T1 trigger rate from TDC.

The copy of T1 trigger signal, which goes to 1877 multihit TDC. That allow us to determine trigger rate. 1-st hit time distribution from that TDC shown on figure 1.

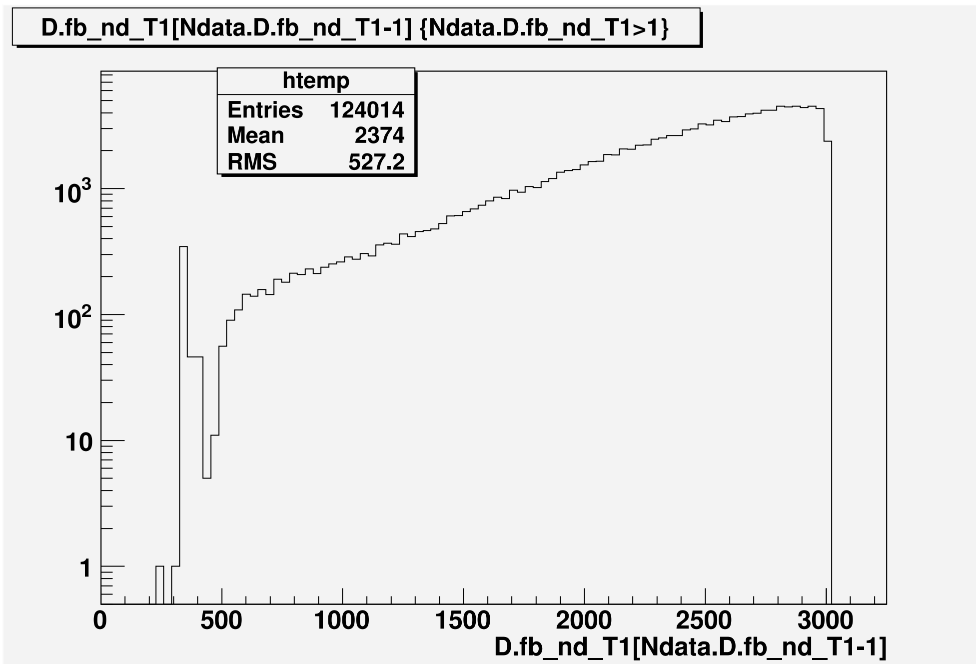

Figure 1: T1 TDC 1-st hit distribution

Exponential growth is because of probability to have 1-st hit far form stop signal is smaller than probability to have 1-st hit closer to stop signal.

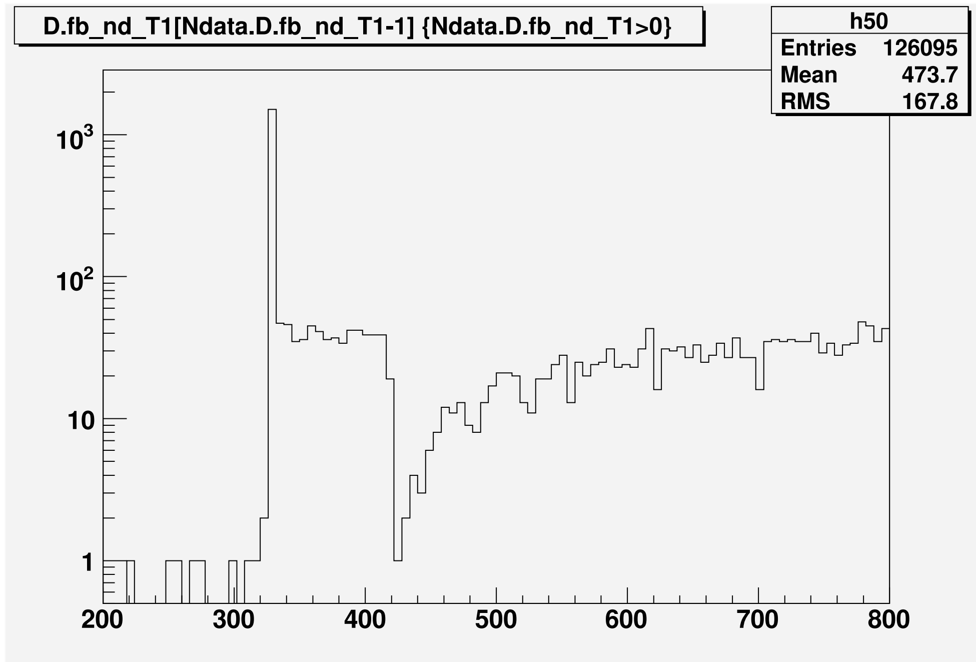

Figure 2: T1 TDC 1-st hit distributrion

Narrow peak near 330 ch on this distribution is self timeng peak. Event will appear in that peak if both start and stop caused by the same signal and T1 edge comes within T2 signal edge. Wide peak 335-420 ch. again due to self timing. Events appears in that peak, when T1 edge comes earlier than T2.

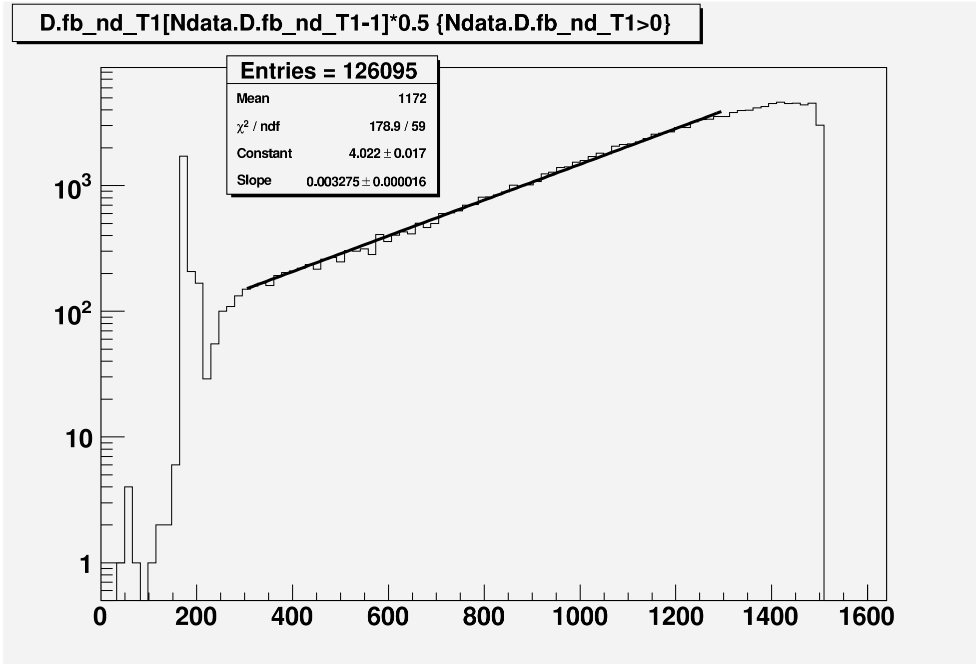

Figure 3: T1 TDC 1-st hit distributrion, exponential fit

$$R = \frac{N_1}{N_2}, \tag{1}$$

where N_1 - number of events at time $t_1 = 300ns$, N_2 - number of events at time $t_2 = 1300ns$, R - will be the probability to have 0 events in time interval between t_1 and t_2. On other side:

$$R = e^{-f\tau}, \tag{2}$$

where f - is rate, and τ - is time interval between t1 and t2. Because of exponential for of distribution, form equation (1) one can get:

$$R = e^{-\alpha\tau}, \tag{3}$$

where α is slope of exponential growth. Comparing equation (2) and (3) and taking into account that time is in ns, one can get:

$$f = \alpha \cdot 10^3 [MHz] \tag{4}$$

ND inefficiency study.

Some part of the N_{T2noT3} is due to the proton is missing the geometry of ND, and not due to ND inefficiency. Taking into account that correction we obtained ND inefficiency for 3 runs. Results are shown in table 2.

Run #	$< I > (\mu A)$	$f_{TDC}^{T1}(MHz)$	N_{T2}^{W}	N_{T2noT3}^{W}	N_{out}	$N_{T2withT3}^{W,accid}$	$N_{T2noT3}^{W,corr}$	$R = N_{T2noT3}^{W,corr}/N_{T2}^{W}, (\%)$
4427	2.54	1.14	2973	1595	435	407	1567	52.7 ± 1.7
4597	4.71	2.69	497	219	51	160	328	66.0 ± 2.2
4596	5.78	3.27	419	181	50	164	295	70.4 ± 2.4

Table 1:

N_{T2}^{W} - number of T2 events, with cut on W: $0.8 < W < 1.15$.

N_{T2noT3}^{W} - number of T2 events that do not have T3, with cut on W: $0.8 < W < 1.15$.

N_{out} - number of N_{T2noT3}^{W}, that are missing the geometry of ND.

$N_{T2noT3}^{W,corr}$ - N_{T2noT3}^{W}, corrected on events that are missing the geometry of ND and on accidental events.

$R = N_{T2noT3}^{W,corr}/N_{T2}^{W}(\%)$ - ND inefficiency