Analysis of Relative tagging ratio

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04/26/13

Outline:

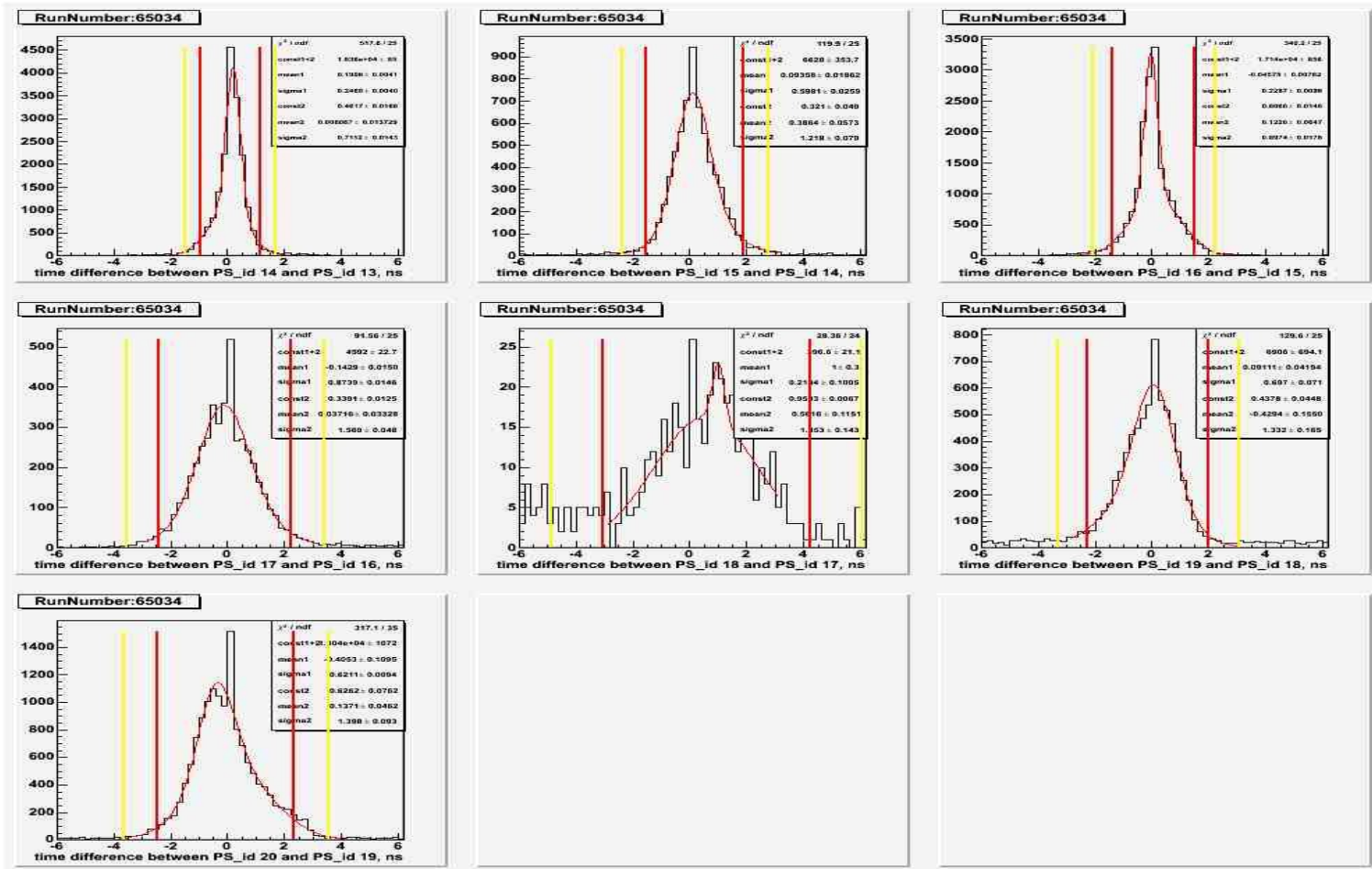1) Algorithm for reconstruction e+e- pair

2) What kind of trigger should be used to analyze relative tagging ratio.

3) Use cut on the time distribution of e- from T-counter

4) For some events, TAGM_LR bank have no hits, but hycal has events

Algorithm for reconstructing e+e- pair

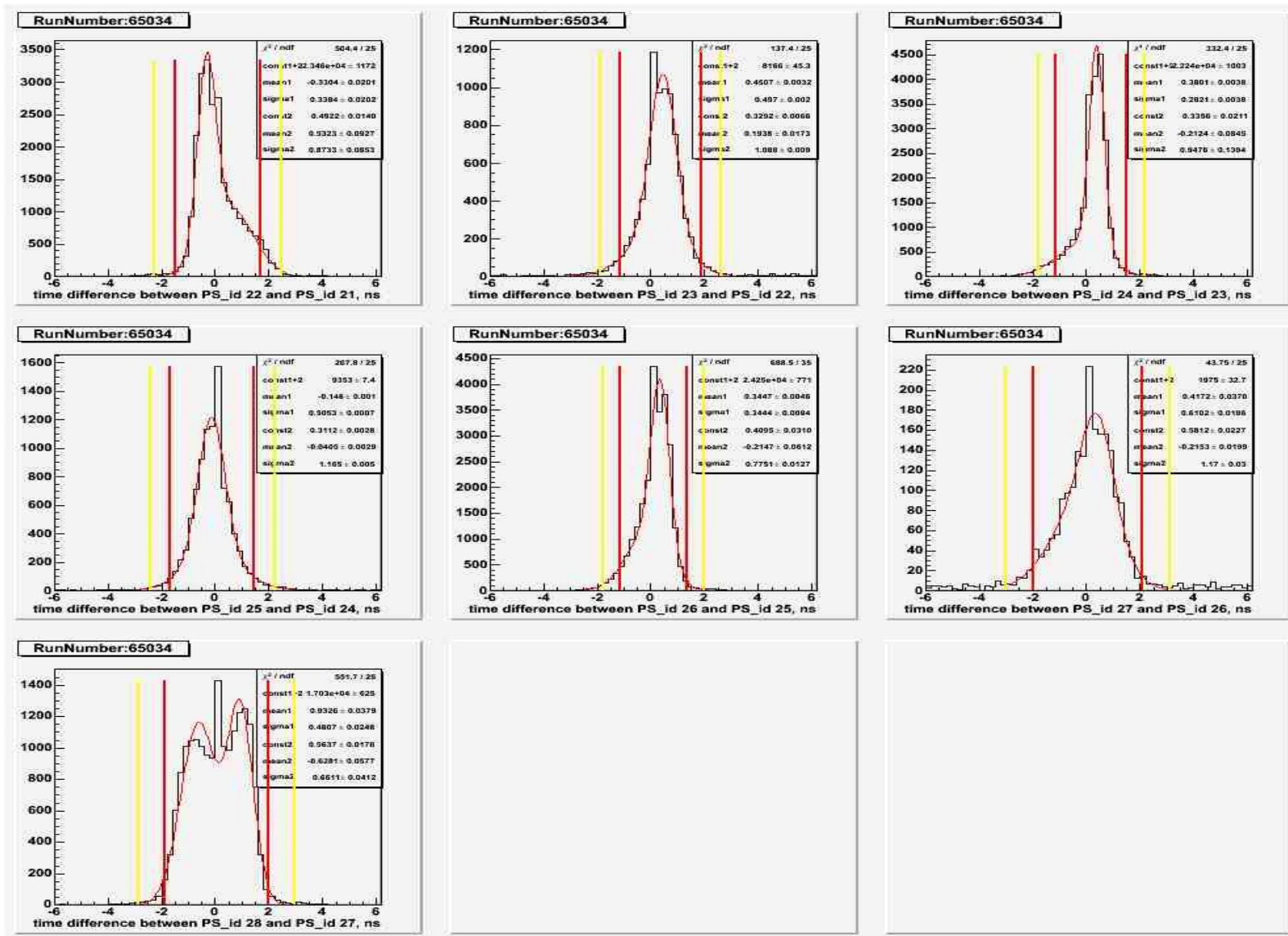1. *Four kinks of Tdiff are used to reconstruction of pair*:

1) Overlap region: Tdiff of two adjacent counters(3 sigma asymmetric cut)

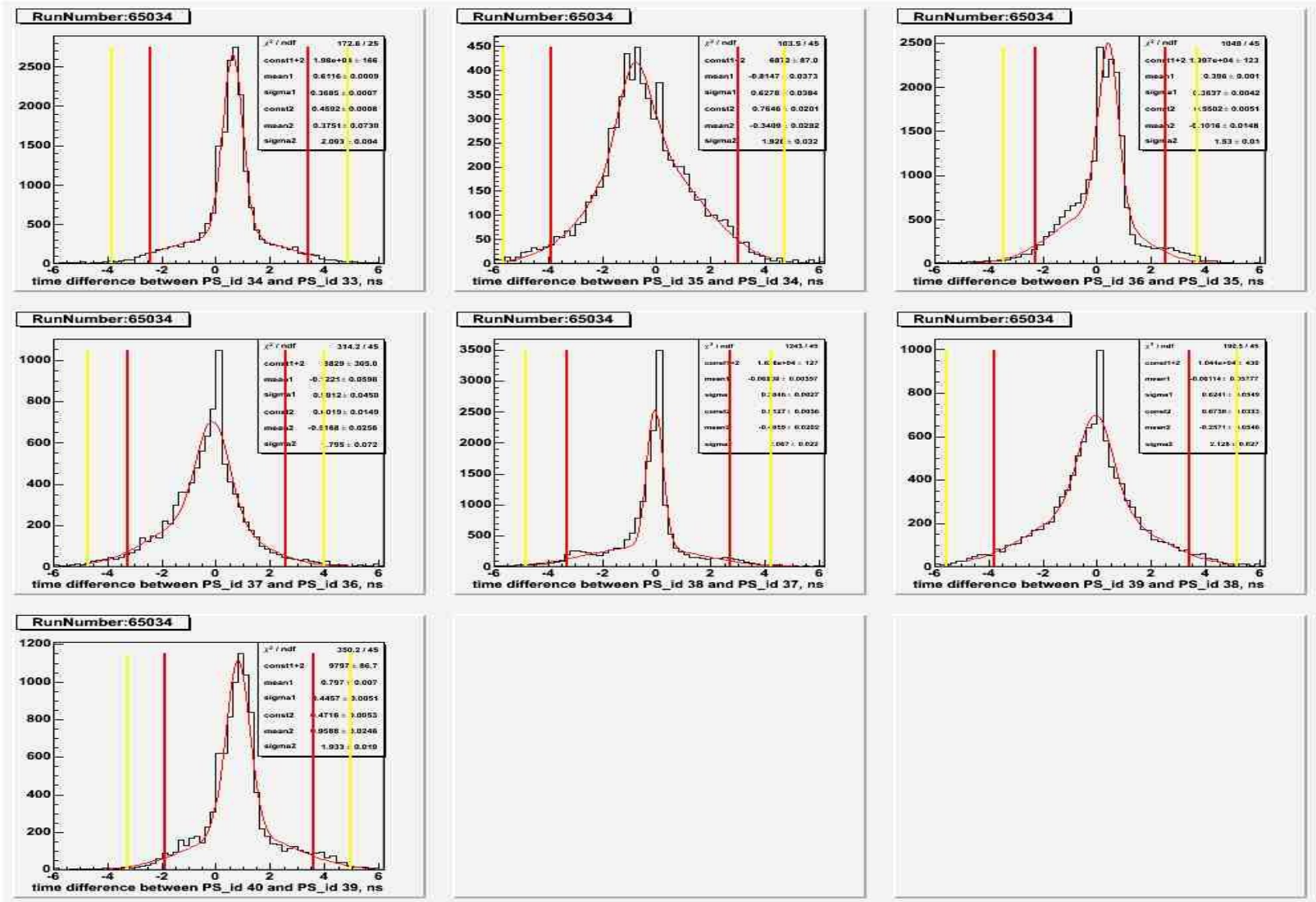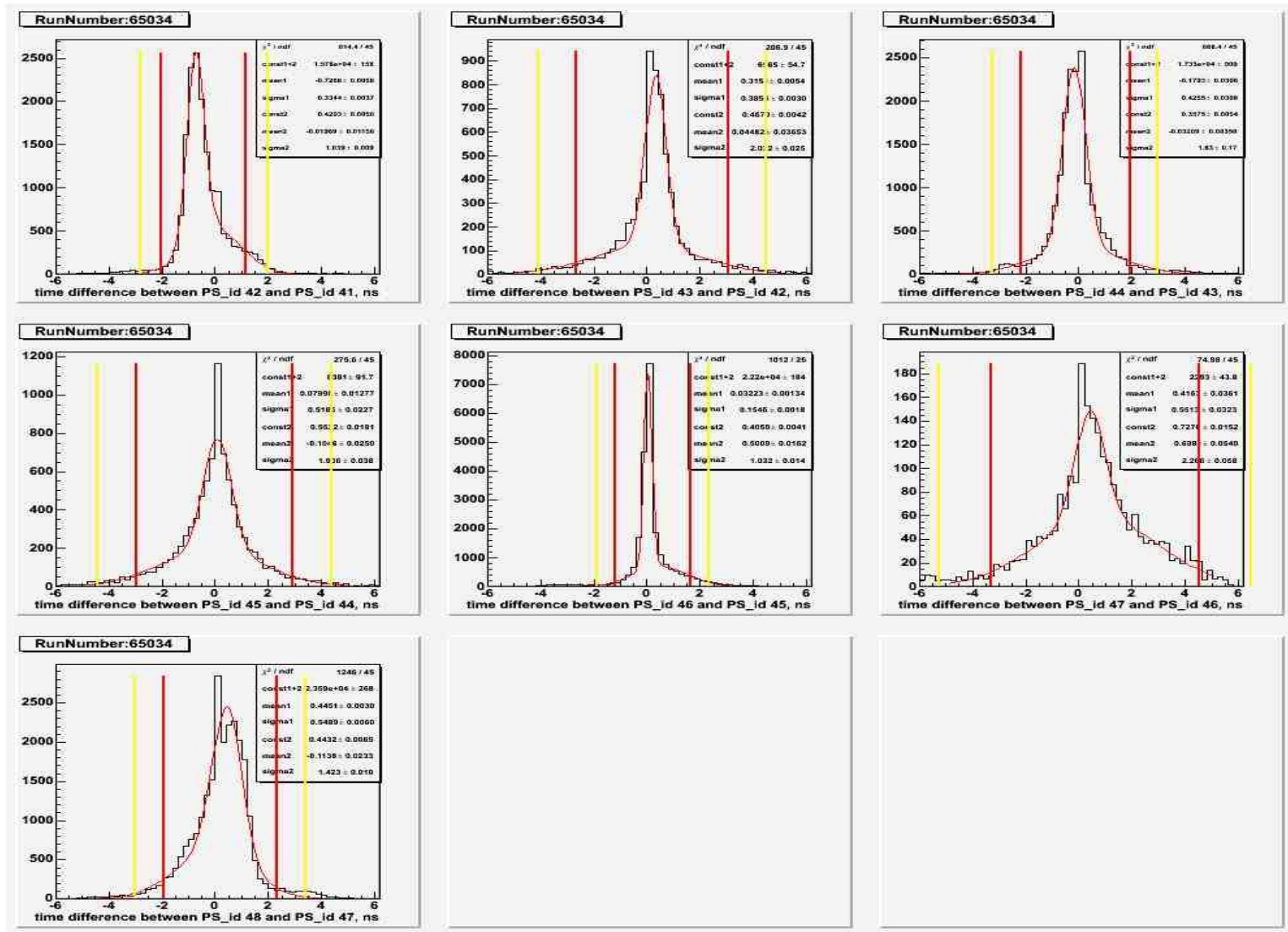Time difference between two adjacent PS counters

Time difference between two adjacent PS counters

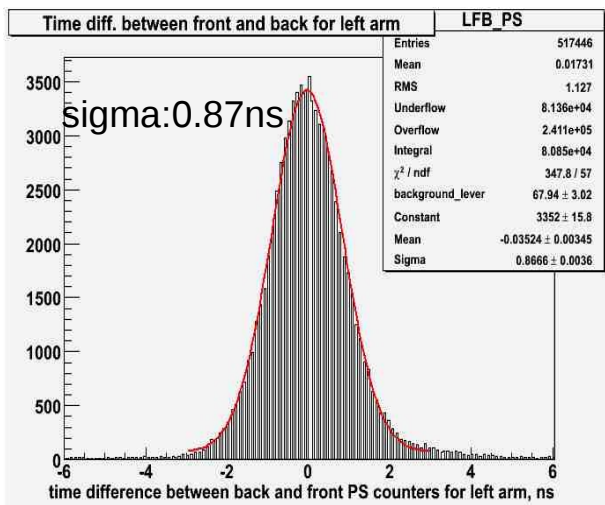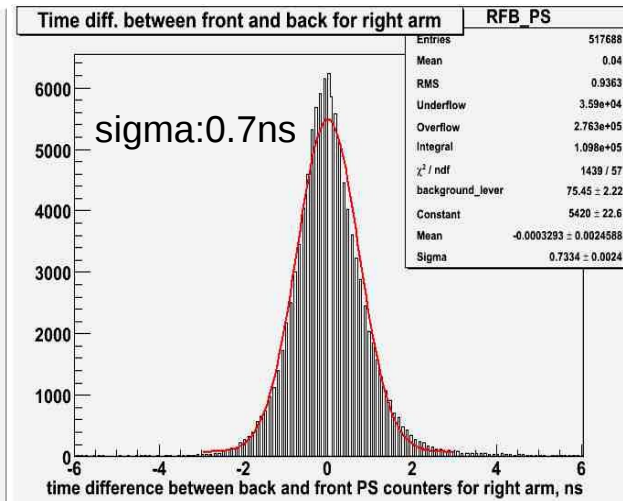# Time difference between two adjacent PS counters

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Time difference between two adjacent PS counters

Algorithm for reconstructing e+e- pair

2) Left track: Tdiff of fron and back counters for right arm(5 sigma cut and geometry maching);

3) Right track: Tdiff of fron and back counters for left arm(5 sigma cut and geometry maching);

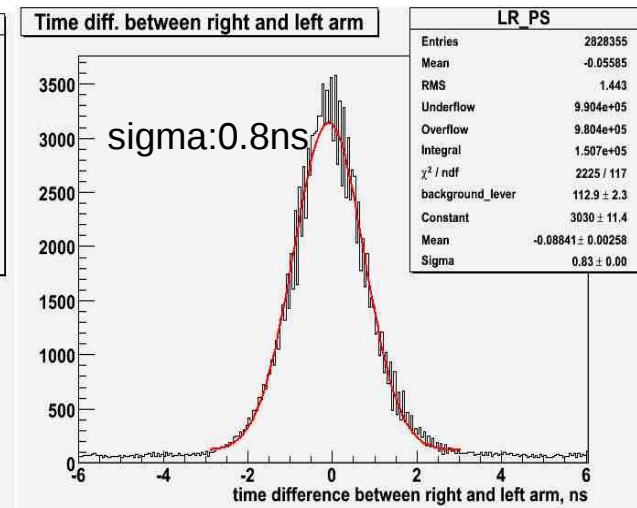4) Pairs: Tdiff of left track and right track (5 sigma cut);

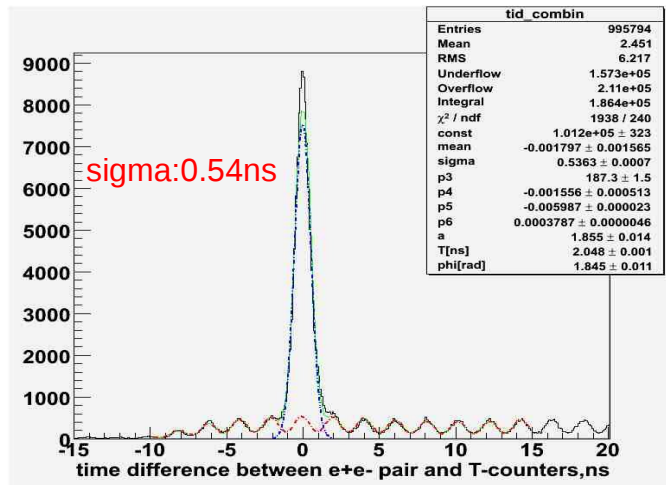Tdiff of front and back for left arm   Tdiff of front and back for right arm   Tdiff of left and right arm
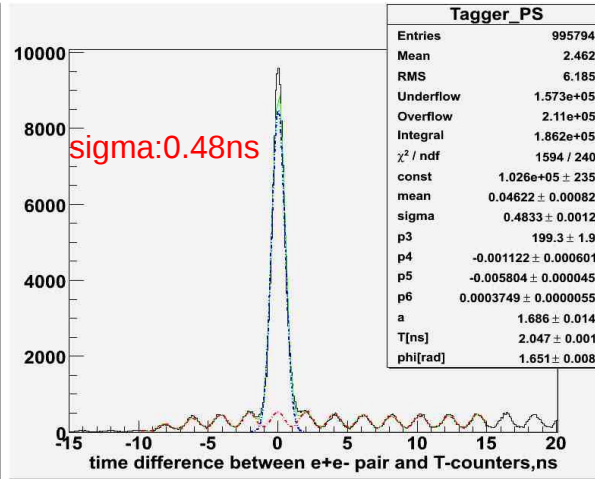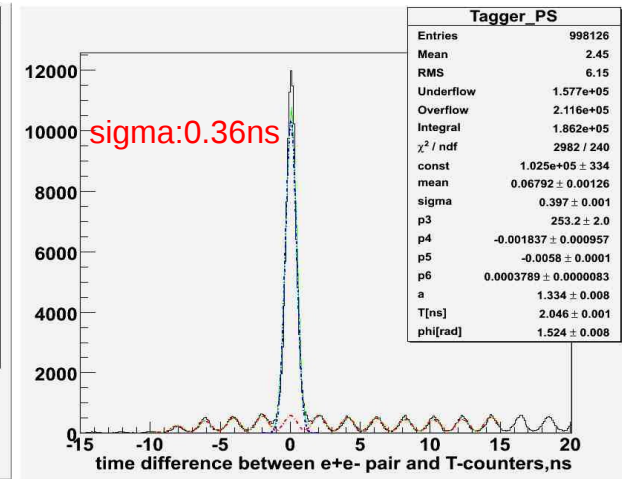
2. The way of define the time of pair

Tdiff of e+e- pair and all T-counters

Time of pairs coming from the Right-front Parts of PS counter

Time of pairs coming from the average time of left-front and right-front

Time of pairs coming from the average time of four Parts of PS counter

What kind of trigger should be used to analyze relative tagging ratio?

a) Using MOR trigger(no Hycal,clock and LMS) :

b) Using clock trigger(TAC runs have no clock trigger) to get the numerator and denominator   of R_rel.

1. MOR trigger(no Hycal,clock and LMS) :
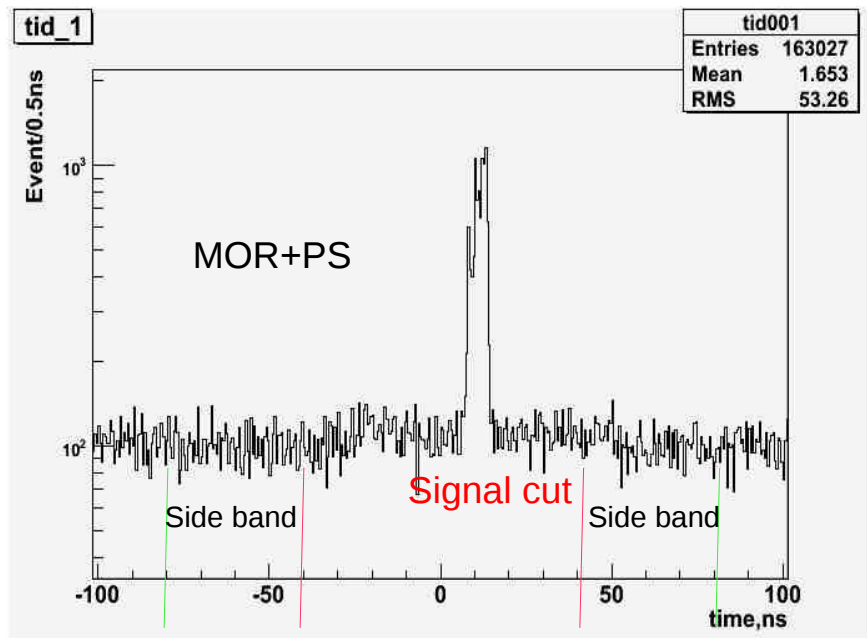
1) how to get the denominator of R_rel:

in the data stream: $N_{beam}+(N_{e+e-}+N_{ac})$

N_{beam}(selected by clean MOR) = $P_{MOR}*n_{beam}$,

$N_{e+e-}+N_{ac}$(selected by MOR+PS) = $(P_{MOR} + P_{ps})*(n_{e+e-}+n_{ac})$

So, the denominator = $(P_{MOR} + P_{ps})*N_{beam}/P_{MOR} +N_{e+e-}+N_{ac}$

Time distribution of e- from T-counters
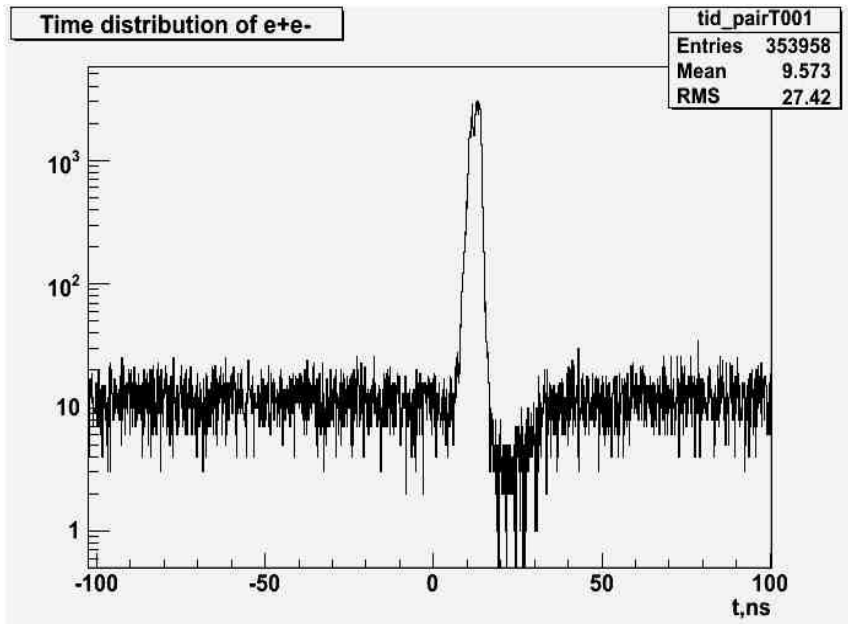
Time distribution of e- from T-counters
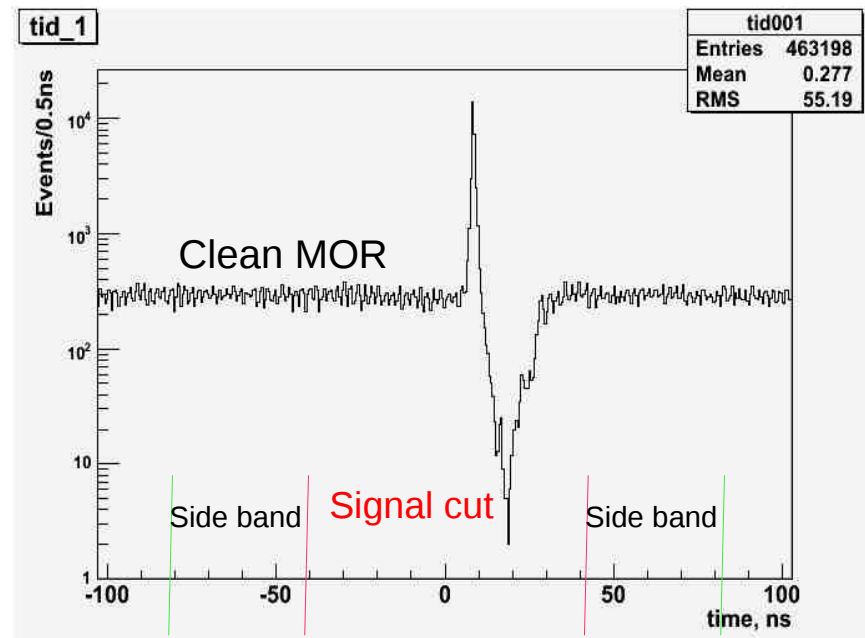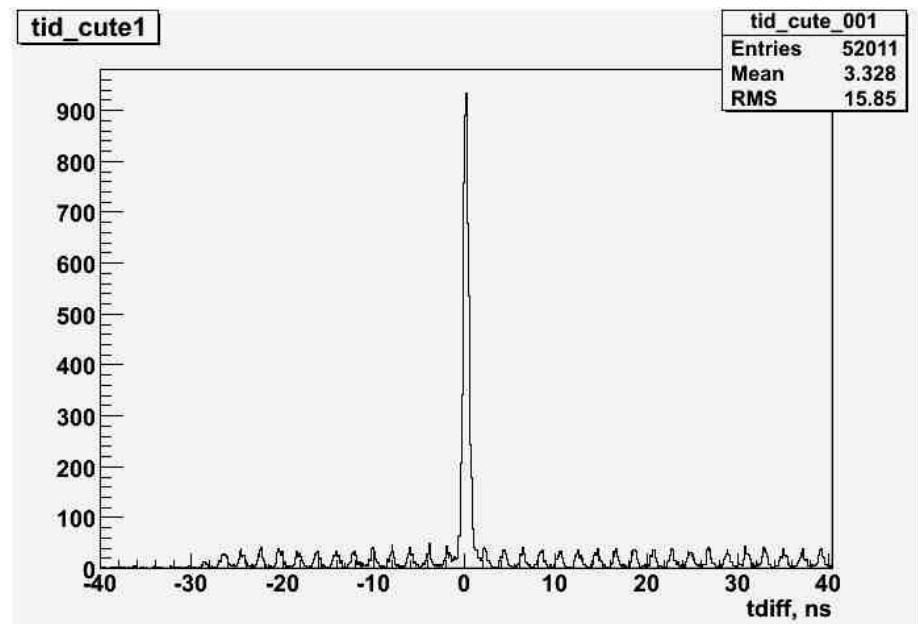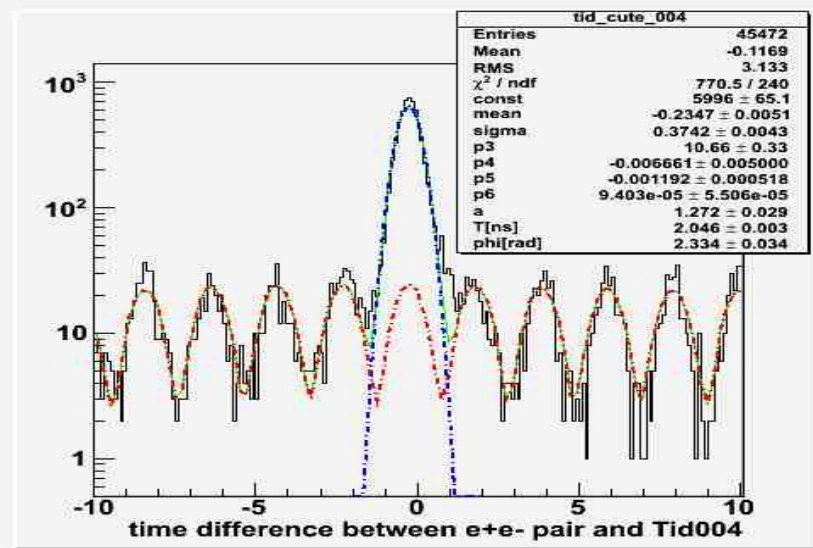

Cut window : [-40,40]ns   Side band window: [-80,40]ns&&[40,80]ns

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2) how to get the number of pairs which are time coincidence with T-counters:
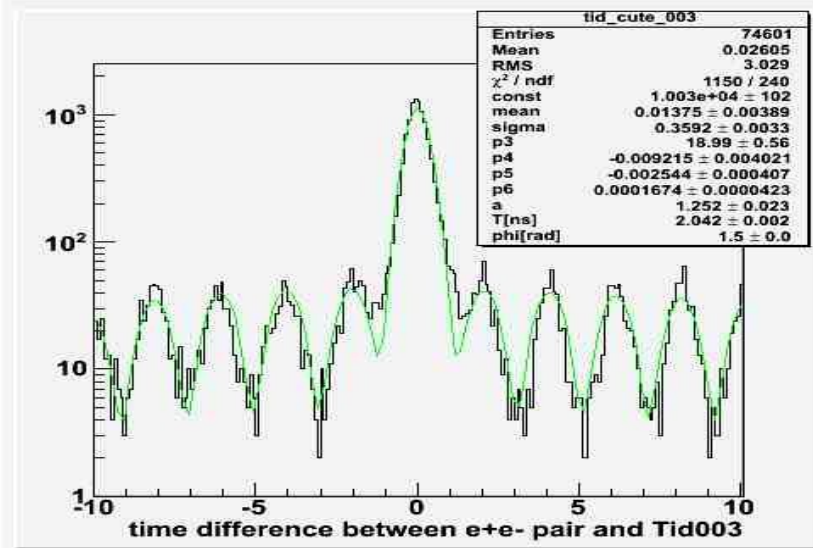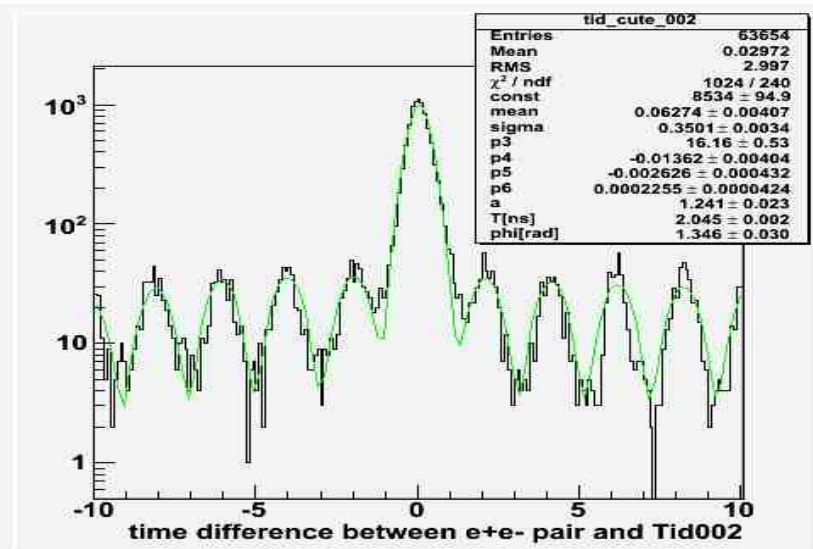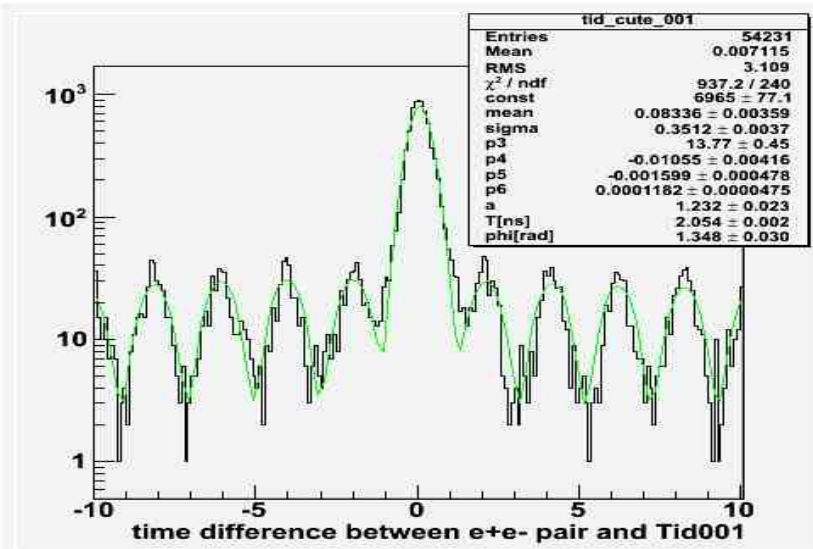
Using MOR trigger(no Hycal,clock and LMS)
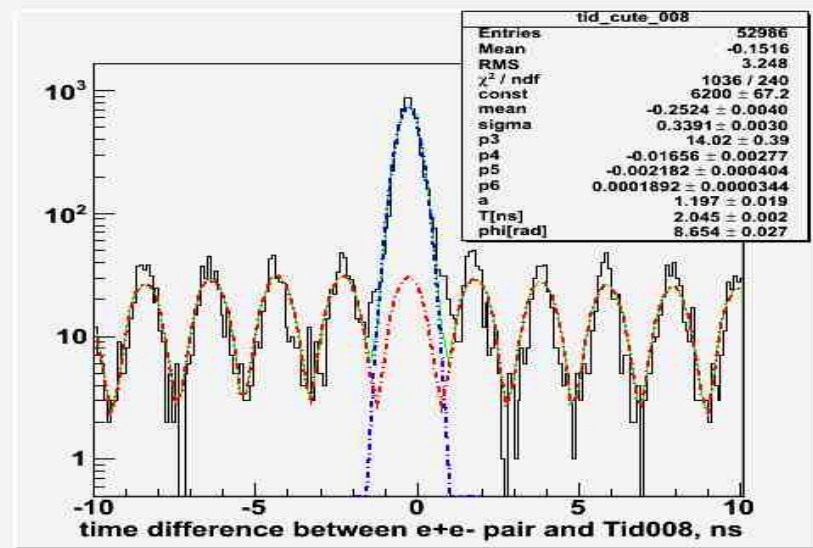
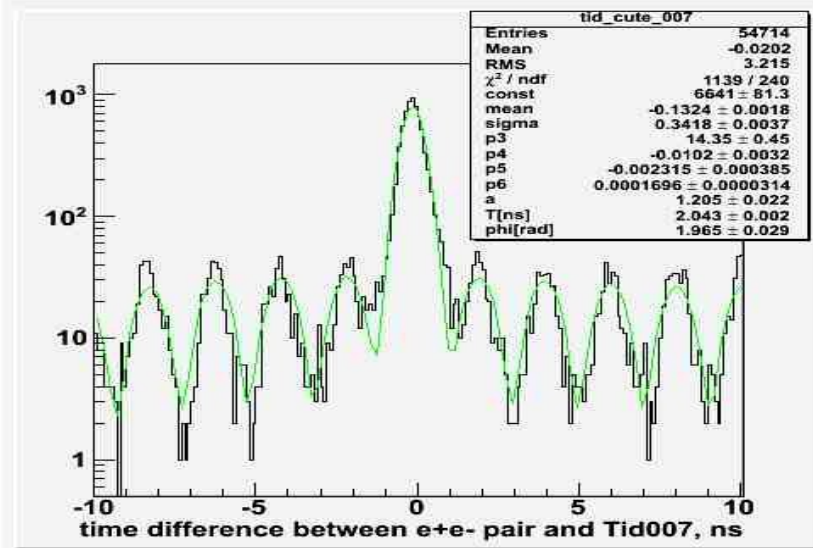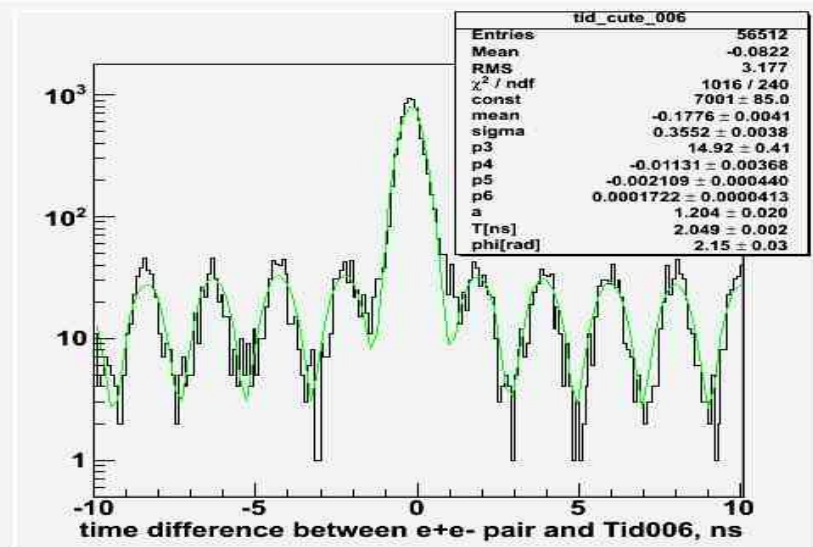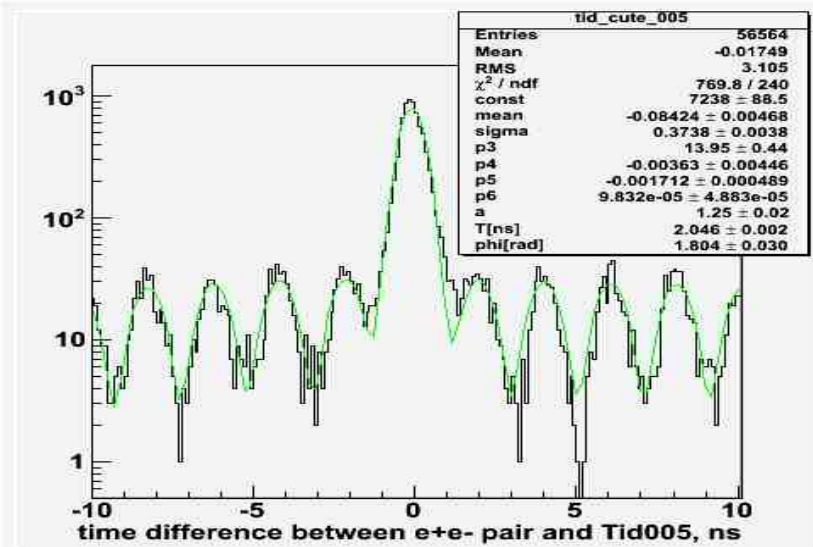Time distribution of e+e-

Tdiff of e+e- pairs and T-counter 1

3) fitting the Tdiff of pairs and T-counters

Fit function: one Gaussian +sin*3rd polynomial
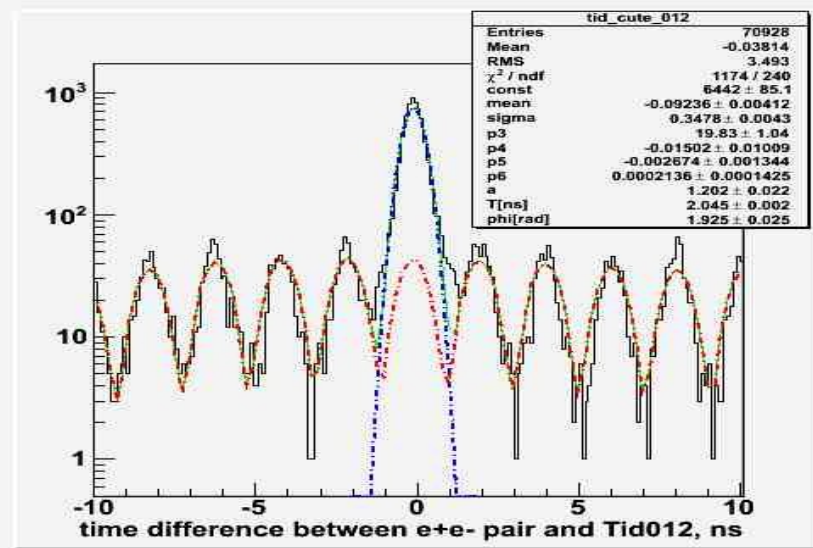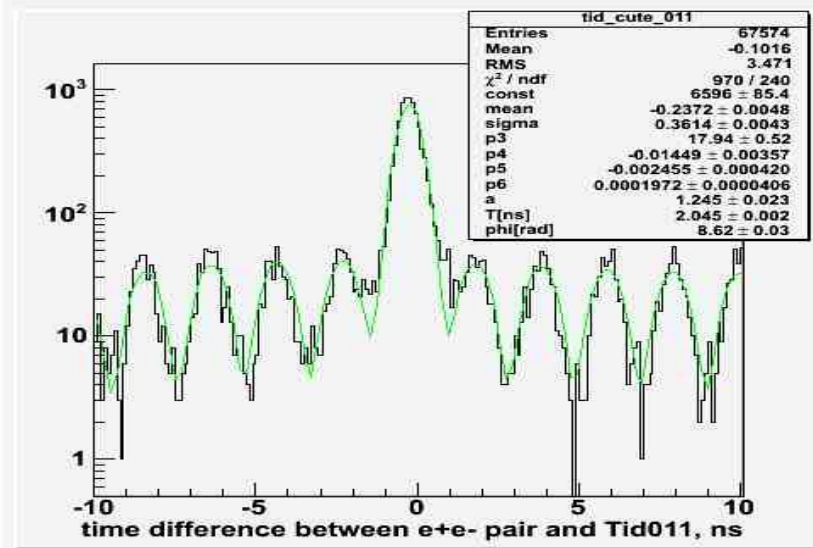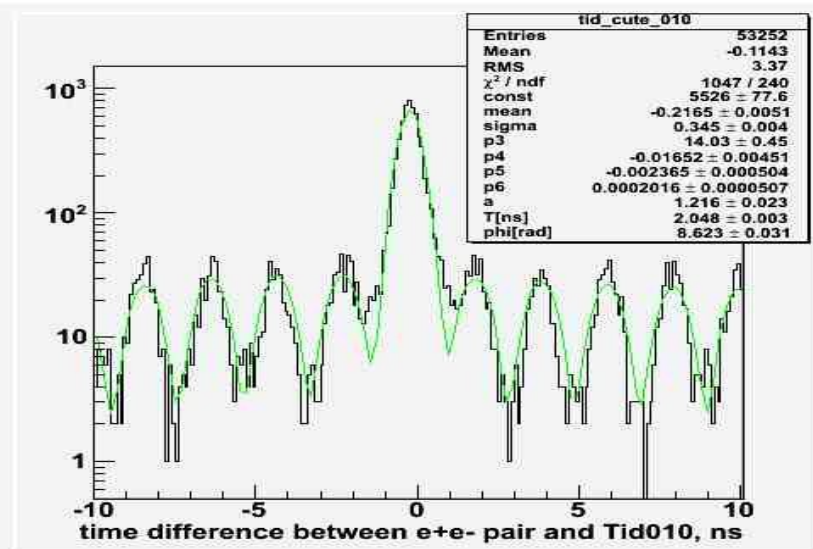
3) fitting the Tdiff of pairs and T-counters

Fit function: one Gaussian +sin*3rd polynomial
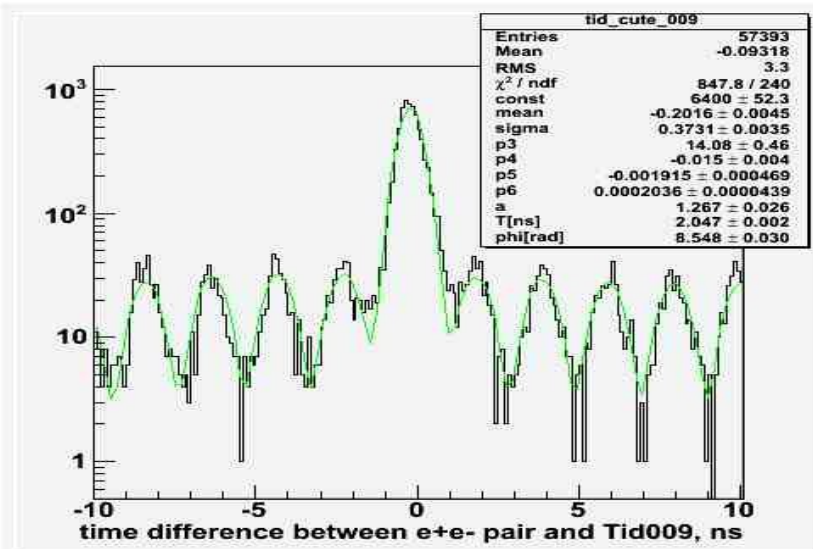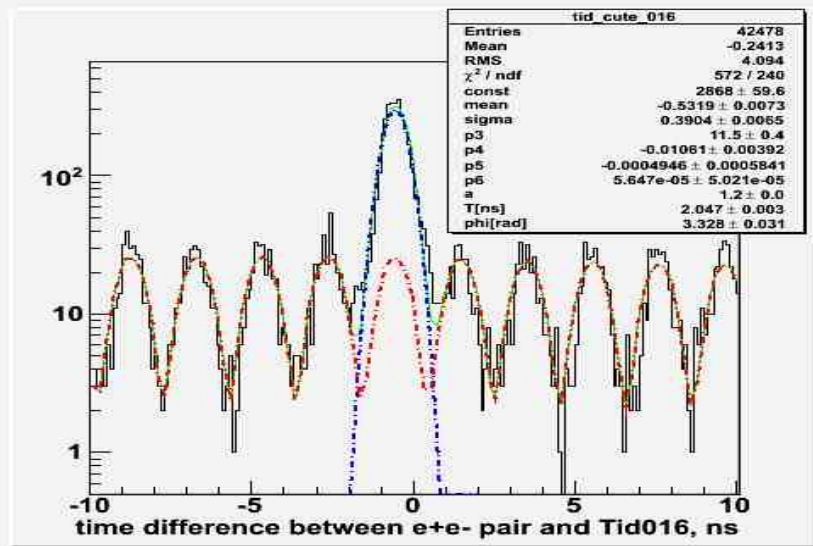
3) fitting the Tdiff of pairs and T-counters
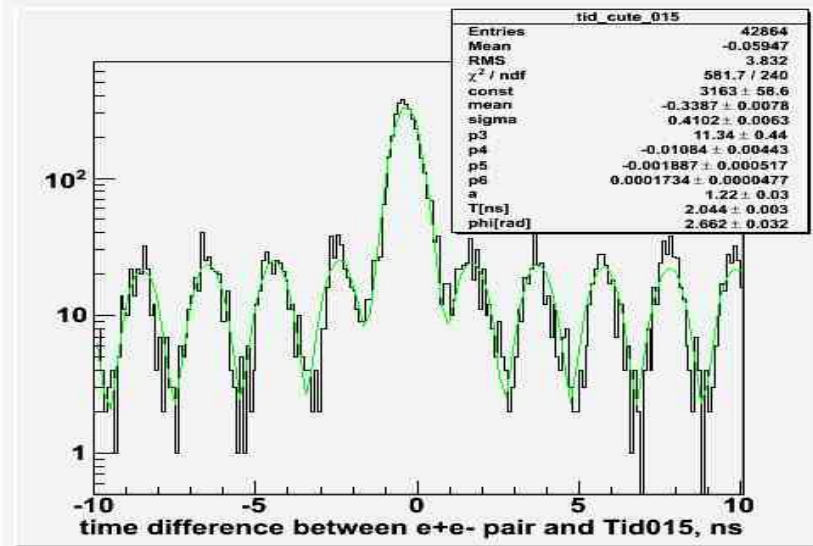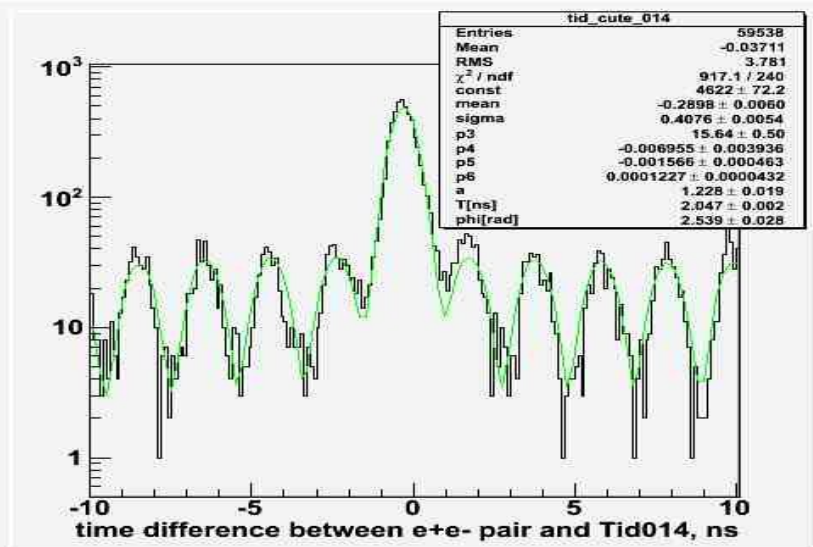
Fit function: one Gaussian +sin*3rd polynomial

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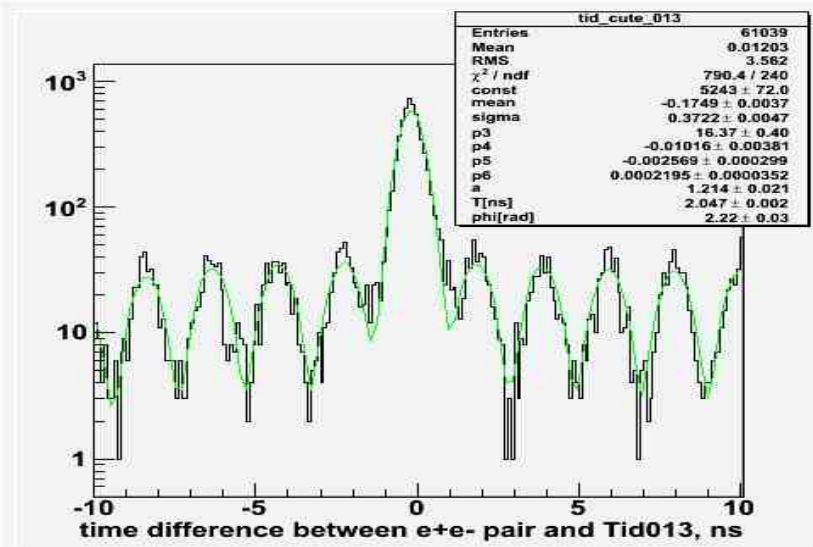
3) fitting the Tdiff of pairs and T-counters

Fit function: one Gaussian +sin*3rd polynomial

3) fitting the Tdiff of pairs and T-counters

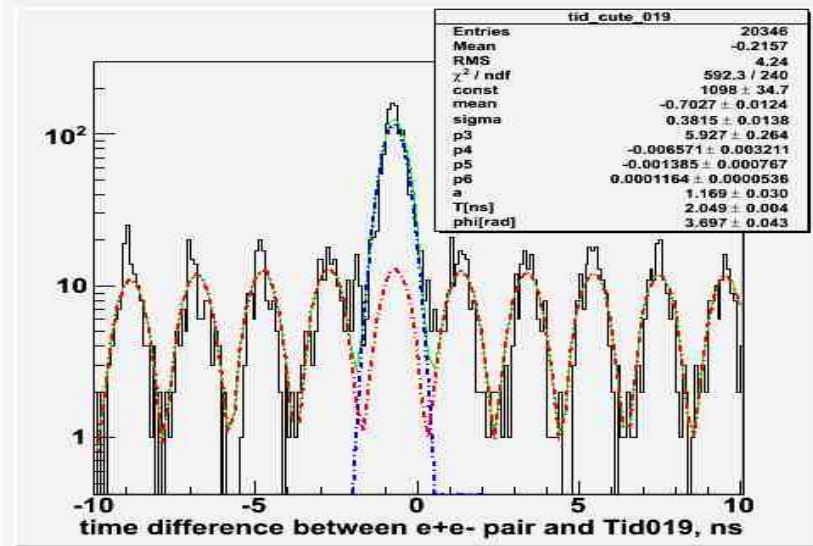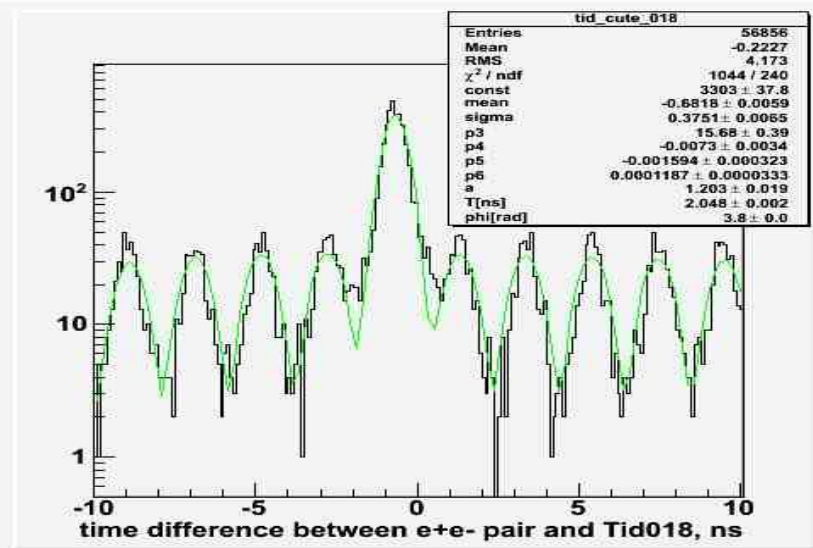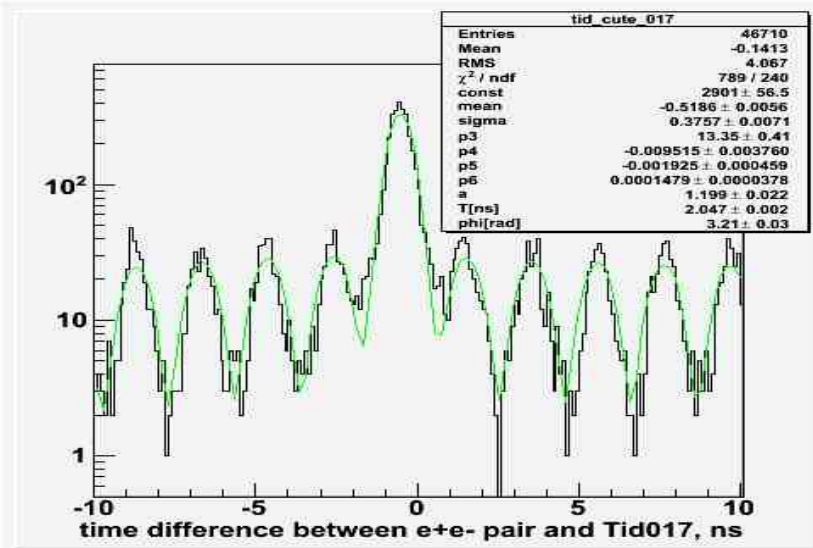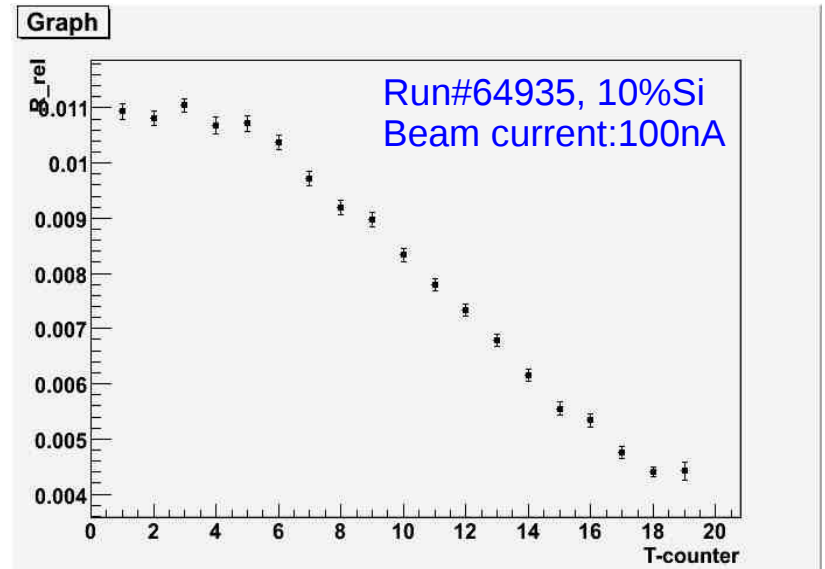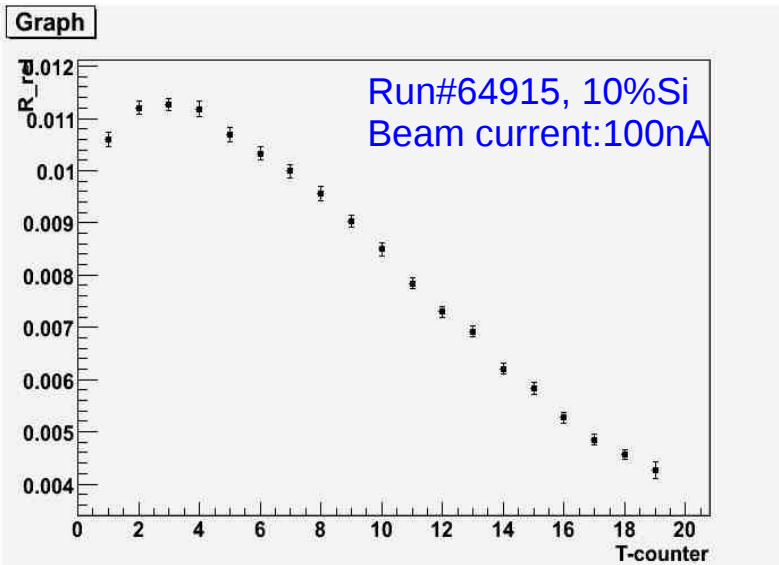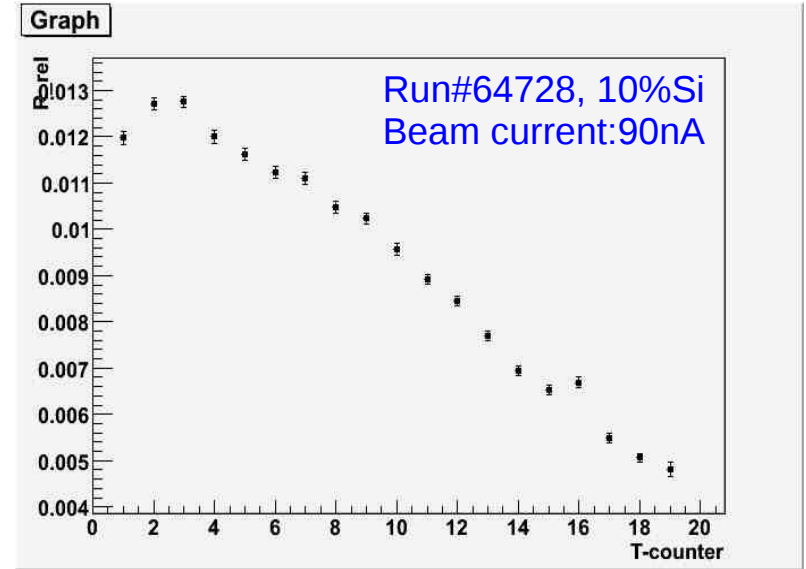Fit function: one Gaussian +sin*3rd polynomial

4)R_rel:

Run#64710, 10%Si
Beam current:90nA

Run#64728, 10%Si
Beam current:90nA

Run#64915, 10%Si
Beam current:100nA

Run#64935, 10%Si
Beam current:100nA

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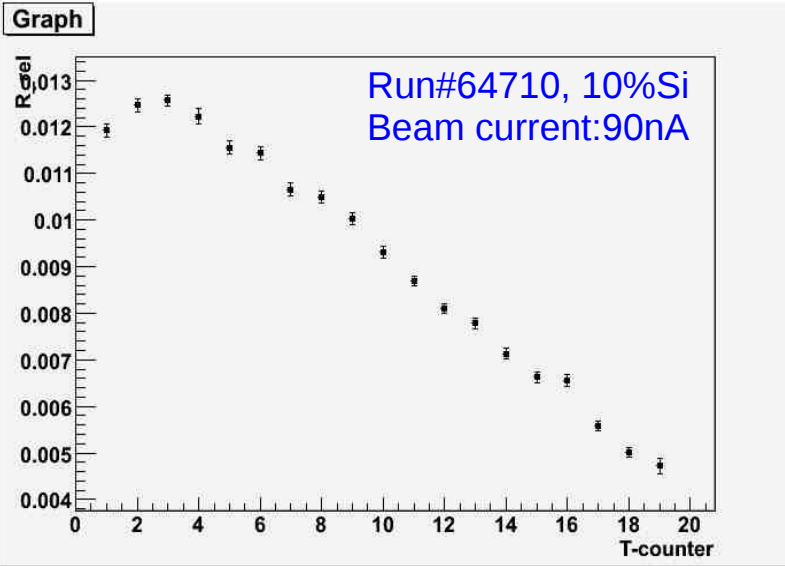
1) R_rel for 10%Si runs by using MOR to get the denominator, MOR+PS trigger (no Hycal,clock and LMS) to get numerator

Relative tagging ratio of Tid1,Tid2,Tid9,Tid12,Tid19 as function of run number of 22 runs spanning all production runs with Si target
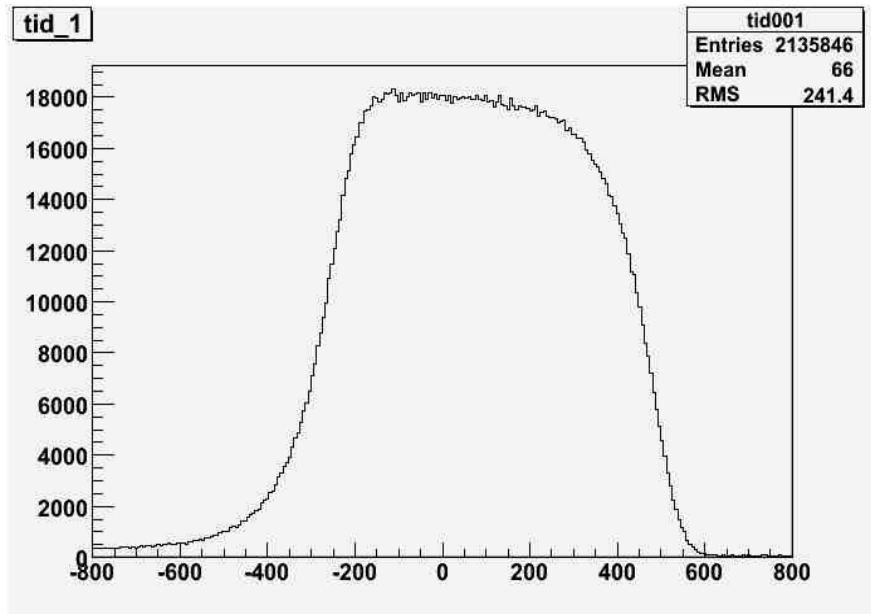
Percent deviation from the average mean value as the function of run numbers, and the average mean values were calculated for each T-counters from 8 of 22 runs at the range from 64710 to 64850
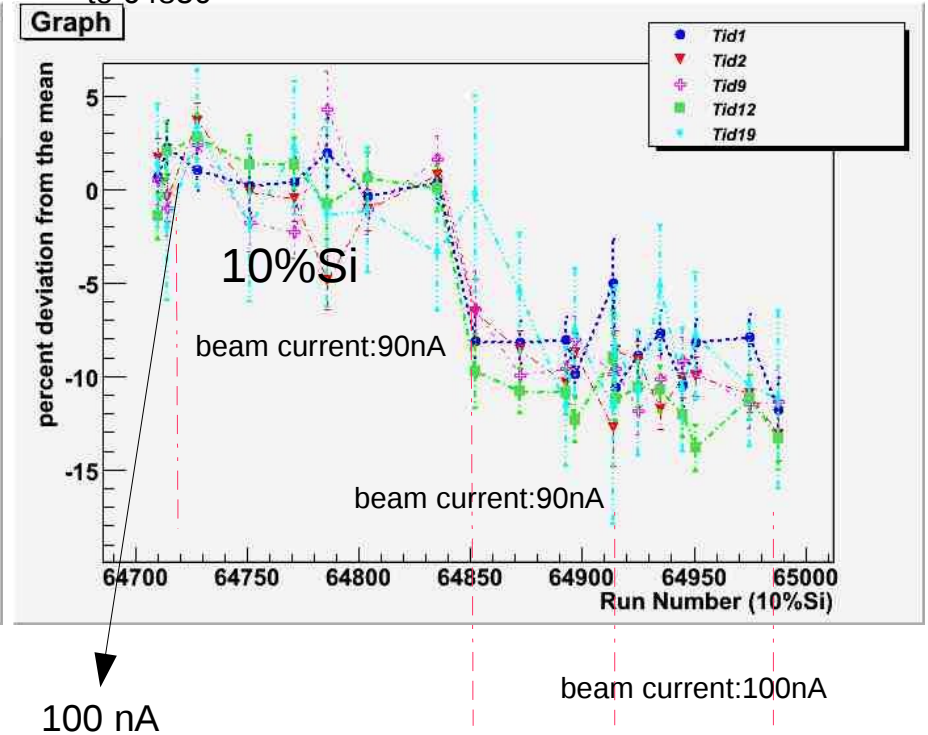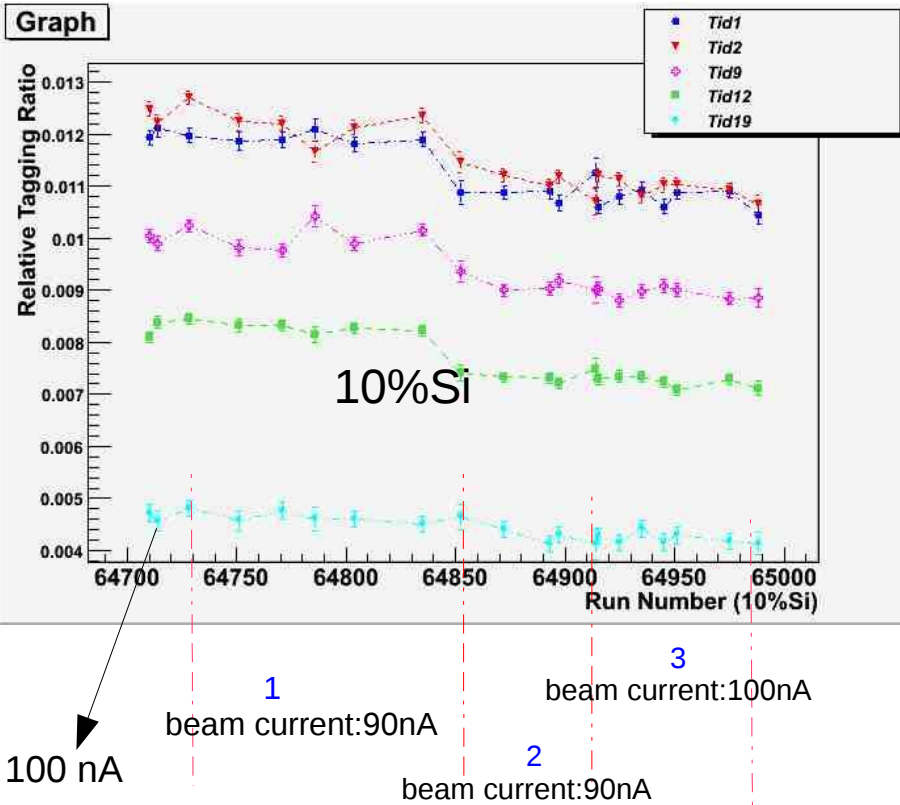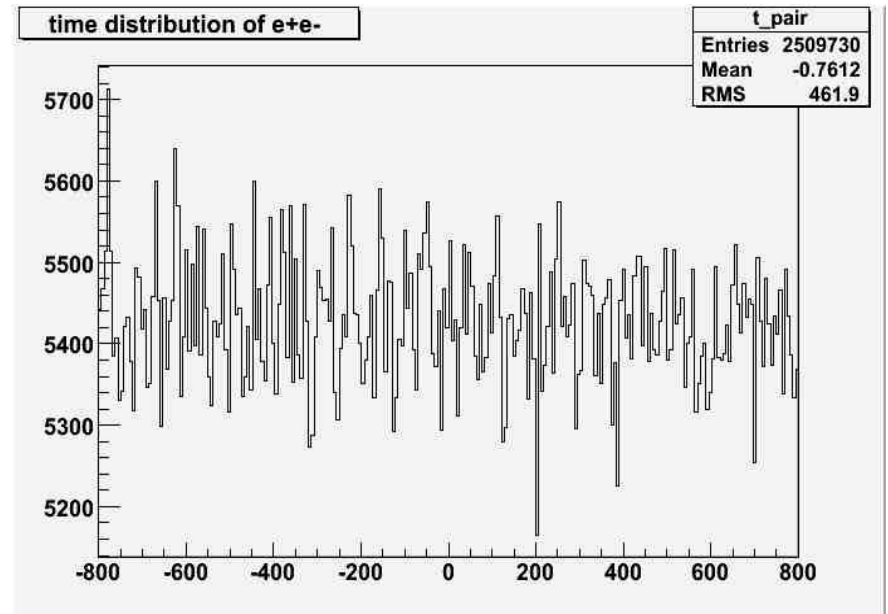

1. Run Number(90nA): 64710, 64728, 64751, 64771, 64786, 64804, 64835, 64852
2. Run Number(90nA): 64872, 64893, 64897, 64912, 64913
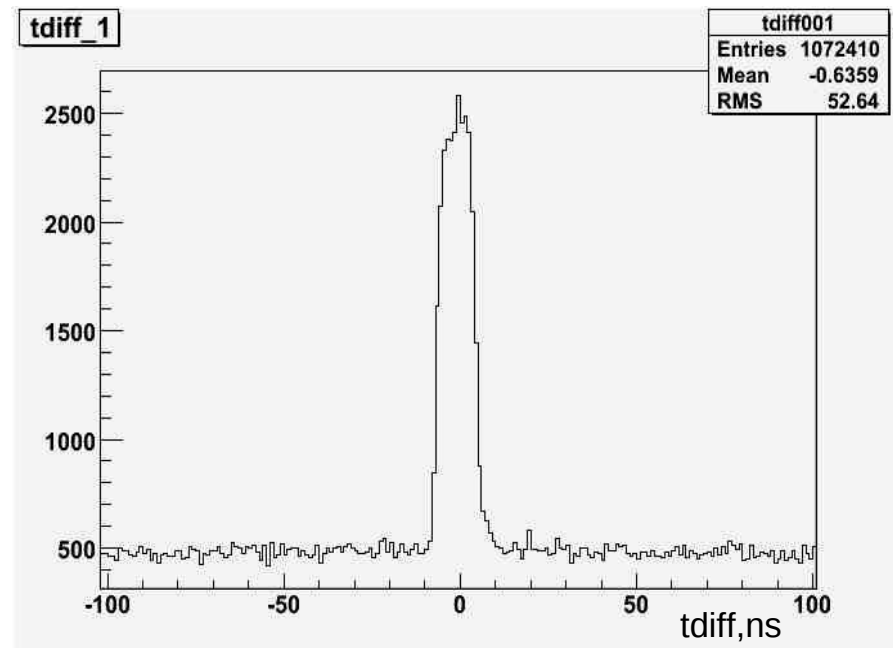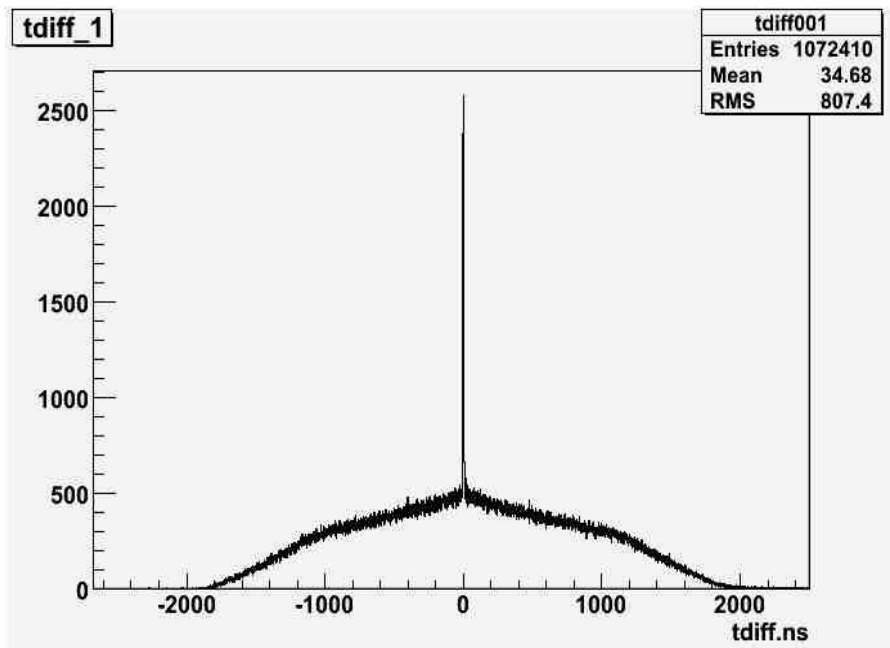3. Run Number(100nA):64714, 64914 ,64915,64925,64935,64945,64951,64975,64988

Clock trigger:

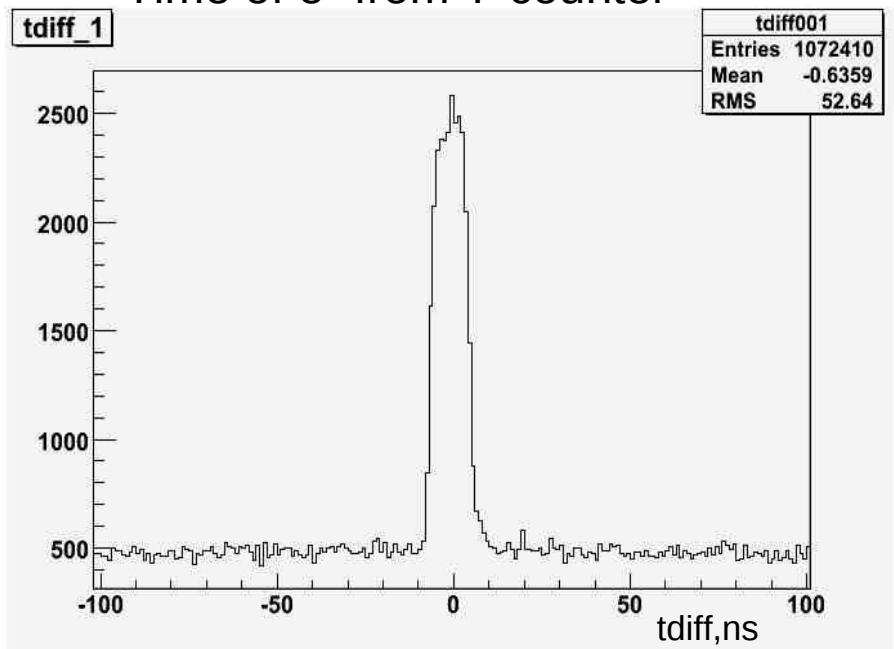Time distribution of e- from T-counters

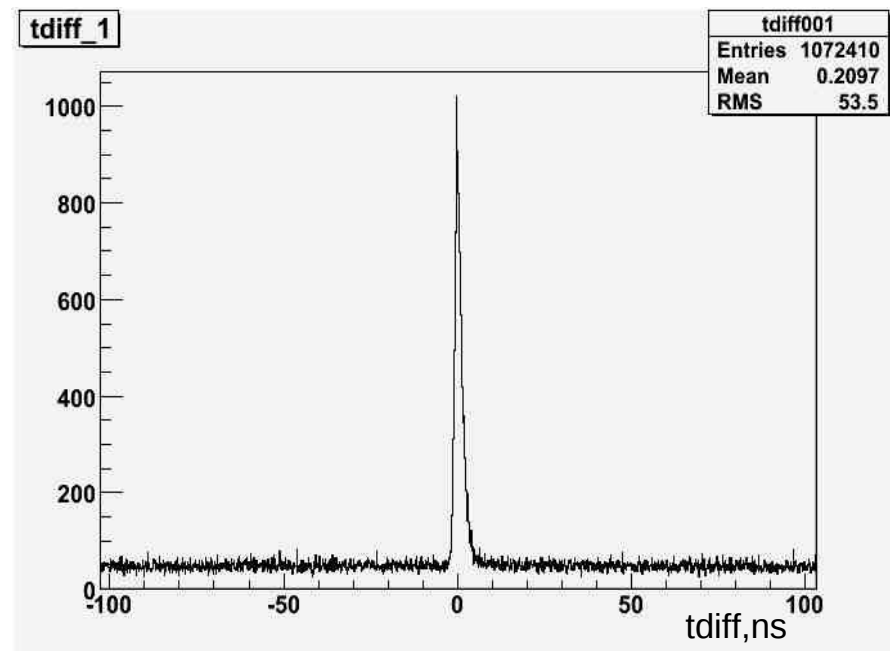Time distribution of e+e-

Tdiff of e+e- pairs and T-counter 1

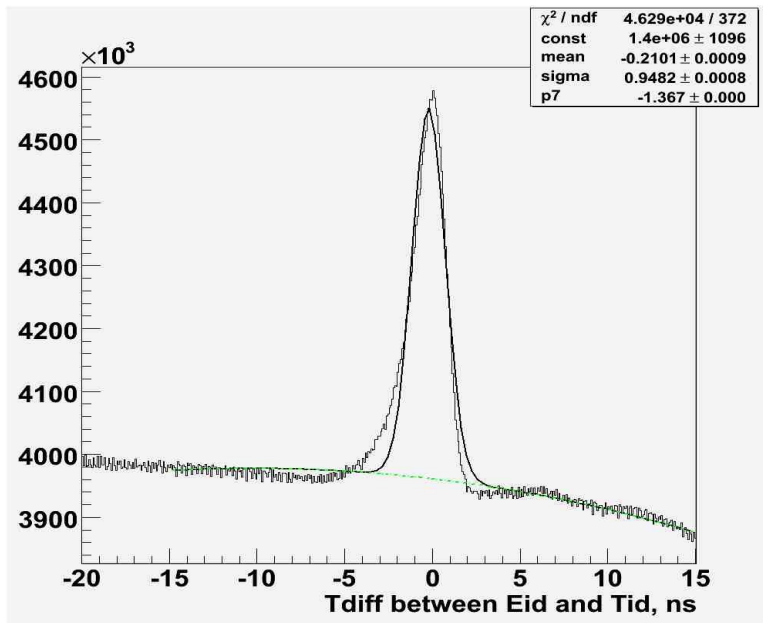# Tdiff of e+e- pairs and T-counter 1 (clock trigger)

Time of e- from T-counter

Time of e- from E-counter

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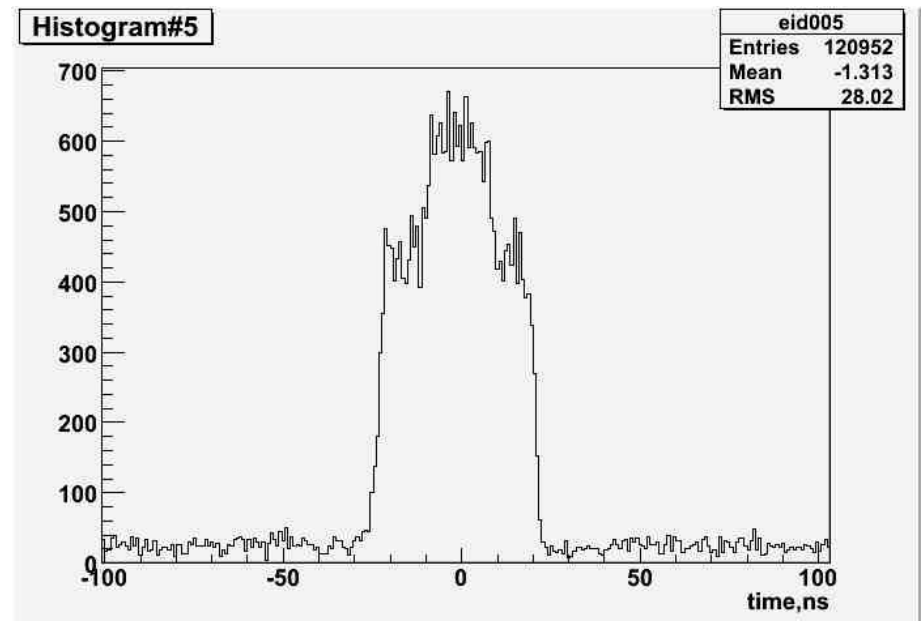
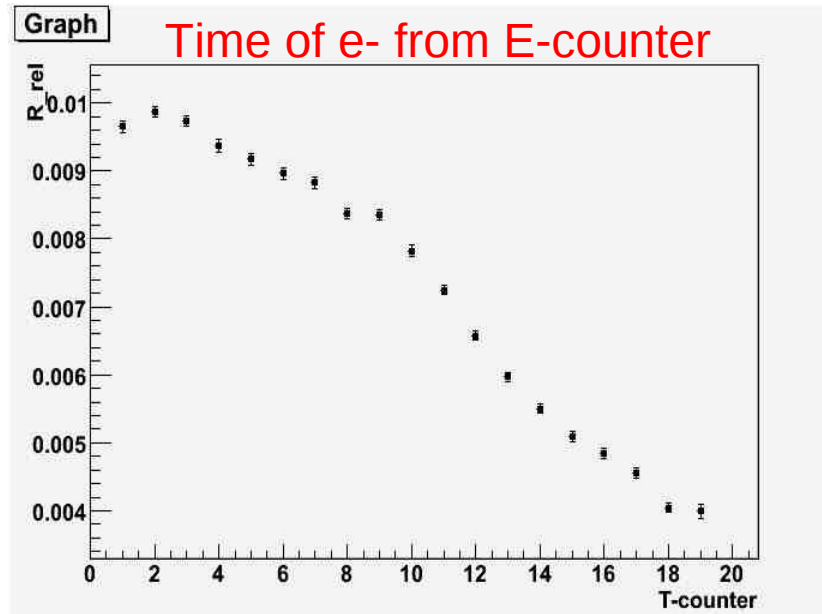# Time difference between E_channel and T_channel

Clean MOR
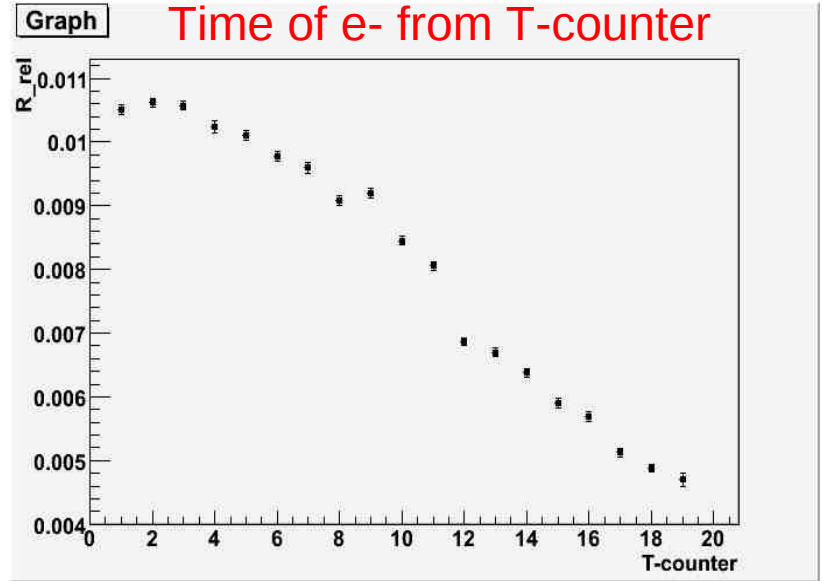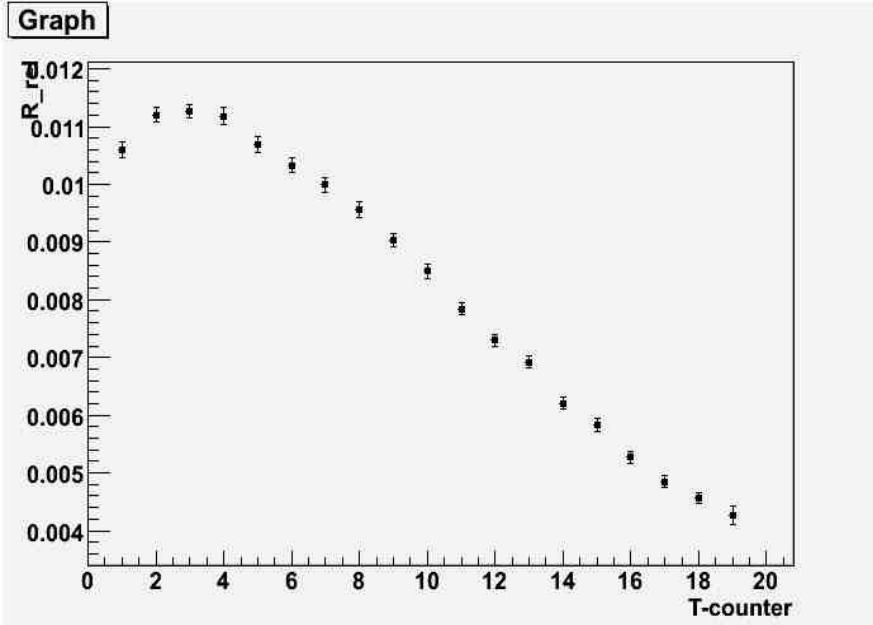
clock

R_rel (clock)

R_rel (MOR)

Time of e- from T-counter

Time of e- from E-counter

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Relative tagging ratio of Tid1,Tid2,Tid9,Tid12,Tid19 as function of run number of 6 runs production runs with Si target

Percent deviation from the average mean value as the function of run numbers, and the average mean values were calculated for each T-counters from run# 64714 to 64835