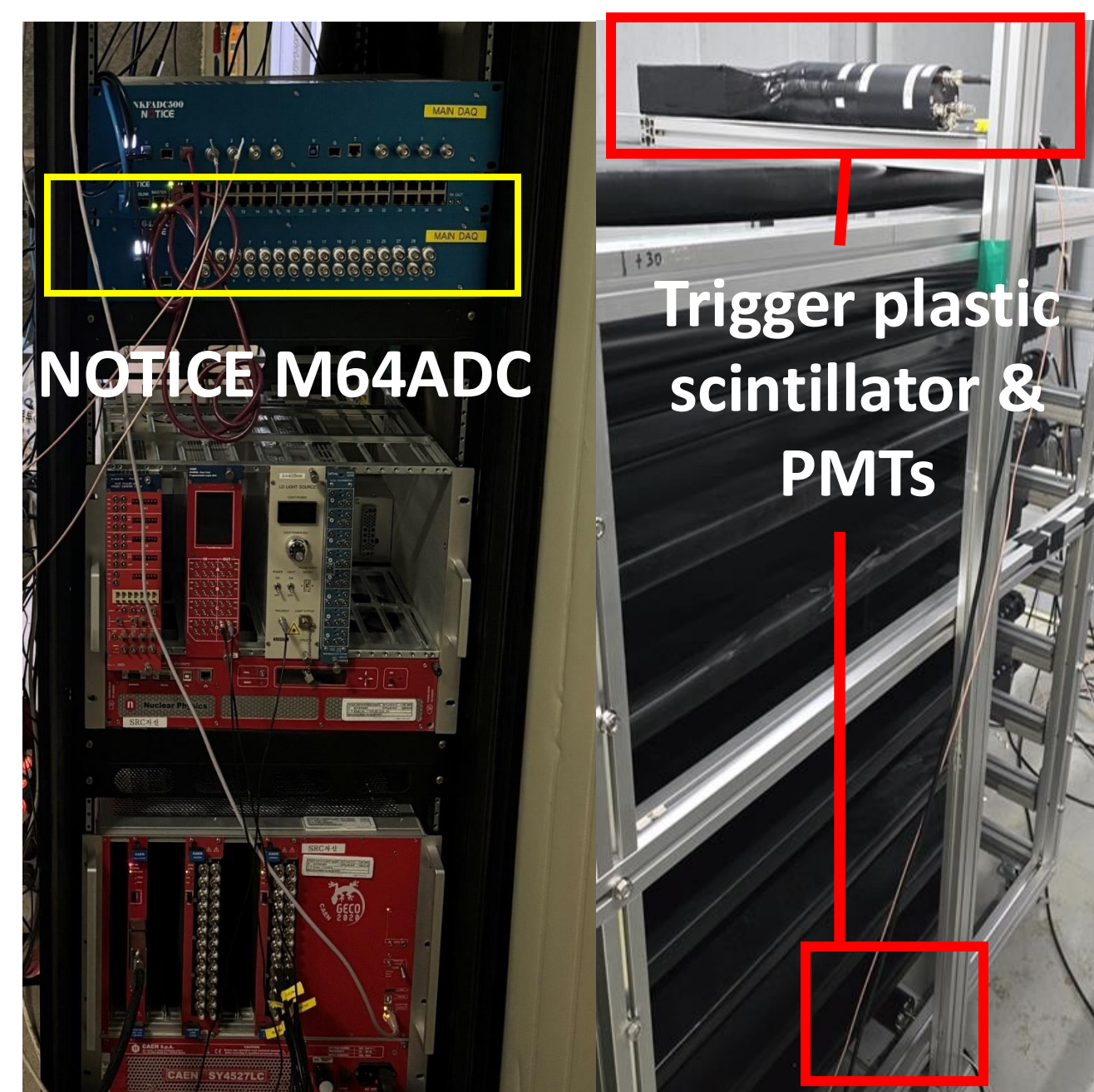
- The RENE (Reactor Experiment for Neutrinos and Exotics) experiment aims to search sterile neutrino oscillation around $\Delta m_{41}^2 \sim 2 \text{ eV}^2$
- RENE prototype detector will be located in the tendon gallery of the Hanbit Nuclear Power Plant in Yeonggwang, about 24 meters from the reactor core
- Veto detectors, composed of 15 plastic scintillators, are installed in the exterior region of the RENE prototype detector and exclude background

Veto Detector

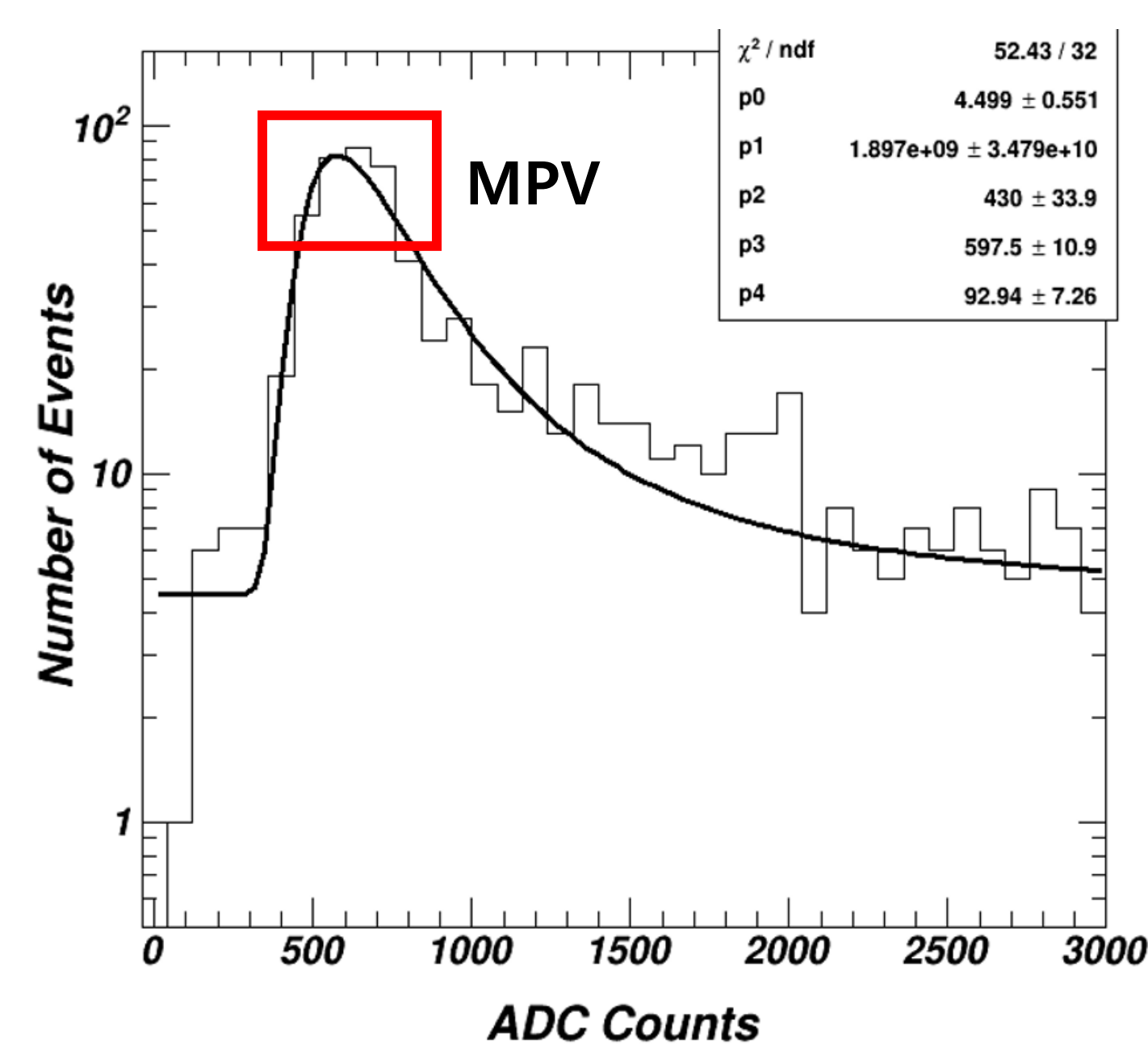


- Plastic scintillators donated from the NEOS collaboration
- Type A : 4140 mm x 600 mm x 30 mm, EJ 200 (9 pcs)
- Type B : 1660 mm x 600 mm x 50 mm, EJ 200 (6 pcs)
- Totally, 32 2-inch PMTs will be used for VETO detector
- PMTs are fixed using 3D printed PMT supports

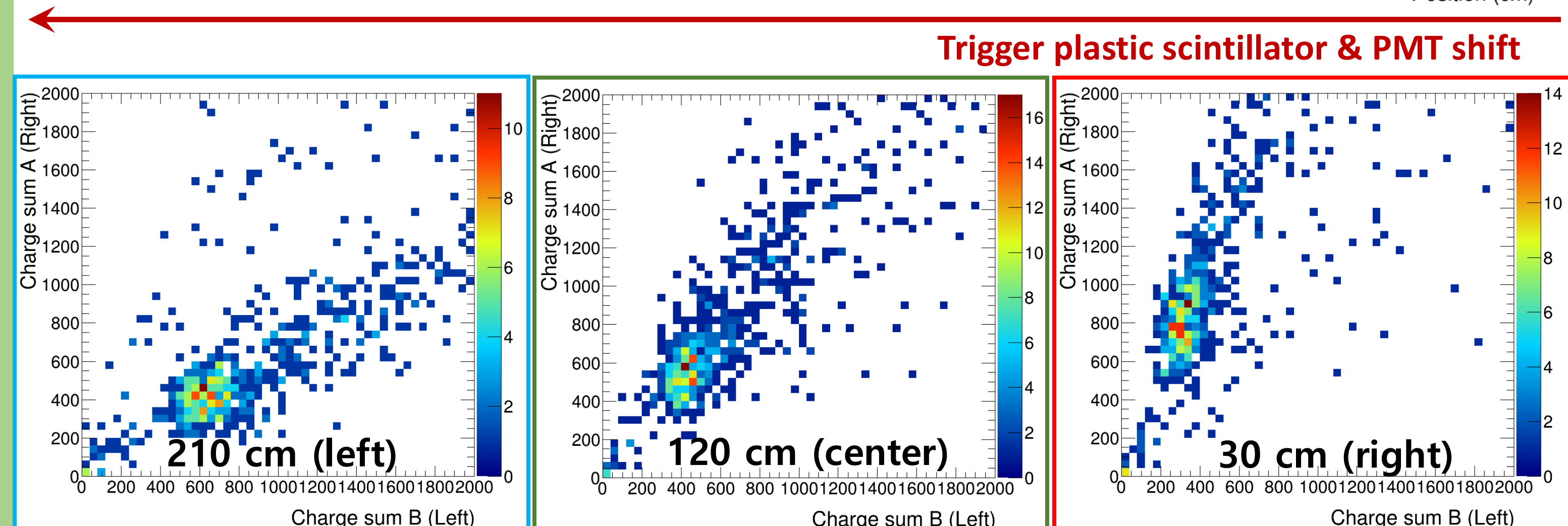
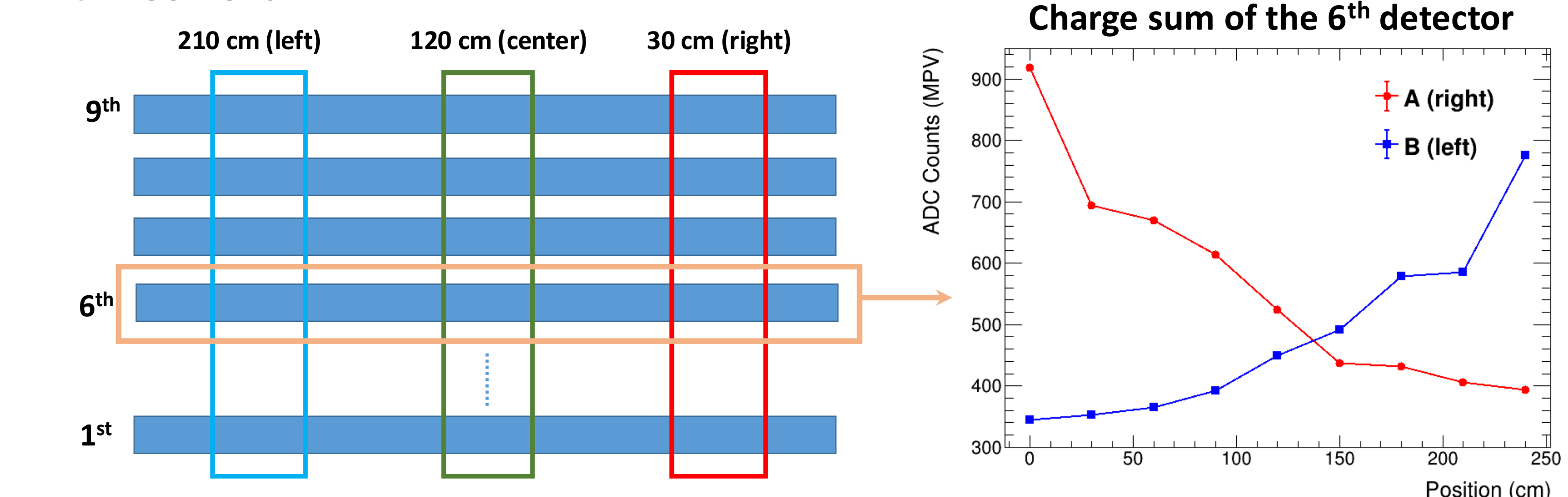
Cosmic Coincidence Test



- NOTICE M64ADC
 - 32 channels
 - ADC resolution = 12 bit
 - Sampling rate = 62.5 MS/ch/s
- For the charge sum data acquired with the M64ADC, a composite fitting function combining an exponential and a Landau distribution was used to determine the most probable value (MPV)



- In plastic scintillator, the minimum ionizing value of dE/dx is $\sim 2 \text{ MeV}\cdot\text{cm}^2/\text{g}$
- Typical energy loss of cosmic muon is $\sim 10 \text{ MeV}$ for 5 cm-thick plastic scintillator
- HV values were adjusted to fit the Landau peak position and threshold



- For plastic scintillators, coincidence data were collected by sliding the top plastic scintillator over the bottom plastic scintillator
- Only the Type A veto detectors were tested

Summary

- Veto detectors are installed in the exterior region of the RENE prototype detector and excludes background
- Coincidence data were collected by sliding the top plastic scintillator over the bottom plastic scintillator
- Composite fitting function (exponential + Landau) was used to determine the most probable value (MPV)
- As the PMT position was shifted, the charge sum correlation exhibited a significant change (Left → Right)
- To definitively confirm the deviations, additional analysis will be conducted using equipment with a higher sampling rate