Virtual lab 5: Study of Spectrum of Gamma sources

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Lab session: 16/11/2021

November 16, 2021

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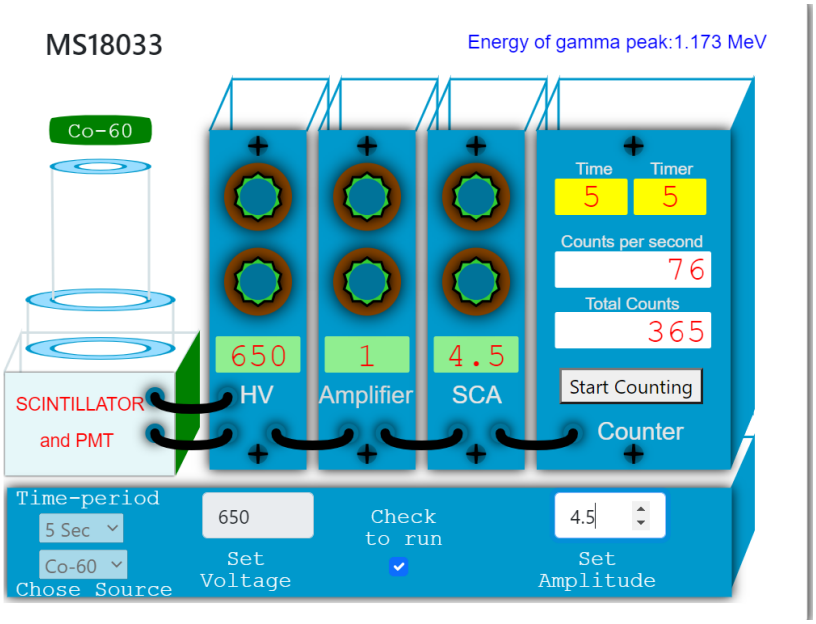
1 Aim

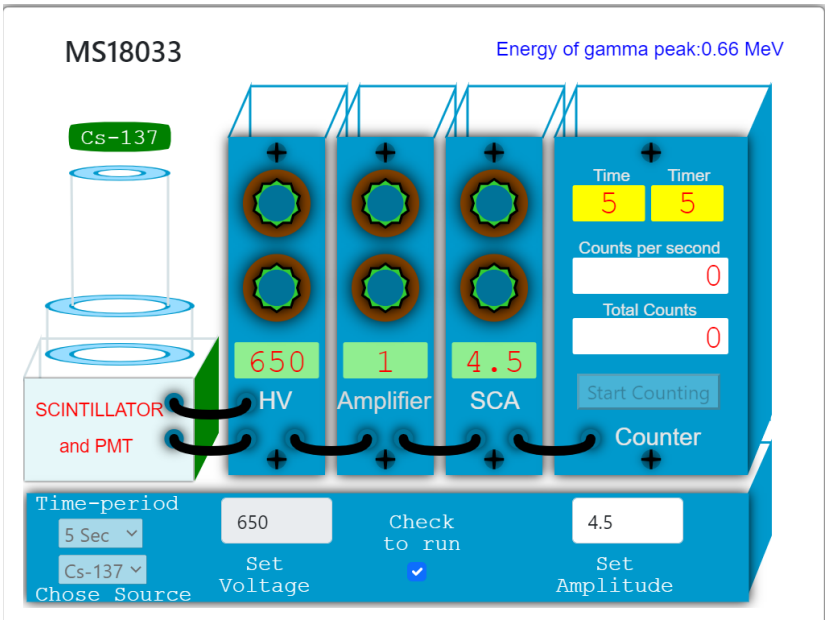
To study the energy spectrum of 3 gamma sources, namely co-60,Cs-137 and Mn-54.

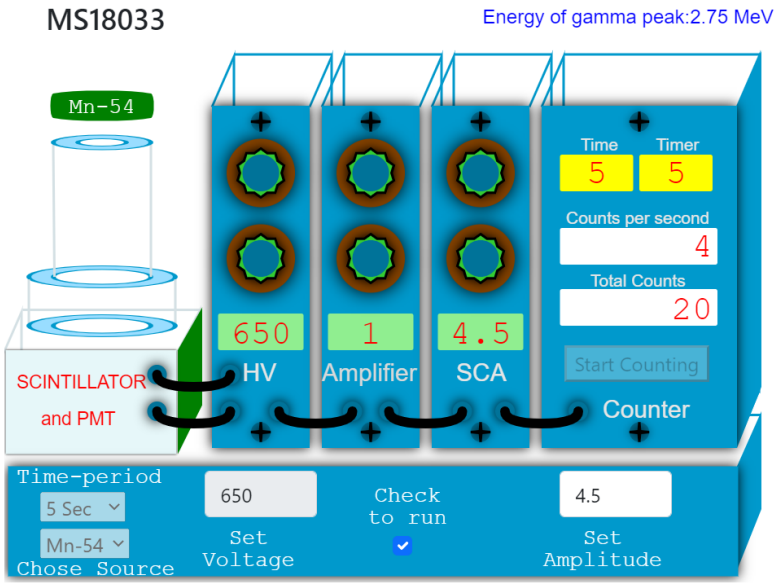
2 Data taken and Observations

The total counts vs LLD data is collected for 3 different sources, namely C0-60,Cs-137 and Mn-54 at the best operating voltage obtained in the previous experiment (650 V). The time period of counts and gain is set to 5s and 1.0 respectively.

2.1 Screenshots







2.2 Data Taken

The count vs LLD data obtained is given below.

LLD	Co-60		Cs-137		Mn-54	
	Total Counts	Average counts/s	Total Counts	Average count/s	Total Counts	Average count/s
0	0	0	0	0	0	0
0.05	0	0	0	0	0	0
0.1	2581	516.2	30140	6028	180	36
0.15	2469	493.8	7349	1469.8	134	26.8
0.2	2913	582.6	6926	1385.2	245	49
0.25	3400	680	7382	1476.4	588	117.6
0.3	2962	592.4	7184	1436.8	335	67
0.35	2569	513.8	6133	1226.6	299	59.8
0.4	2629	525.8	6459	1291.8	334	66.8
0.45	2585	517	6192	1238.4	270	54
0.5	2630	526	6534	1306.8	228	45.6
0.55	2617	523.4	6954	1390.8	220	44
0.6	2701	540.2	8088	1617.6	258	51.6
0.65	3148	629.6	7960	1592	173	34.6
0.7	3408	681.6	7530	1506	193	38.6
0.75	3516	703.2	7452	1490.4	187	37.4
0.8	3251	650.2	6949	1389.8	210	42
0.85	3103	620.6	7021	1404.2	171	34.2
0.9	3064	612.8	6375	1275	170	34
0.95	2957	591.4	6306	1261.2	157	31.4
1	2997	599.4	6538	1307.6	112	22.4
1.05	2859	571.8	6460	1292	136	27.2
1.1	2445	489	6050	1210	99	19.8
1.15	2651	530.2	6841	1368.2	80	16

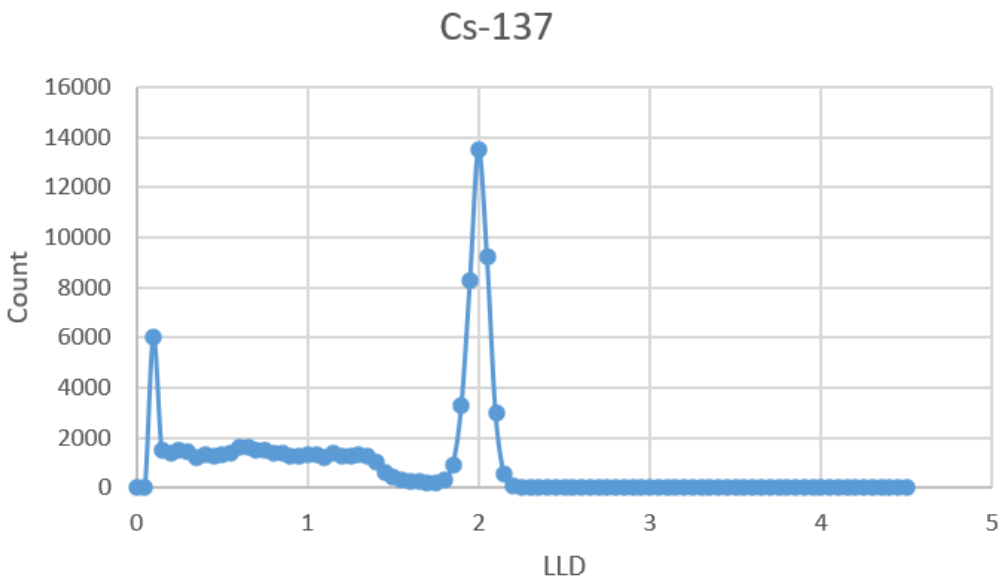
1.2	2623	524.6	6408	1281.6	115	23
1.25	2432	486.4	6406	1281.2	90	18
1.3	2657	531.4	6560	1312	83	16.6
1.35	2732	546.4	6361	1272.2	86	17.2
1.4	2446	489.2	4994	998.8	80	16
1.45	2467	493.4	3069	613.8	126	25.2
1.5	2604	520.8	2082	416.4	107	21.4
1.55	2333	466.6	1556	311.2	81	16.2
1.6	2675	535	1253	250.6	95	19
1.65	2517	503.4	1129	225.8	112	22.4
1.7	2670	534	881	176.2	100	20
1.75	2359	471.8	1086	217.2	88	17.6
1.8	2405	481	1640	328	110	22
1.85	2846	569.2	4666	933.2	77	15.4
1.9	2586	517.2	16491	3298.2	100	20
1.95	2629	525.8	41272	8254.4	94	18.8
2	2775	555	67661	13532.2	70	14
2.05	2673	534.6	46036	9207.2	38	7.6
2.1	2724	544.8	14905	2981	60	12
2.15	2797	559.4	2649	529.8	57	11.4
2.2	2783	556.6	311	62.2	7	1.4
2.25	2568	513.6	121	24.2	61	12.2
2.3	2821	564.2	132	26.4	31	6.2
2.35	2971	594.2	119	23.8	105	21
2.4	3075	615	129	25.8	228	45.6

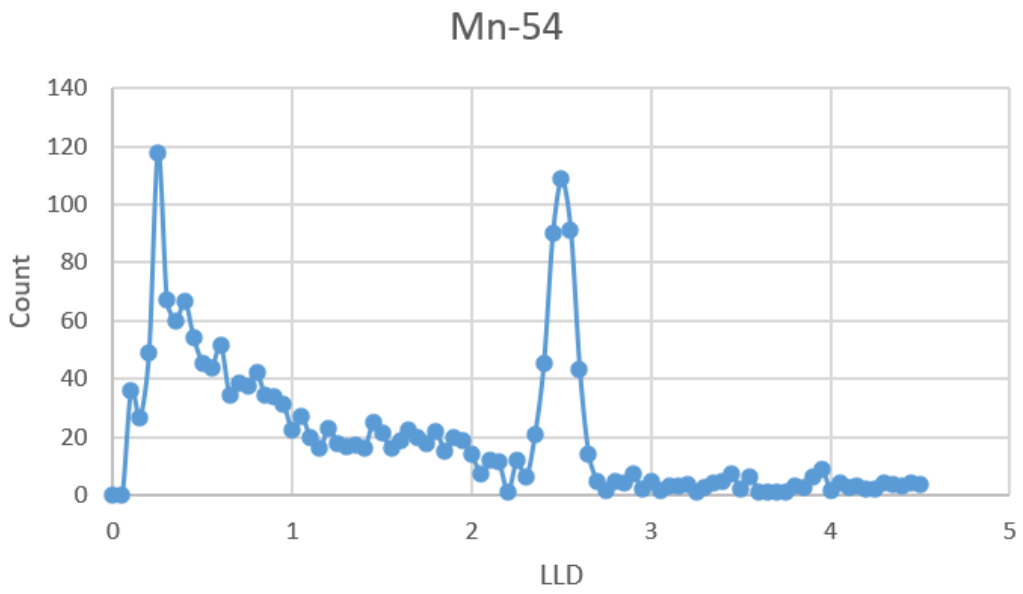
2.45	3200	640	93	18.6	450	90
2.5	2875	575	124	24.8	544	108.8
2.55	3204	640.8	90	18	456	91.2
2.6	3383	676.6	66	13.2	217	43.4
2.65	3377	675.4	83	16.6	71	14.2
2.7	3173	634.6	92	18.4	24	4.8
2.75	3290	658	79	15.8	8	1.6
2.8	2786	557.2	100	20	23	4.6
2.85	2403	480.6	92	18.4	22	4.4
2.9	2425	485	83	16.6	37	7.4
2.95	2204	440.8	120	24	11	2.2
3	1955	391	52	10.4	23	4.6
3.05	1949	389.8	72	14.4	8	1.6
3.1	1936	387.2	51	10.2	16	3.2
3.15	1724	344.8	71	14.2	16	3.2
3.2	1793	358.6	83	16.6	18	3.6
3.25	1719	343.8	68	13.6	7	1.4
3.3	2240	448	61	12.2	14	2.8
3.35	4113	822.6	58	11.6	21	4.2
3.4	7257	1451.4	45	9	24	4.8
3.45	10605	2121	46	9.2	36	7.2
3.5	11415	2283	47	9.4	11	2.2
3.55	8071	1614.2	40	8	31	6.2
3.6	4271	854.2	31	6.2	7	1.4
3.65	1794	358.8	49	9.8	6	1.2
3.7	1080	216	32	6.4	5	1

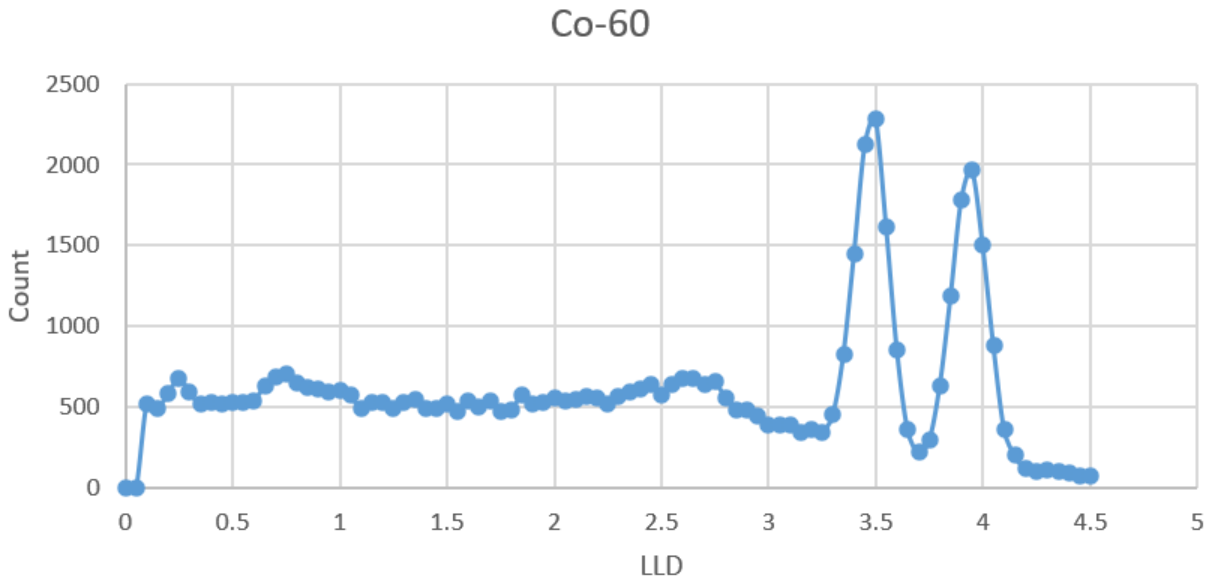
3.75	1452	290.4	65	13	6	1.2
3.8	3167	633.4	42	8.4	16	3.2
3.85	5914	1182.8	105	21	14	2.8
3.9	8905	1781	66	13.2	31	6.2
3.95	9827	1965.4	65	13	45	9
4	7519	1503.8	63	12.6	8	1.6
4.05	4415	883	75	15	22	4.4
4.1	1816	363.2	7	1.4	13	2.6
4.15	998	199.6	7	1.4	17	3.4
4.2	579	115.8	5	1	10	2
4.25	497	99.4	13	2.6	12	2.4
4.3	522	104.4	13	2.6	22	4.4
4.35	492	98.4	5	1	18	3.6
4.4	434	86.8	23	4.6	16	3.2
4.45	360	72	6	1.2	22	4.4
4.5	365	73	0	0	20	4

2.3 Plots

The average count vs LLD plots are as follows:







3 Result

The energy spectrum of Co-60, Cs-137 and Mn-54 were obtained.