LAMPS Monthly Meeting

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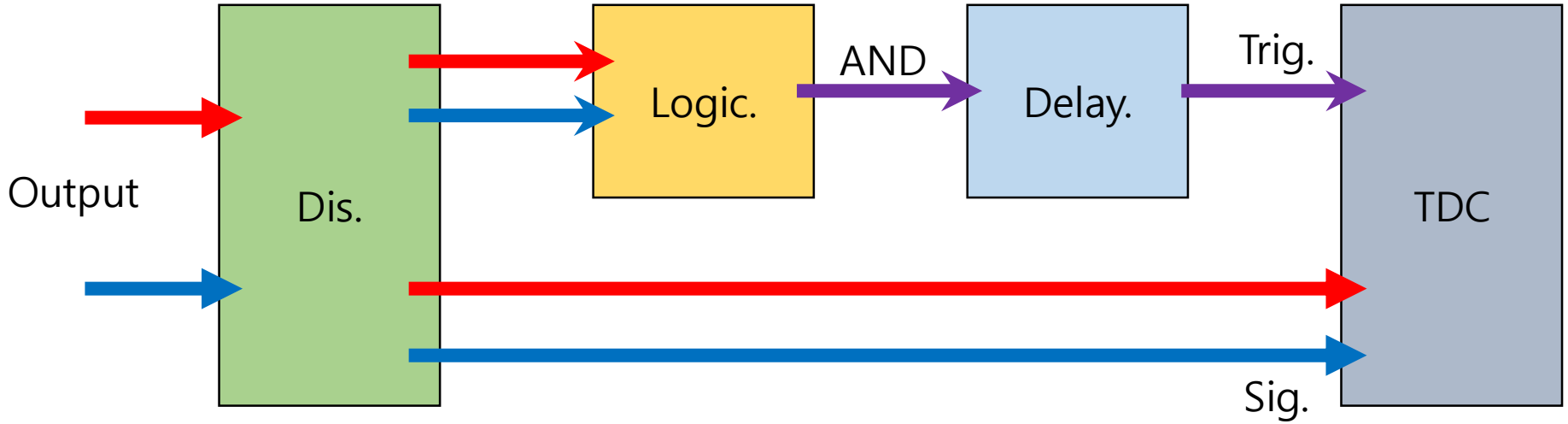
Set Up

▸ Time resolution optimization was done first with Veto considering output size → will move to start counter after wards.

▸ Time resolution measurement was done with PMT and MPPCs

- PMT : H2431-50
- MPPC main boards are connected with two sensor boards(30 MPPCs)

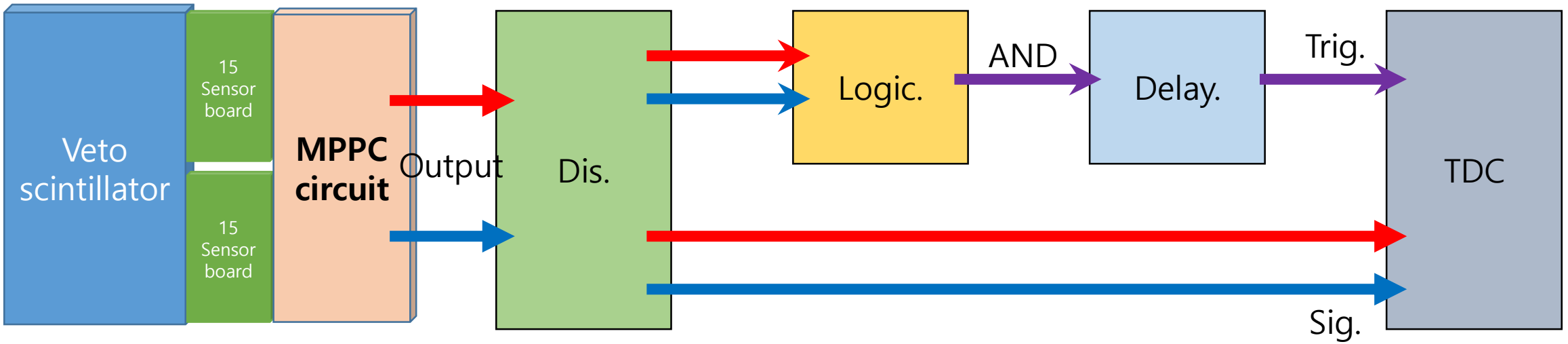
▸ DAQ set up :



Resolution of components except for scintillator and MPPC

▸ To make sure if the other components works as expected, the duplicated MPPC signals were used to measure.

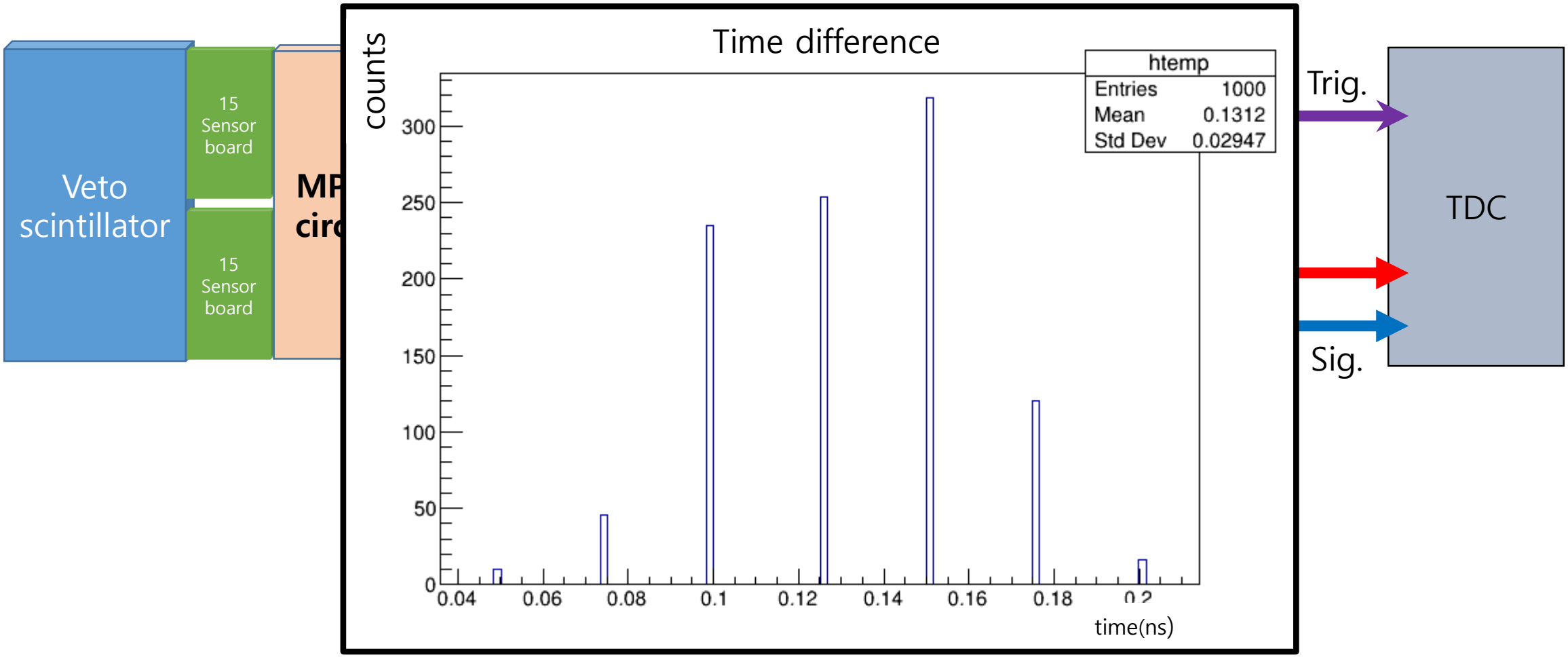
▸ Test schematics :



Module check

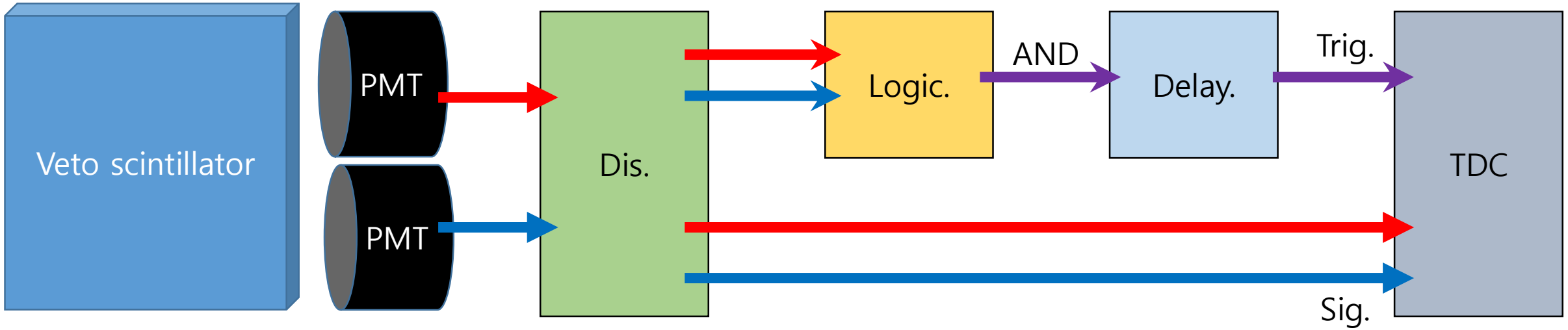
▸ To check whether the timing resolution of each modules are big or not, I conducted the timing resolution test of modules.

▸ The main board makes duplicated signals from each output channels.

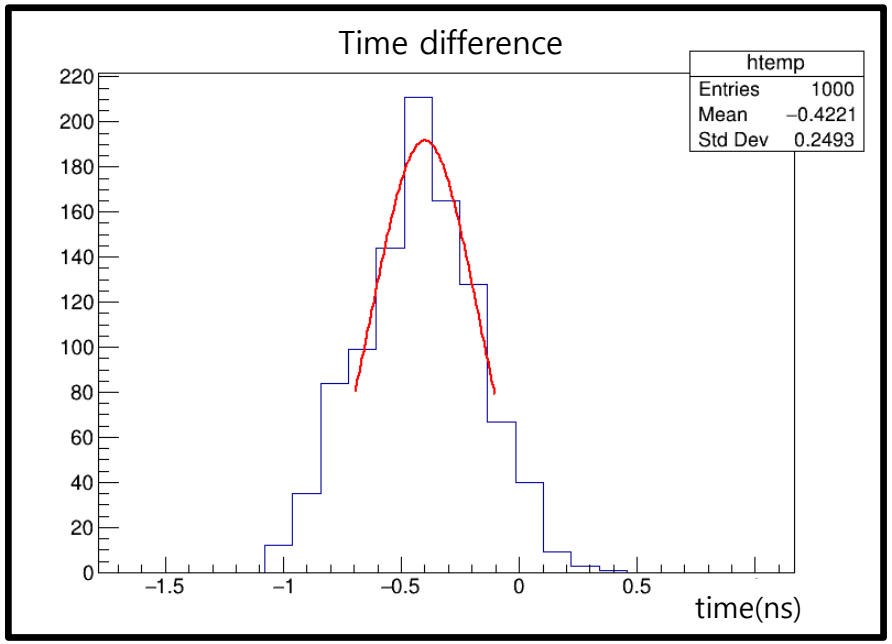


PMT test

- Set up schematics :



- Result :

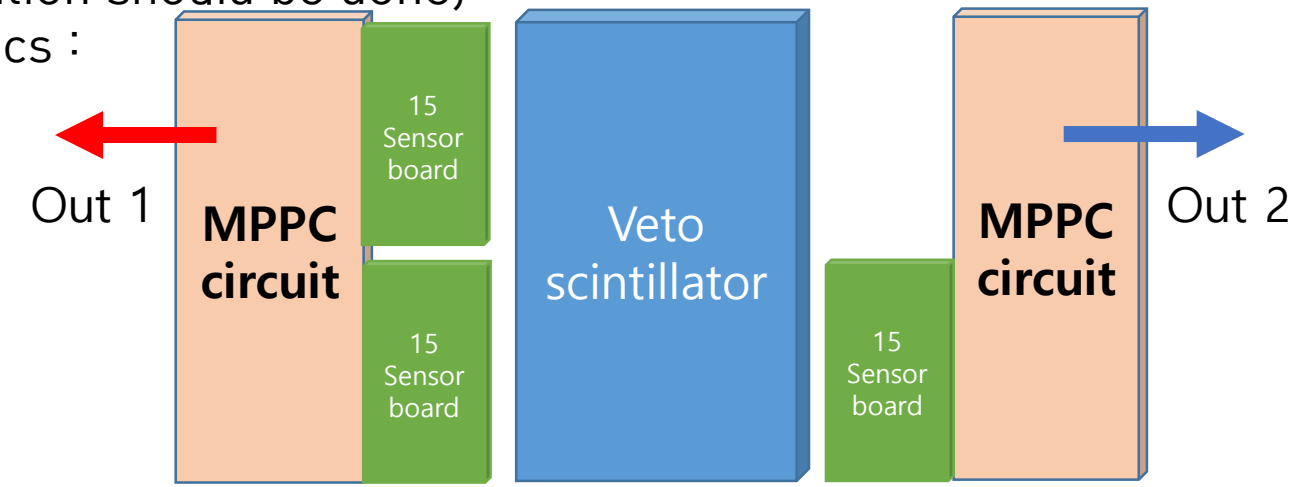


timing resolution ~ 110ps (220ps ÷ 2)
The mean was shifted due to the asymmetry of the location of Am-241 source.

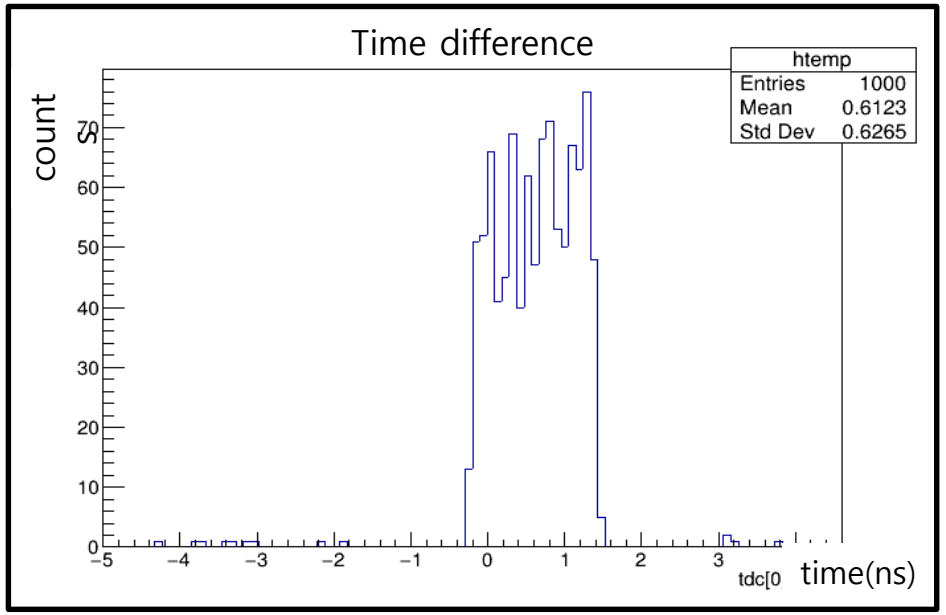
MPPC test

▸ To make a output pulse size similar, one of the main boards is connected with only one sensor board. (Later, the gain calibration should be done)

▸ MPPC test schematics :



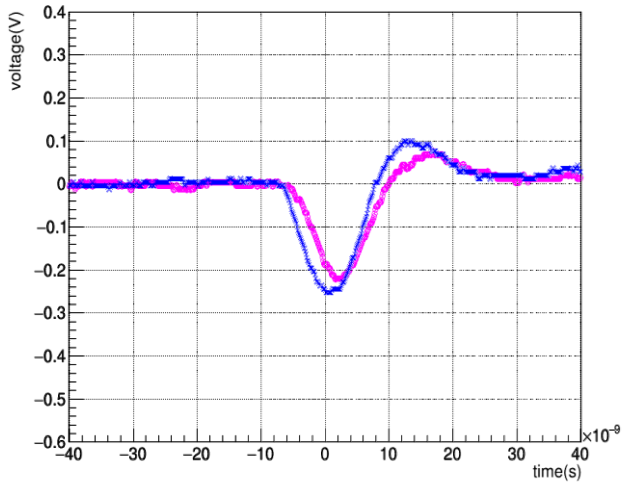
▸ Result :

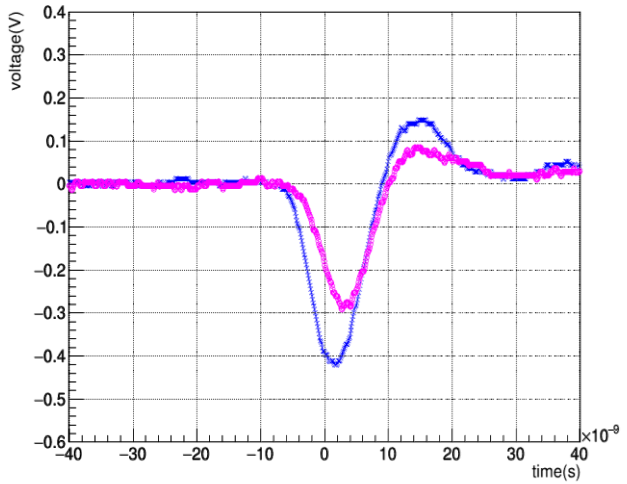


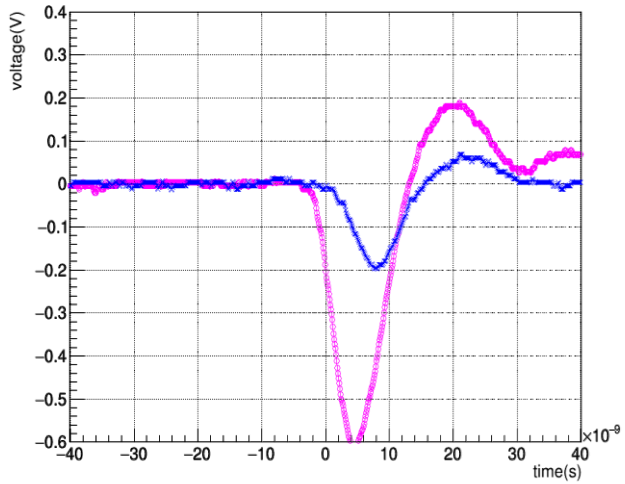
- the distribution is not Gaussian.
- The steepen part of distribution is occurred output pulse width of logic module

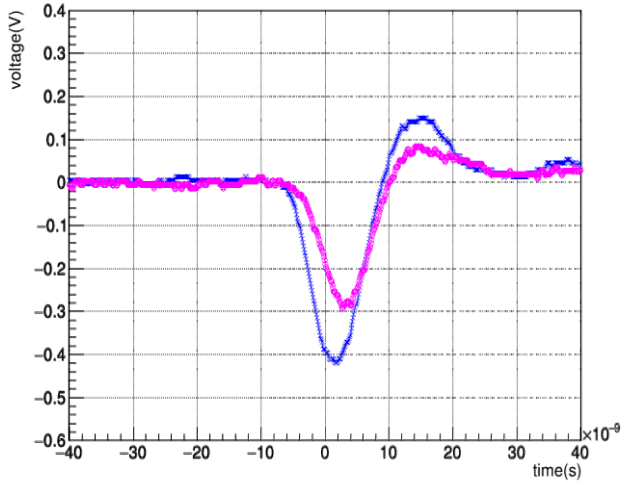
MPPC test

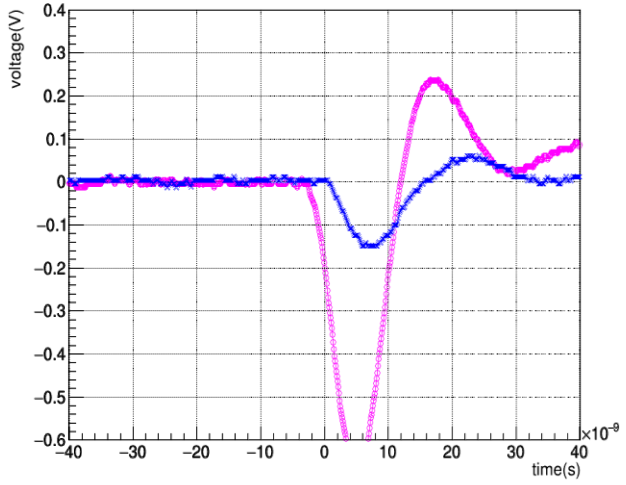
- The output pulse of each main board.











Output 1
Output 2

- The output pulse shape (not only the amplitude) looks quite different from two different boards for same event
→ MPPC gain & circuit calibration for each sensor is necessary. In addition, operation voltage giving an effect on the time resolution will be optimized.

Summary & Plan

- The time resolution of 110ps was obtained with the setup using Veto counter and PMTs.
- It seems MPPC gain & circuit calibration is necessary to get reasonable time resolution → start from next week.
- The resulting pulse shape will be checked with QDC and FADC.

PLAN	8/ 3^{rd} week	8/ 4^{th} week	8/ 5^{th} week	8/ 6^{th} week	9/ 1^{st} week	9/ 2^{nd} week
QDC code debug	⟷	⟷				
Calibrate MPPC board	⟷	⟷	⟷			
Timing resolution test			⟷	⟷	⟷	⟷