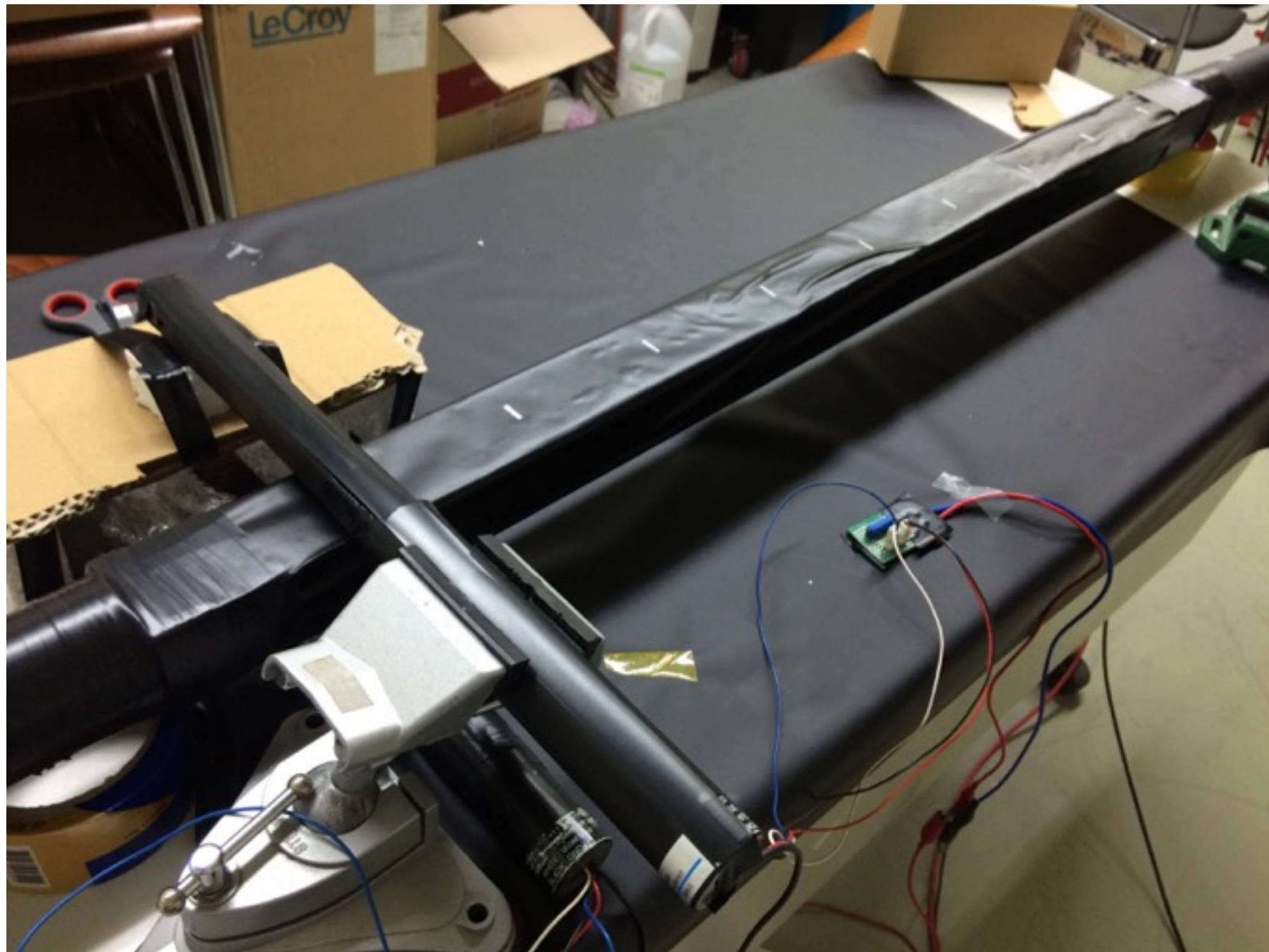


# GBAR Meeting (SNU)

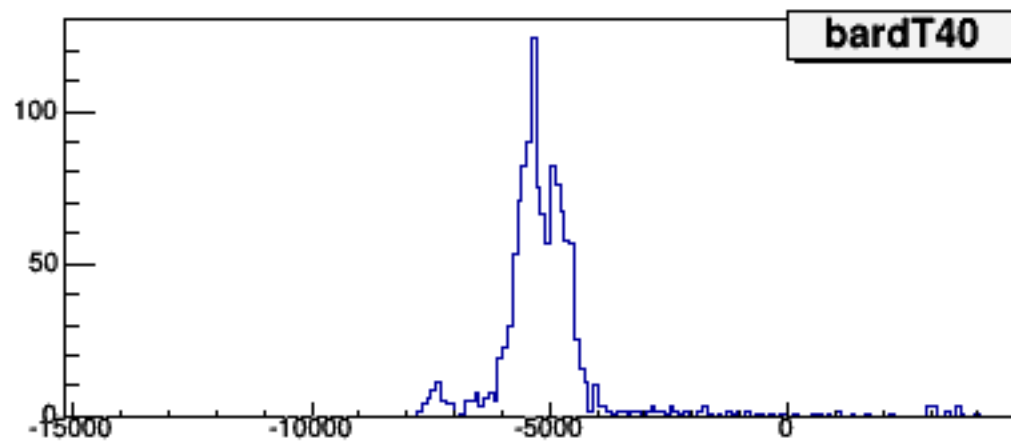
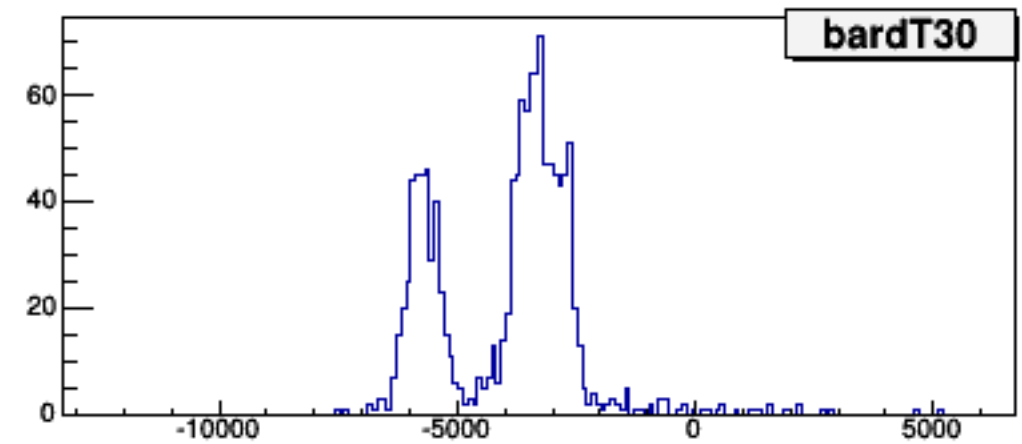
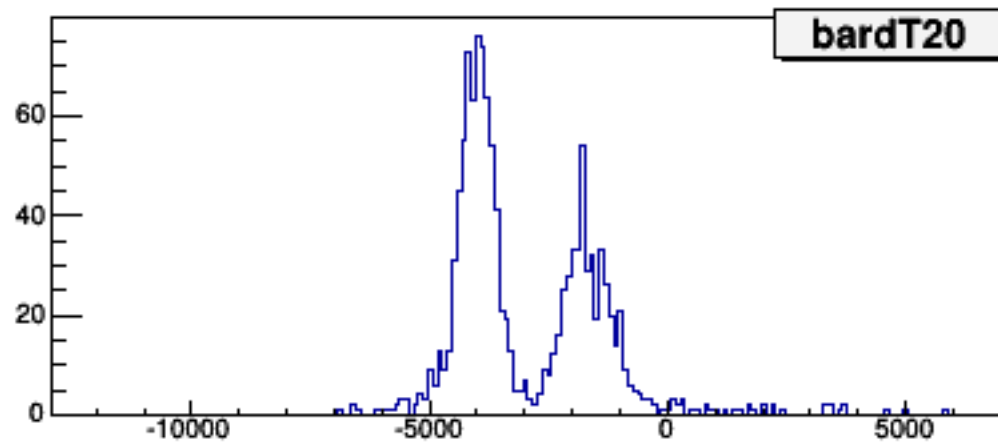
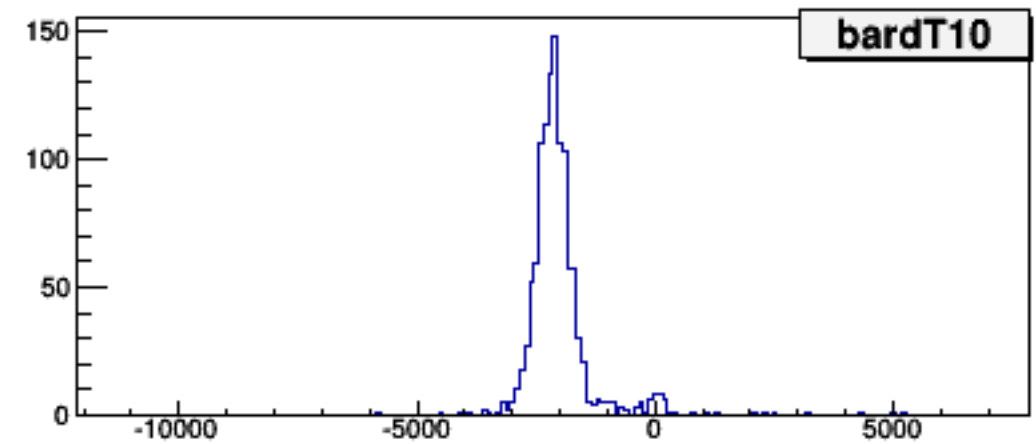
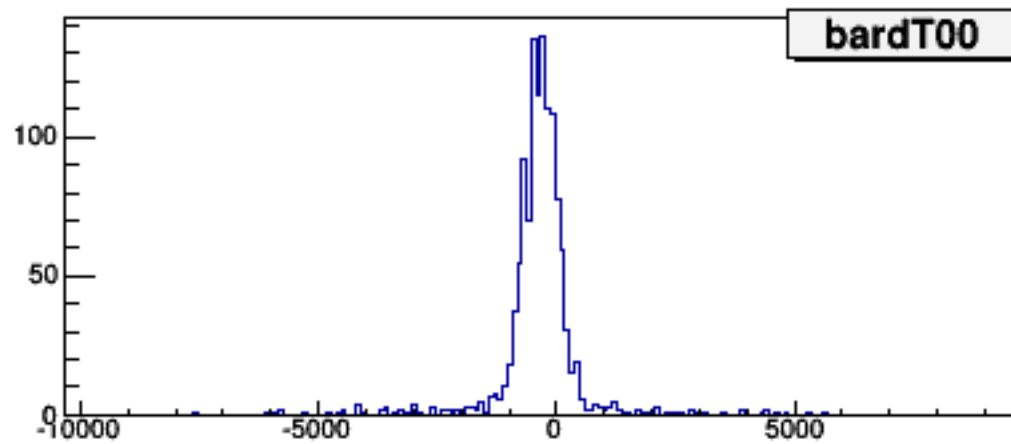
## (14 June 2016)

Jongwon Hwang

# Test of the DAQ system with PWO scintillation crystal



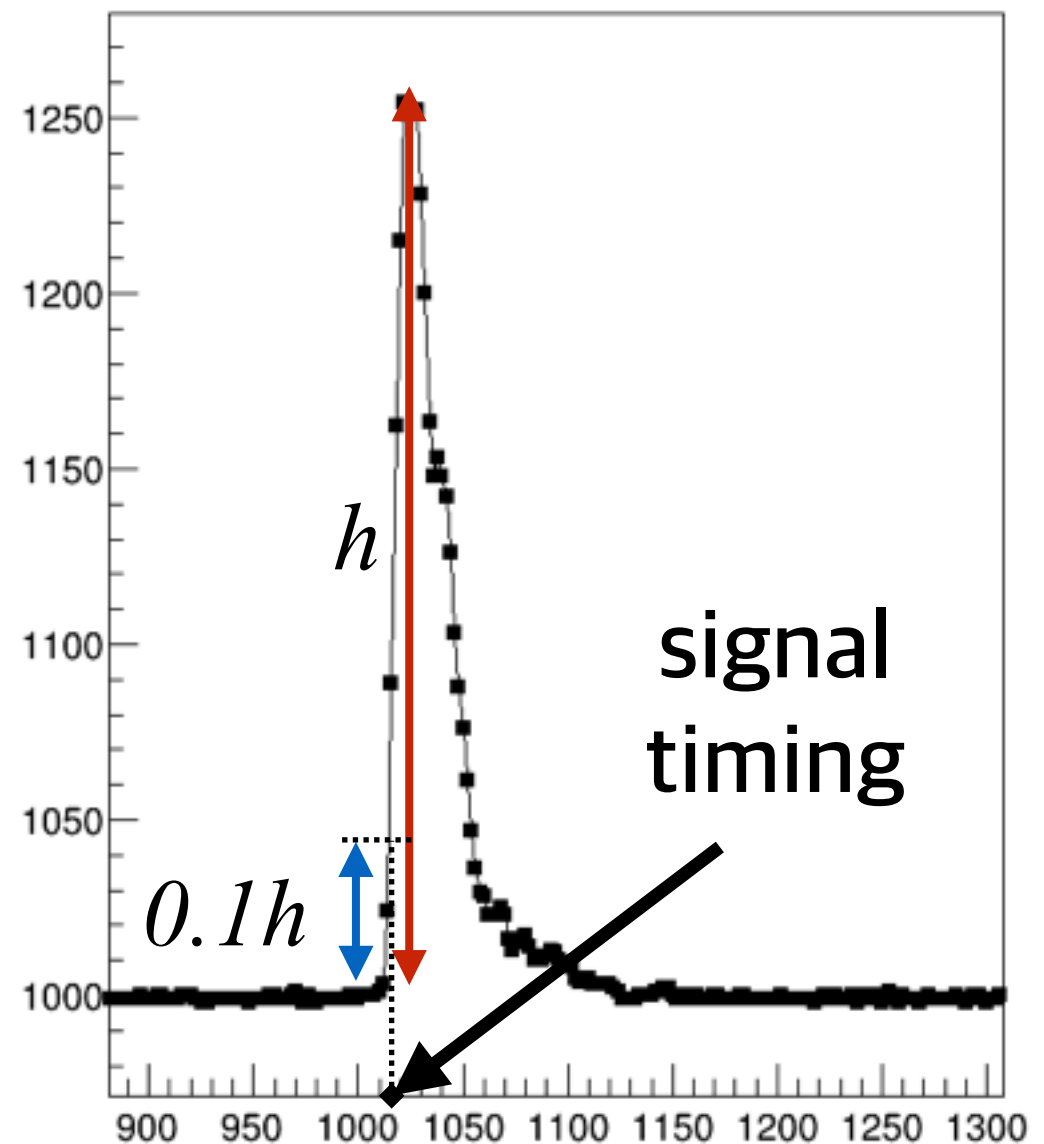
# $\Delta T$ of bar



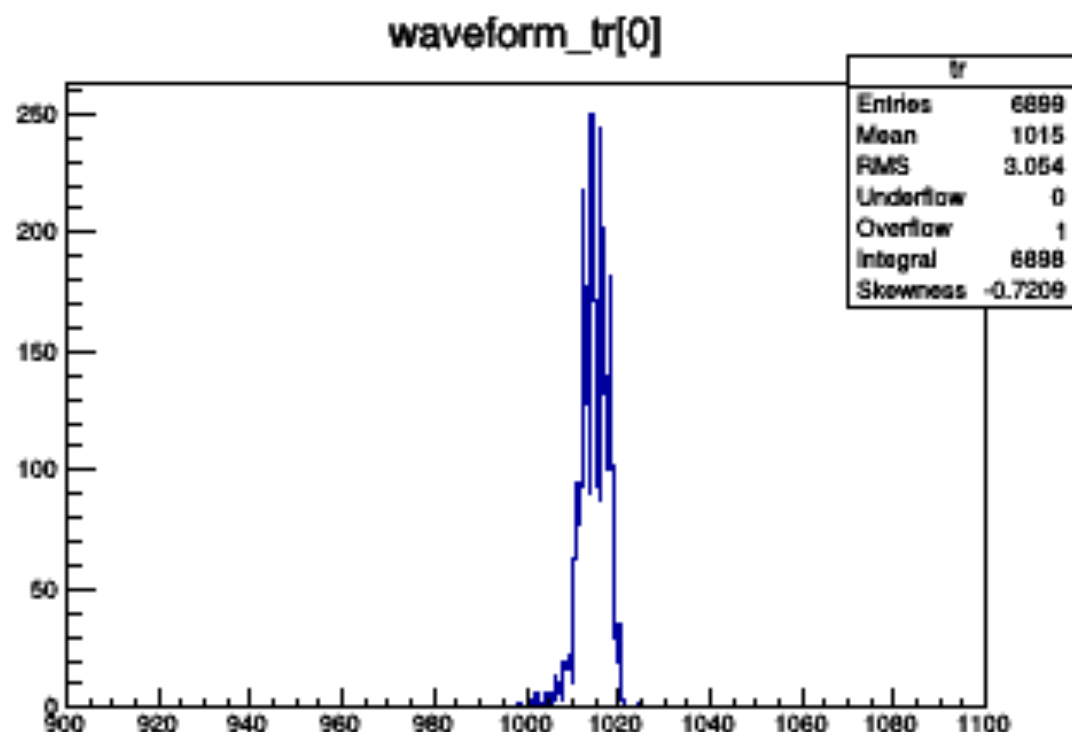
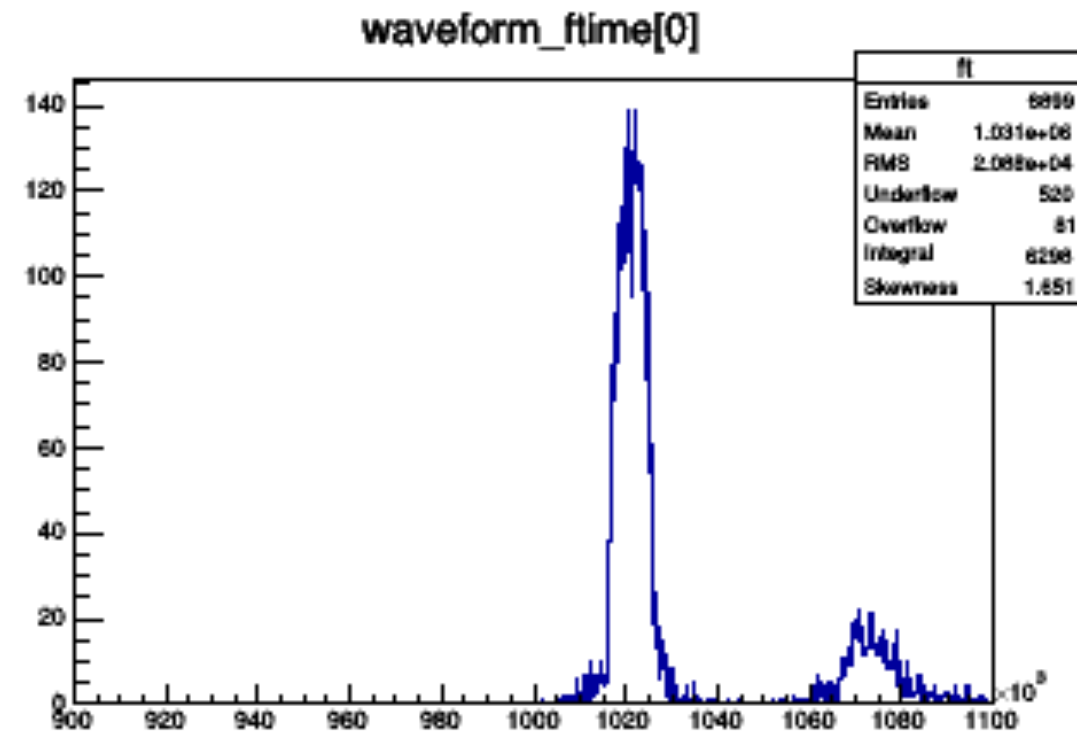
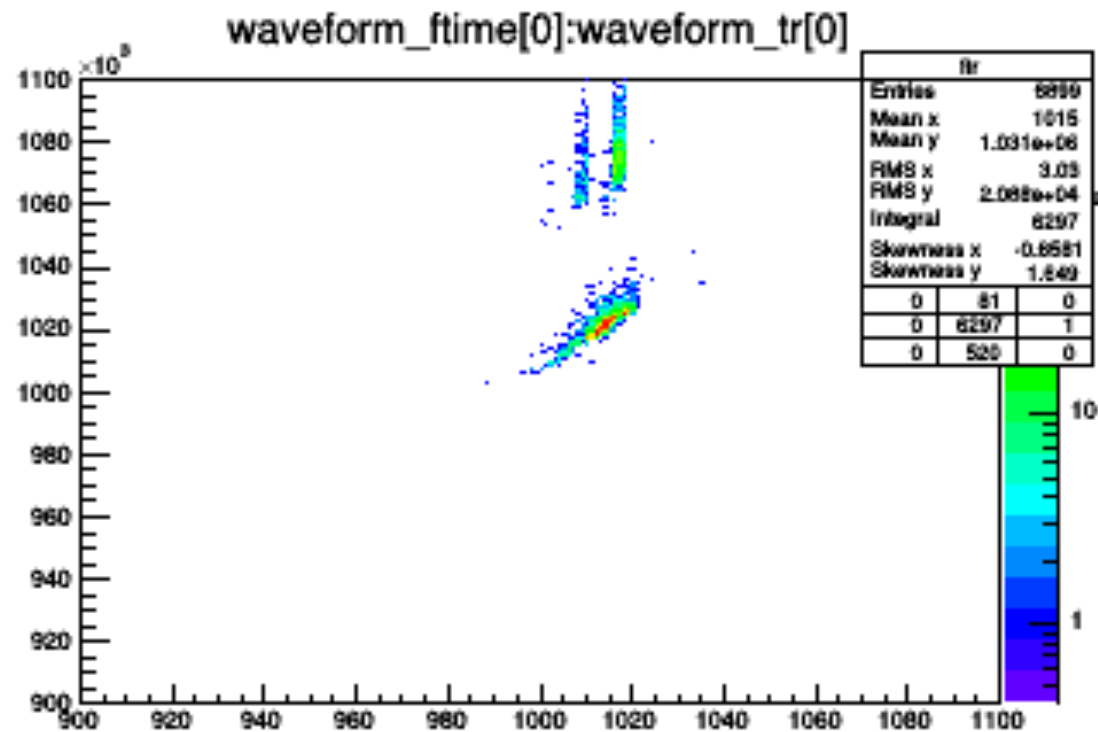
Double-peak problem!

# Solution: Waveform analysis

- Instead of TDC timing, use the one extracted from a waveform.
- Find the timing when an amplitude crosses the one tenth of the height of the signal.
- Use a 2-point linear interpolation.  
(should be improved?)



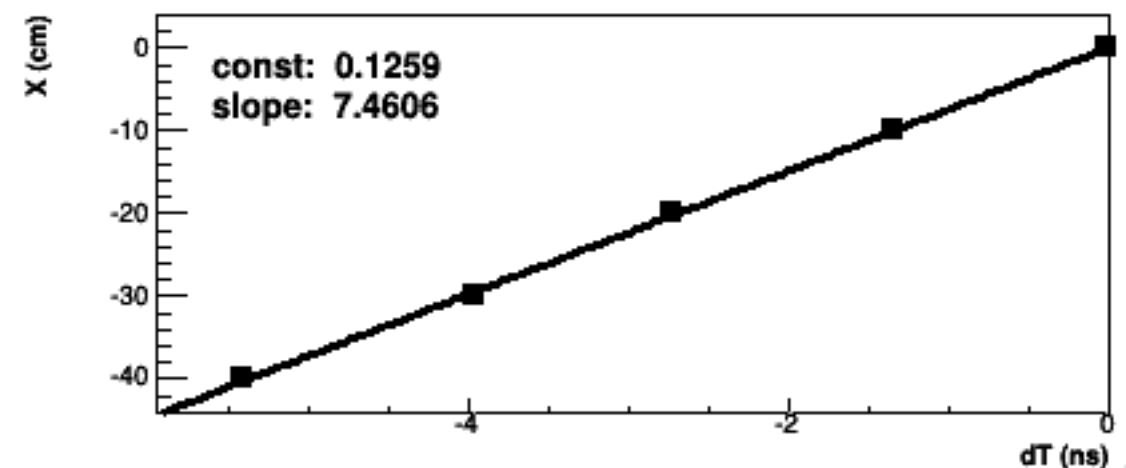
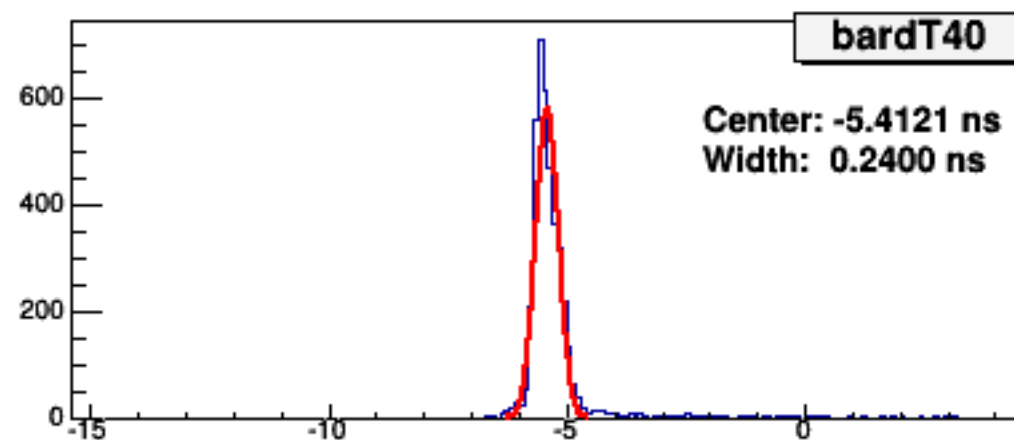
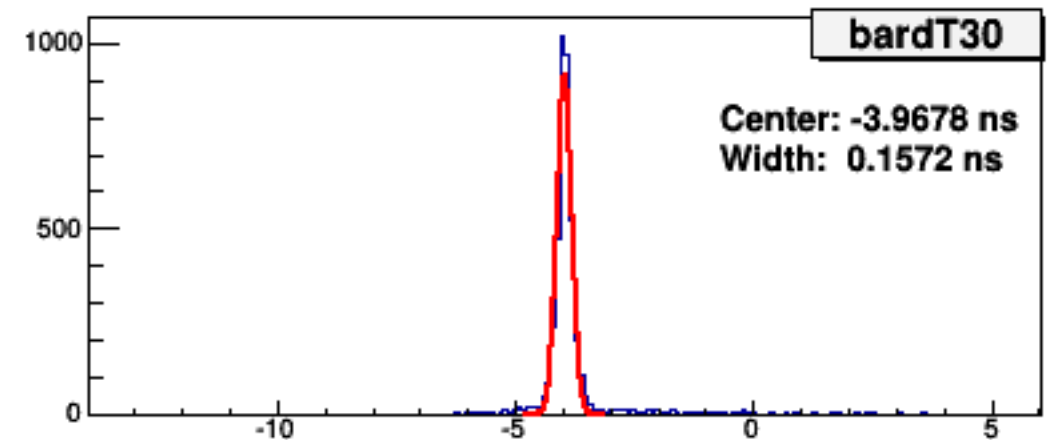
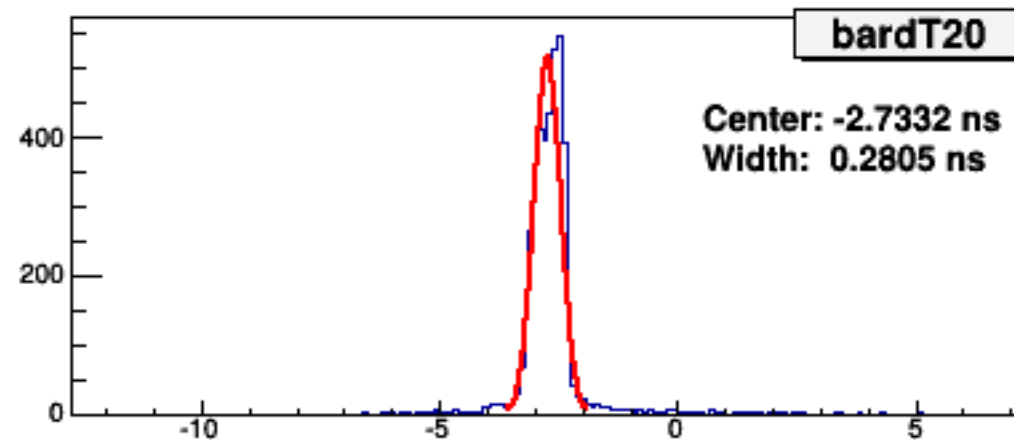
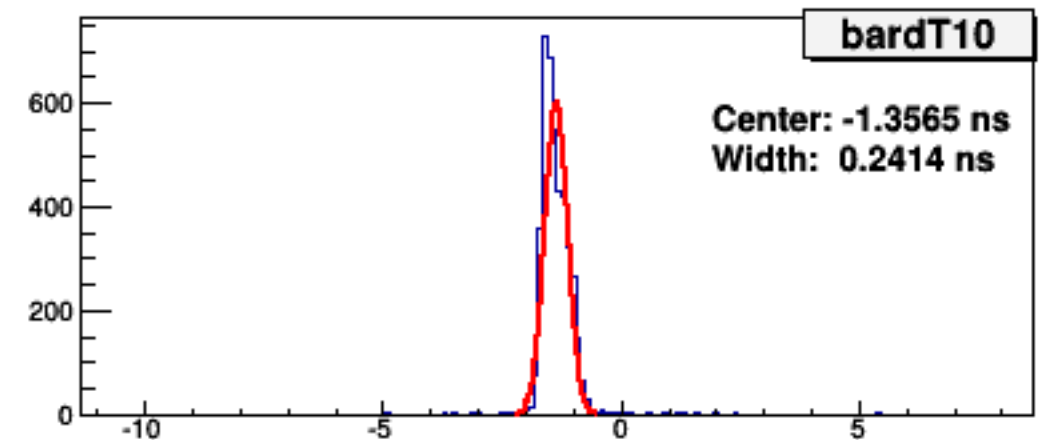
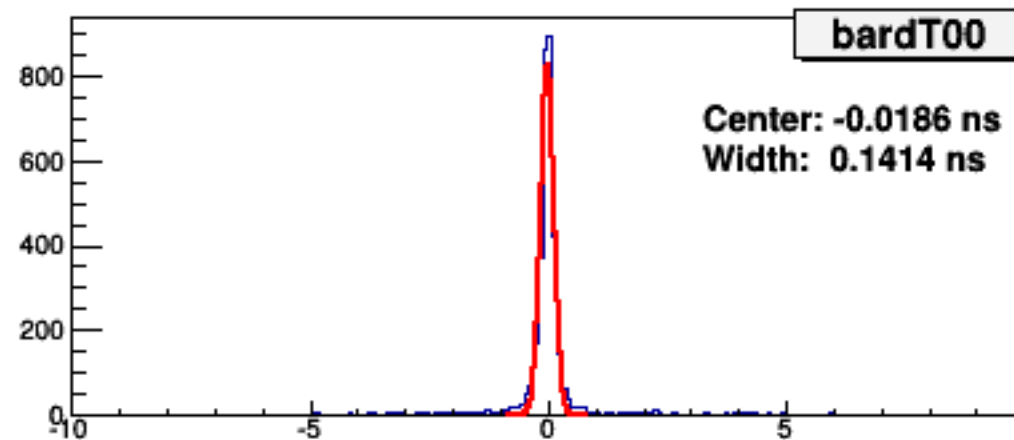
# Solution: Waveform analysis



No Zero peak  
No Second peak

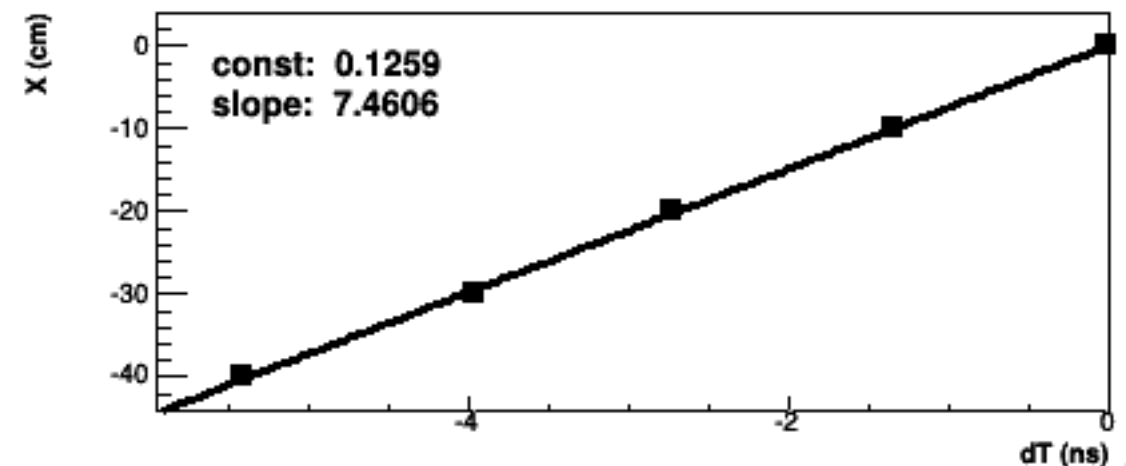
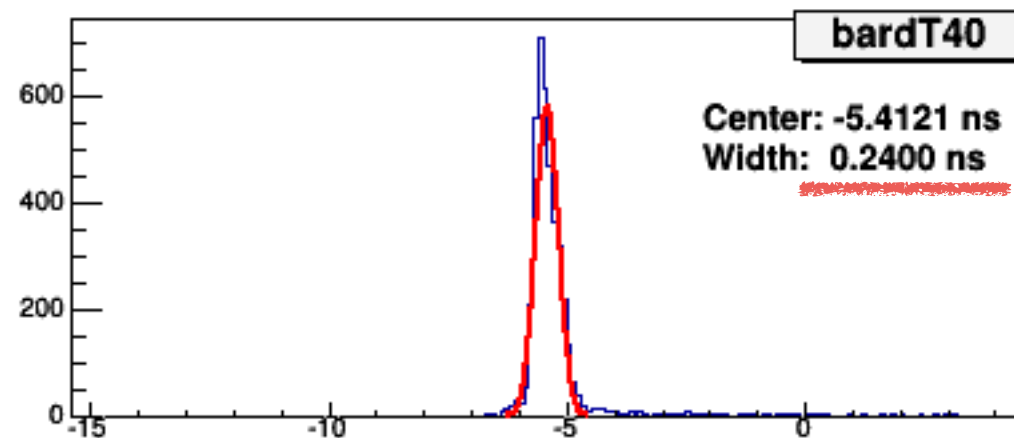
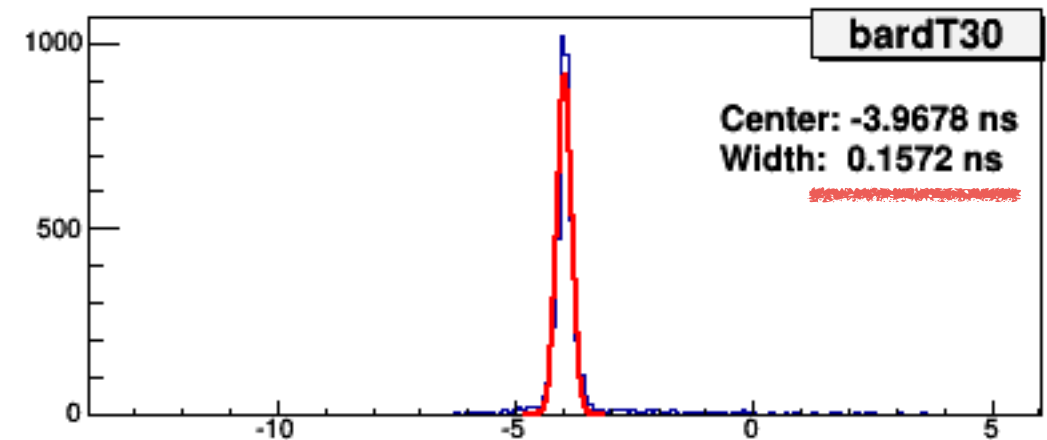
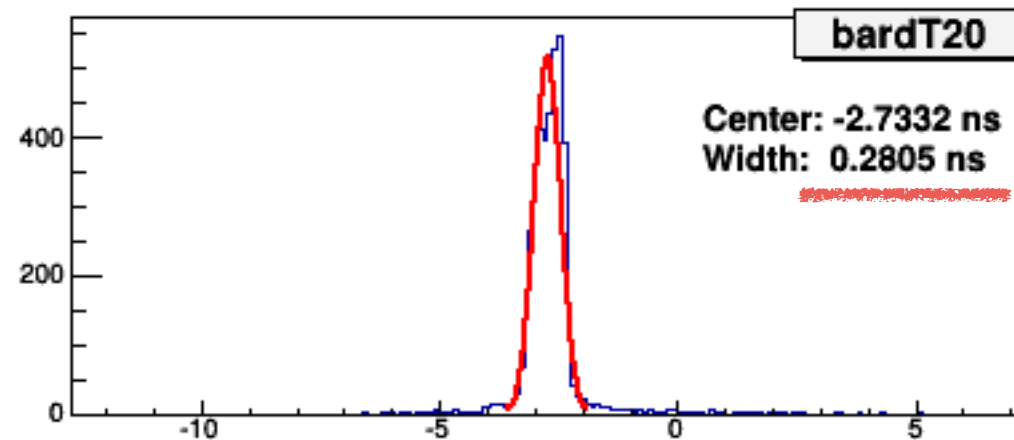
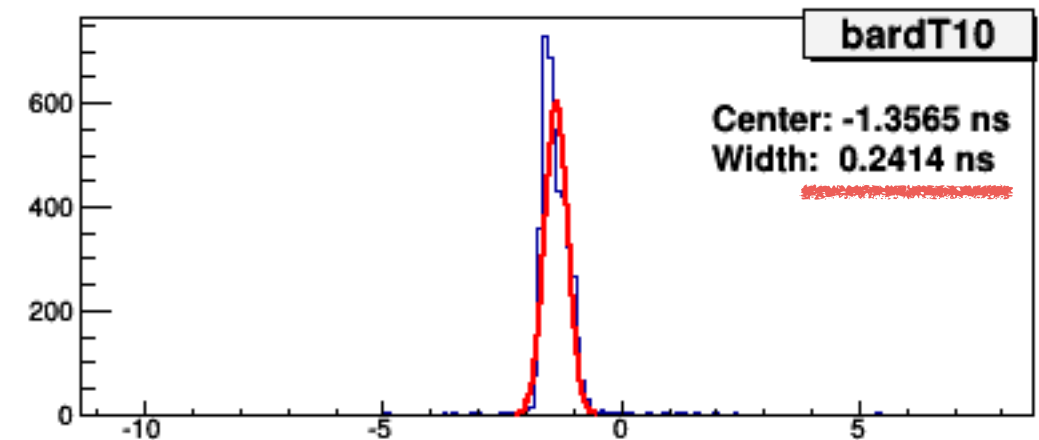
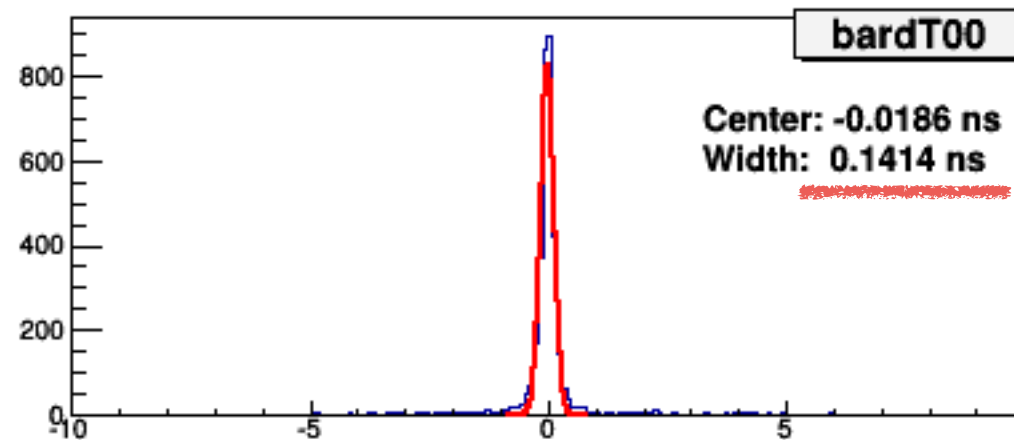
We can use this timing  
instead of that from TDC.

# $\Delta T$ – Position relation



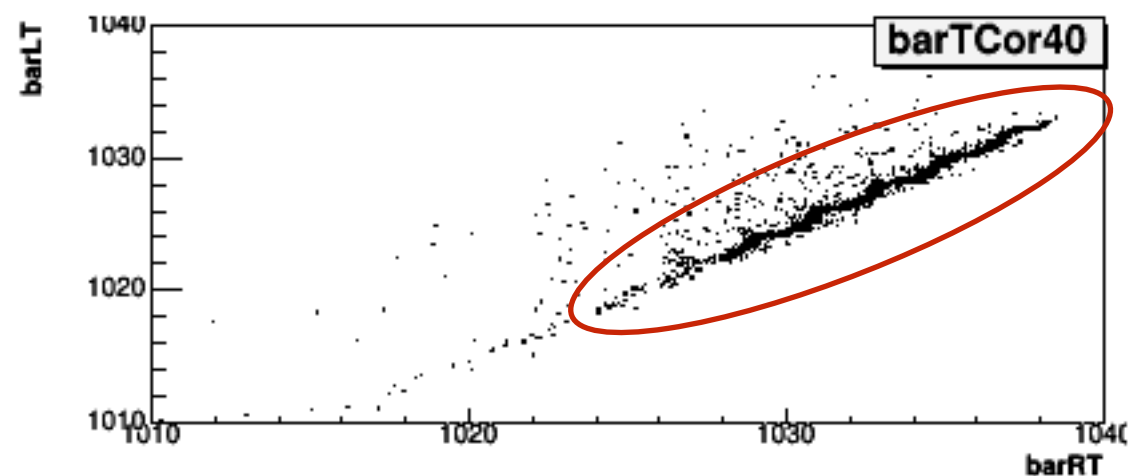
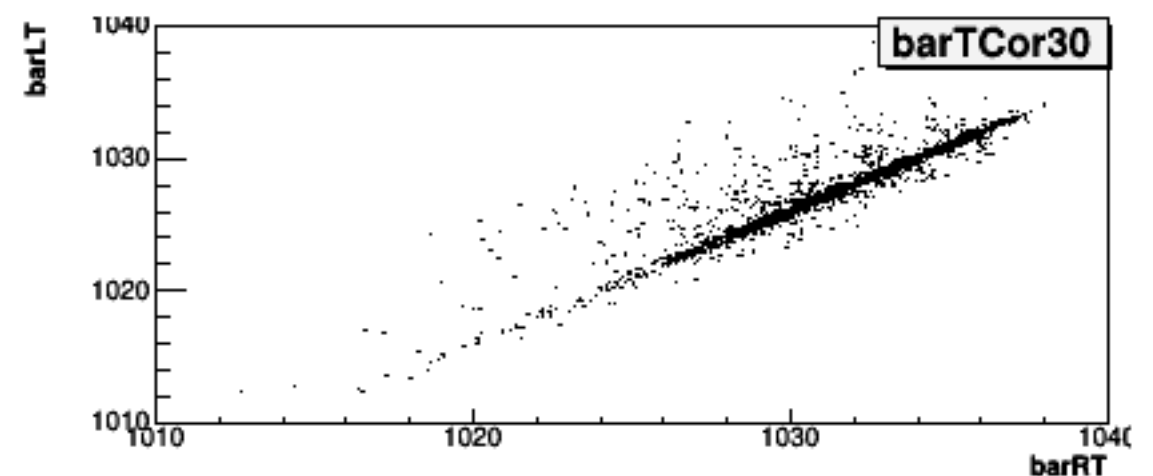
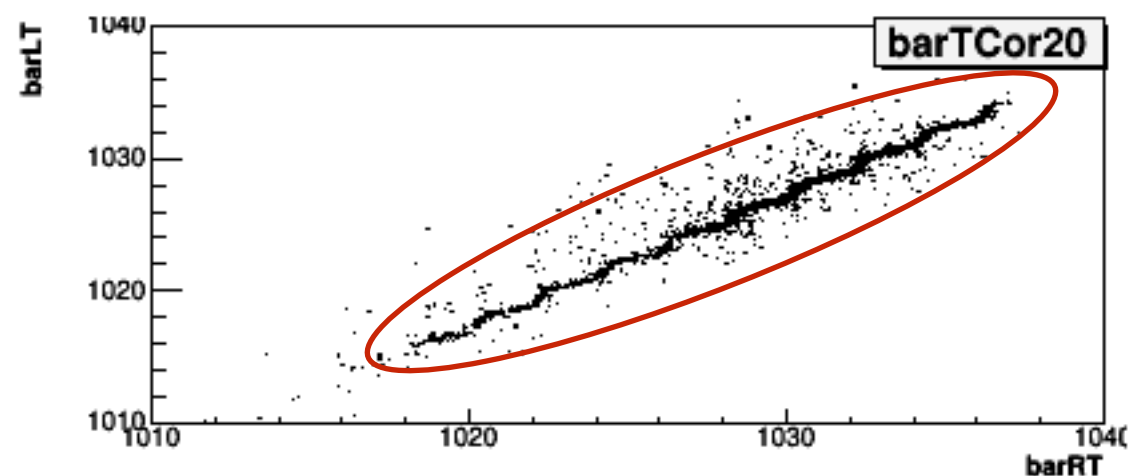
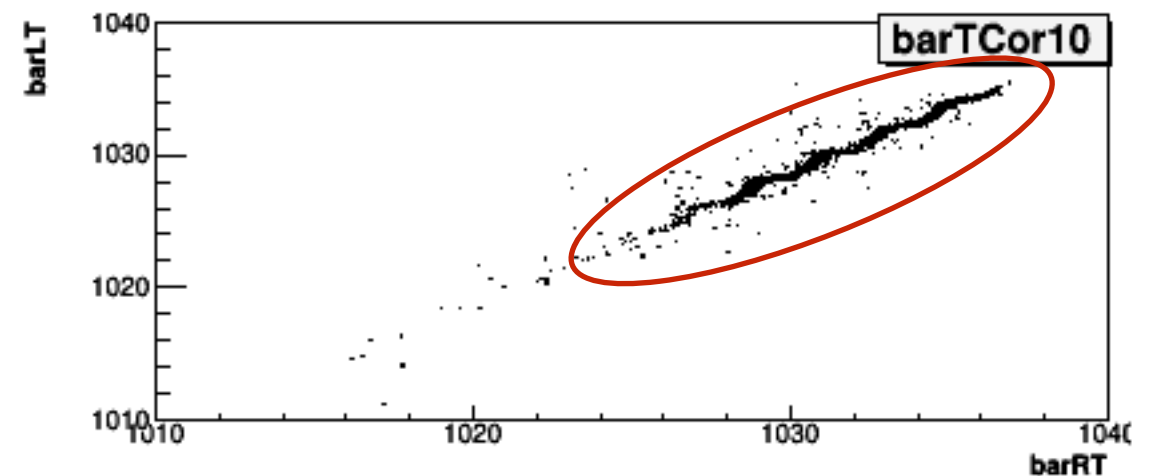
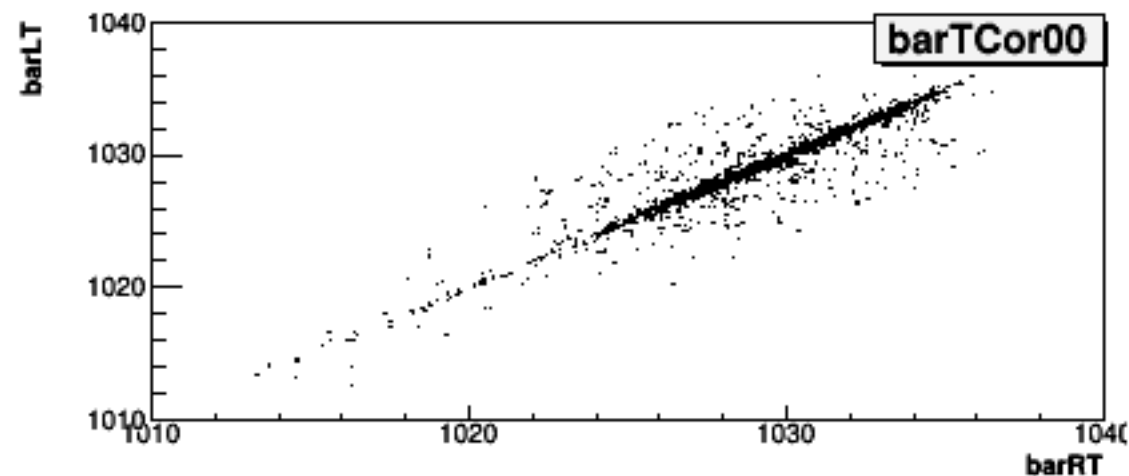
$$x = 7.4606 \times \Delta T_{LR} [\text{ns}] + 0.1260 [\text{cm}]$$

# Time ( $\Delta T$ ) resolution?



Some are small, the others are large (about twice).

# $T_L - T_R$ correlation



Zigzag pattern appear for the large-width cases.

# Inter-channel correlation

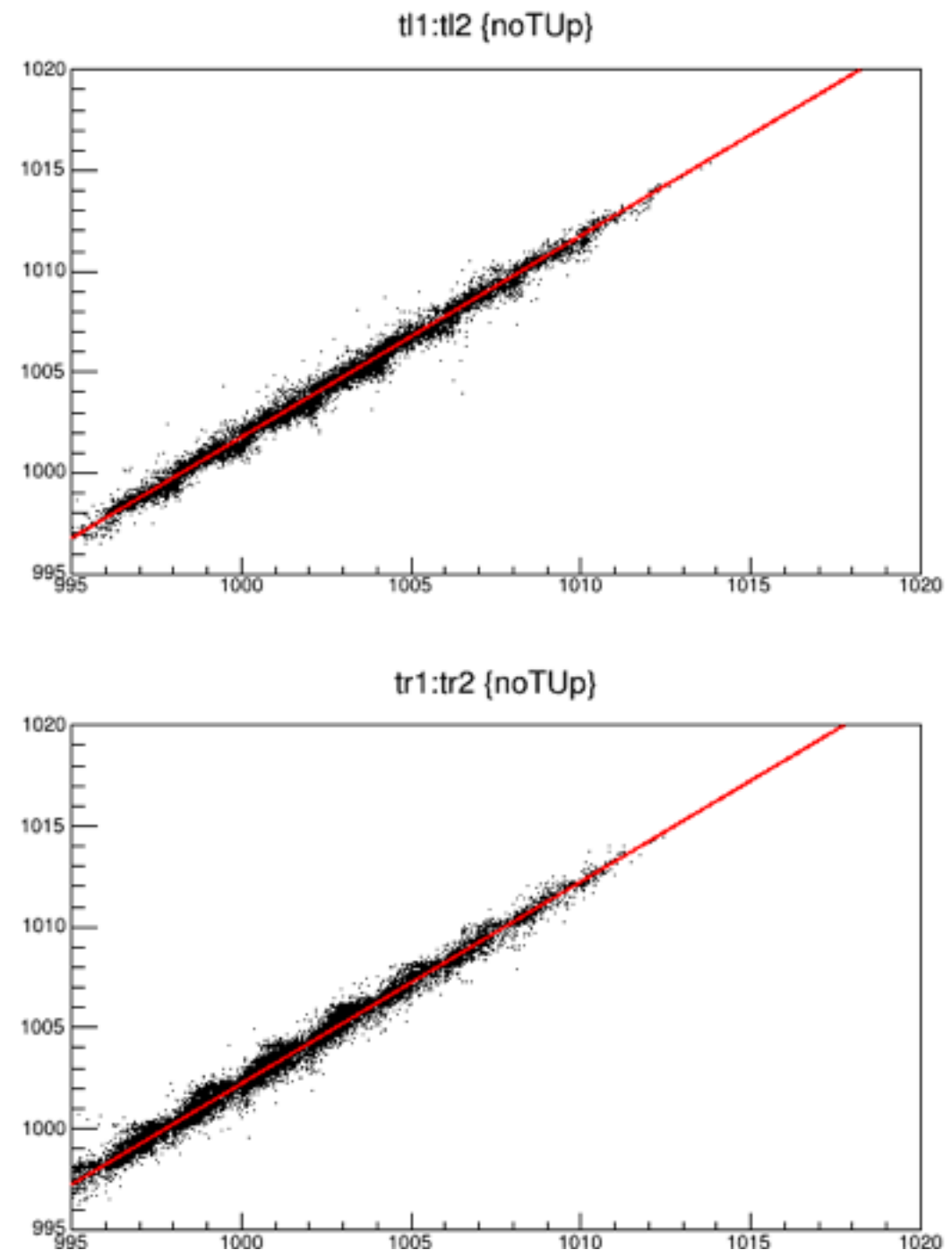
- It is suspicious that the correlation between channels of the FADC.
- Change the setup: the same signals from one PMT to different channels (no use of scintillators for trigger)  
(Left PMT: CH 1 & 3 / Right PMT: CH 2 & 4)
- Take cosmic-ray data.
- Data for CH1(2) & 3(4) should be identical.

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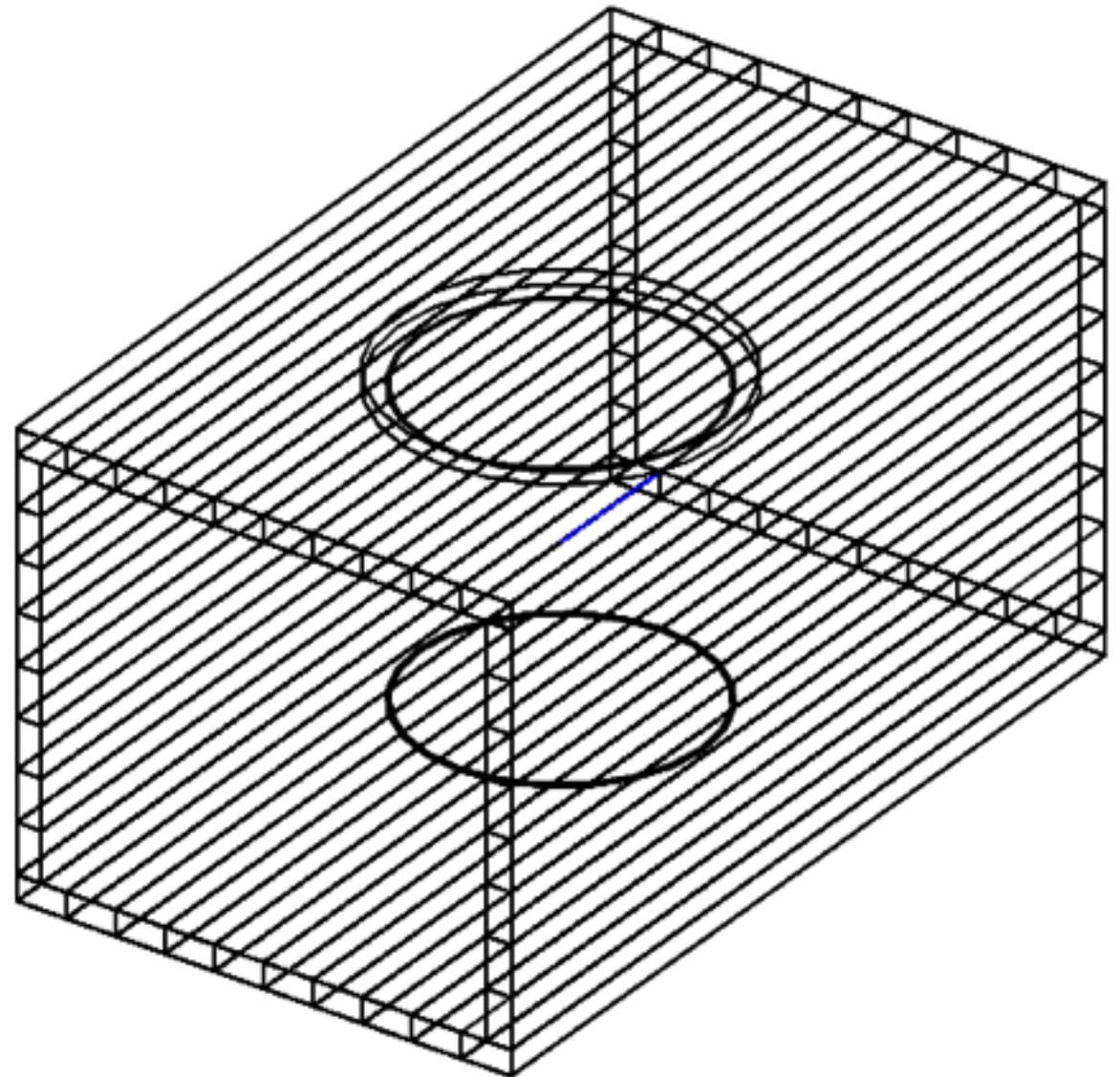
# Inter-channel correlation

- Zigzag patterns appear for both cases  
(Left: CH 1 vs CH 3)  
(Right: CH 2 vs CH 4)
- Why?



# GEANT4 simulation

- Succeeded to compile.
- Succeeded to run.
- Going to consider a cosmic-ray filter.





# Scintillator from IBS

