

# Total Absorption Cross Sections

Lingling Ma

- 1) Syst. Error from TAC ADC pedestal subtraction
- 2) Syst. Error from TAC ADC calibration of gain factor
- 3) Syst. Error from tdc cut
- 4) Syst. error from  $\alpha$  and  $\varepsilon$

# Syst. Error from TAC ADC pedestal subtraction

(Si Target)

T-counter	Rel. error from pedestal+40counts	Rel. error from pedestal-40counts	maximum error
1	0.0037	-0.0050	$\pm 0.0050$
2	0.0044	-0.0050	$\pm 0.0050$
3	0.0044	-0.0053	$\pm 0.0053$
4	0.0050	-0.0050	$\pm 0.0050$
5	0.0049	-0.0054	$\pm 0.0054$
6	0.0052	-0.0048	$\pm 0.0052$
7	0.0050	-0.0059	$\pm 0.0059$
8	0.0048	-0.0050	$\pm 0.0050$
9	0.0046	-0.0053	$\pm 0.0053$
10	0.0048	-0.0048	$\pm 0.0048$
11	0.0044	-0.0054	$\pm 0.0054$
12	0.0053	-0.0046	$\pm 0.0053$
13	0.0049	-0.0047	$\pm 0.0049$
14	0.0044	-0.0046	$\pm 0.0046$
15	0.0049	-0.0062	$\pm 0.0062$
16	0.0061	-0.0058	$\pm 0.0061$
17	0.0054	-0.0040	$\pm 0.0054$
18	0.0058	-0.0058	$\pm 0.0058$
19	0.0055	-0.0056	$\pm 0.0056$

# Syst. Error from TAC ADC pedestal subtraction

(<sup>12</sup>C Target)

T-counter	Rel. error from pedestal+40counts	Rel. error from pedestal-40counts	maximum error
1	0.0029	-0.0014	±0.0029
2	0.0011	-0.0012	±0.0012
3	0.0005	-0.0014	±0.0014
4	0.0032	-0.0024	±0.0032
5	0.0009	-0.0015	±0.0015
6	0.0023	-0.0034	±0.0034
7	0.0027	-0.0024	±0.0027
8	0.0028	-0.0035	±0.0035
9	0.0025	-0.0016	±0.0025
10	0.0021	-0.0022	±0.0022
11	0.0029	-0.0029	±0.0029
12	0.0016	-0.0035	±0.0035
13	0.0017	-0.0030	±0.0030
14	0.0038	-0.0026	±0.0038
15	0.0003	-0.0016	±0.0016
16	0.0045	-0.0003	±0.0045
17	0.0037	-0.0022	±0.0037
18	0.0030	-0.0032	±0.0032
19	0.0012	-0.0034	±0.0034

# Syst. Error from TAC ADC calibration of gain factor

(Si Target)

T-counter	Rel. error from gain*(1+1%)	Rel. error from gain*(1-1%)	maximum error
1	-0.0015	0.0010	$\pm 0.0015$
2	-0.0012	0.0016	$\pm 0.0016$
3	-0.0011	0.0014	$\pm 0.0014$
4	-0.0012	0.0007	$\pm 0.0012$
5	-0.0013	0.0011	$\pm 0.0013$
6	-0.0013	0.0018	$\pm 0.0018$
7	-0.0015	0.0014	$\pm 0.0015$
8	-0.0007	0.0013	$\pm 0.0013$
9	-0.0006	0.0014	$\pm 0.0014$
10	-0.0006	0.0013	$\pm 0.0013$
11	-0.0008	0.0006	$\pm 0.0008$
12	-0.0009	0.0017	$\pm 0.0017$
13	-0.0011	0.0008	$\pm 0.0011$
14	-0.0011	0.0009	$\pm 0.0011$
15	-0.0013	0.0009	$\pm 0.0013$
16	-0.0009	0.0012	$\pm 0.0012$
17	-0.0011	0.0011	$\pm 0.0011$
18	-0.0014	0.0013	$\pm 0.0014$
19	0.0002	0.0013	$\pm 0.0013$

# Syst. Error from TAC ADC calibration of gain factor

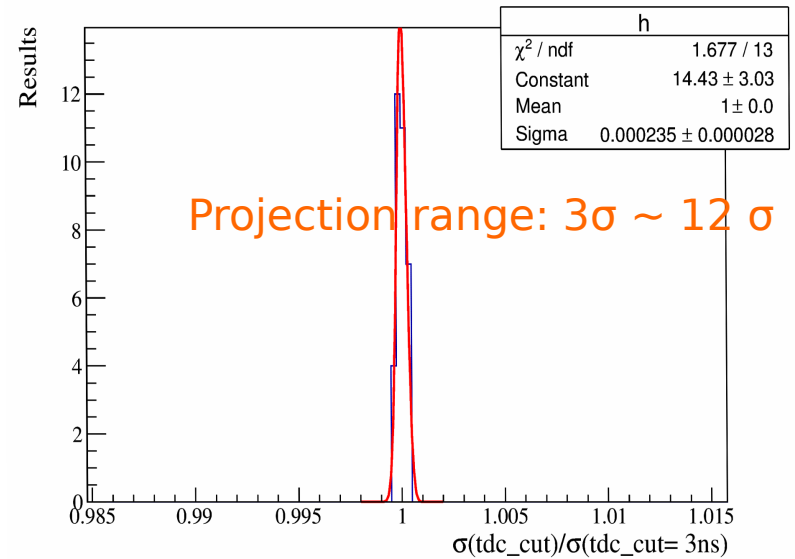
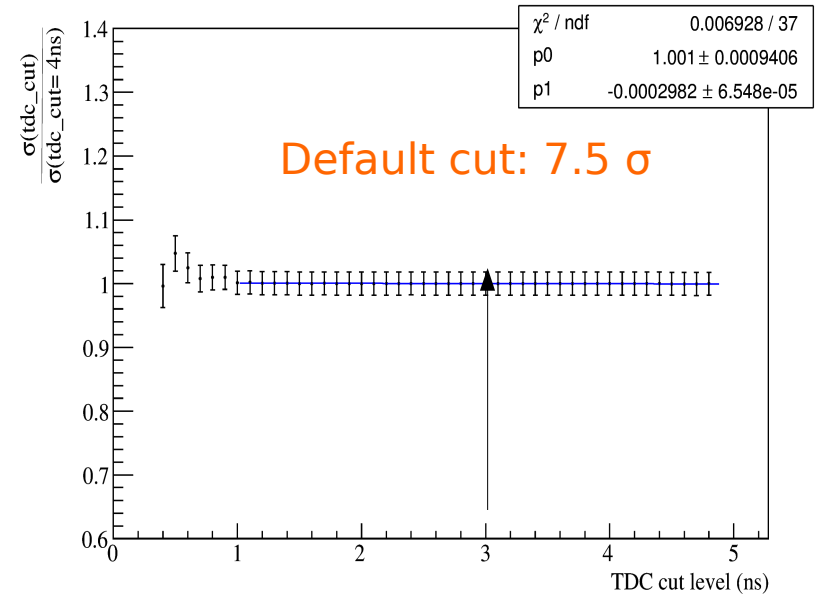
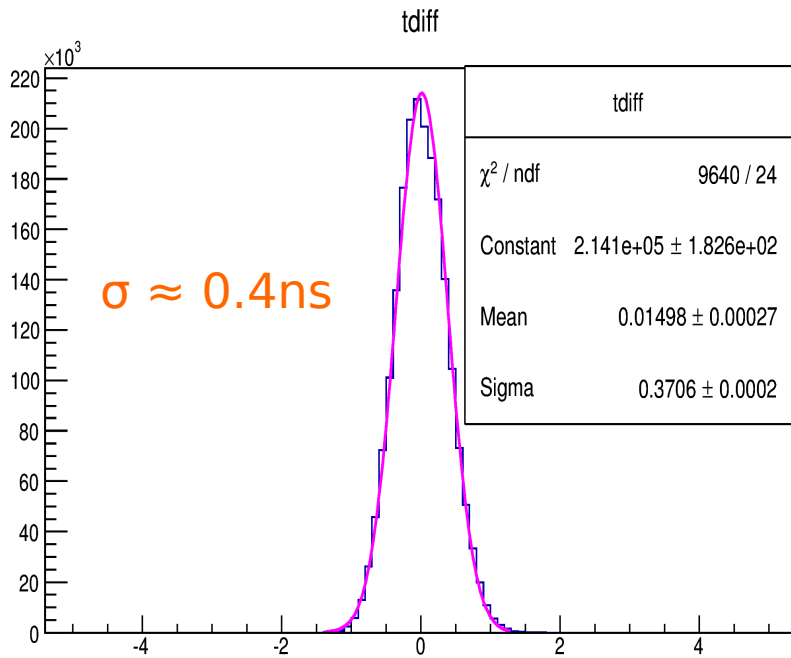
(<sup>12</sup>C Target)

T-counter	Rel. error from gain*(1+1%)	Rel. error from gain*(1-1%)	maximum error
1	0.0008	0.0026	±0.0026
2	0.0000	0.0003	±0.0003
3	0.0003	0.0003	±0.0003
4	-0.0008	0.0016	±0.0016
5	-0.0016	0.0003	±0.0016
6	-0.0006	0.0006	±0.0006
7	-0.0018	0.0014	±0.0018
8	0.0000	0.0007	±0.0007
9	-0.0006	0.0006	±0.0006
10	-0.0012	0.0009	±0.0012
11	-0.0011	0.0000	±0.0011
12	-0.0004	0.0004	±0.0004
13	-0.0005	0.0000	±0.0005
14	0.0000	0.0008	±0.0008
15	0.0026	0.0009	±0.0026
16	-0.0007	0.0014	±0.0014
17	0.0000	-0.0003	±0.0003
18	-0.0006	-0.0003	±0.0006
19	-0.0003	0.0014	±0.0014

# Syst. Error from tdc cut

## (Si Target)

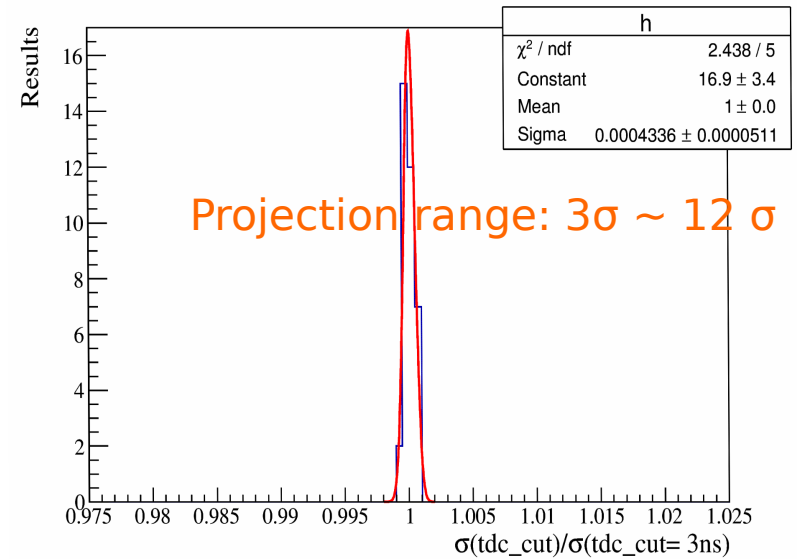
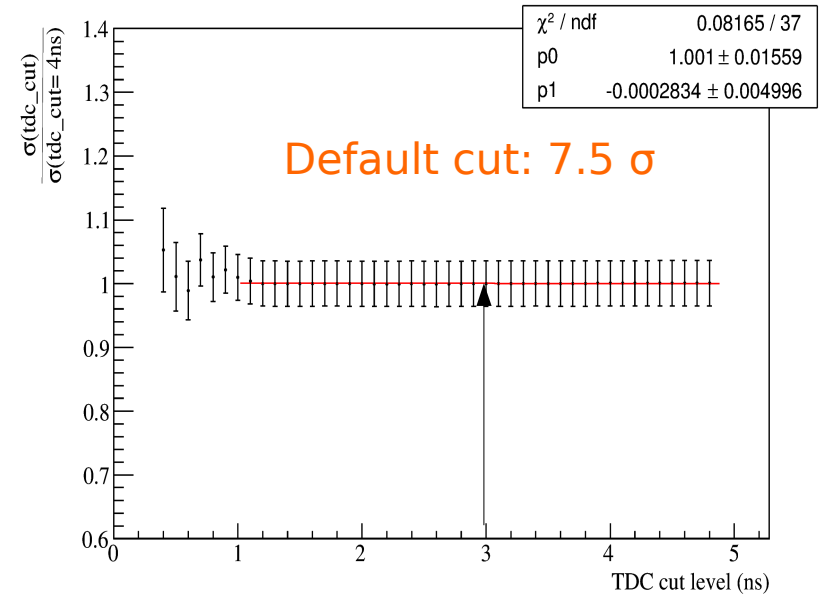
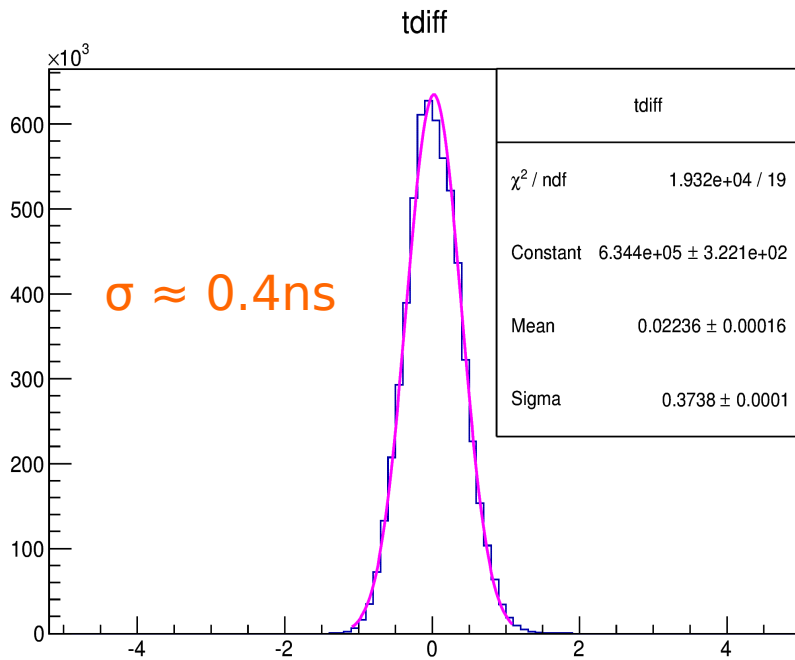
Total absorption cross section vs TDC cut level



# Syst. Error from tdc cut

## (<sup>12</sup>C Target)

Total absorption cross section vs TDC cut level





T-counter	Rel. error from TDC cut (Si Target)	Rel. error from TDC cut ( <sup>12</sup> C Target)
1	0.0002	0.0004
2	0.0001	0.0004
3	0.0002	0.0003
4	0.0003	0.0005
5	0.0001	0.0007
6	0.0007	0.0003
7	0.0002	0.0004
8	0.0002	0.0004
9	0.0001	0.0004
10	0.0002	0.0012
11	0.0003	0.0003
12	0.0001	0.0002
13	0.0005	0.0013
14	0.0002	0.0005
15	0.0004	0.0004
16	0.0002	0.0008
17	0.0005	0.0003
18	0.0004	0.0003
19	0.0003	0.0003

## Syst. error from epsilon

T-counter

Rel. error from epsilon  
increased by 30%  
(Si Target)

Rel. error from epsilon  
increased by 30%  
(<sup>12</sup>C Target)

1	-0.0064	-0.0043
2	-0.0059	-0.0044
3	-0.0062	-0.0044
4	-0.0059	-0.0042
5	-0.0059	-0.0043
6	-0.0059	-0.0045
7	-0.0058	-0.0043
8	-0.0060	-0.0043
9	-0.0060	-0.0044
10	-0.0060	-0.0043
11	-0.0059	-0.0046
12	-0.0061	-0.0046
13	-0.0061	-0.0043
14	-0.0060	-0.0045
15	-0.0060	-0.0043
16	-0.0064	-0.0042
17	-0.0063	-0.0044
18	-0.0059	-0.0046
19	-0.0059	-0.0042

# Syst. error from alpha (Si Target)

T-counter	Rel. error from alpha increased by 10%	Rel. error from alpha reduced by 10%
1	0.0010	0.0011
2	0.0009	0.0010
3	0.0010	0.0011
4	0.0010	0.0010
5	0.0009	0.0010
6	0.0009	0.0010
7	0.0009	0.0010
8	0.0010	0.0010
9	0.0010	0.0010
10	0.0010	0.0010
11	0.0009	0.0010
12	0.0010	0.0011
13	0.0010	0.0011
14	0.0010	0.0010
15	0.0010	0.0010
16	0.0010	0.0011
17	0.0010	0.0011
18	0.0010	0.0010
19	0.0010	0.0010

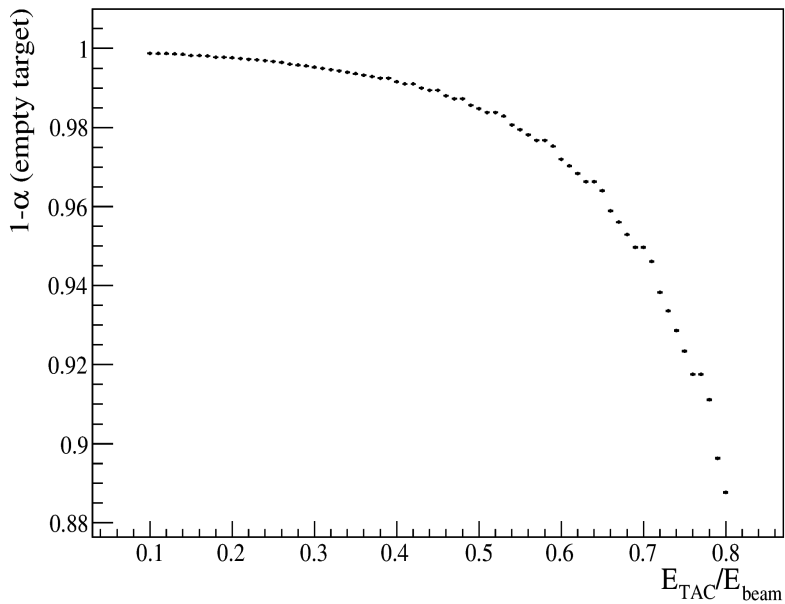
# Syst. error from alpha

(<sup>12</sup>C Target)

T-counter	Rel. error from alpha increased by 10%	Rel. error from alpha reduced by 10%
1	-0.00002	0.00002
2	-0.00002	0.00002
3	-0.00003	0.00002
4	-0.00002	0.00002
5	-0.00002	0.00002
6	-0.00003	0.00002
7	-0.00002	0.00003
8	-0.00002	0.00002
9	-0.00002	0.00002
10	-0.00002	0.00003
11	-0.00002	0.00003
12	-0.00002	0.00003
13	-0.00003	0.00002
14	-0.00002	0.00002
15	-0.00002	0.00002
16	-0.00002	0.00002
17	-0.00002	0.00002
18	-0.00002	0.00003
19	-0.00002	0.00002

# $\alpha$ and $\epsilon$ behavior as a function of $R = E_{\text{tac}}/E_{\text{beam}}$ cut

$(1-\alpha)$  vs. cut level on  $E_{\text{tac}}/E_{\text{beam}}$



$\epsilon$  vs. cut level on  $E_{\text{tac}}/E_{\text{beam}}$

