

# **Fiber tracker with mppc readout system 20/100 MeV proton beam test at KOMAC**

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# Goals

**1. XY beam scanning**

**2. Time structure of 1 spill( ~100 us) proton beam**

- **32 us + 32 us +32 us ~ 100 us**

# Beamtime

201603

.....

**20 MeV Proton beam**

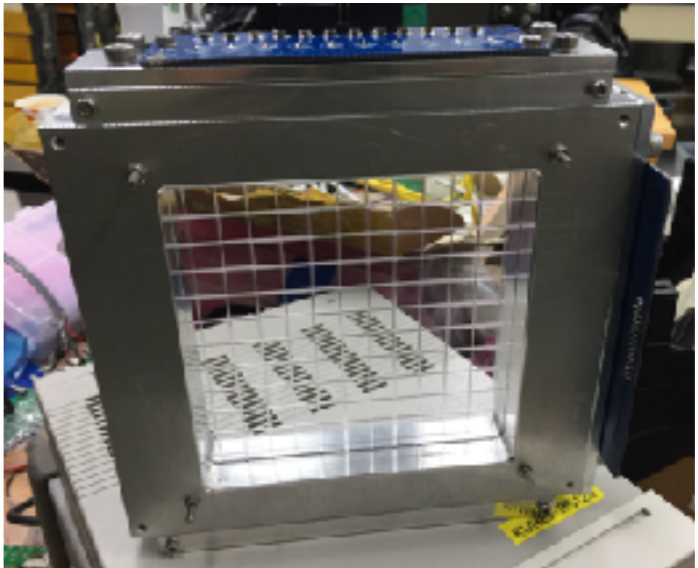


201611

.....

201703

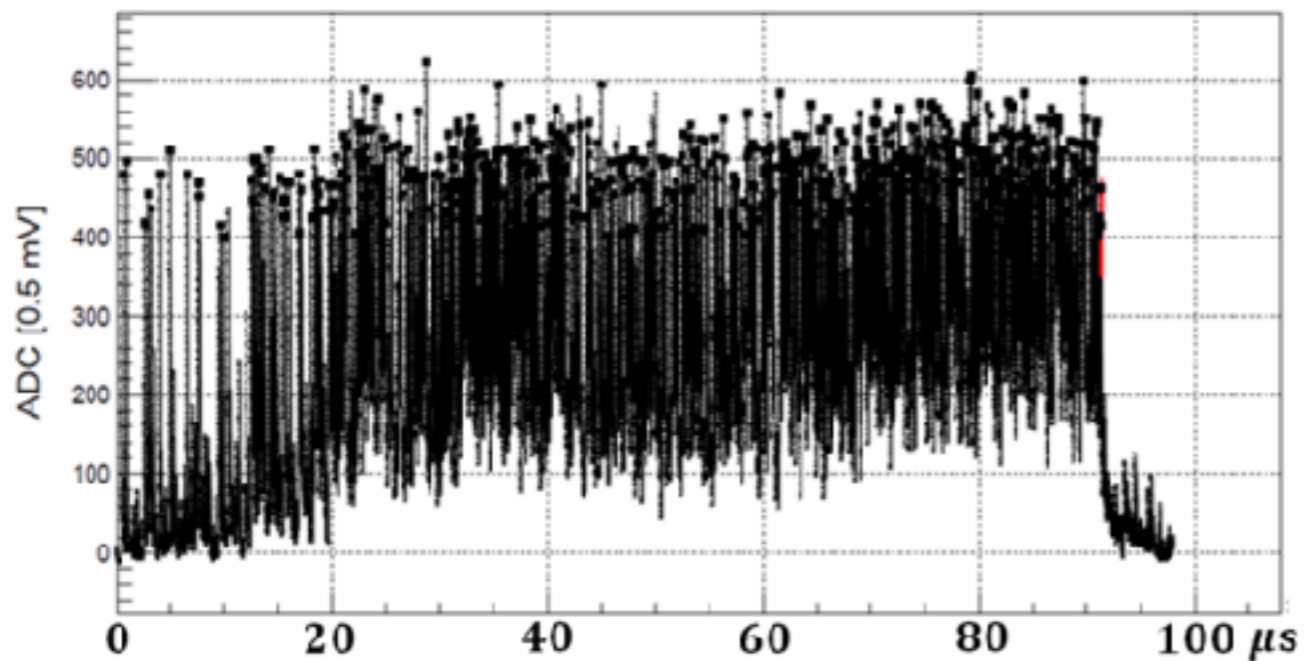
**20/100 MeV Proton beam**



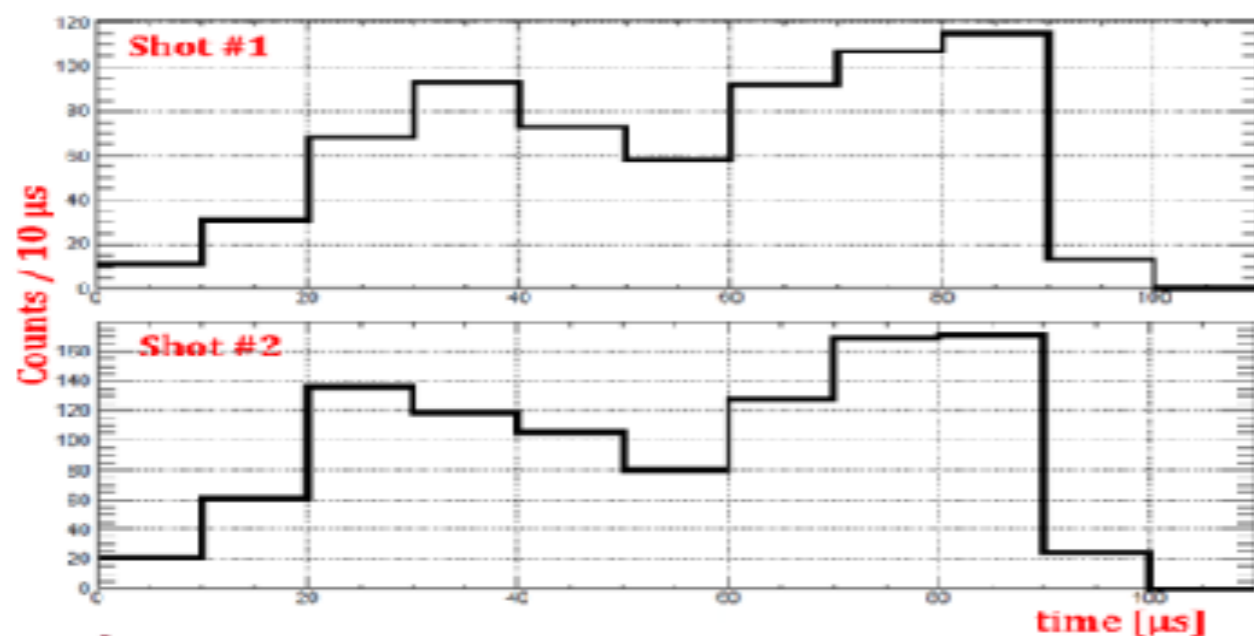
# Previous Beamtime Results - 201603

- 20 MeV Proton beam (w/ fiber tracker)

○ Micro-time structure of proton beam in a spill of 100  $\mu$ s.



DAQ : NOTICE500  
TRIGGER : Self trigger



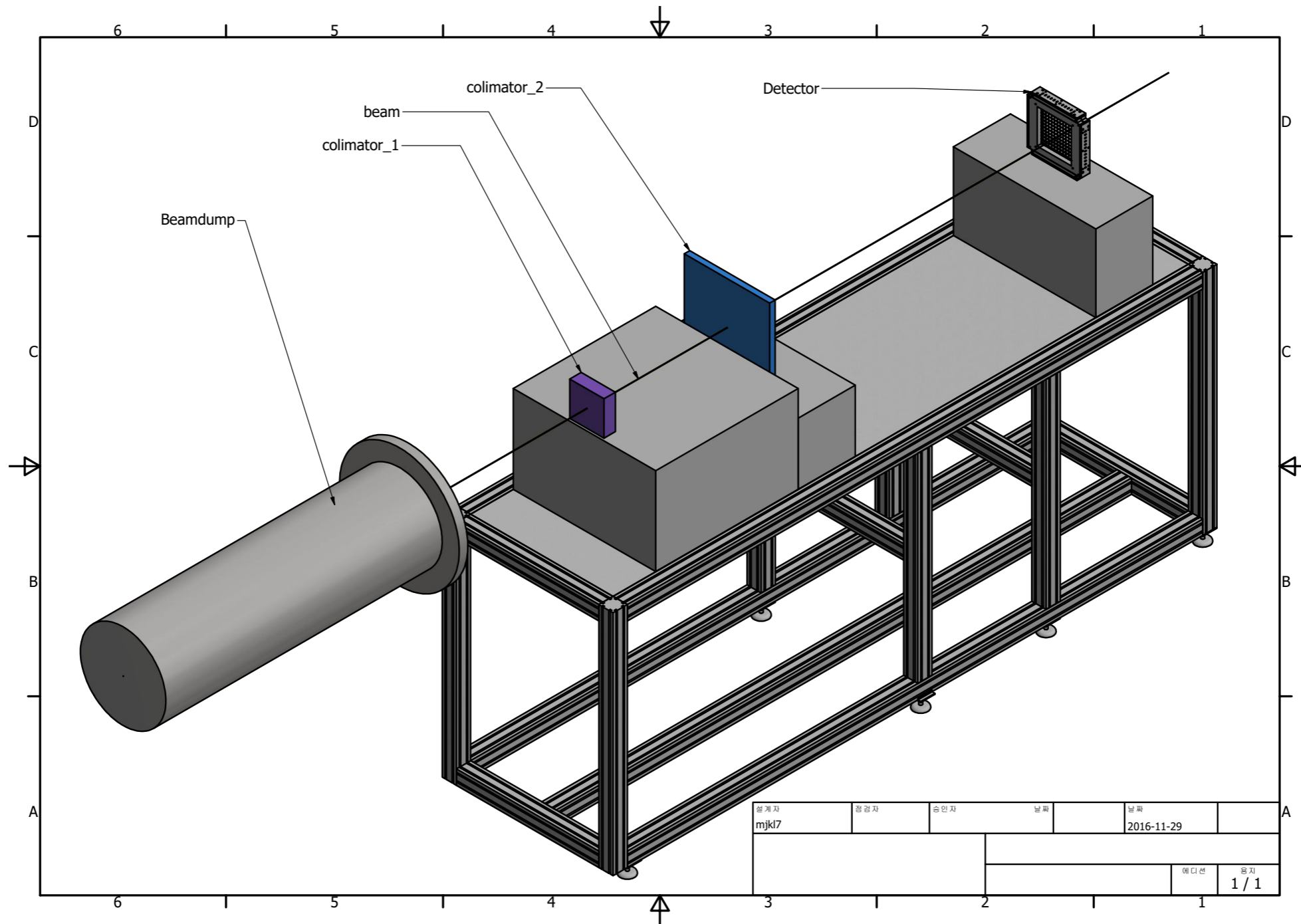
# Problems

**NOTICE FADC 's maximum recording length = 32 us**

1. We used self-trigger mode of noticeFADC, and wanted to get 3 serial events(32 us +32 us +32 us)
2. 10000 events are triggered, but the number of full time scanning (100 us)events is only 2!

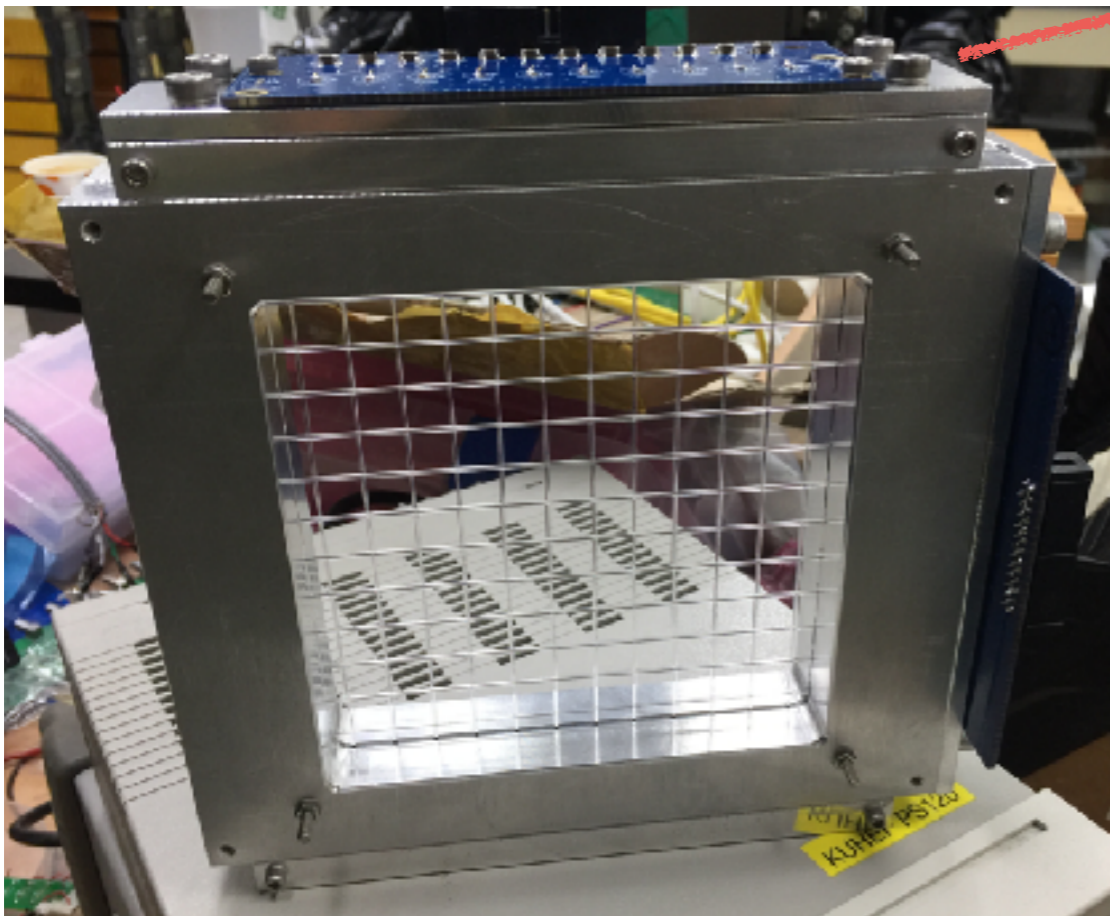
# November Beamtime

## Beamline Set-up 2016.11.29

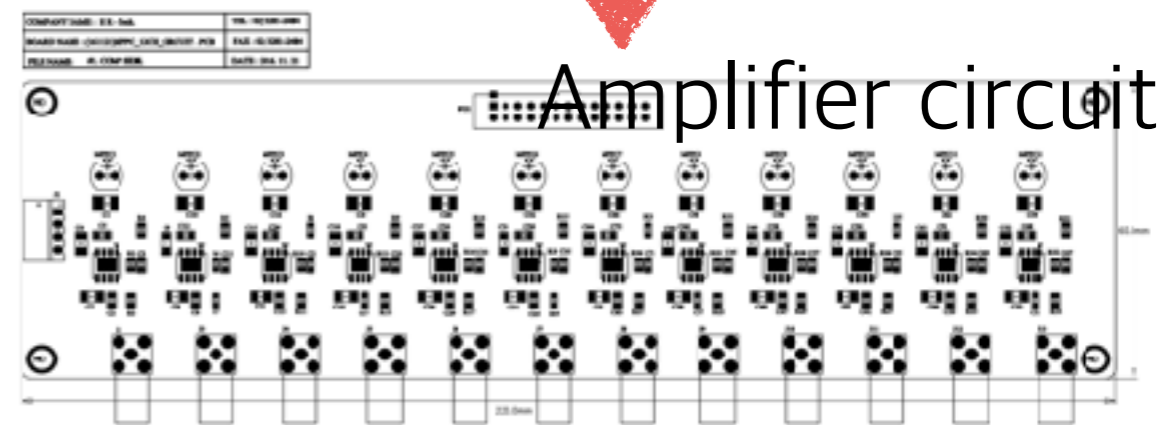
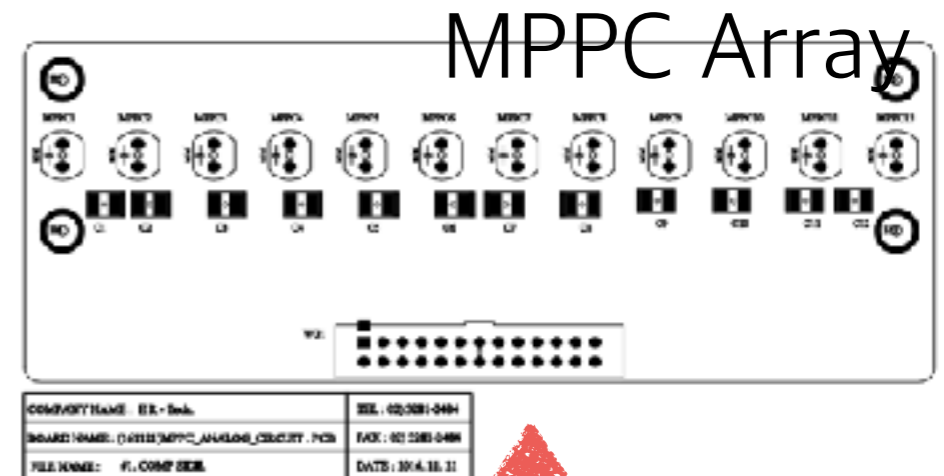




# November Beamtime Detector



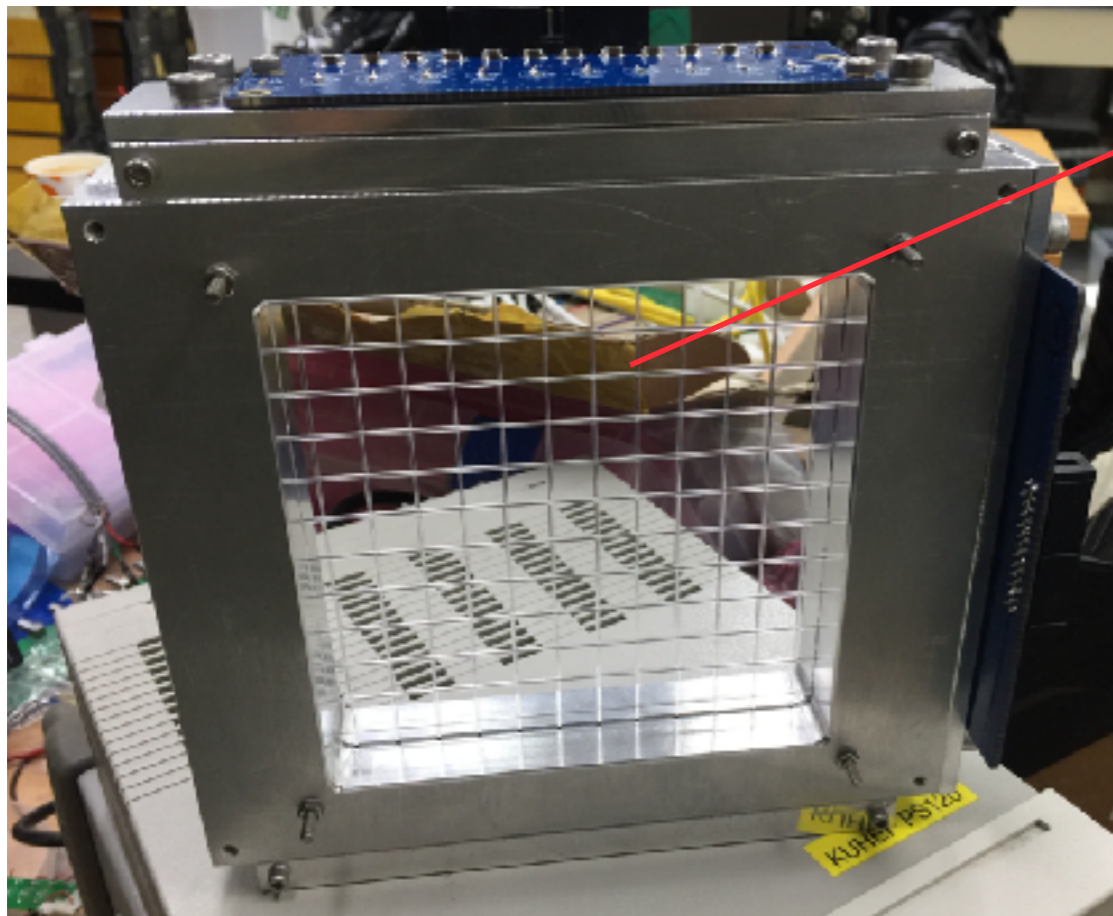
fiber tracker





# November Beamtime Trigger

## Trigger logic



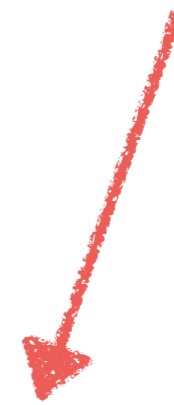
Center position fiber's signal



NIM logics

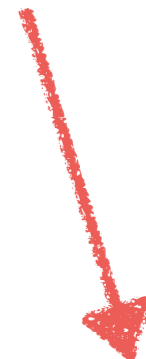


1st trigger



2nd trigger

(33 us delayed)



3rd trigger

(66 us delayed)

fiber tracker

**3 same trigger signals with different timing**

# November Beamtime

## Summary

2016.11.29

**XY beam scanning is ok!**

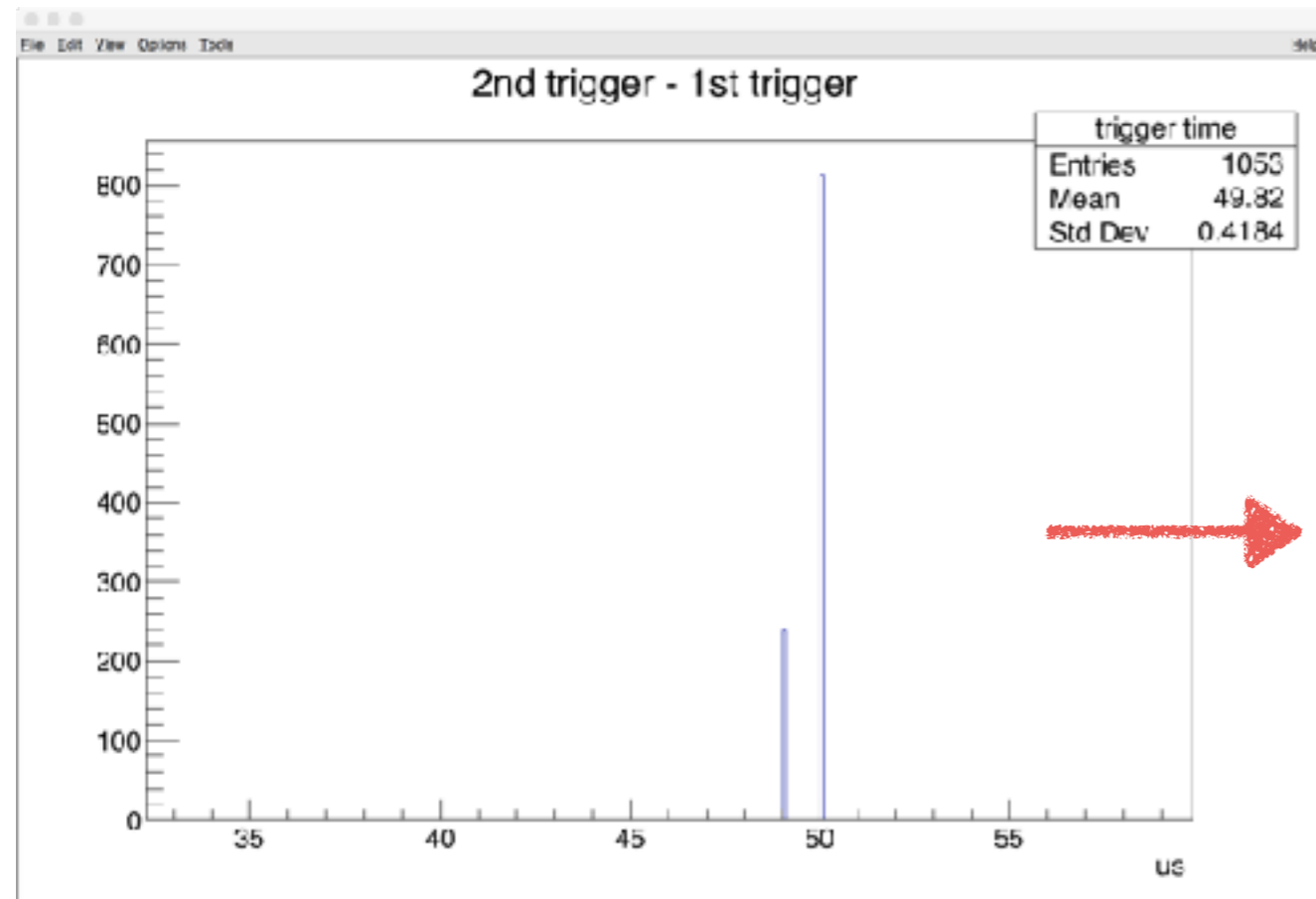
Used center position fiber's signal with 33 us ,66 us delayed triggers as a external trigger

 it failed, Notice FADC can't record following 2 events

Changed plan, delaying each trigger 50 us and 100 us and took data

( Delaying time between triggers 33 us -> 50 us)

# November beamtime Summary



814 events with 22 ch  
**Total 814 x 22 = 17908**

1st and 2nd(50 us delayed) serial  
events are triggered ~1000 events

But there is no event that has 3 serial events!

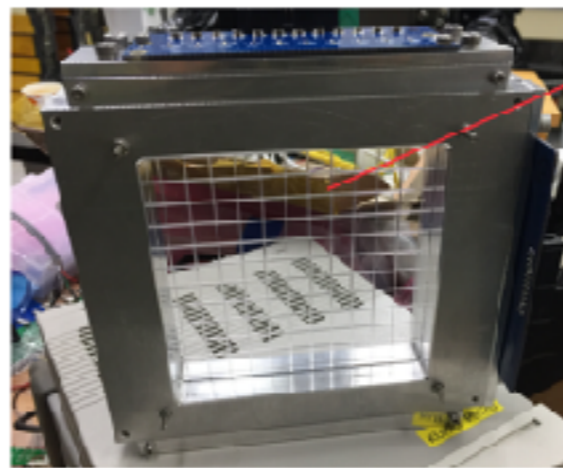
# 201703 Beamtime Plan

New strategy - Recording data with two FADCs parallelly

Dividing signals

FADC1

FADC2



fiber tracker

Center position fiber's signal

NIM logics

1st trigger

2nd trigger  
(33 us delayed)

3rd trigger  
(66 us delayed)

## Trigger logic

FADC 1 - 1st trigger(0~33)

3rd trigger(66~99)

FADC 2 - 2nd trigger(33~66)

(us)

# Summary

- Remaining goal of the fiber tracker Proton beam test is get data that has Time structure of 1 spill(  $\sim 100$  us) proton beam  
( $32$  us +  $32$  us +  $32$  us  $\sim 100$  us)
- We going to get time structure data with new daq logic