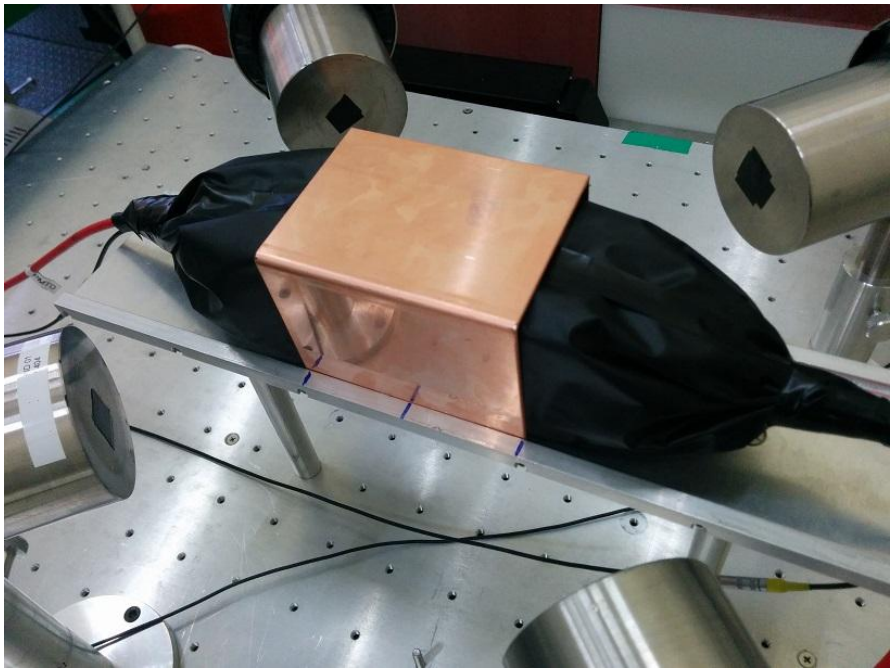
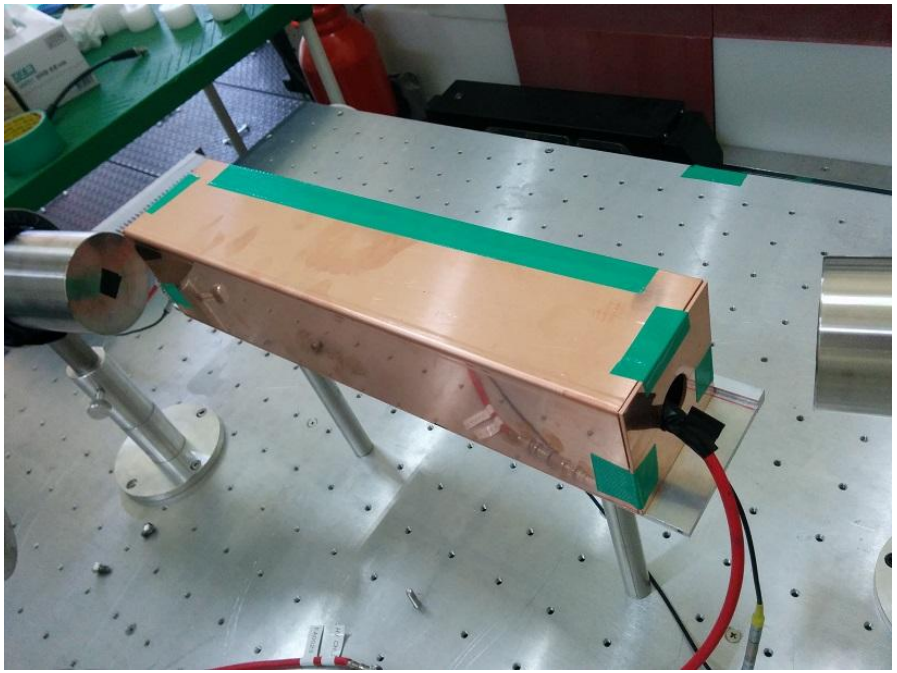
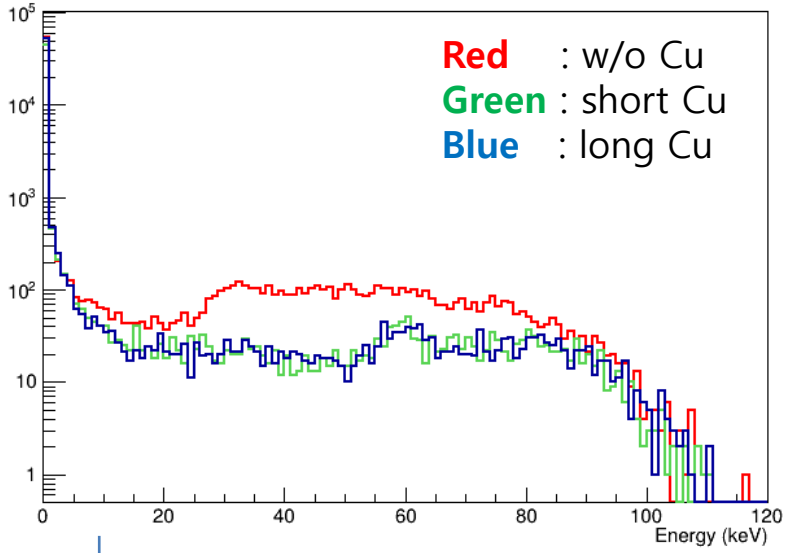
NaI single rate



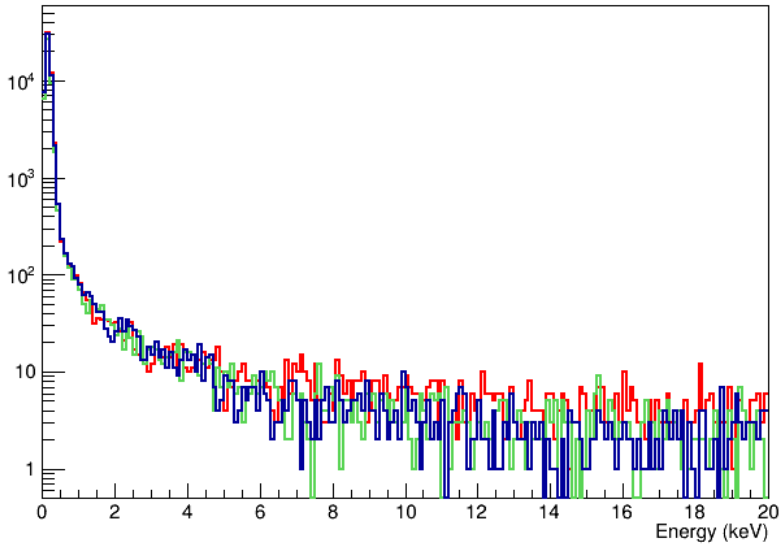


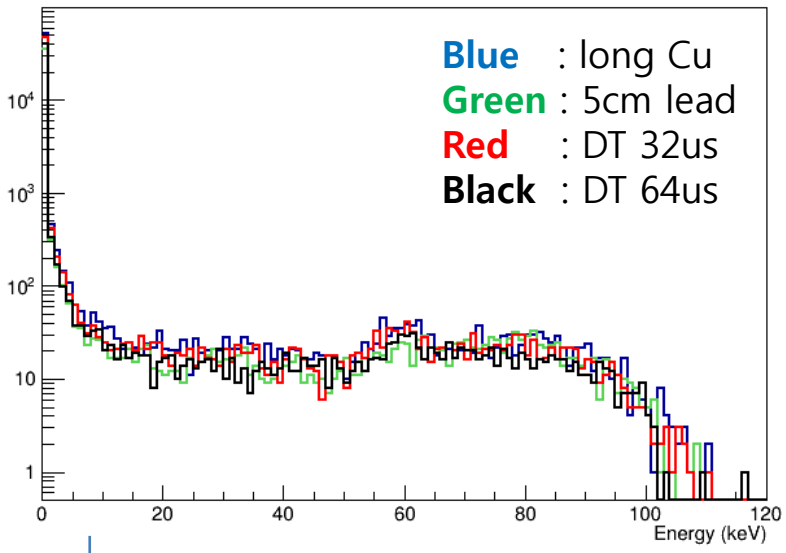
	BKG (Hz)	NG on (Hz)
w/o Cu	78.5	6,782.3
with Cu (short)	65.3	6,364.6
with Cu (long)	47.2	6,120.3
Long + 5cm lead	46.0	4,214.2
Long + DT 32 us	45.3	5,496.2
Long + DT 64 us	''	4,710.2

NaI deposit energy with neutron generator on (~10 sec)

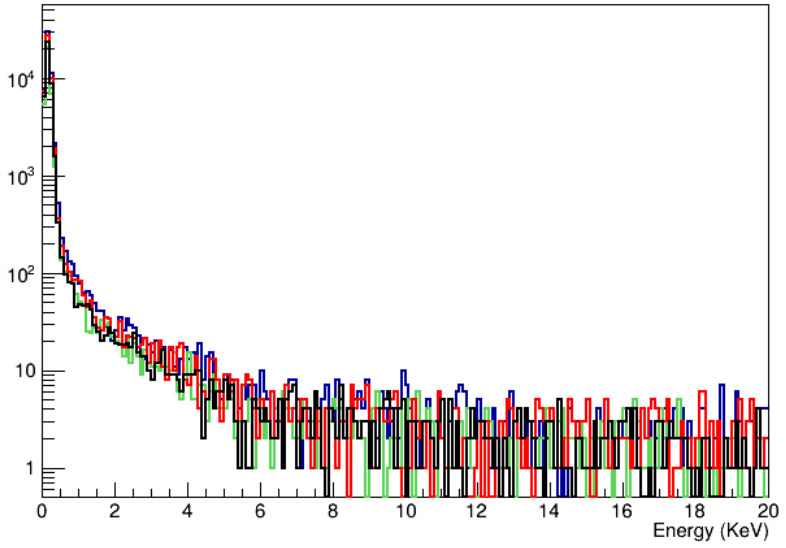


Zoomed

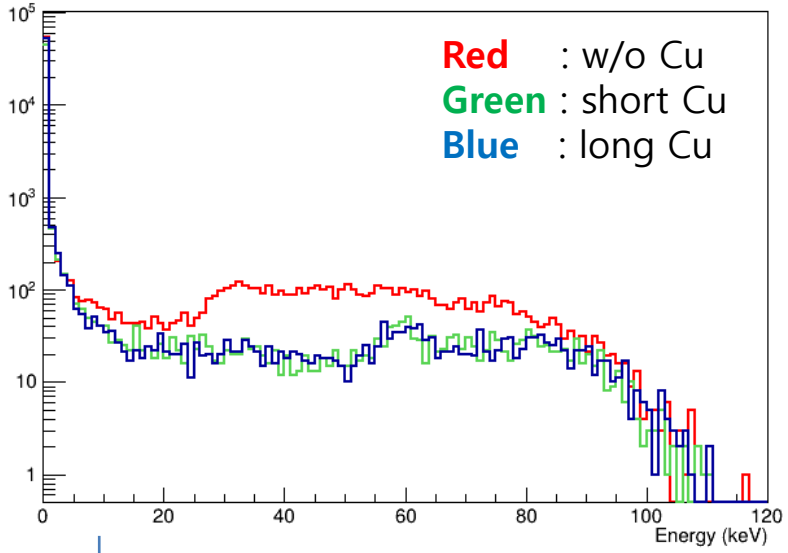




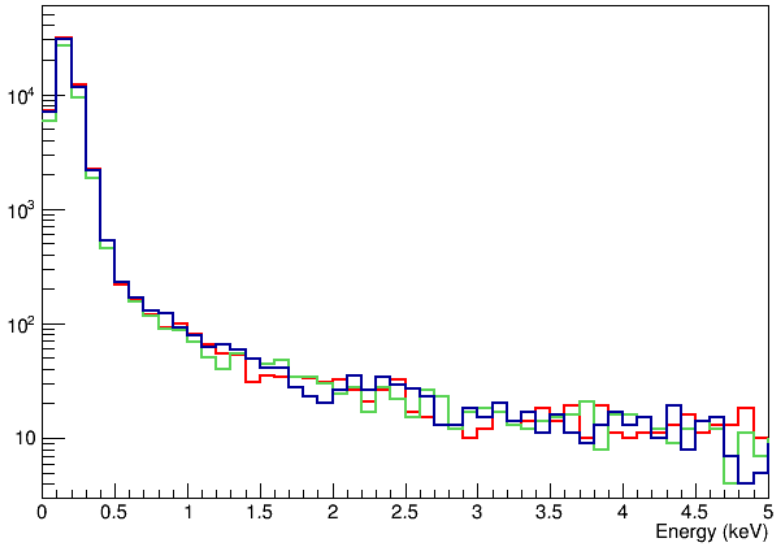
Zoomed

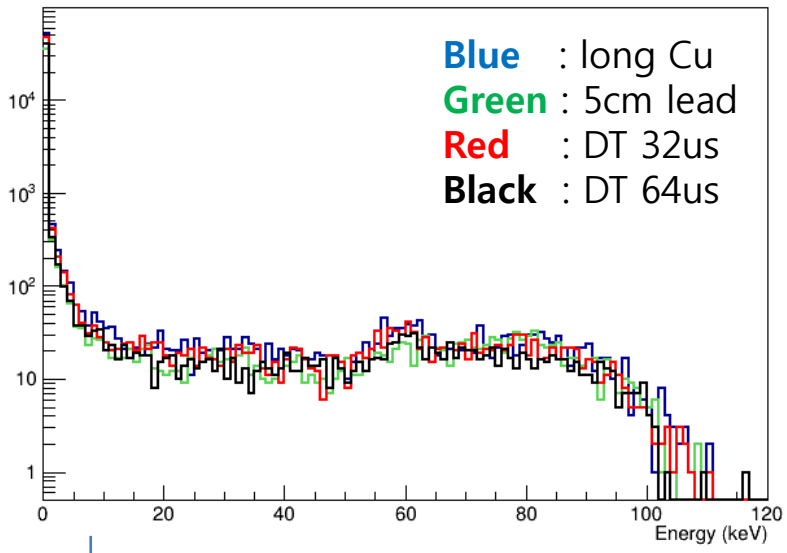


NaI deposit energy with neutron generator on (~10 sec)

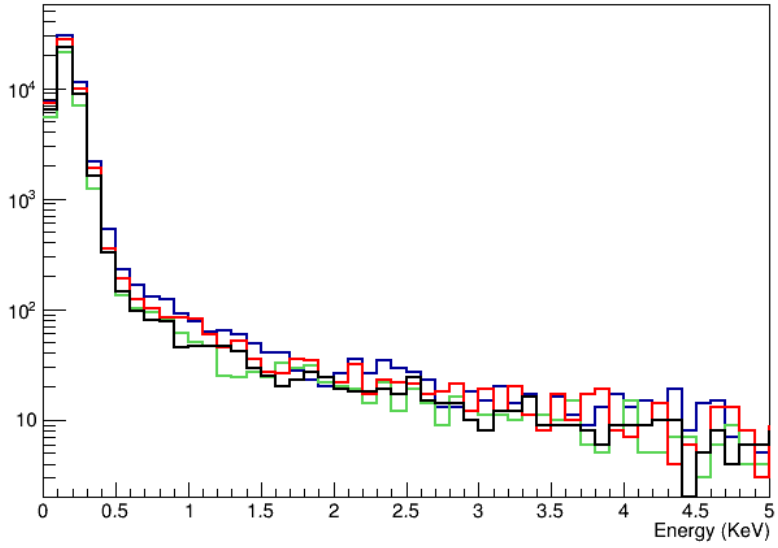


Zoomed

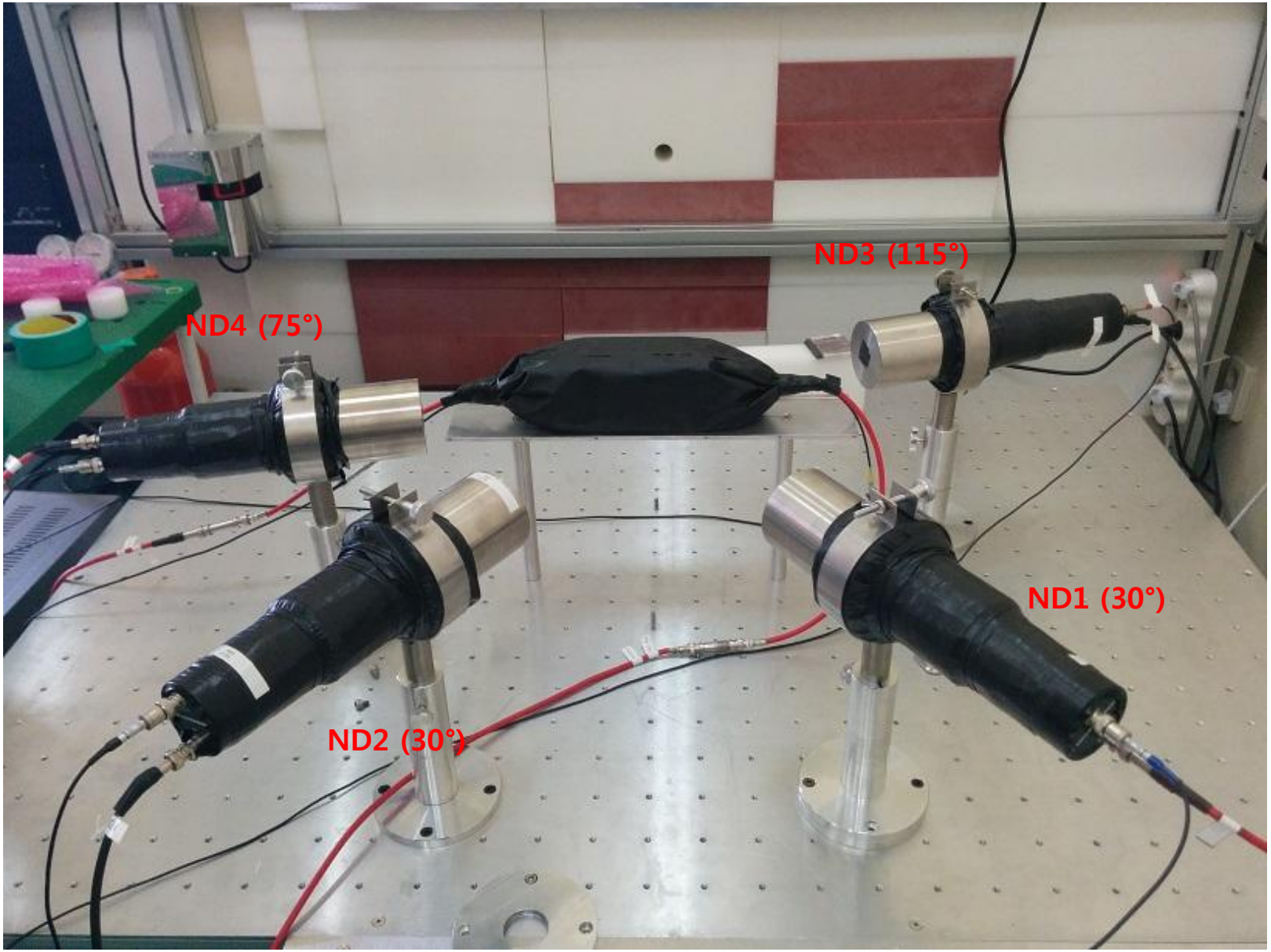




Zoomed



Coincidence setup



Neutron background

With long Cu shield

	triggered	PSD	TOF	TOF / PSD
DT = 8us	31,981	3,429	1,380	0.40
+ lead block	23,138	2,129	631	0.30
DT = 32us	19,370	2,412	1,191	0.49
DT = 64us	13,647	1,963	1,101	0.56

With short Cu shield

	triggered	PSD	TOF	TOF / PSD
DT = 8us	37,250	3,790	1,602	0.42
+ lead block	23,692	2,136	689	0.32
DT = 32us	21,448	2,438	1,193	0.49
DT = 64us	17,891	2,098	1,008	0.48

Number of clusters before 2 us (PSD, TOF, >1 keV)

	PMT1	PMT2	SUM
Low NG power (PSD measurement)	0.10	0.09	0.19
Low NG power (QF measurement)	0.06	0.06	0.12
High NG power (QF measurement)	0.35	0.32	0.67
High NG power (current)	0.13	0.21	0.35

(unit : Clusters / 1 us)

* **PSD measurement** : ~0.9 m from generator
* **QF measurement, current setup** : ~1.5 m from generator

* **Low NG power** : ~ 10^7 neutrons / sec
* **High NG power** : ~2*10^8 neutrons / sec

Number of clusters before 2 us (PSD, TOF, >1 keV)

With long Cu shield

	PMT1	PMT2	SUM
DT = 8us	0.14	0.16	0.30
+ 5cm lead block	0.11	0.14	0.25
DT = 32us	0.11	0.14	0.25
DT = 64us	0.13	0.15	0.28

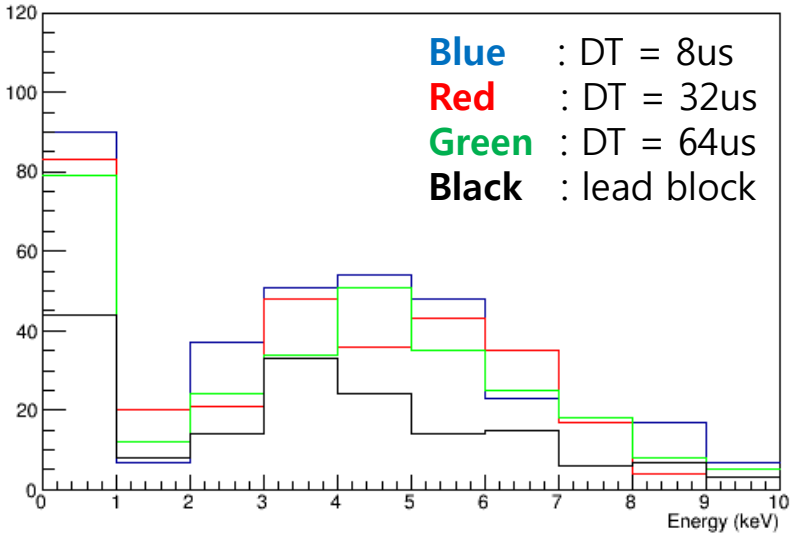
With short Cu shield

	PMT1	PMT2	SUM
DT = 8us	0.17	0.19	0.36
+ 5cm lead block	0.10	0.12	0.23
DT = 32us	0.11	0.14	0.25
DT = 64us	0.12	0.15	0.27

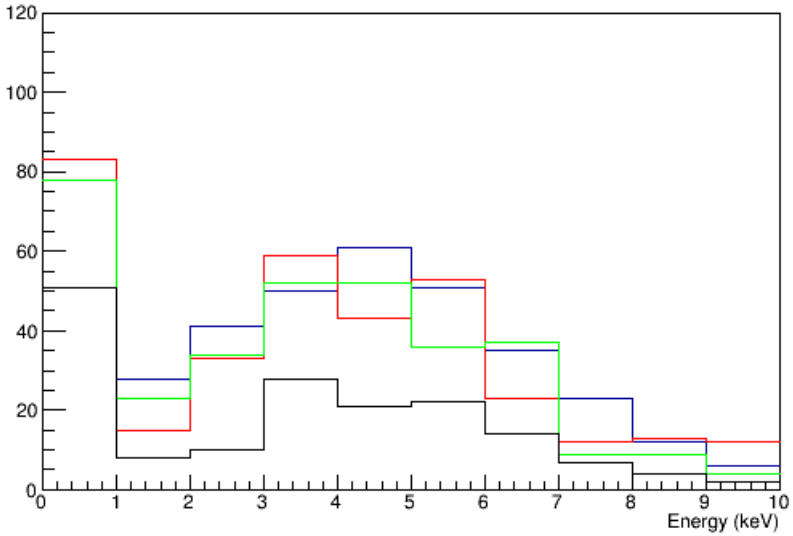
(unit : Clusters / 1 us)

Deposit energy on NaI (Long Cu shield, 30 min data)

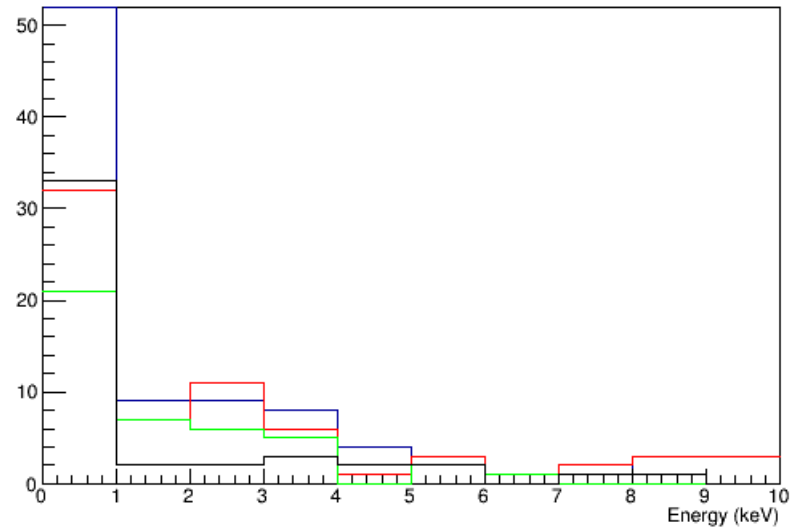
ND1 **(30°)**



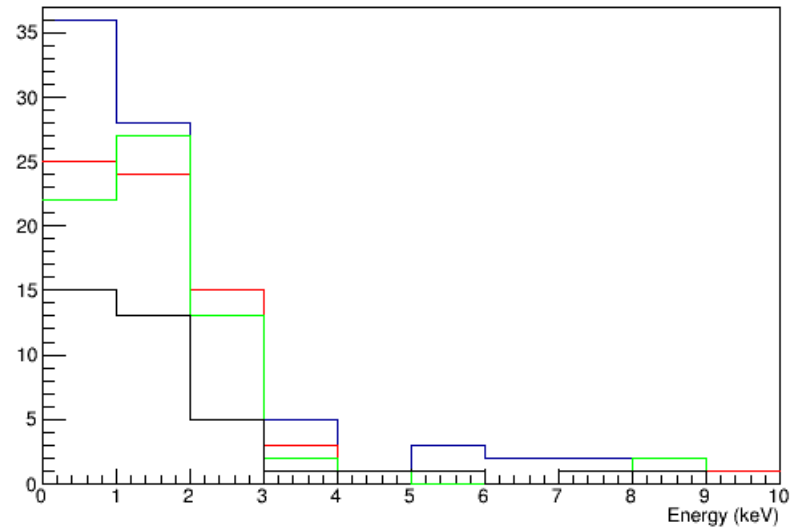
ND2 **(30°)**



ND3 **(115°)**

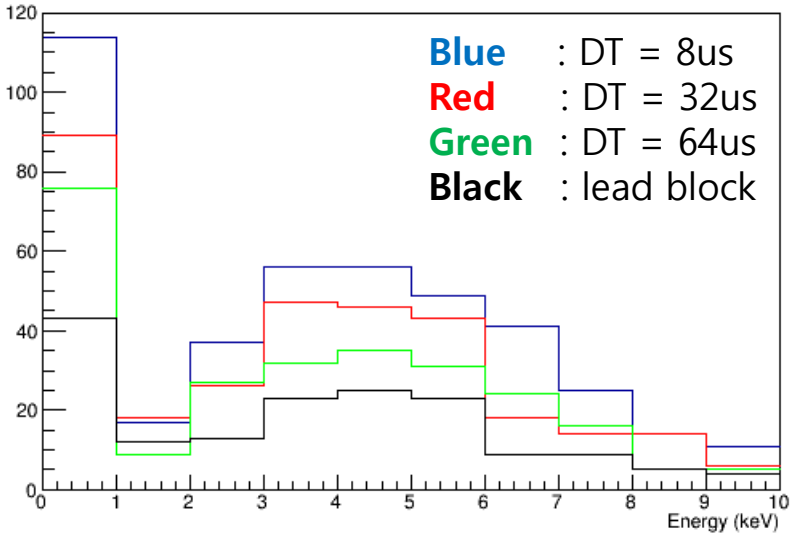


ND4 **(75°)**

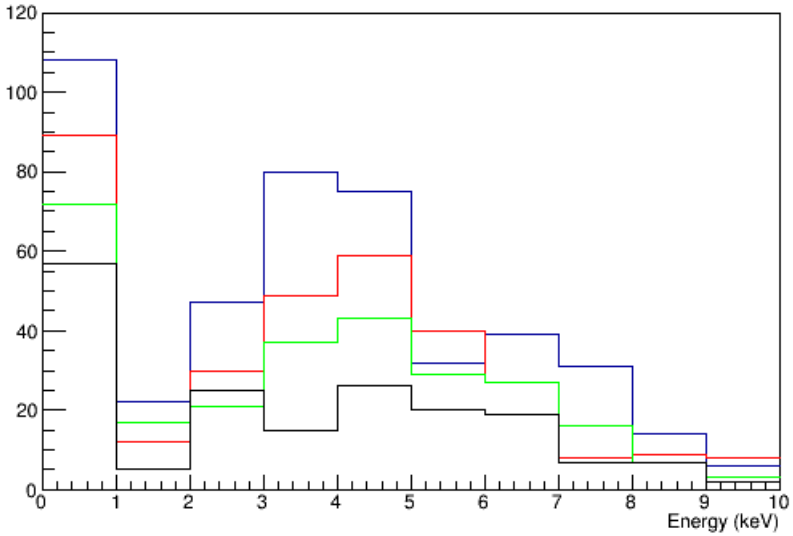


Deposit energy on NaI (Short Cu shield, 30 min data)

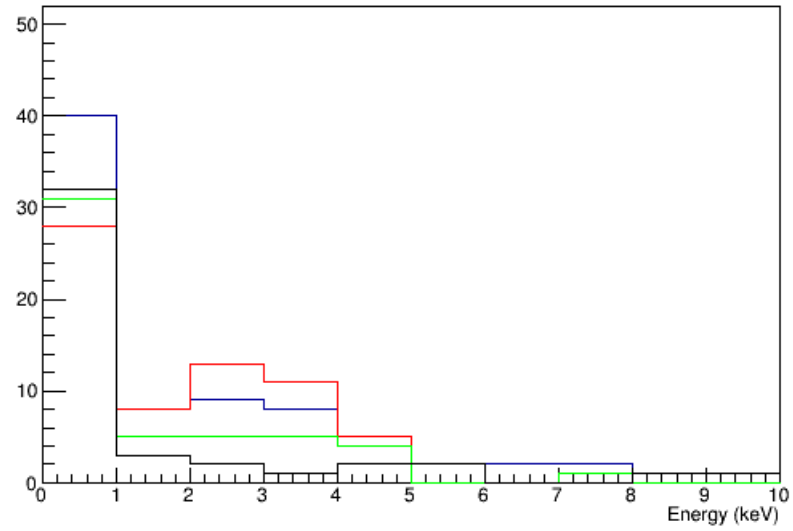
ND1 **(30°)**



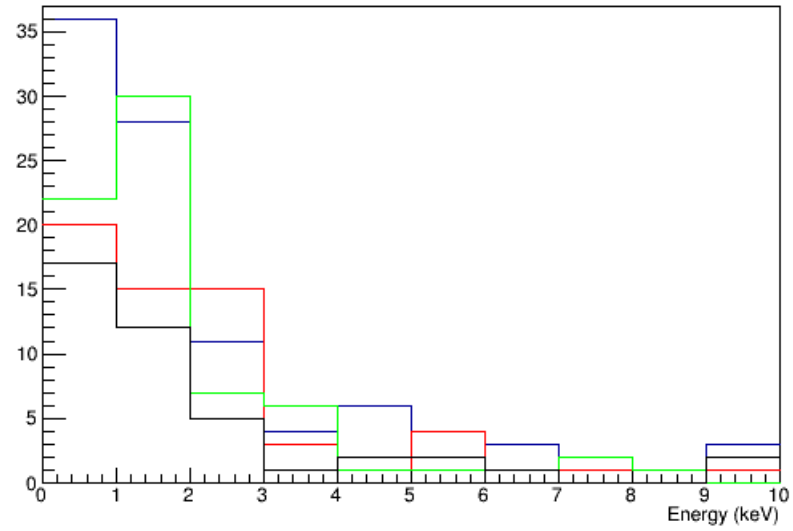
ND2 **(30°)**



ND3 **(115°)**

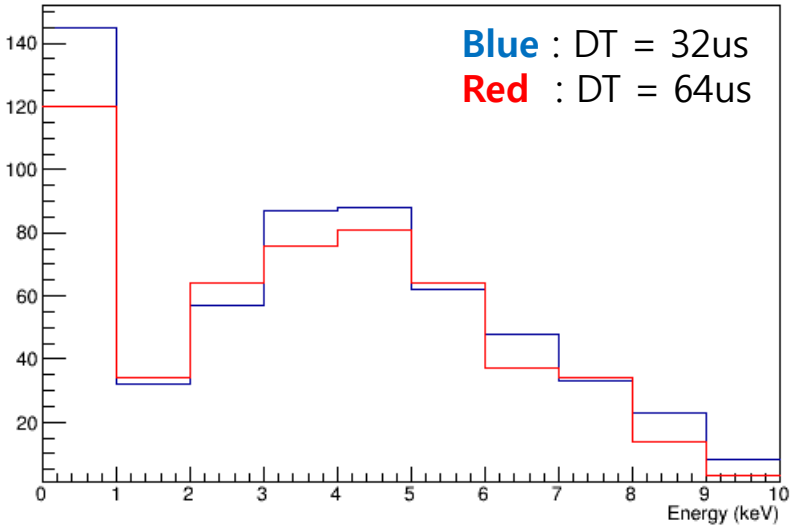


ND4 **(75°)**

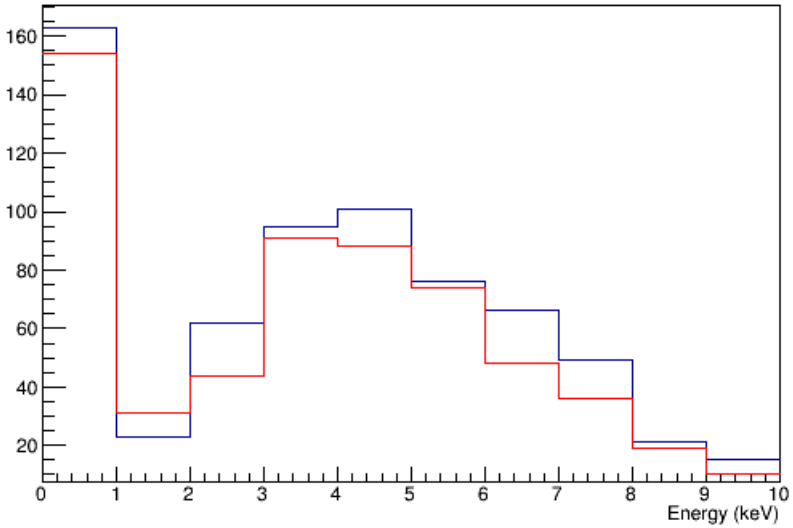


Deposit energy on NaI (Short Cu shield, 1 hour data)

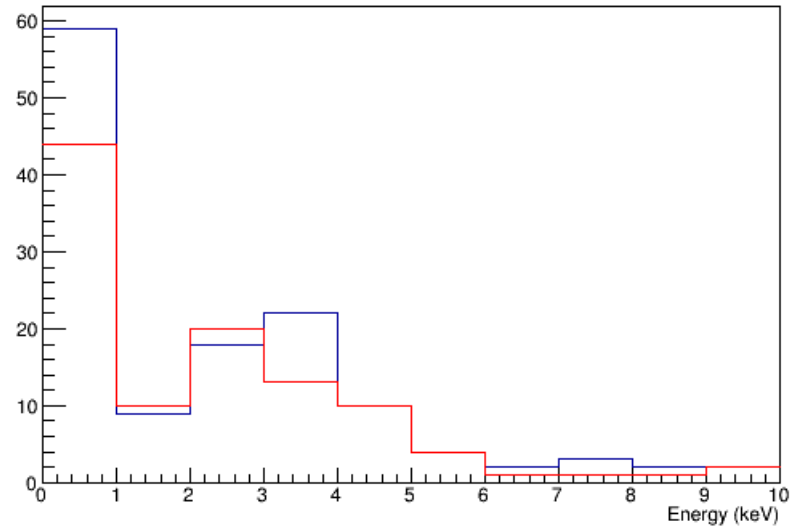
ND1 **(30°)**



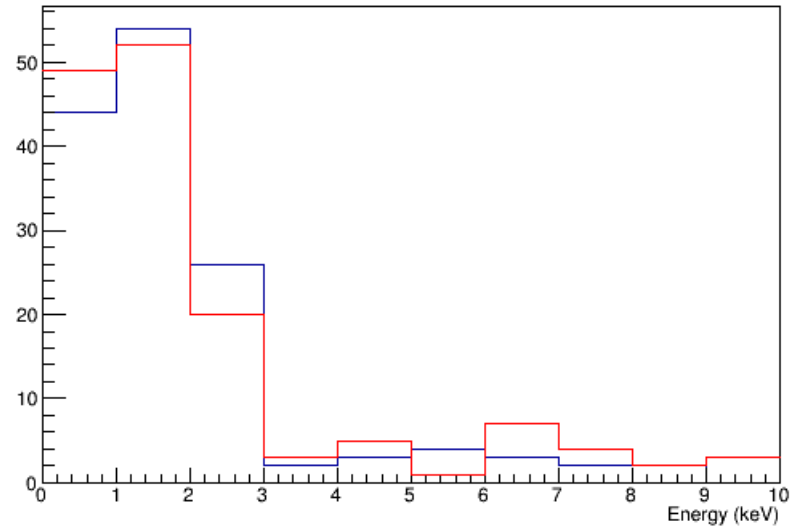
ND2 **(30°)**



ND3 **(115°)**

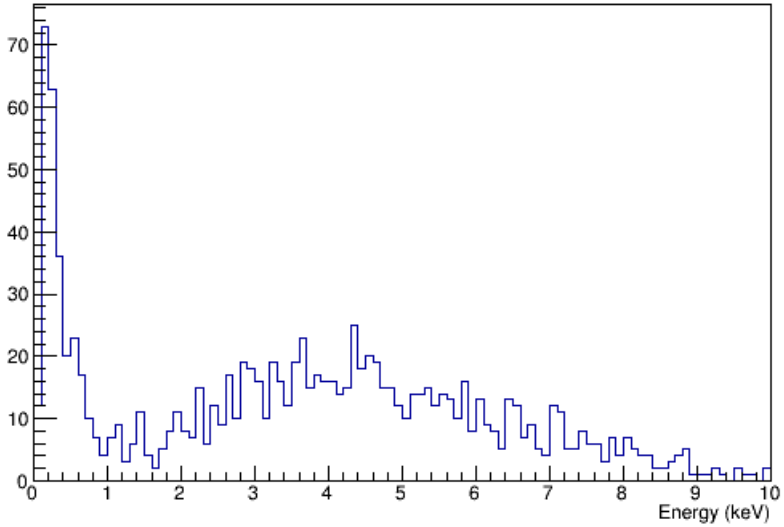


ND4 **(75°)**

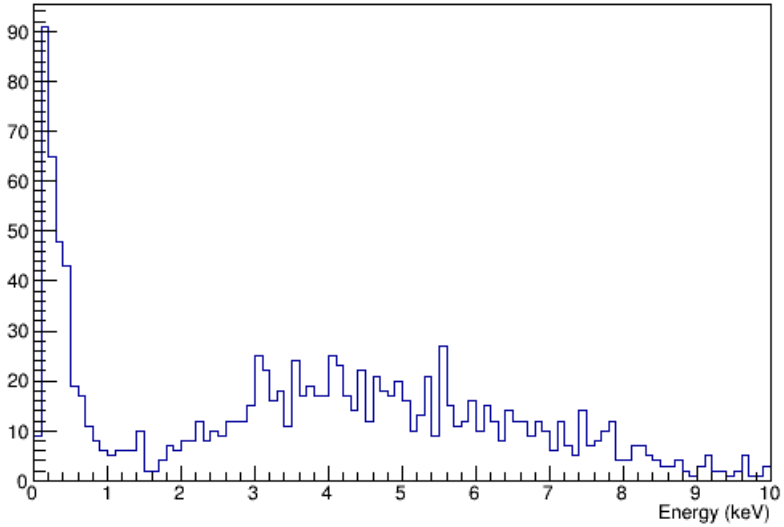


Deposit energy on NaI (Short Cu shield, 2 hour data)

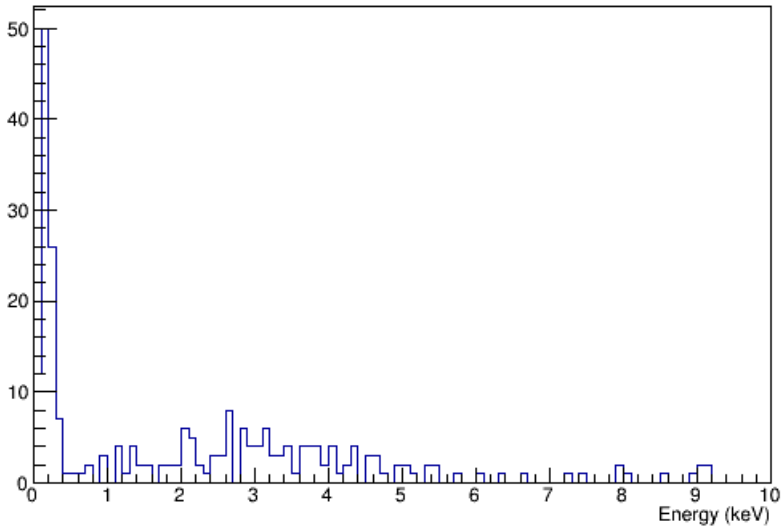
ND1 **(30°)**



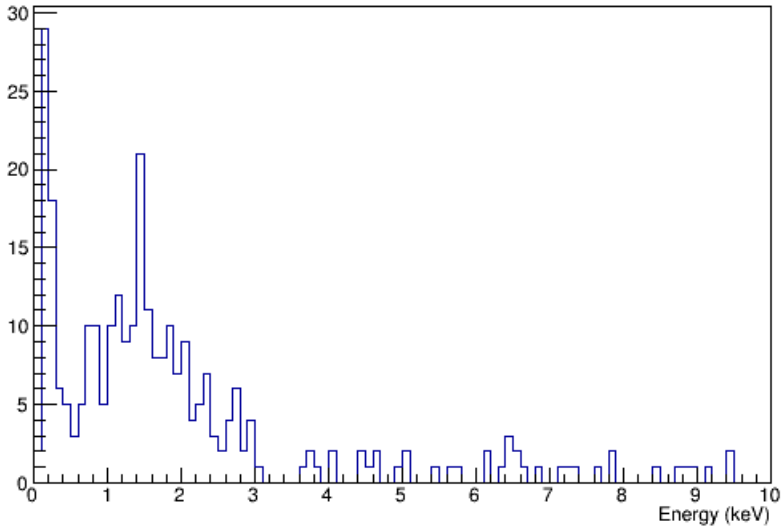
ND2 **(30°)**



ND3 **(115°)**

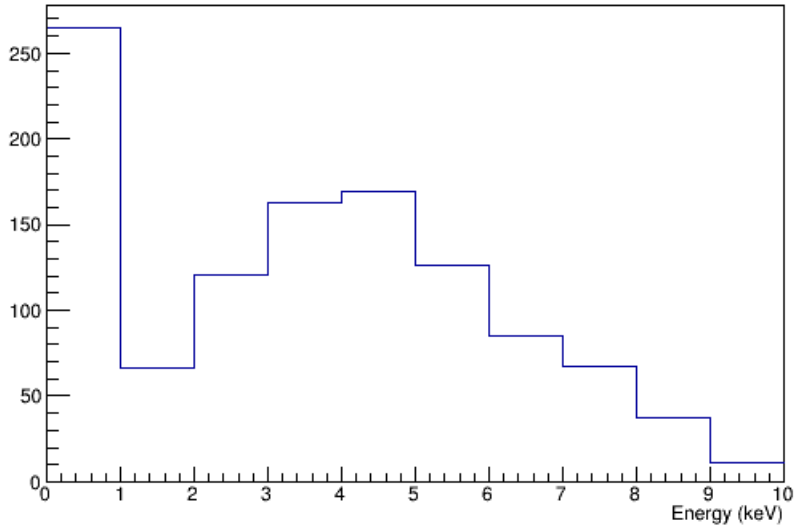


ND4 **(75°)**

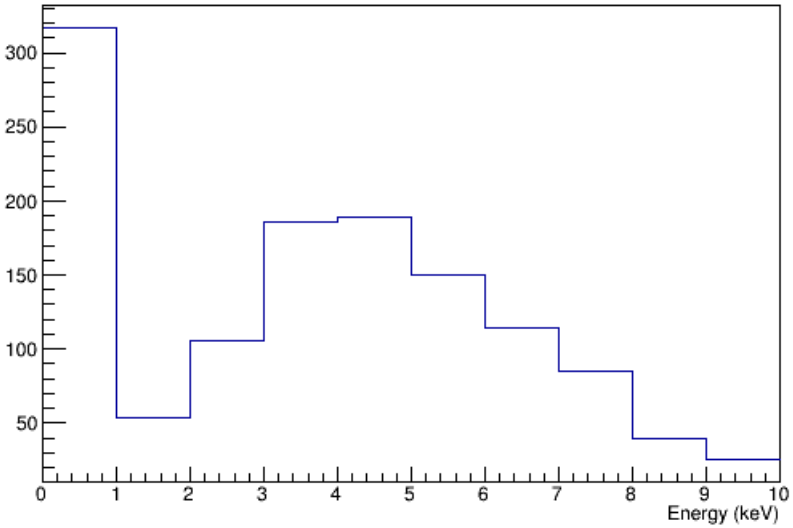


Deposit energy on NaI (Short Cu shield, 2 hour data)

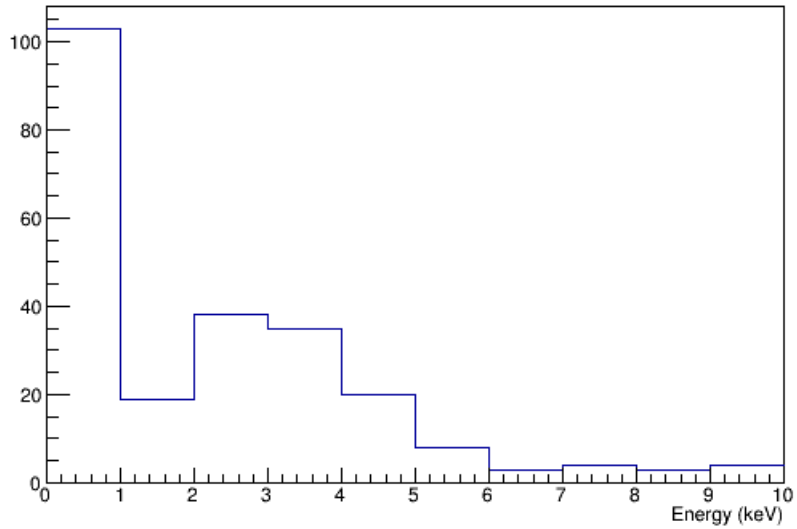
ND1 **(30°)**



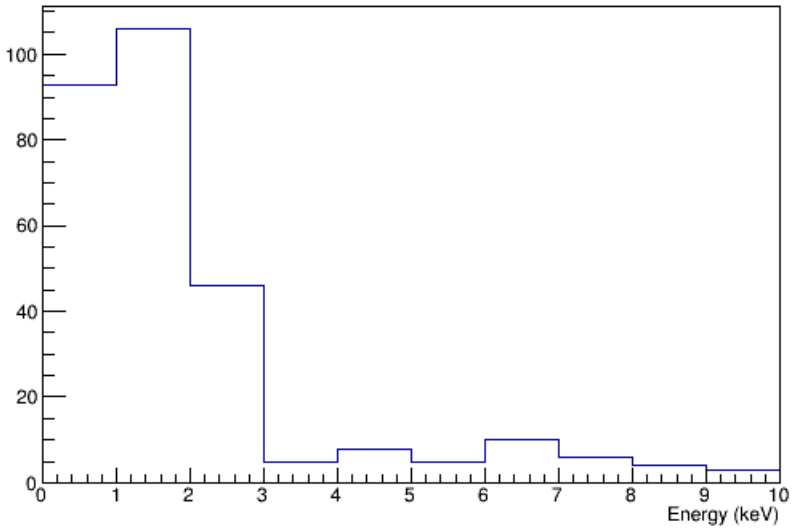
ND2 **(30°)**



ND3 **(115°)**



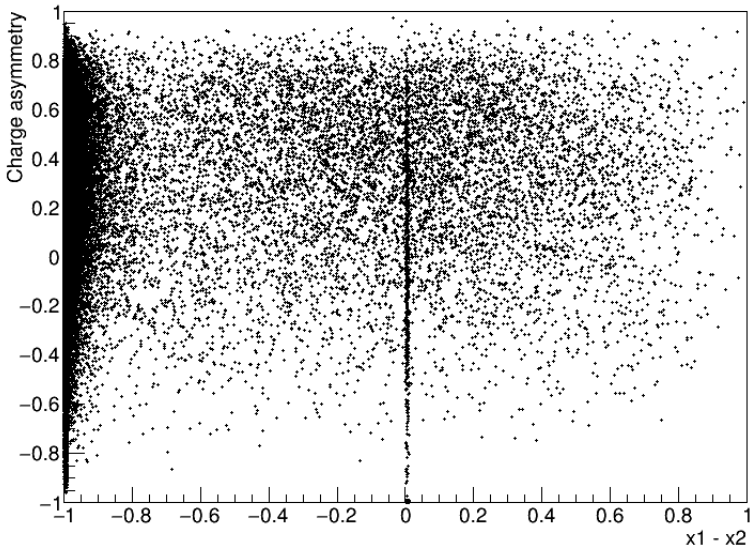
ND4 **(75°)**



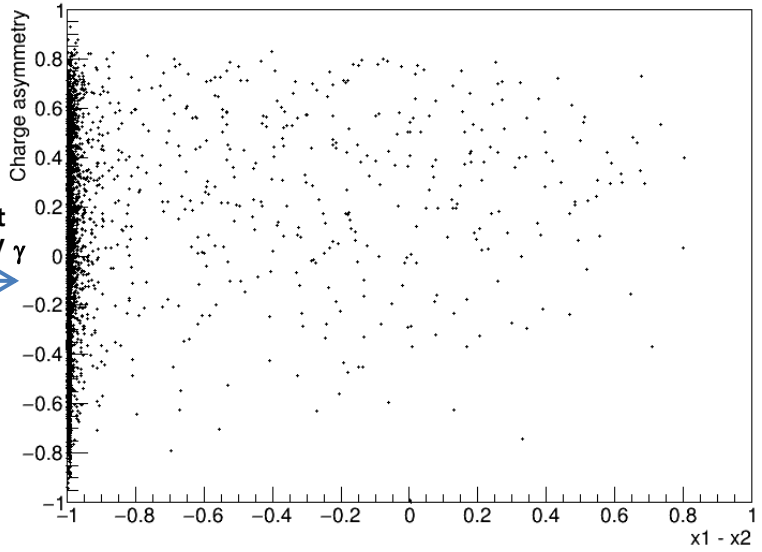
Cut efficiency (NaI triggered)

Left : w/o, **Right** : with time difference cut

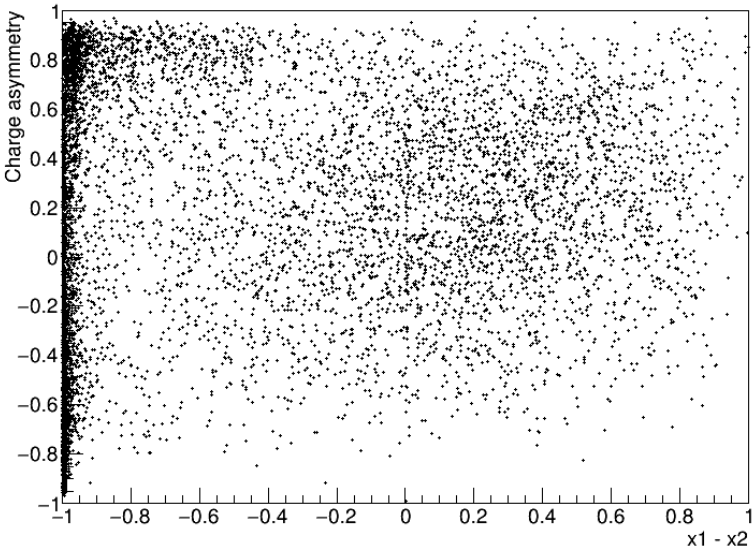
0~0.5 keV

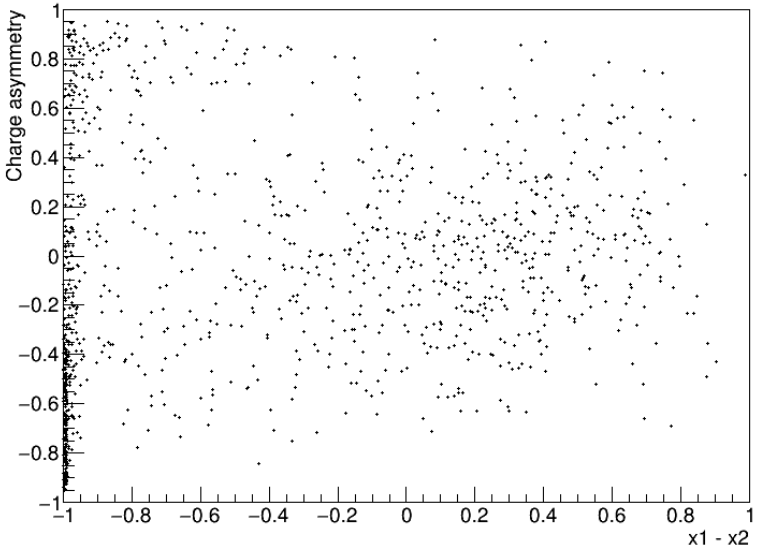


Pick out 511 keV γ



0.5~1 keV

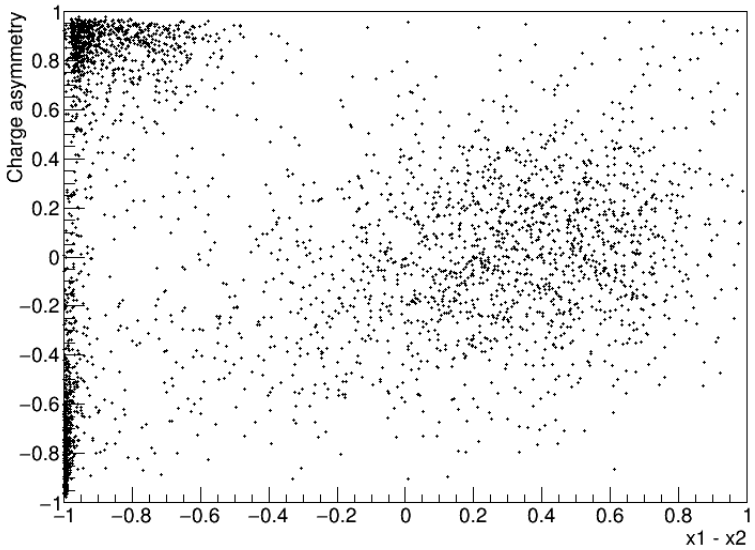


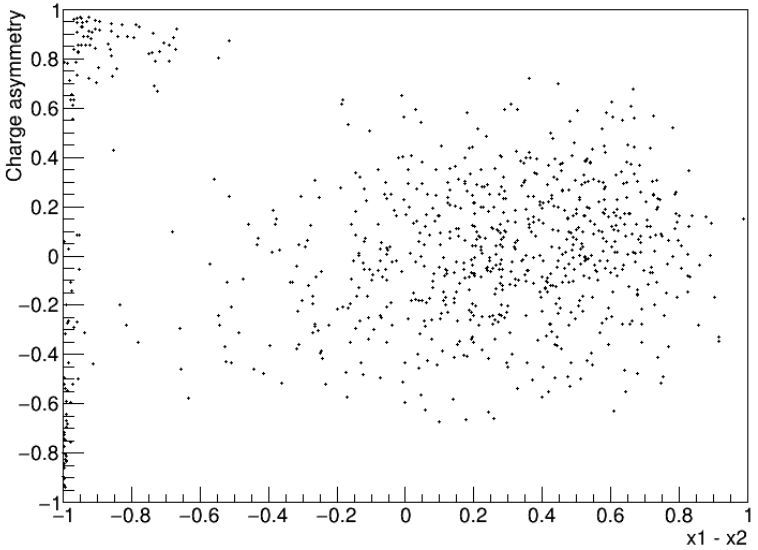


Cut efficiency (NaI triggered)

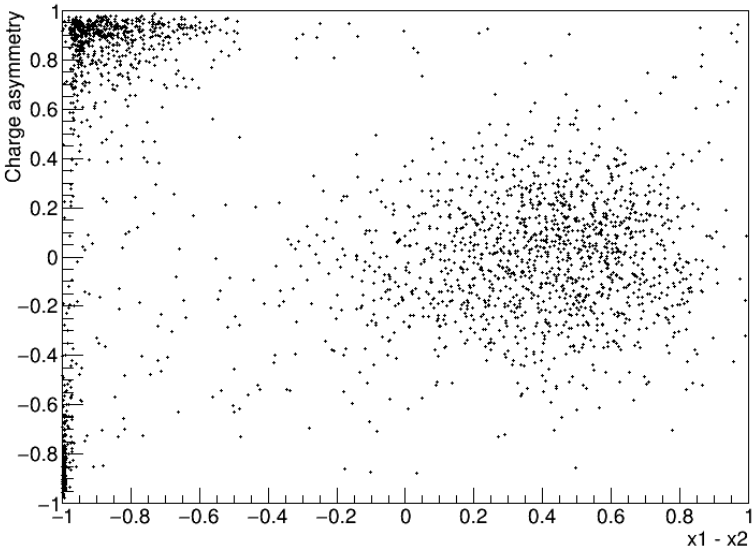
Left : w/o, **Right** : with time difference cut

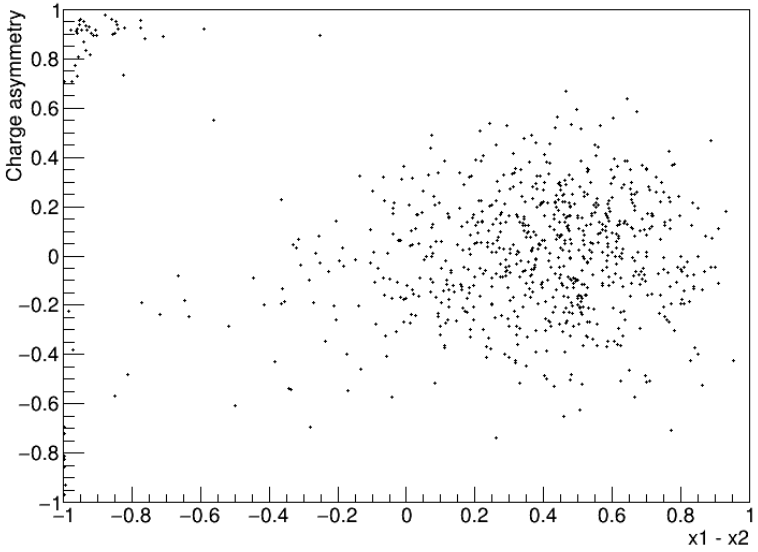
1~1.5 keV





1.5~2 keV

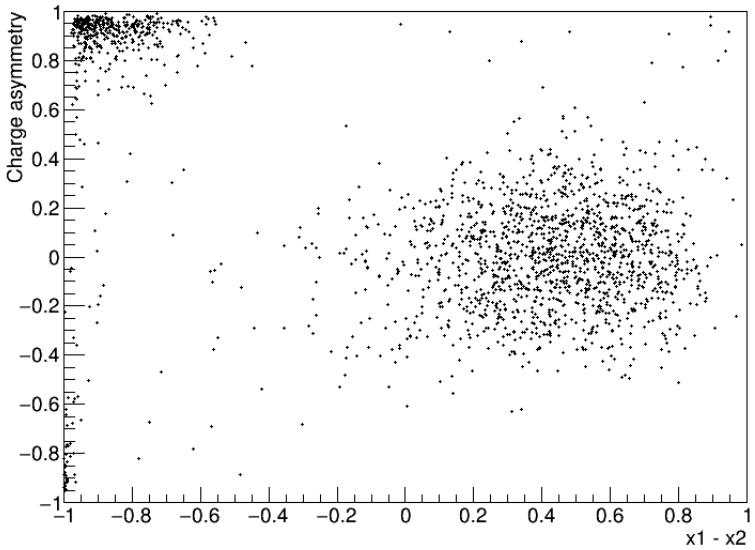


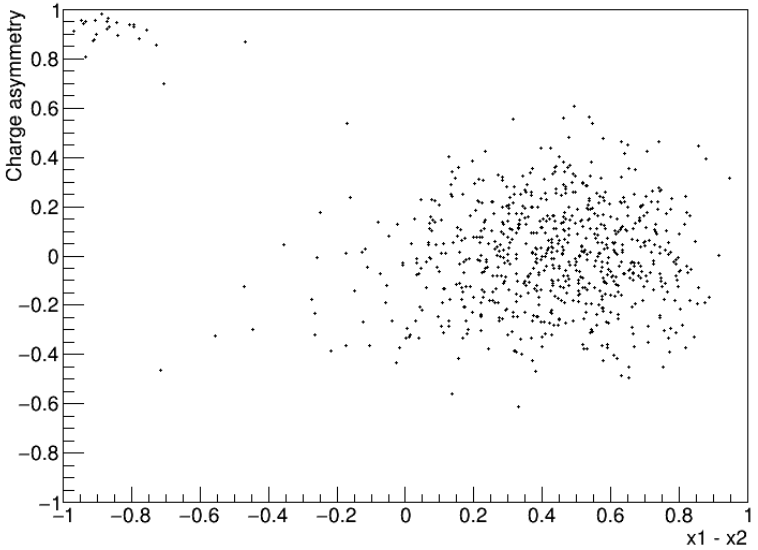


Cut efficiency (NaI triggered)

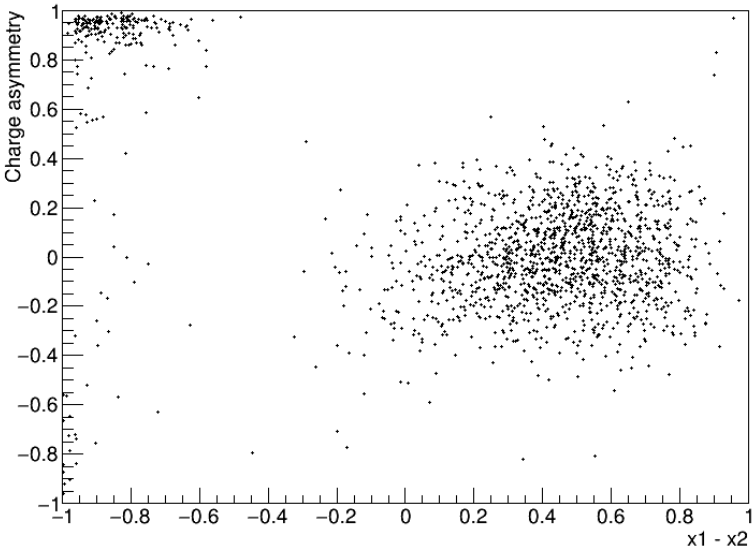
Left : w/o, **Right** : with time difference cut

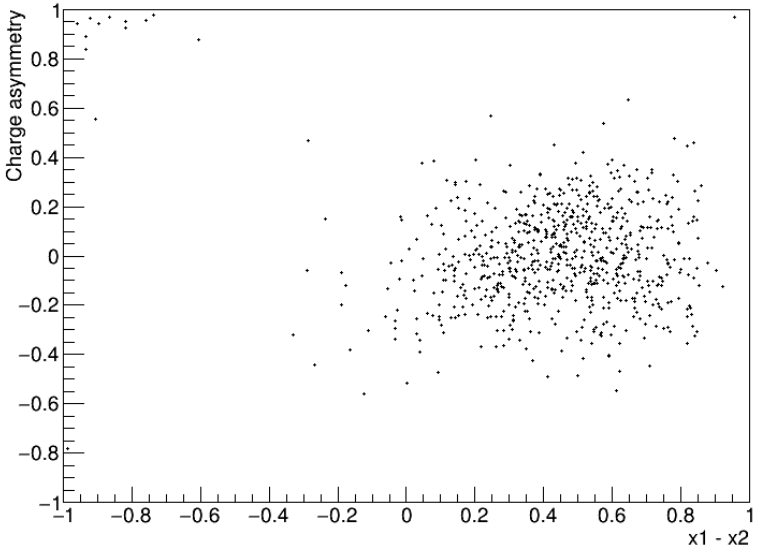
2~2.5 keV





2.5~3 keV

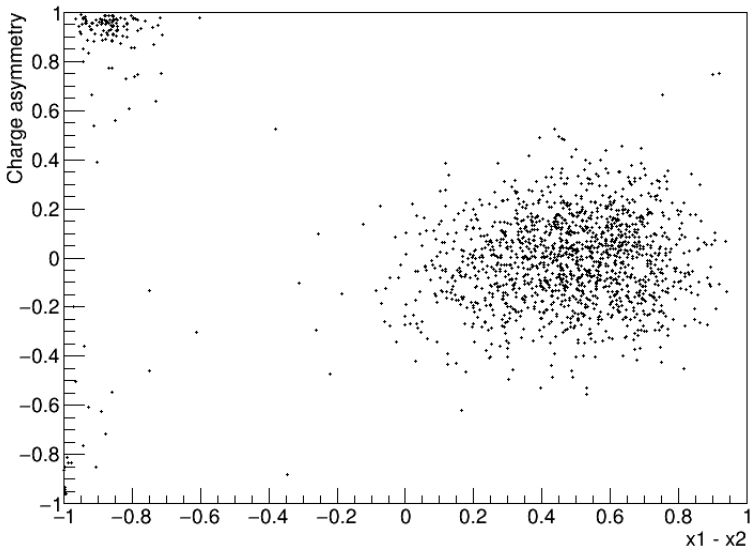


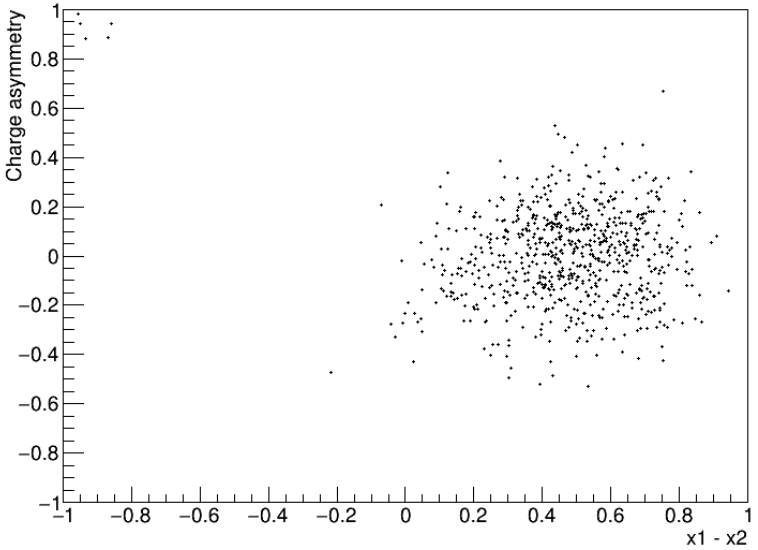


Cut efficiency (NaI triggered)

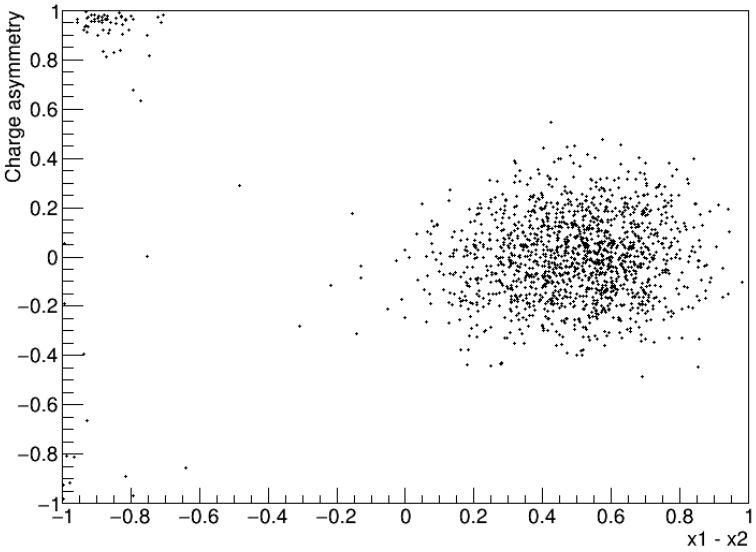
Left : w/o, **Right** : with time difference cut

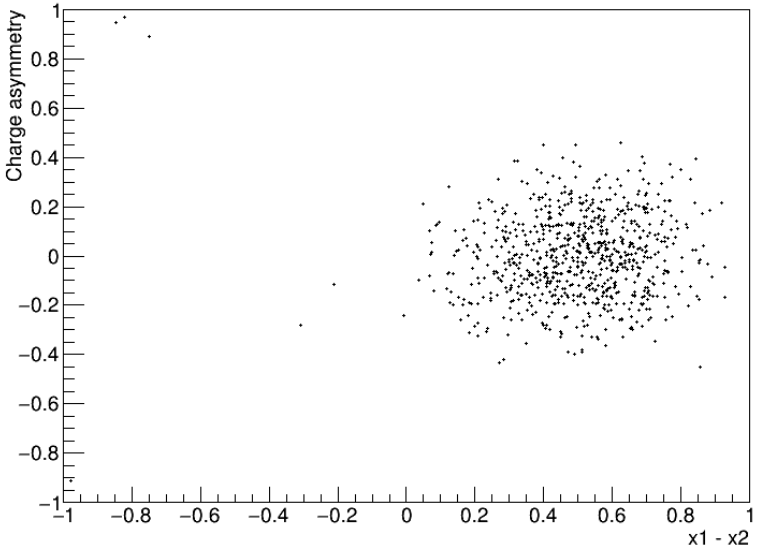
3~3.5 keV





3.5~4 keV

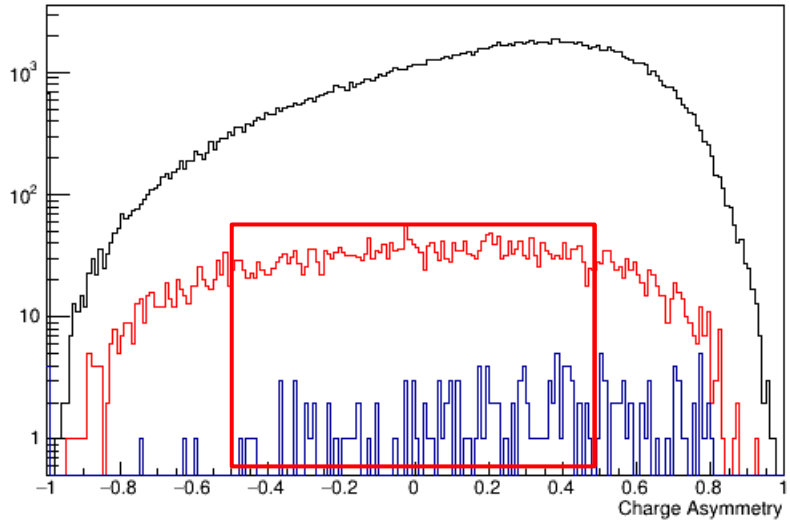


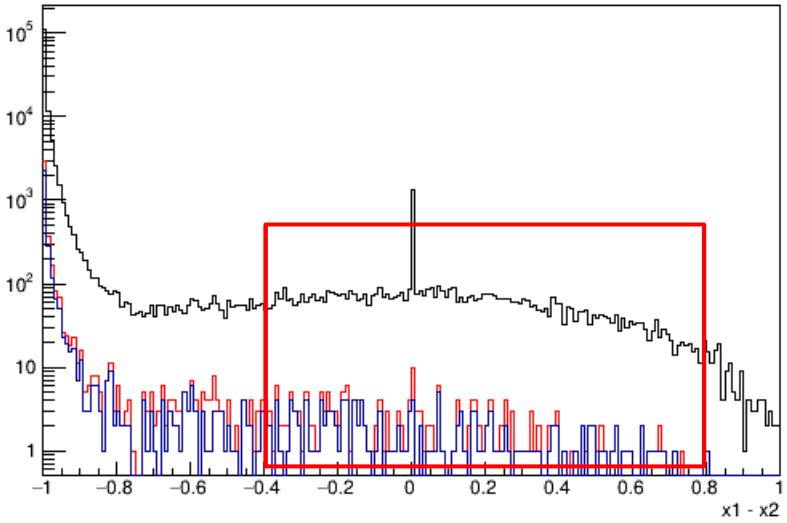


Cut efficiency

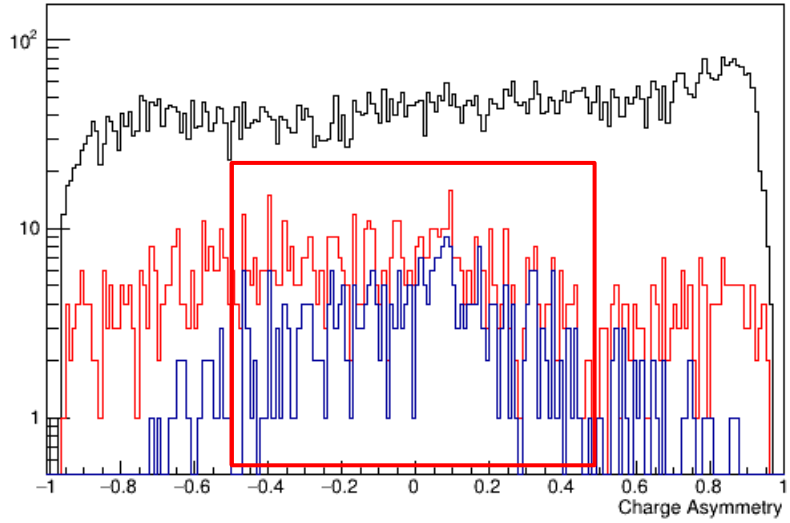
Black : no cuts
Red : time difference cut
Blue : DAMA/Asymmetry cut

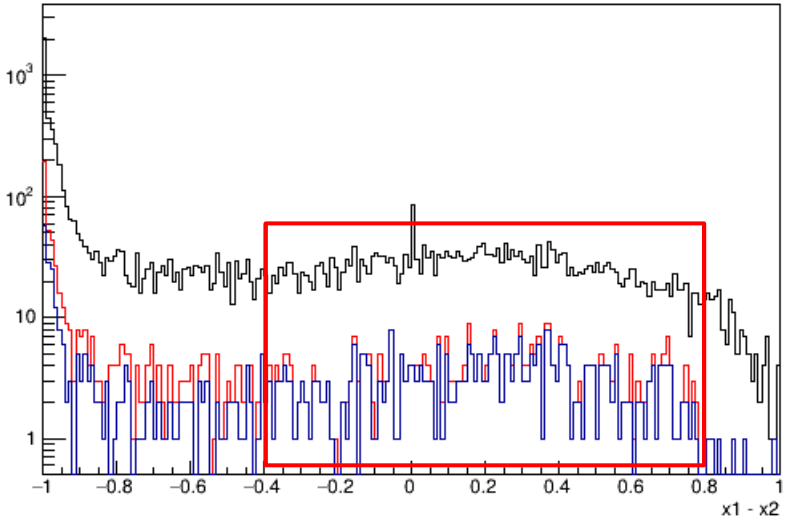
0~0.5 keV





0.5~1 keV

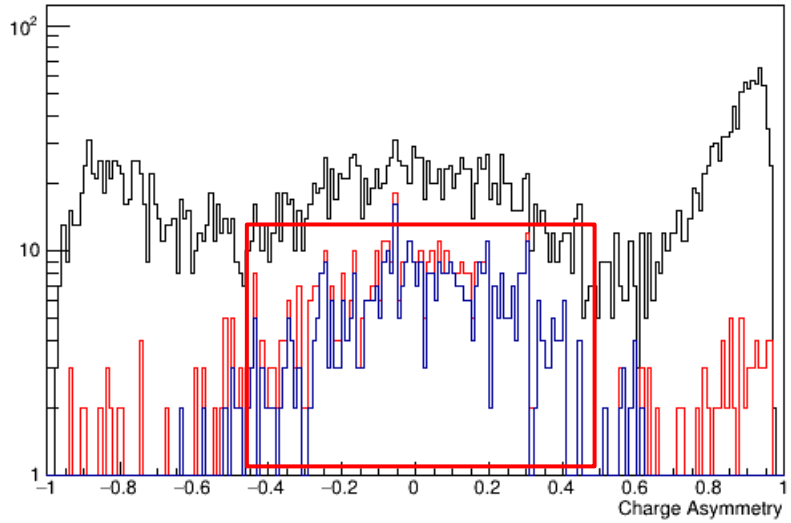


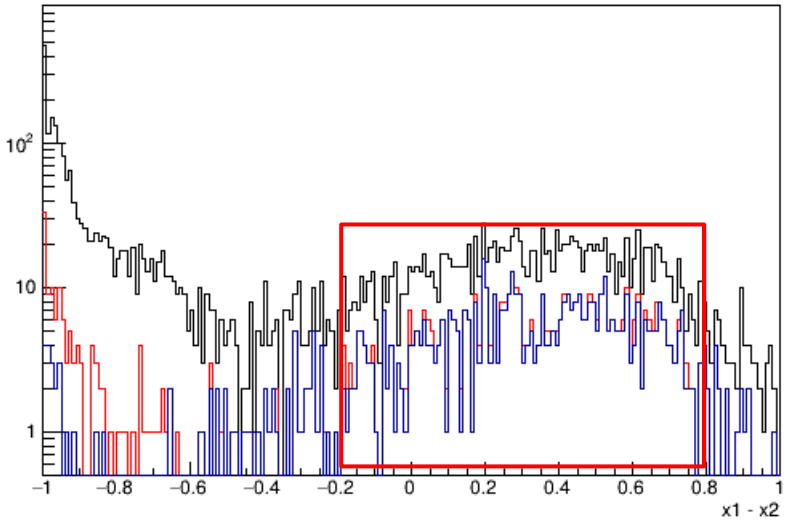


Cut efficiency

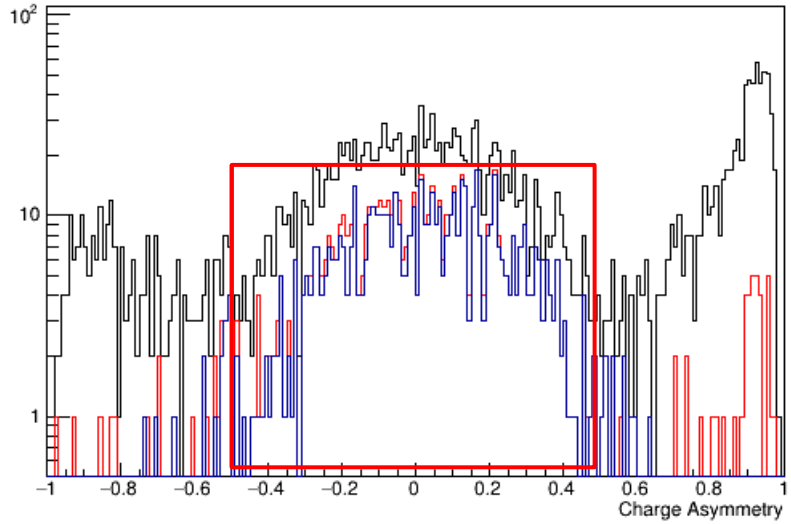
Black : no cuts
Red : time difference cut
Blue : DAMA/Asymmetry cut

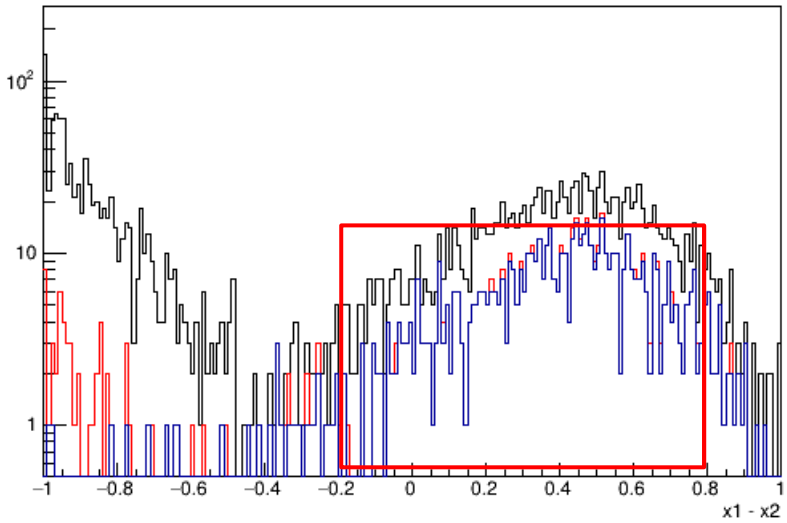
1~1.5 keV





1.5~2 keV

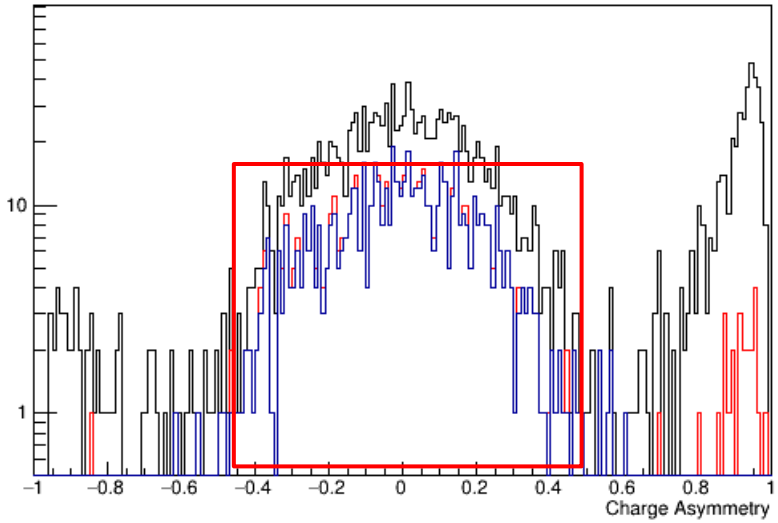


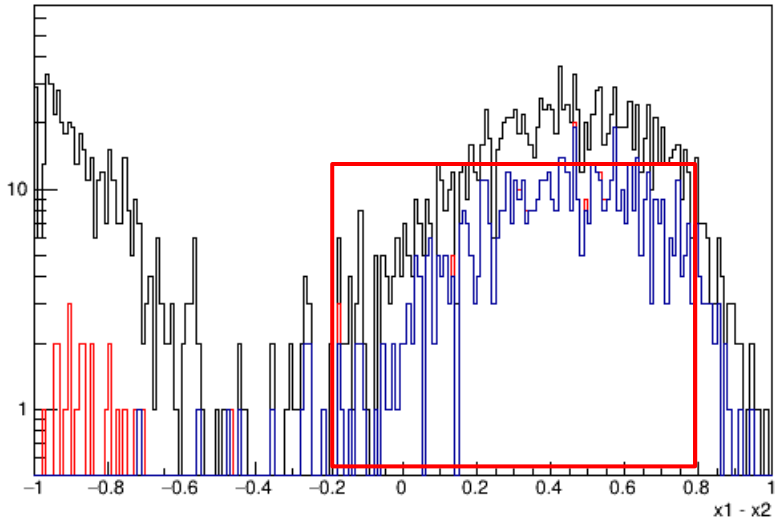


Cut efficiency

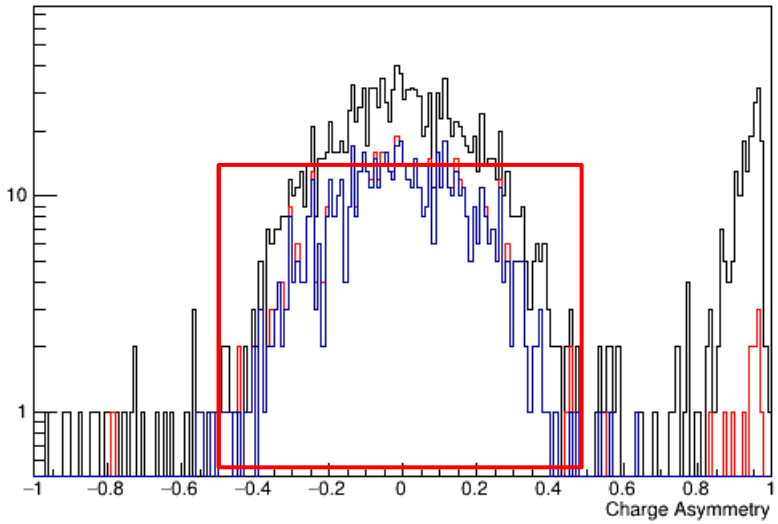
Black : no cuts
Red : time difference cut
Blue : DAMA/Asymmetry cut

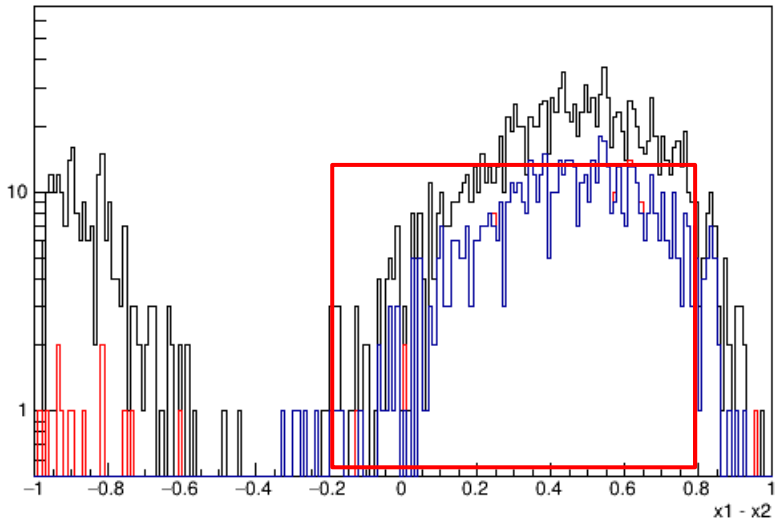
2~2.5 keV





2.5~3 keV

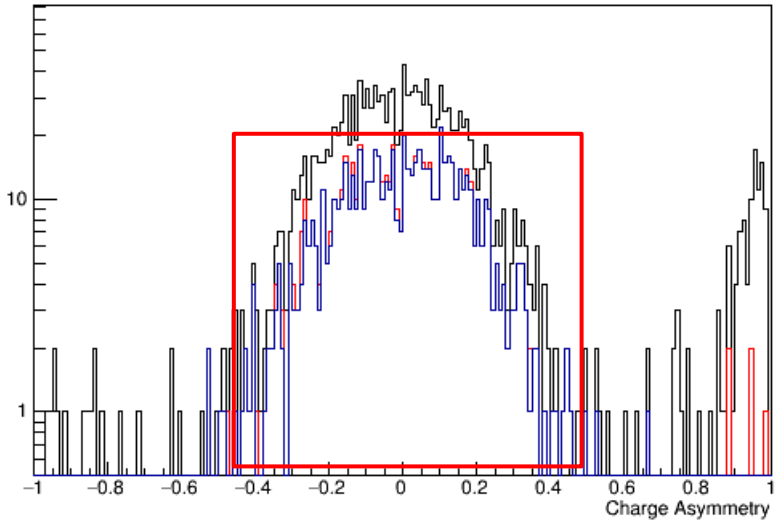


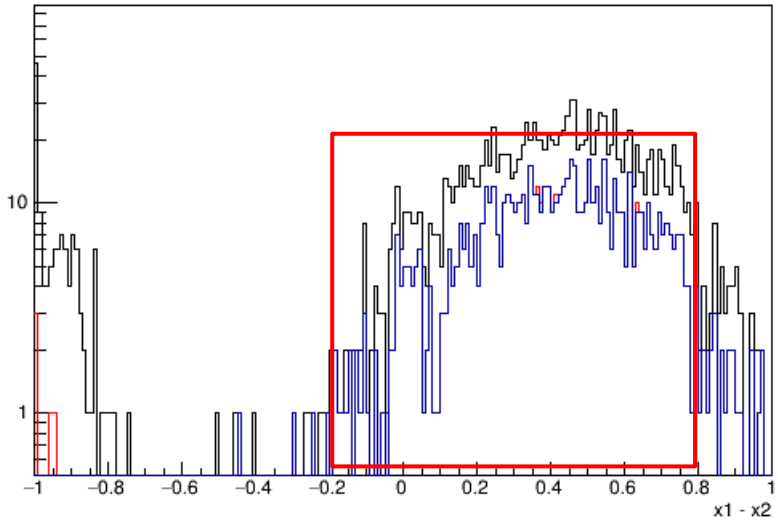


Cut efficiency

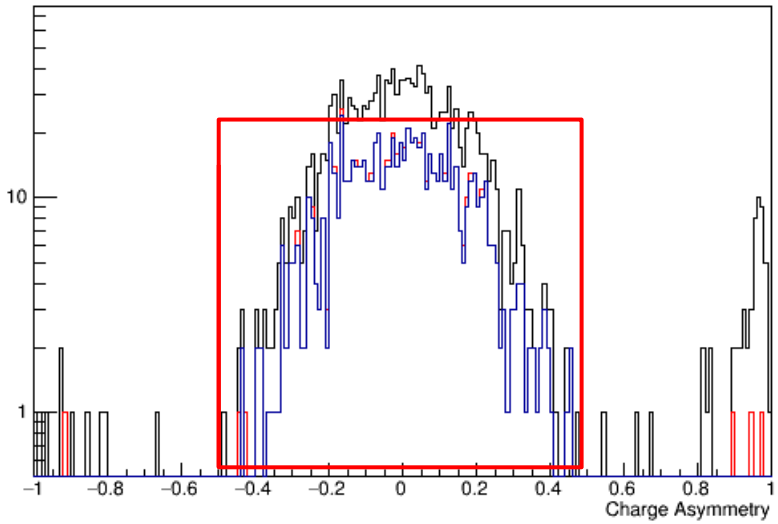
Black : no cuts
Red : time difference cut
Blue : DAMA/Asymmetry cut

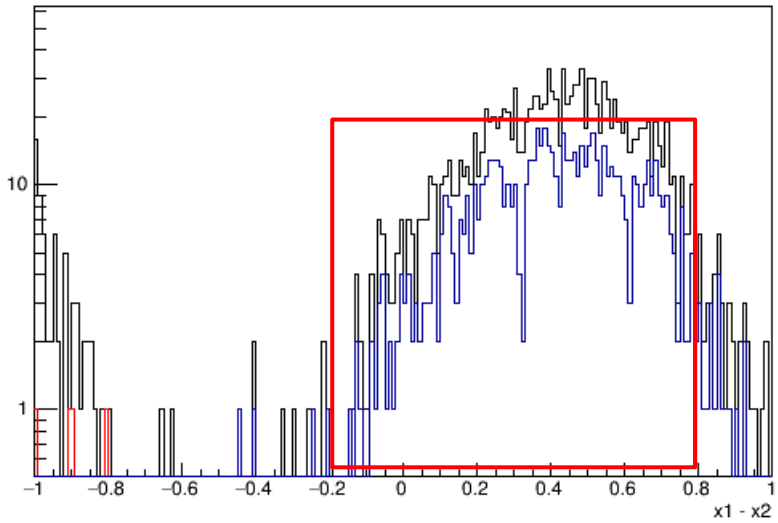
3~3.5 keV





3.5~4 keV





Summary & Plans

- **Some tests for NaI PSD measurement setup was performed**

  - test run is ongoing with short 2mm Cu shield and DT = 64 us

  - calculate mean decay time and compare with previous measurement and check background level is low enough

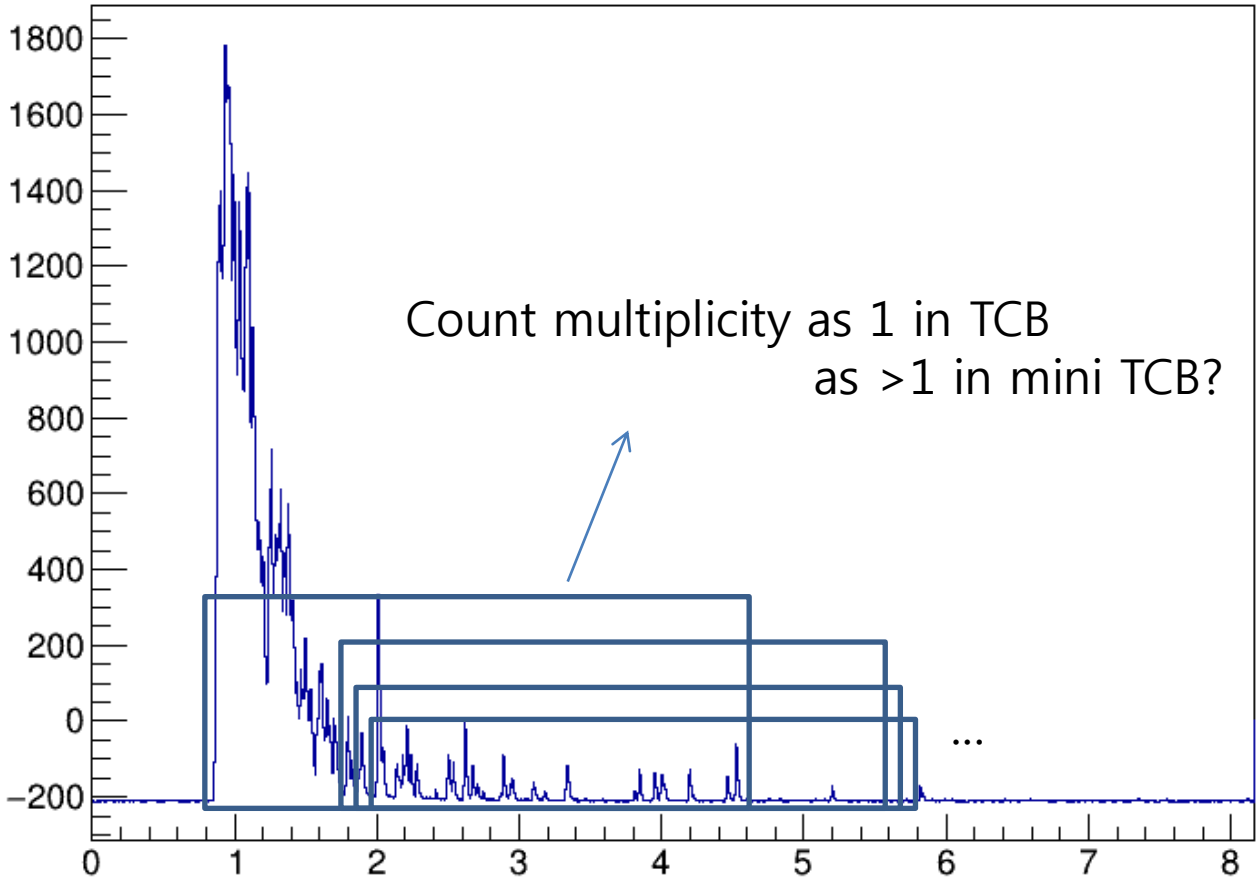
- **Study about event selection cuts with 511 coincidence γ**

  - current event selections cuts are not working properly in < 1keV

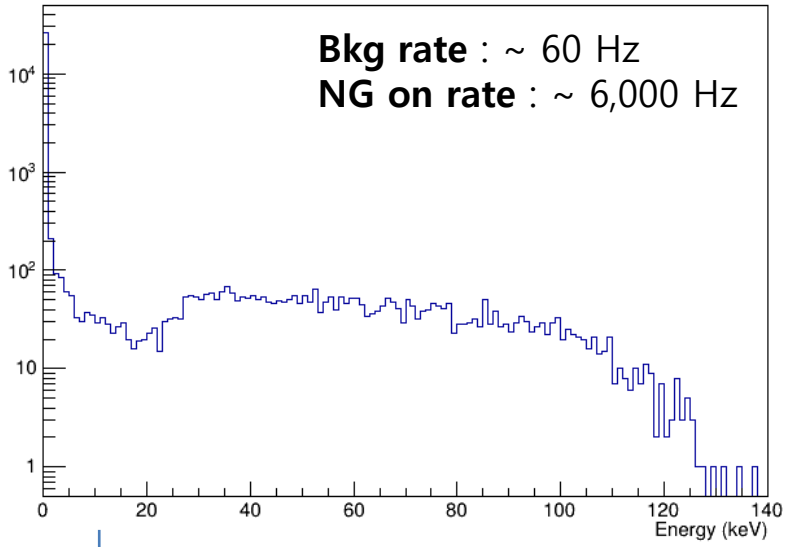
  - additional DAQ will be performed after NaI PSD measurement

Problem in mini TCB

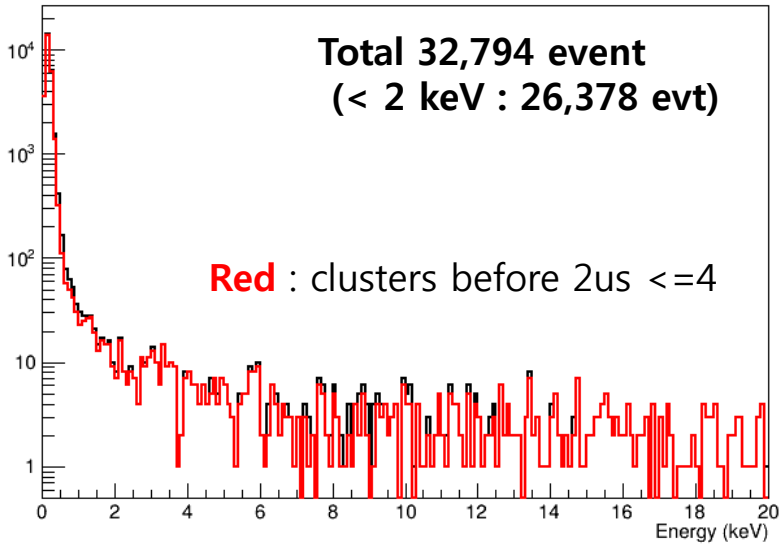
1x2x3 or 1x2x4 / multiplicity = 3 : no problem
1x2+3+4 / multiplicity = 3 : doesn`t work properly
(but works properly for pulse)

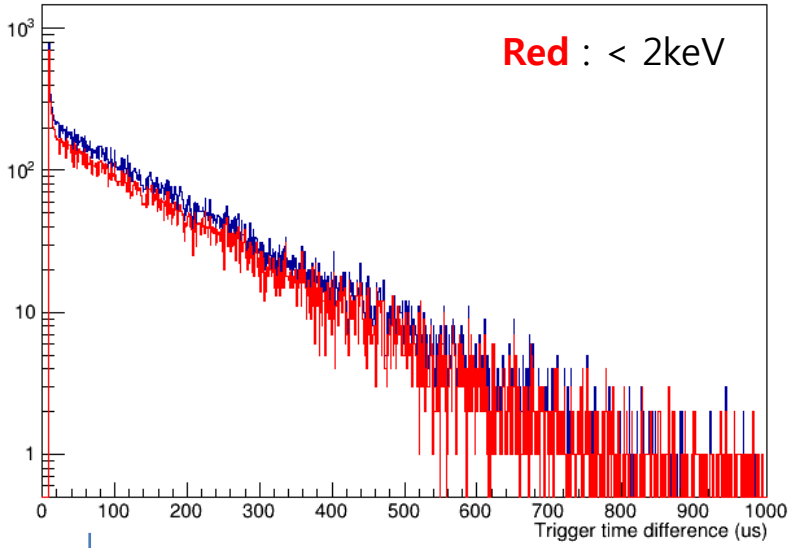


Neutron generator on (~5 sec)

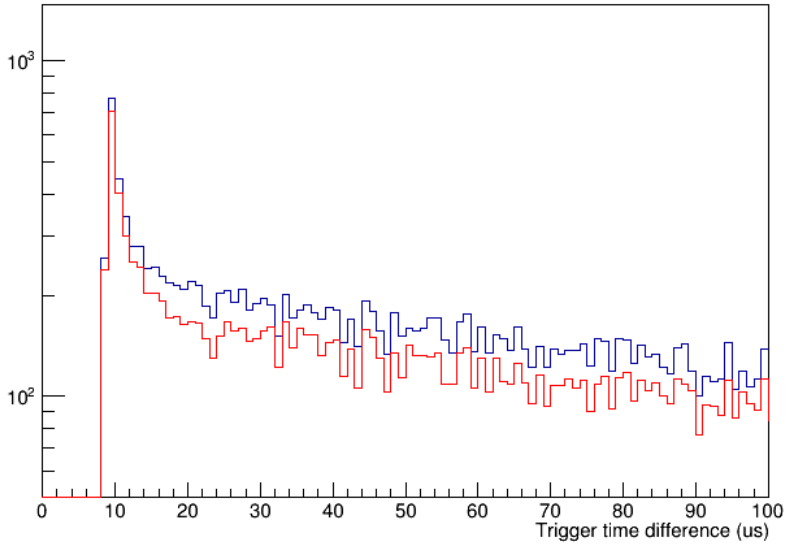


Zoomed





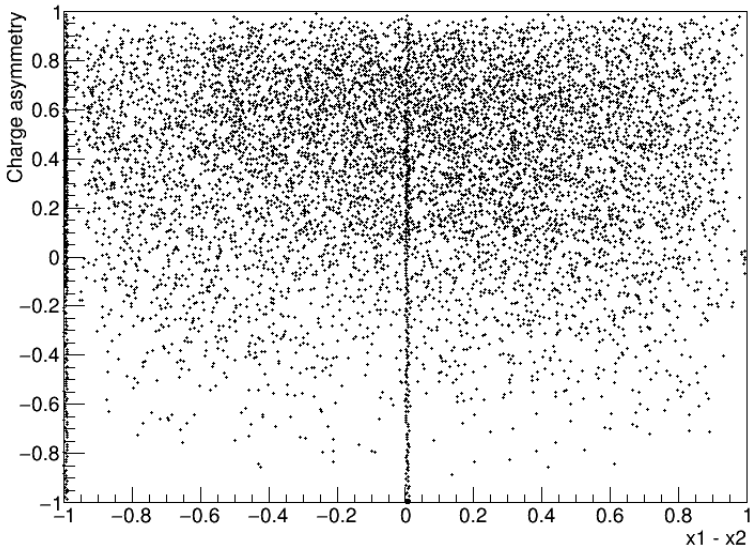
Zoomed

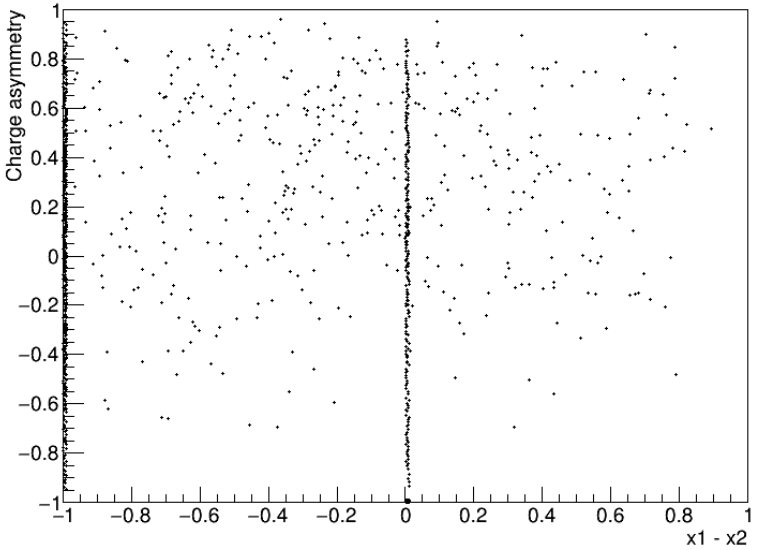


Cut efficiency (LaBr3 triggered)

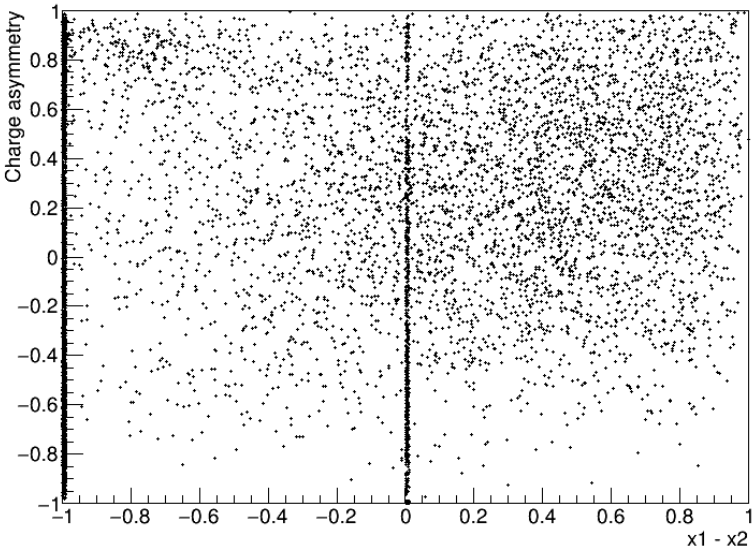
Left : w/o, **Right** : with time difference cut

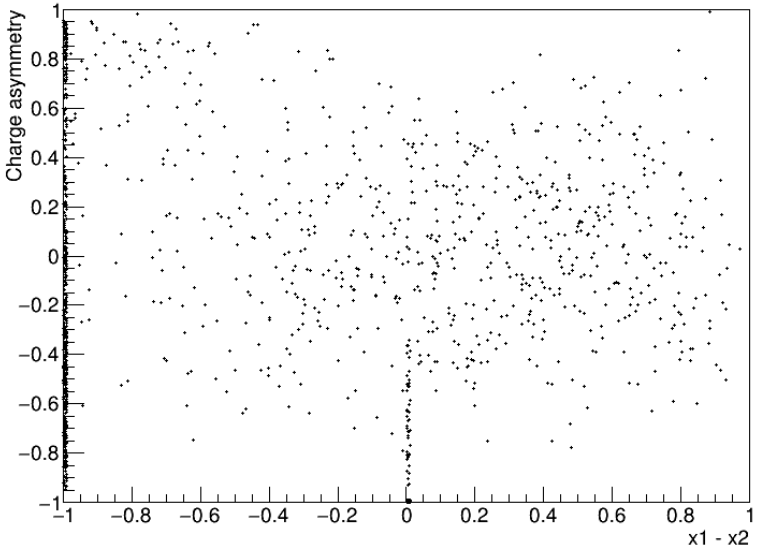
0~0.5 keV





0.5~1 keV

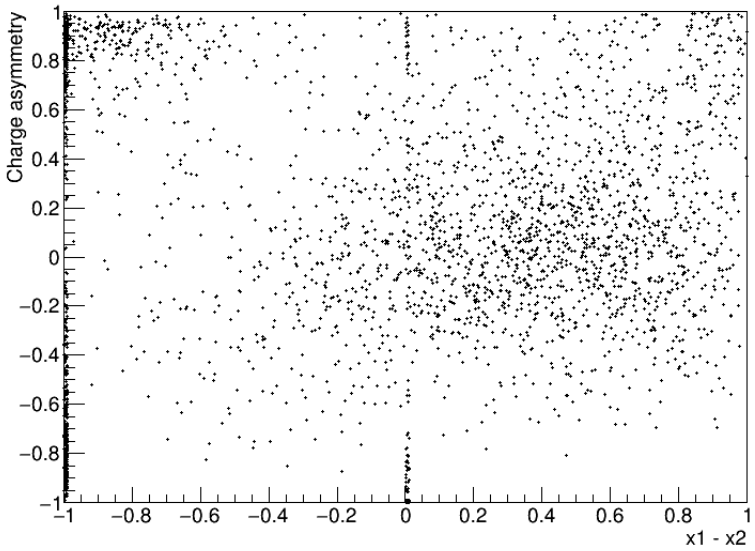


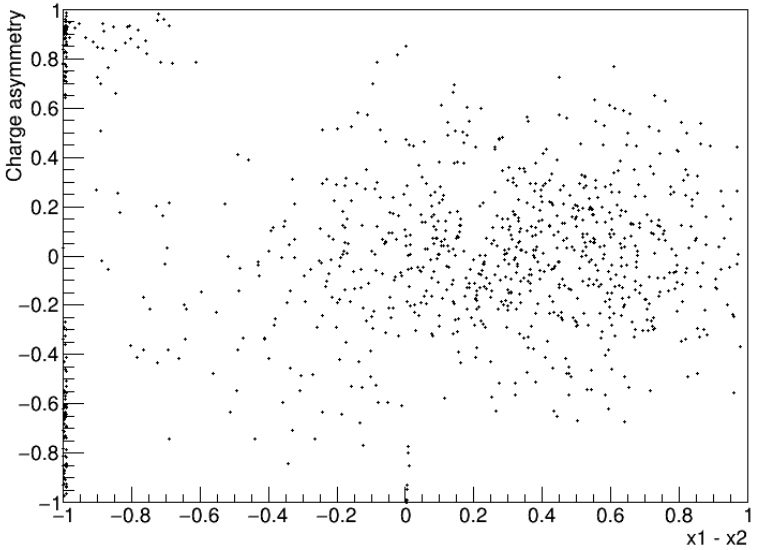


Cut efficiency (LaBr3 triggered)

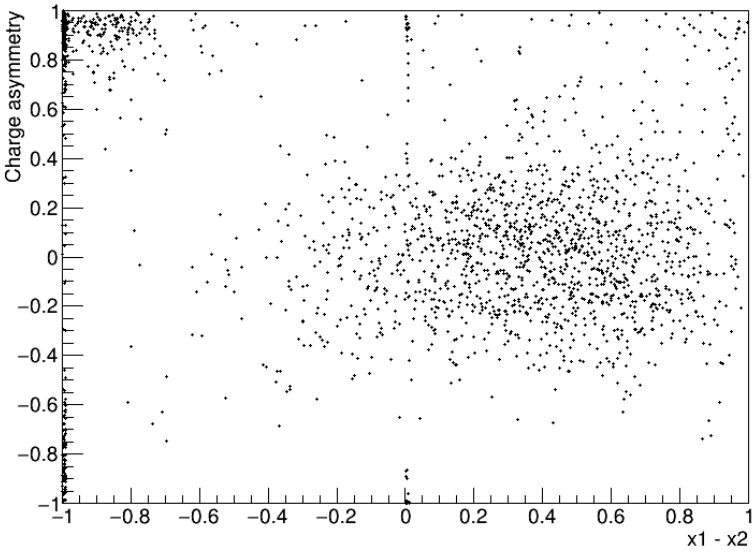
Left : w/o, **Right** : with time difference cut

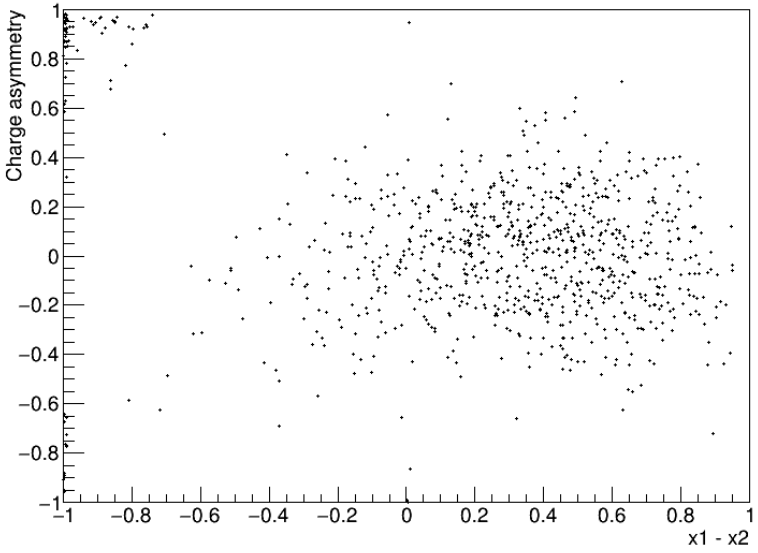
1~1.5 keV





1.5~2 keV

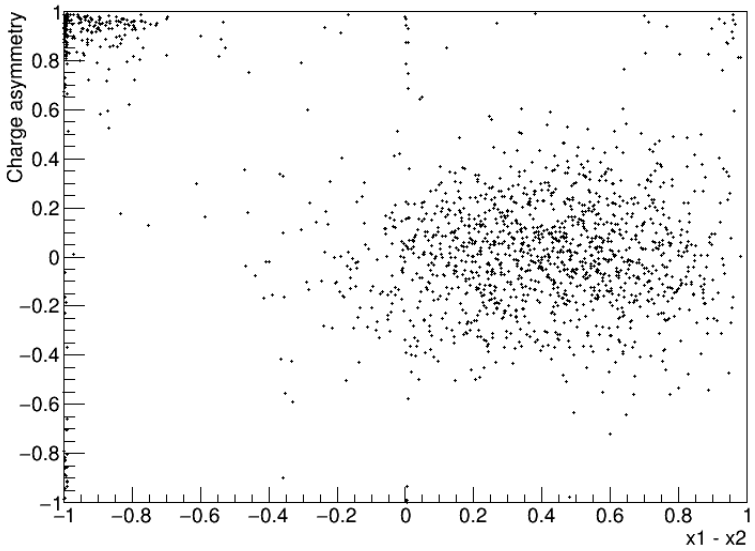


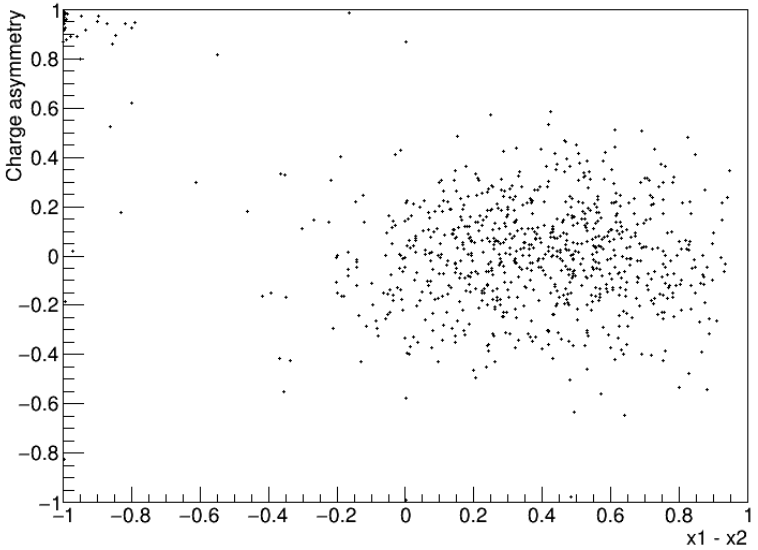


Cut efficiency (LaBr3 triggered)

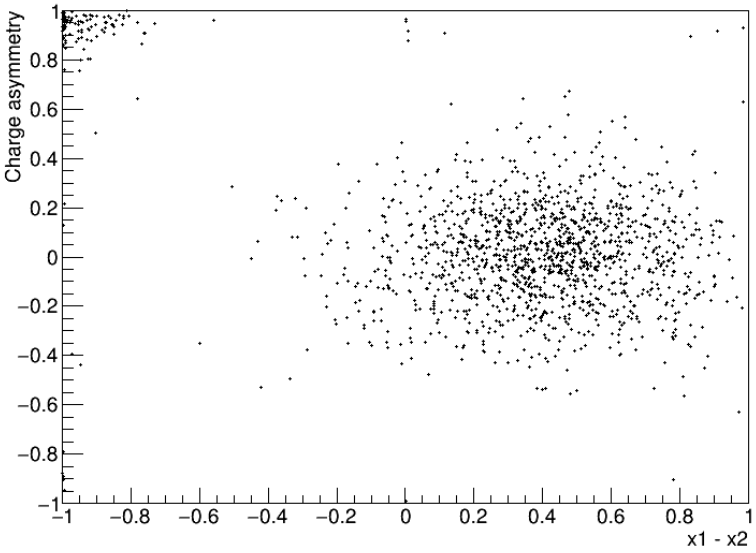
Left : w/o, **Right** : with time difference cut

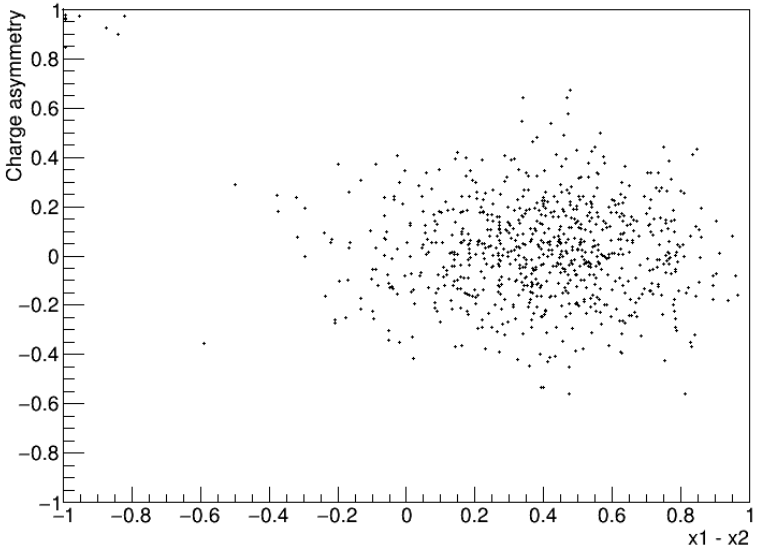
2~2.5 keV





2.5~3 keV

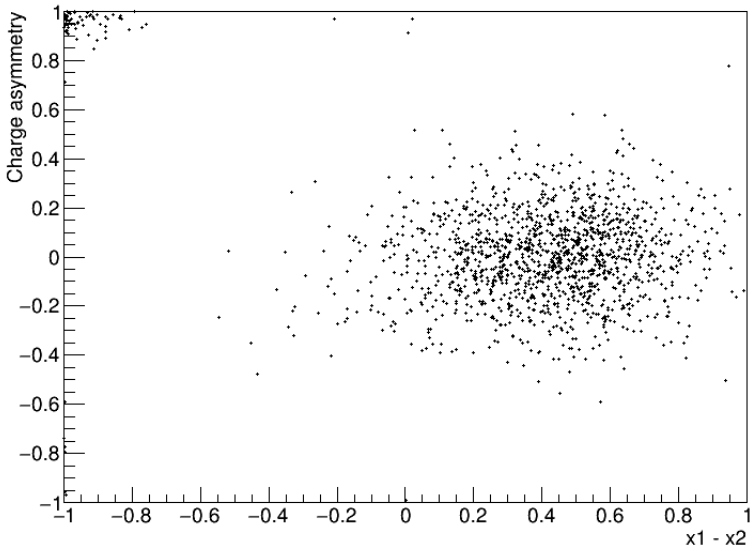


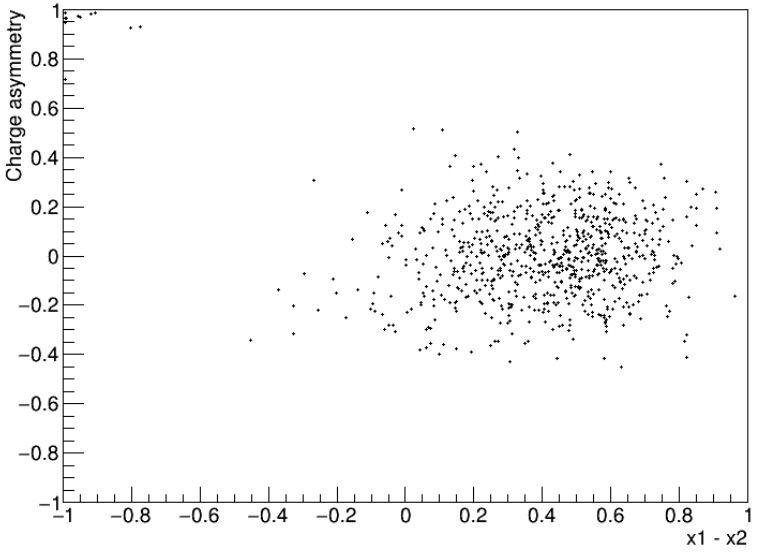


Cut efficiency (LaBr3 triggered)

Left : w/o, **Right** : with time difference cut

3~3.5 keV





3.5~4 keV