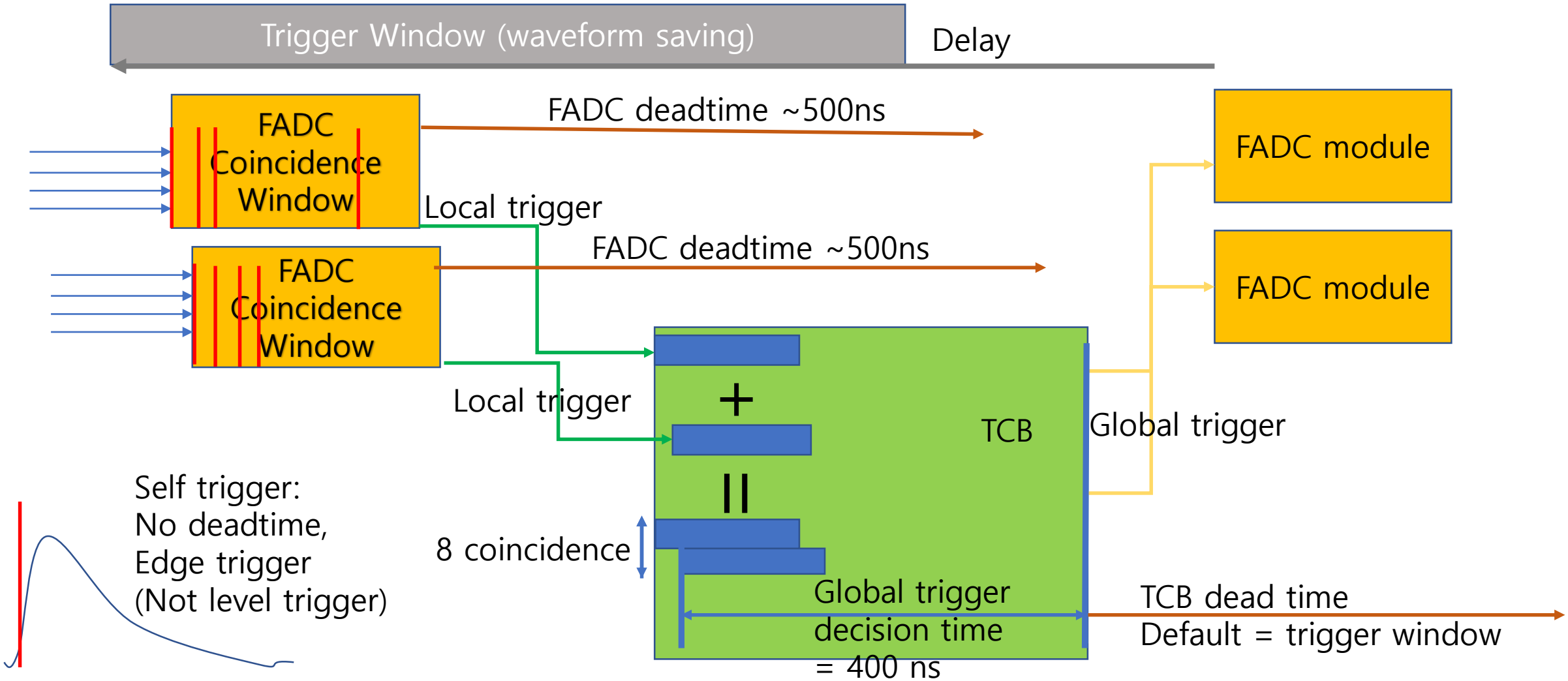
FADC and TCB

3 triggers : Self trigger(each channel), Local trigger(FADC to TCB) and global trigger(TCB to FADC)

Assuming 8 coincidence



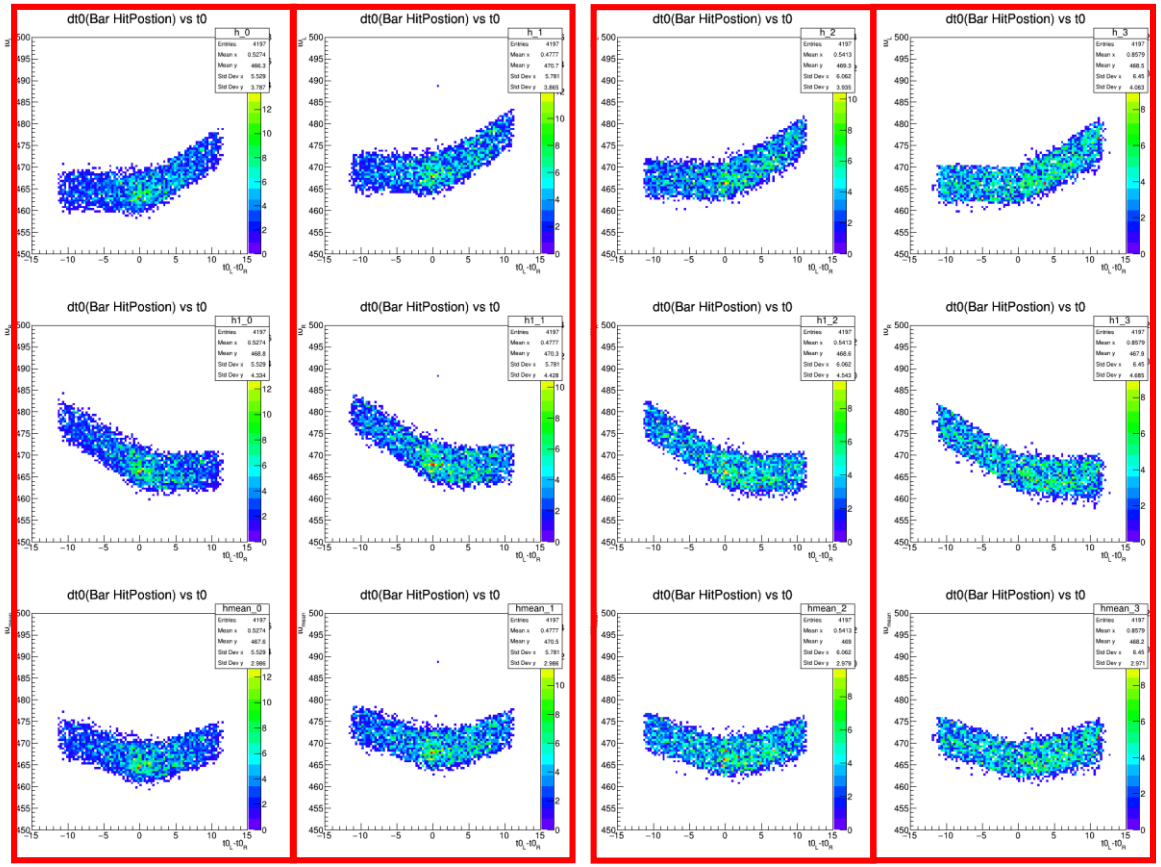
Hit time distribution

- I thought that this distribution should be flat. ($t_{mean} = 0.5(t_L + t_R)$)
- But light speed in scintillator is much smaller than muon speed.

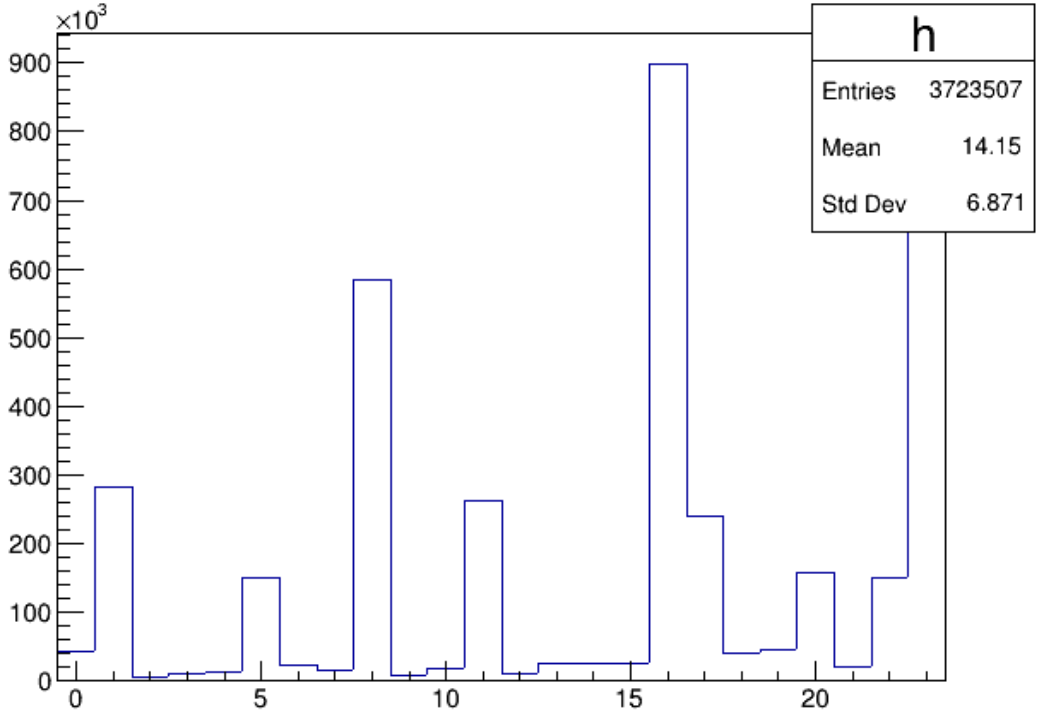
Left PMT

right PMT

mean

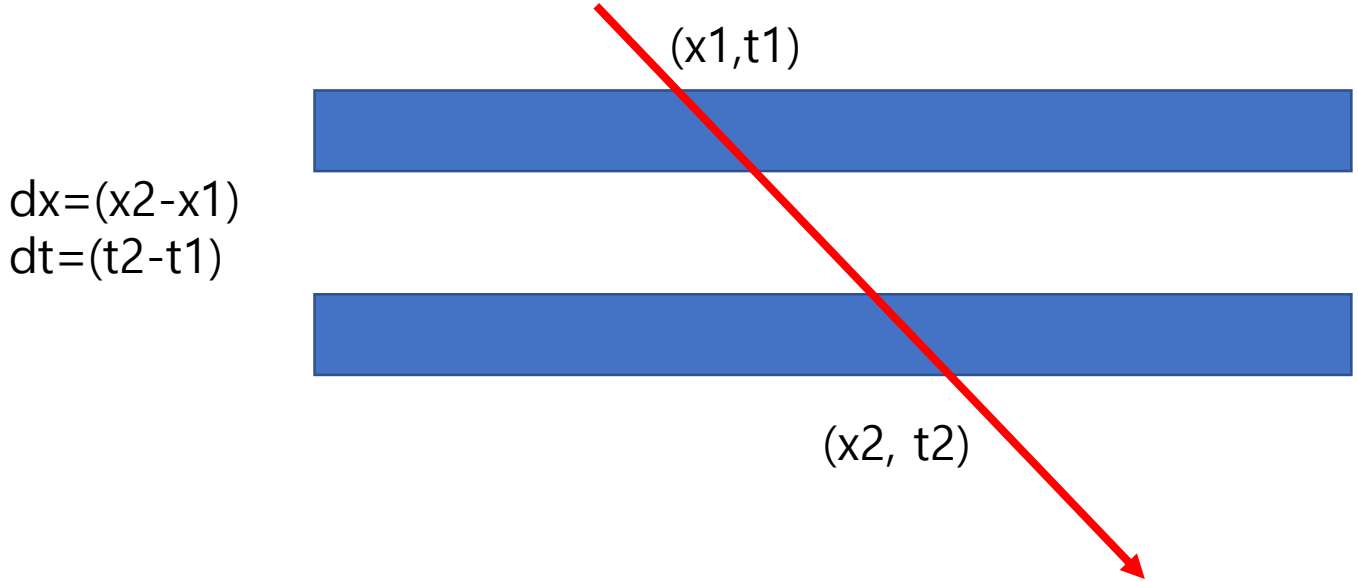


PMT whose t0 is the fastest in a event



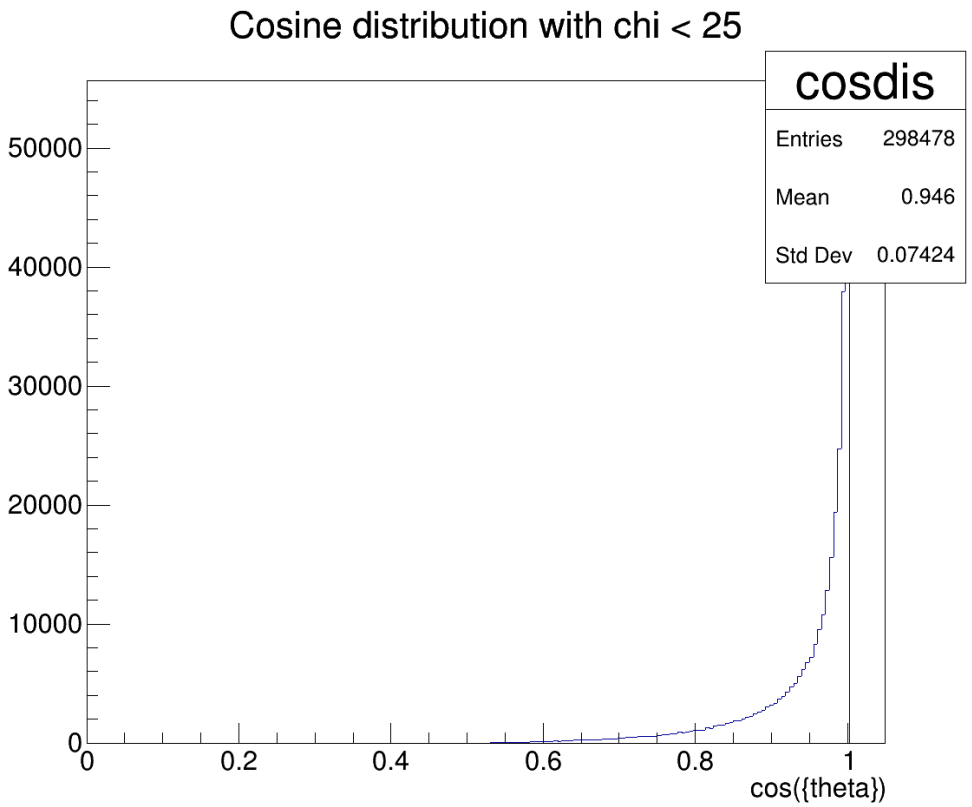
Hit time distribution

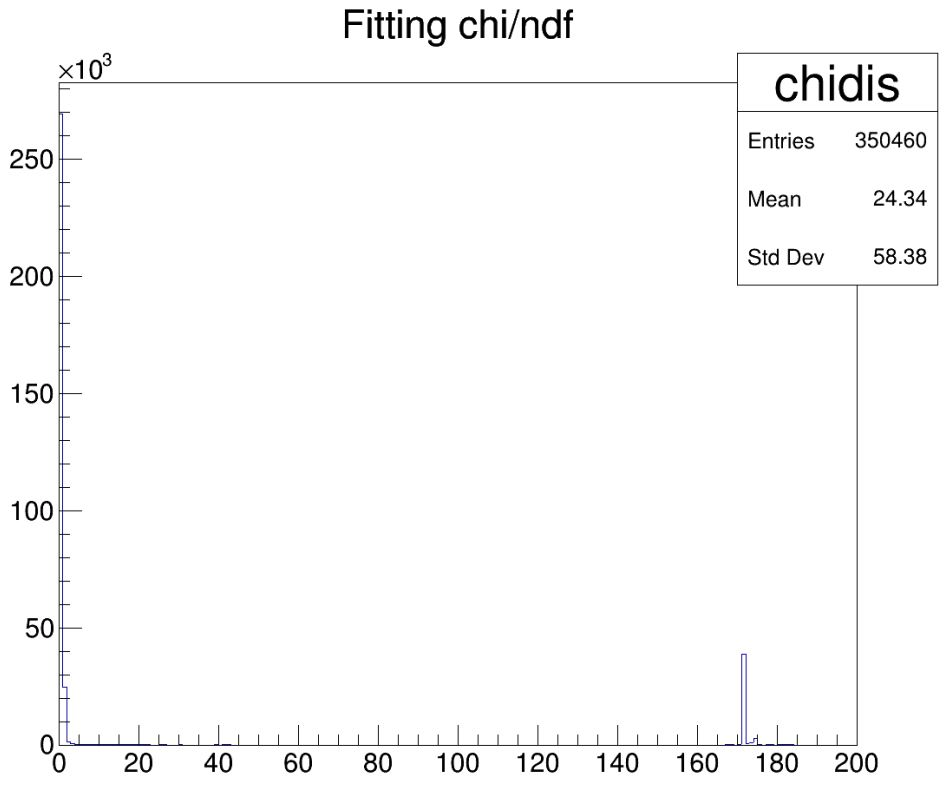
- We have not yet calibrated time between bars.
- To see that the relative time between hits within a trigger are correct, I compared dx – dt scatter plots of the real data and Geant4 data.
- dx information is obtained by fitting track. (12 bar hits)



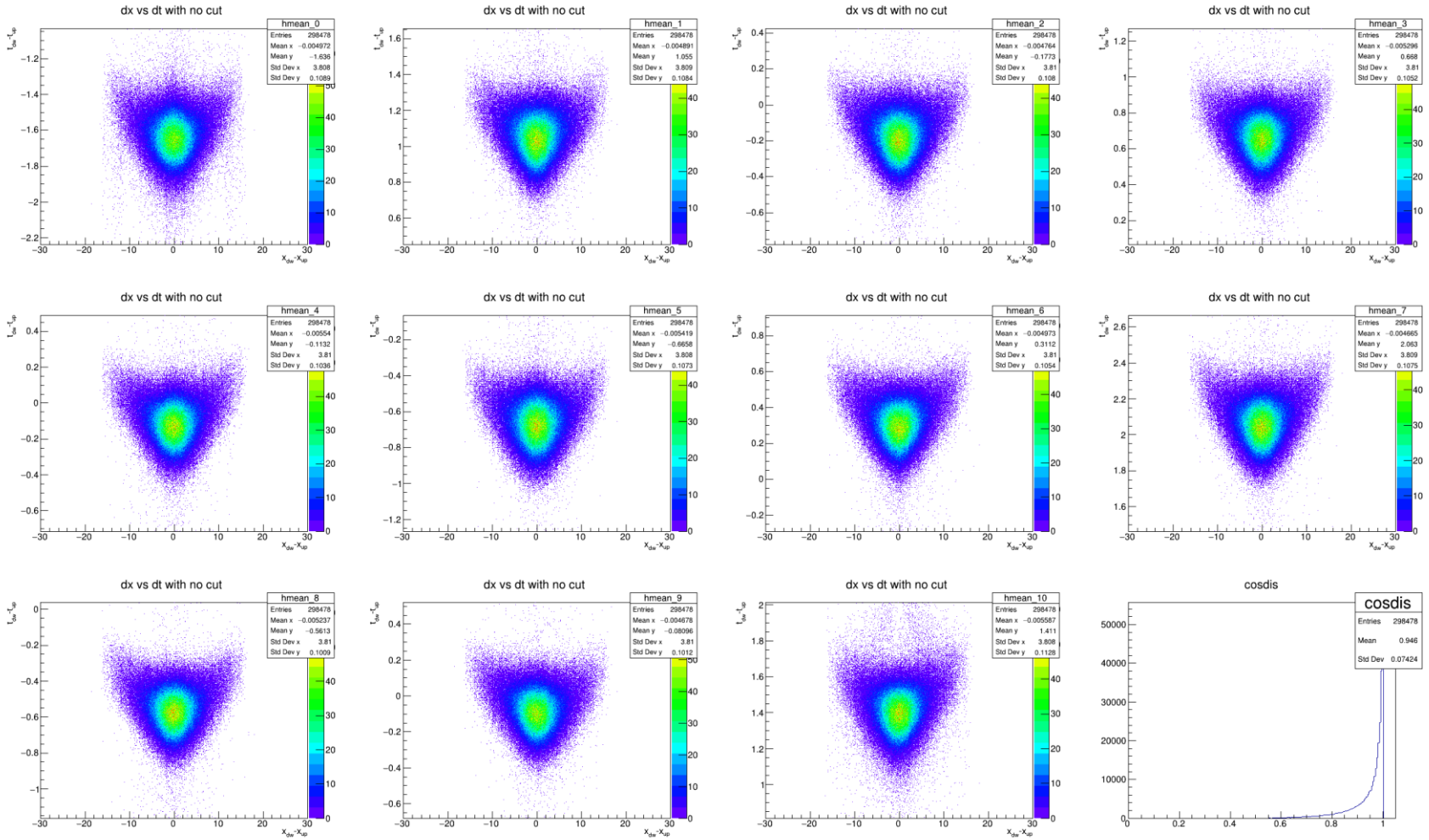
Hit time distribution

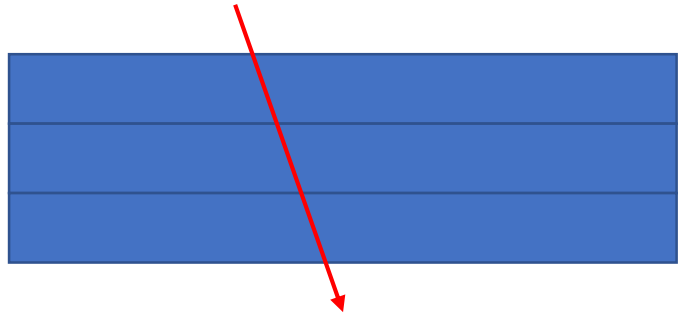
- The real data track fitting





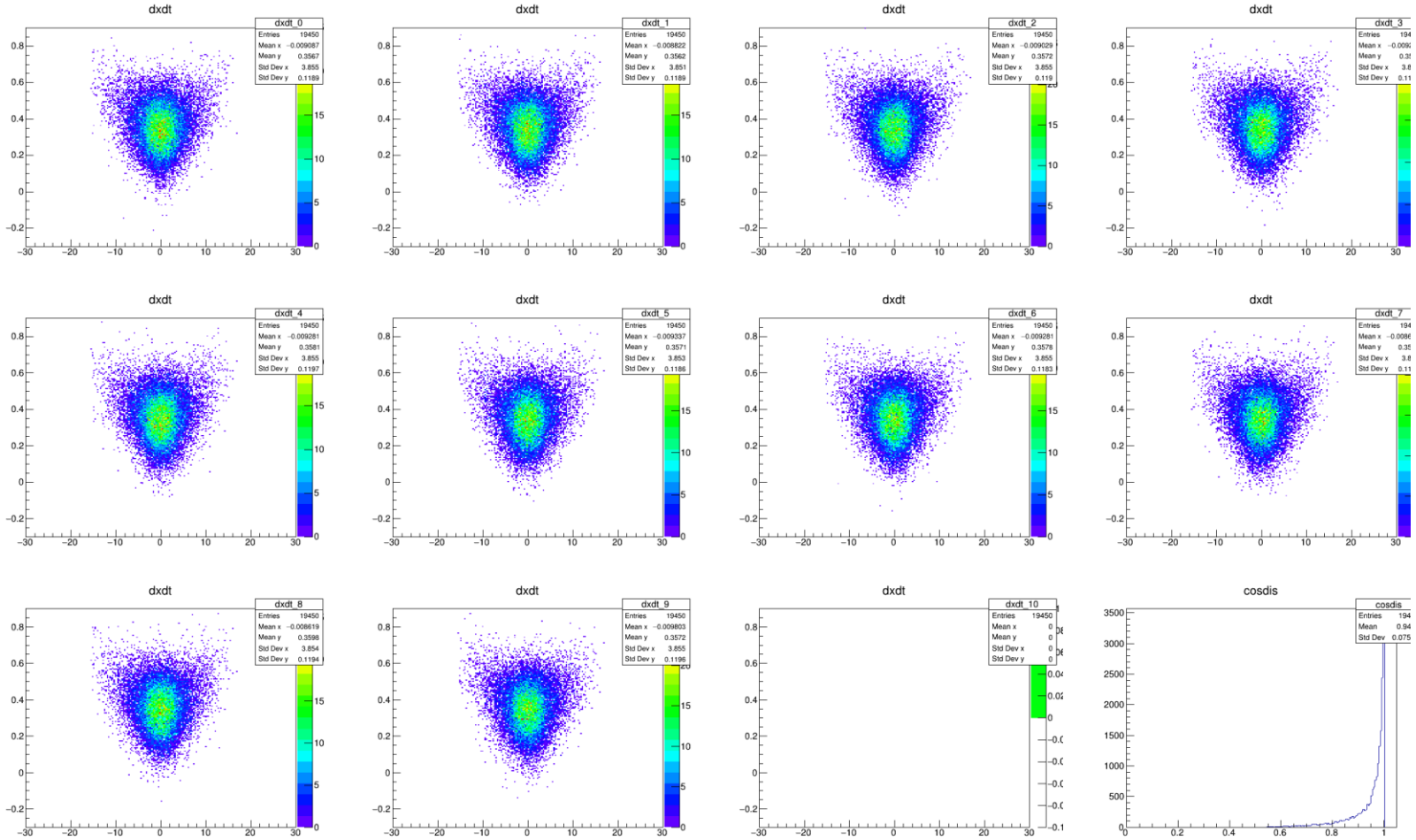
Hit time distribution





- Real data dx-dt plots for adjacent bars

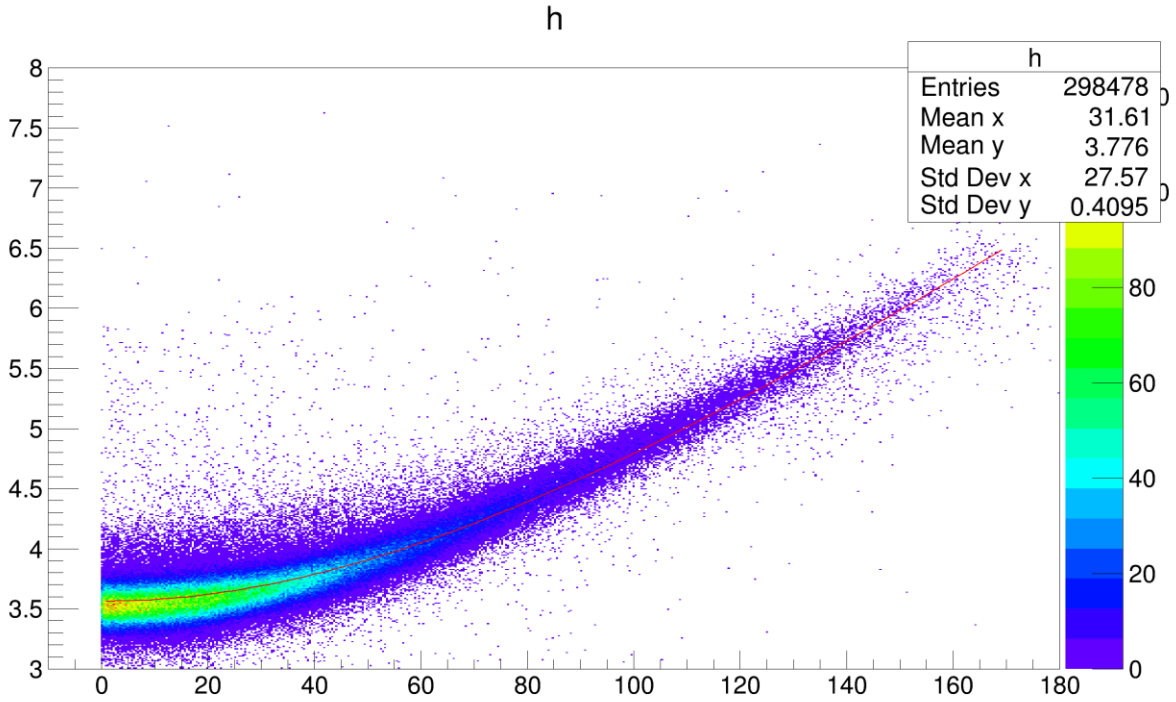
Hit time distribution

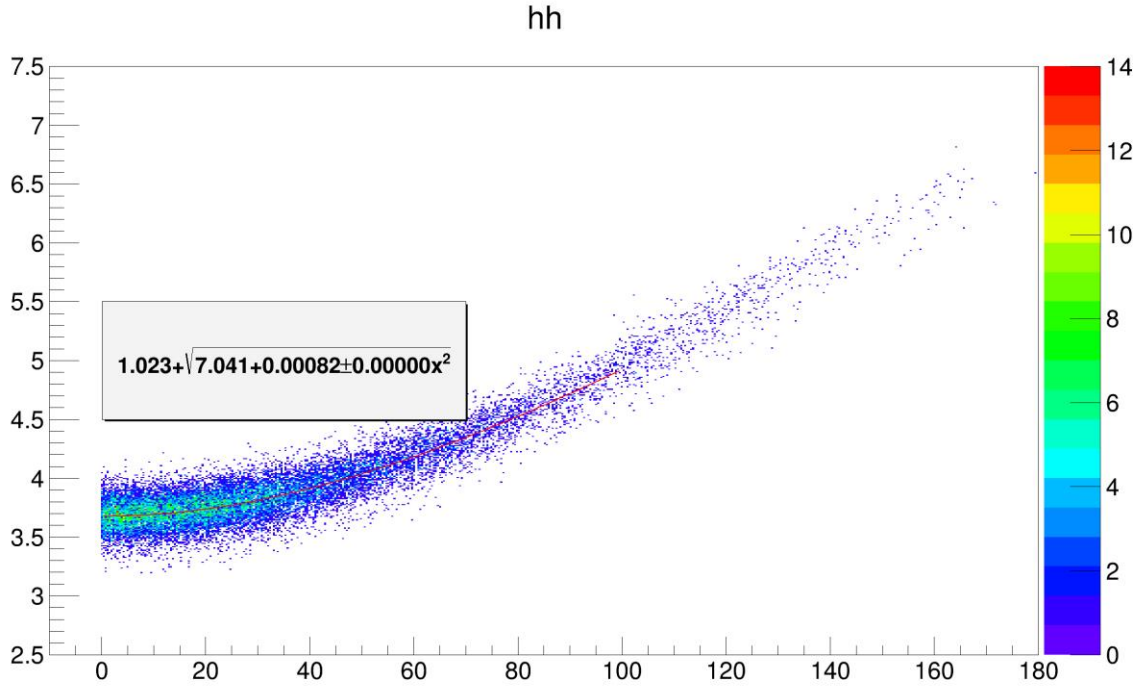


- MC data dx-dt plots for adjacent bars
- Hit time with 80ps resolution
- 3 MeV threshold
- Track fitting with the real single muon track

Hit time distribution

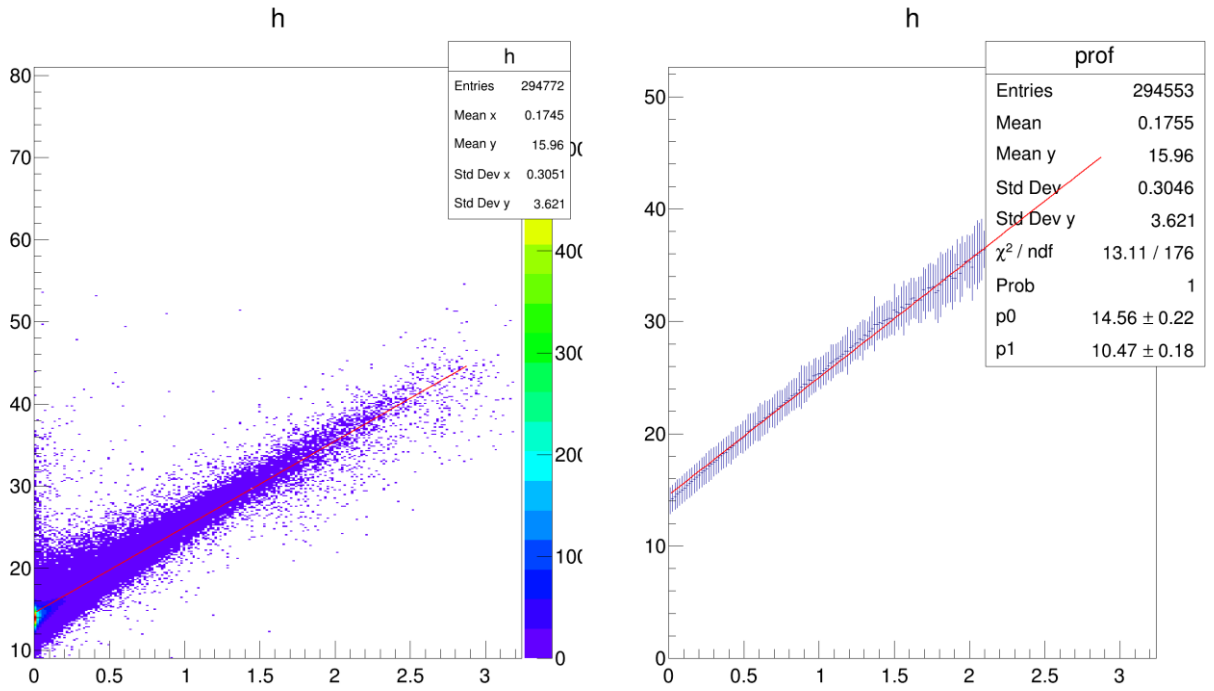
- Last bar – first bar
- Real (left), MC (right)
- Behavior $\sim \Delta t^2 = a + b\Delta x^2$



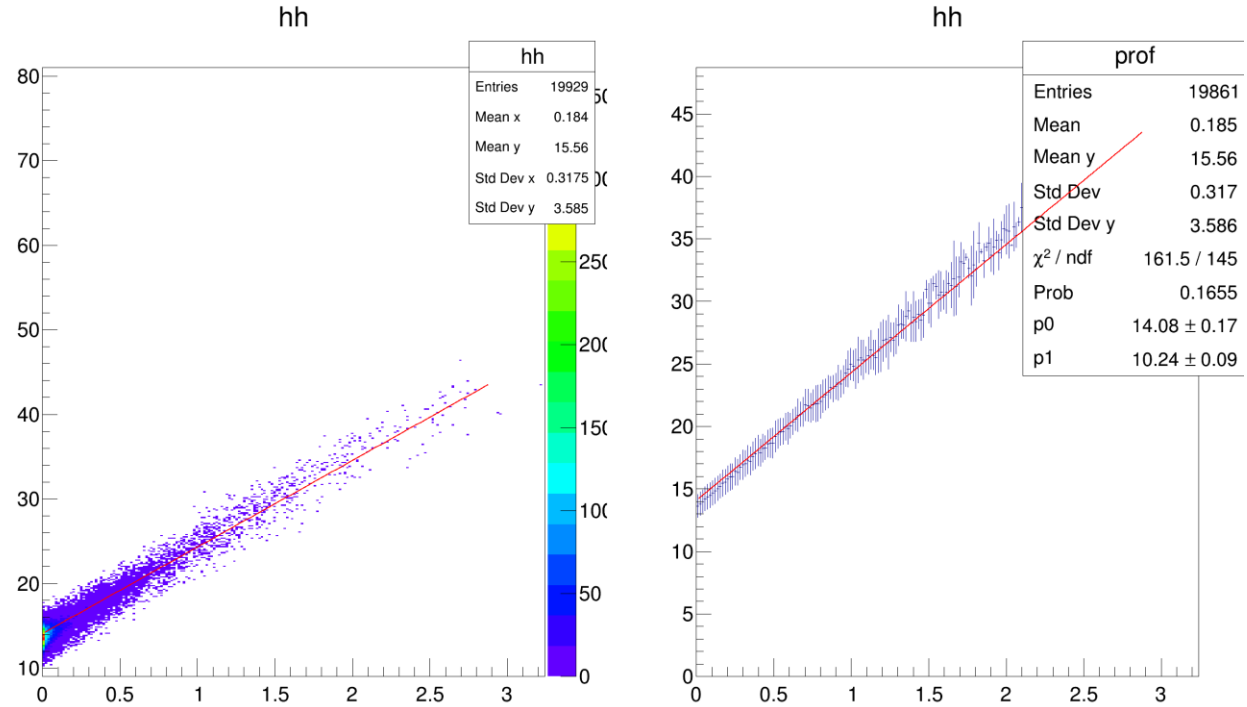


Hit time distribution

- X axis = Δx^2 , Y axis = Δt^2
- Behaviors are almost same.



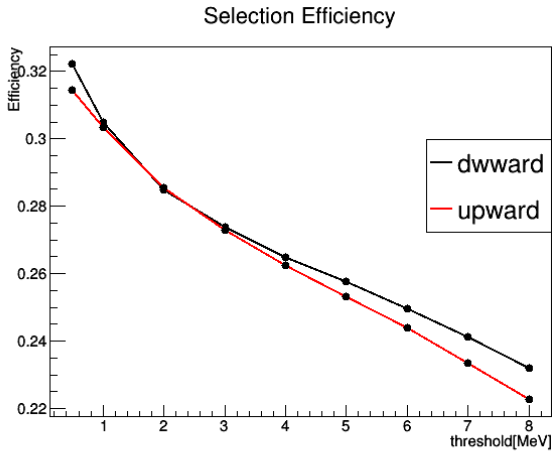
Real data

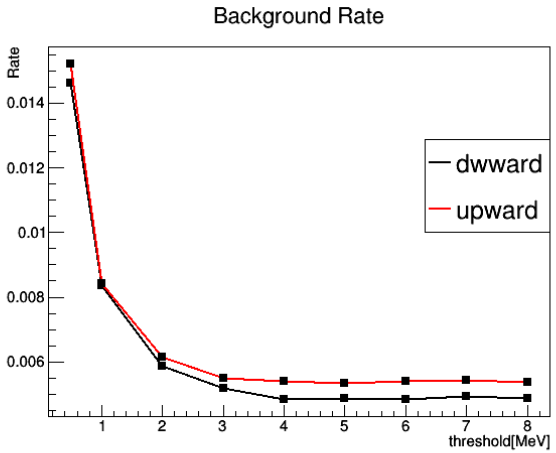


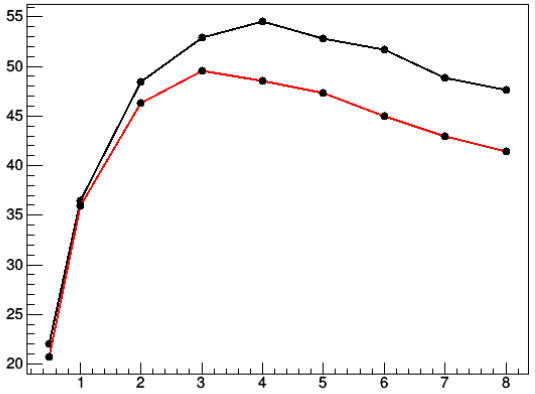
MC

About Simulation

- FoM = selection efficiency / background rate
- For different threshold
- Single track trigger
- 3rd algorithm







Saturated pulse t0 determination?

- How to deal with saturated events?
- 100 adc count ~ 3 MeV (700 adc count ~ 20 MeV from muon MPV)
- adc count > 3900 ~ 120 MeV
  -> saturation

- Red line -> false t0 determination(saturated)
- Green line -> correct t0 determination