

Monte Carlo Simulation of the Planar Setup

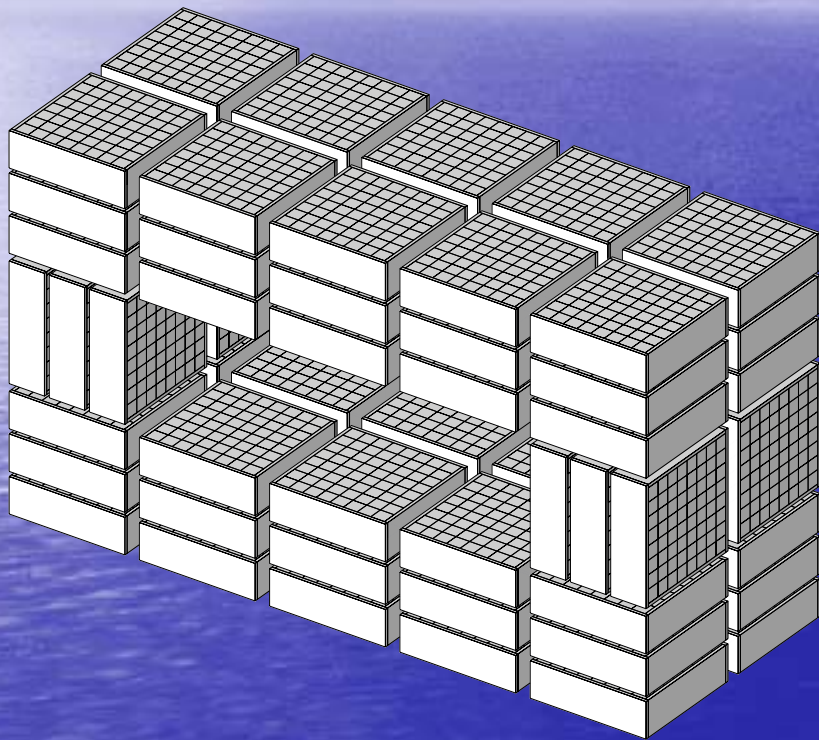
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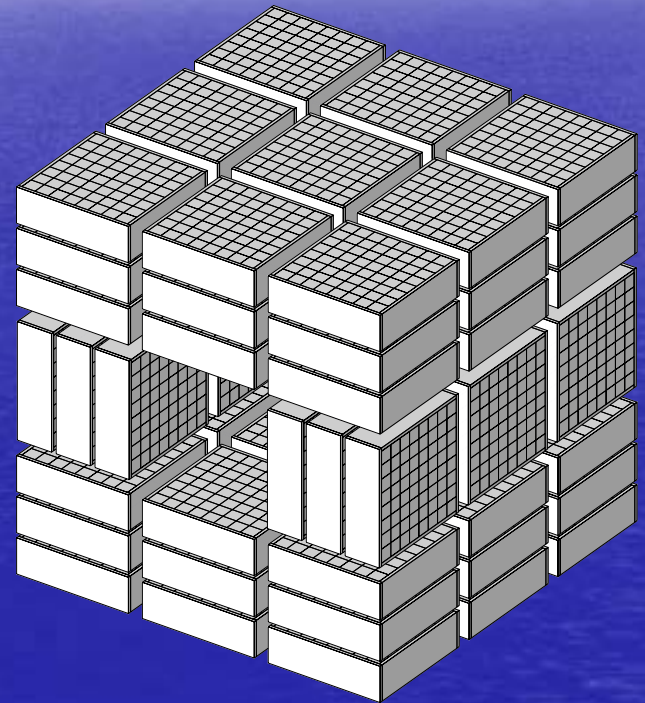
Details of the simulation

- Three basic geometries: standard, cube, and neutron geometry in full detail.
- Composite detectors: Ge planar detectors of 72x72x22 mm³, active volume of 68x68x22 mm³. Guard ring of 2 mm thickness. Al capsule of 1.5 mm thickness. Al-Ge, and Ge-Ge distance 3mm.
- Geant4 simulation code using 0.1 mm cuts and low energy physics.
- Point-like and extended monoenergetic gamma sources

Some pictures

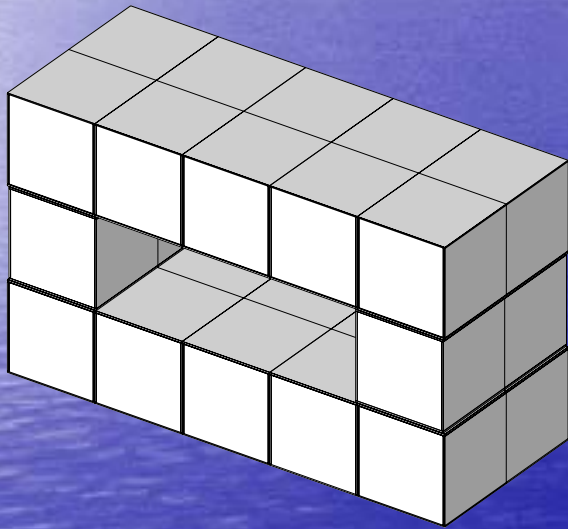


Standard, neutron geometry

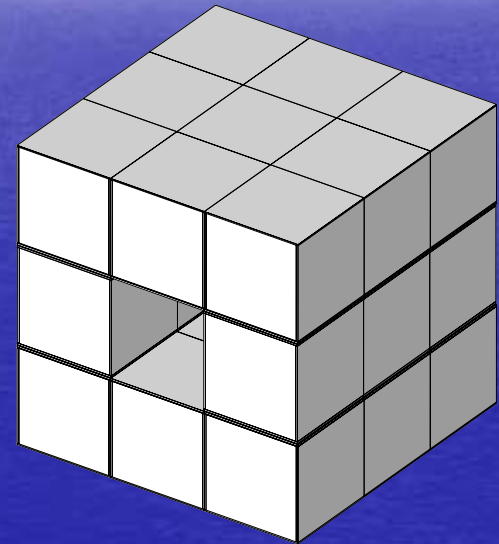


Cube geometry

Some pictures



Standard, neutron geometry



Cube geometry

Efficiency I: standard setup

Point-like source

Extended source

E (MeV)	Eff (peak)	P/T	Eff (tot)
0.10	47.6	91.2	53.7
0.25	38.7	67.5	57.4
0.50	27.2	49.7	55.6
1.00	19.0	38.0	50.3
2.00	12.7	28.9	44.5
5.00	6.5	16.6	39.6
10.00	3.4	8.7	39.7

E (MeV)	Eff (peak)	P/T	Eff (tot)
0.10	47.3	91.1	53.5
0.25	38.1	67.4	57.8
0.50	27.1	49.7	55.4
1.00	19.0	38.2	50.5
2.00	12.8	29.1	44.3
5.00	6.5	16.6	39.7
10.00	3.2	8.3	39.5

Efficiency II: positioning

Standard setup

E (MeV)	Eff (peak)	P/T	Eff (tot)
0.10	47.6	91.2	53.7
0.25	38.7	67.5	57.4
0.50	27.2	49.7	55.6
1.00	19.0	38.0	50.3
2.00	12.7	28.9	44.5
5.00	6.5	16.6	39.6
10.00	3.4	8.7	39.7

Neutron setup

E (MeV)	Eff (peak)	P/T	Eff (tot)
0.10	29.2	90.8	33.2
0.25	24.7	68.0	37.0
0.50	18.2	49.9	37.0
1.00	13.2	38.5	34.6
2.00	8.9	29.2	30.9
5.00	4.7	16.9	28.2
10.00	2.3	8.3	28.4

Efficiency III: different setups

Standard setup

E (MeV)	Eff (peak)	P/T	Eff (tot)
0.10	47.6	91.2	53.7
0.25	38.7	67.5	57.4
0.50	27.2	49.7	55.6
1.00	19.0	38.0	50.3
2.00	12.7	28.9	44.5
5.00	6.5	16.6	39.6
10.00	3.4	8.7	39.7

Cube setup

E (MeV)	Eff (peak)	P/T	Eff (tot)
0.10	65.2	91.5	73.2
0.25	55.6	70.2	81.0
0.50	40.6	52.9	78.0
1.00	28.5	40.4	71.0
2.00	19.6	31.7	63.0
5.00	10.0	18.4	56.1
10.00	5.4	9.8	56.0

Efficiency IV: different setups

Standard setup

E (MeV)	Eff (peak)	P/T	Eff (tot)
0.10	47.6	91.2	53.7
0.25	38.7	67.5	57.4
0.50	27.2	49.7	55.6
1.00	19.0	38.0	50.3
2.00	12.7	28.9	44.5
5.00	6.5	16.6	39.6
10.00	3.4	8.7	39.7

Clover setup (6 clovers)

E (MeV)	Eff (peak)	P/T	Eff (tot)
0.10	36.4	78.5	46.3
0.25	30.7	66.5	46.2
0.50	23.5	53.9	43.6
1.00	18.0	44.2	40.7
2.00	12.9	35.3	36.6
5.00	7.1	21.7	32.8
10.00	4.0	14.0	28.7

Hits statistics (cube geometry)

Number of planar hits in one event

E	N=1	N=2	N=3	N=4	5	6	7	8	9	10
0.1	1120	70801	1272	11						
1.0	724	37556	25533	6738	888	69	1			
2.0	576	31541	21790	7154	1553	257	28	3	1	
5.0	392	21660	18070	9996	4080	1253	309	74	9	1

Still to do (among many other things)

- More involved studies, in a more realistic experimental situations. The machinery for doing that is already available
- Tracking? Comparison of the effectiveness of the two tracking algorithms (backtracking, clustering)
- Implementation of the DSSD in the geometry
- Simulation of a beta decay experiment
- Common framework for the simulations