



Gamma-ray Spectrometry

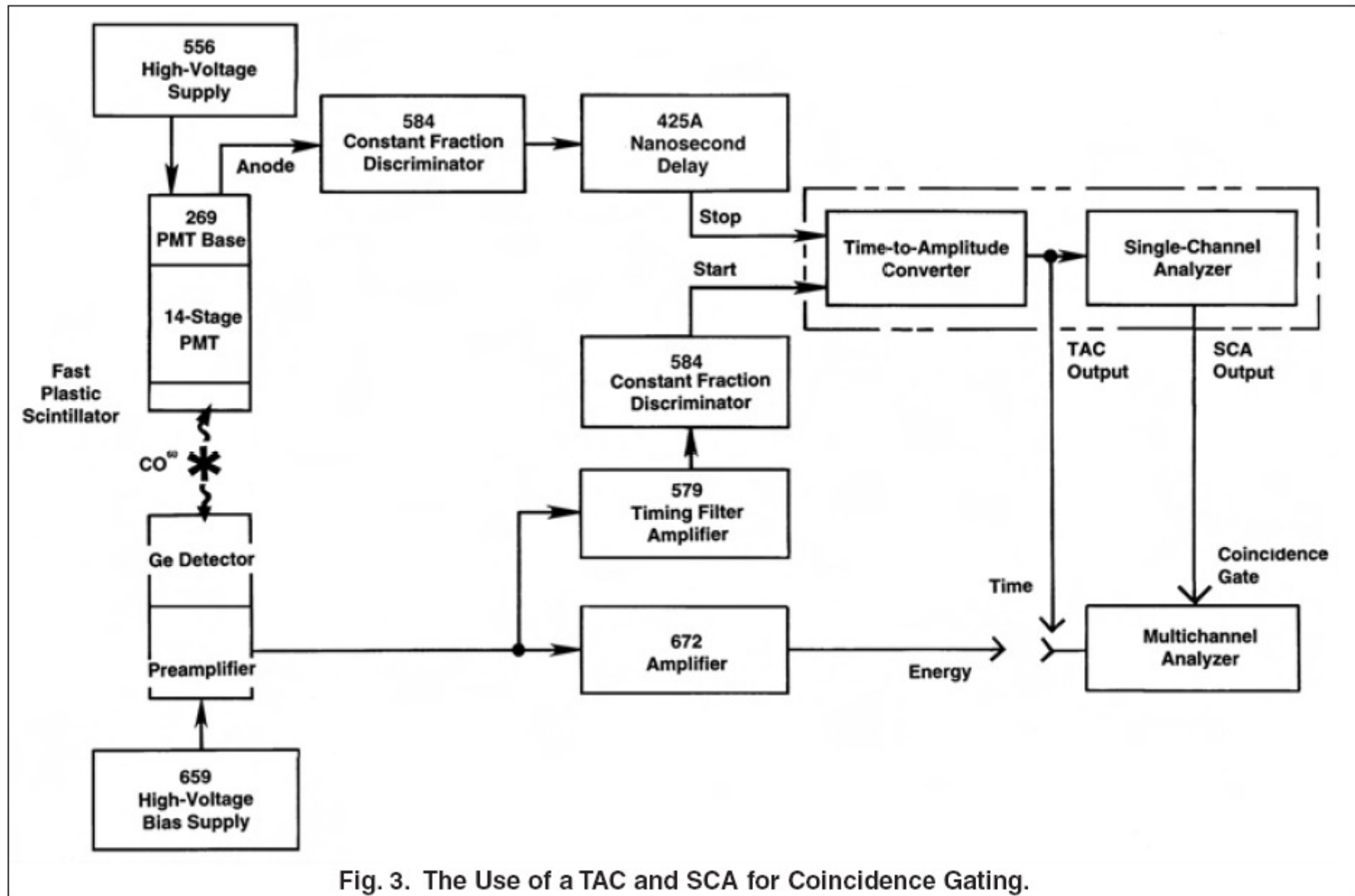
Coincidence Techniques

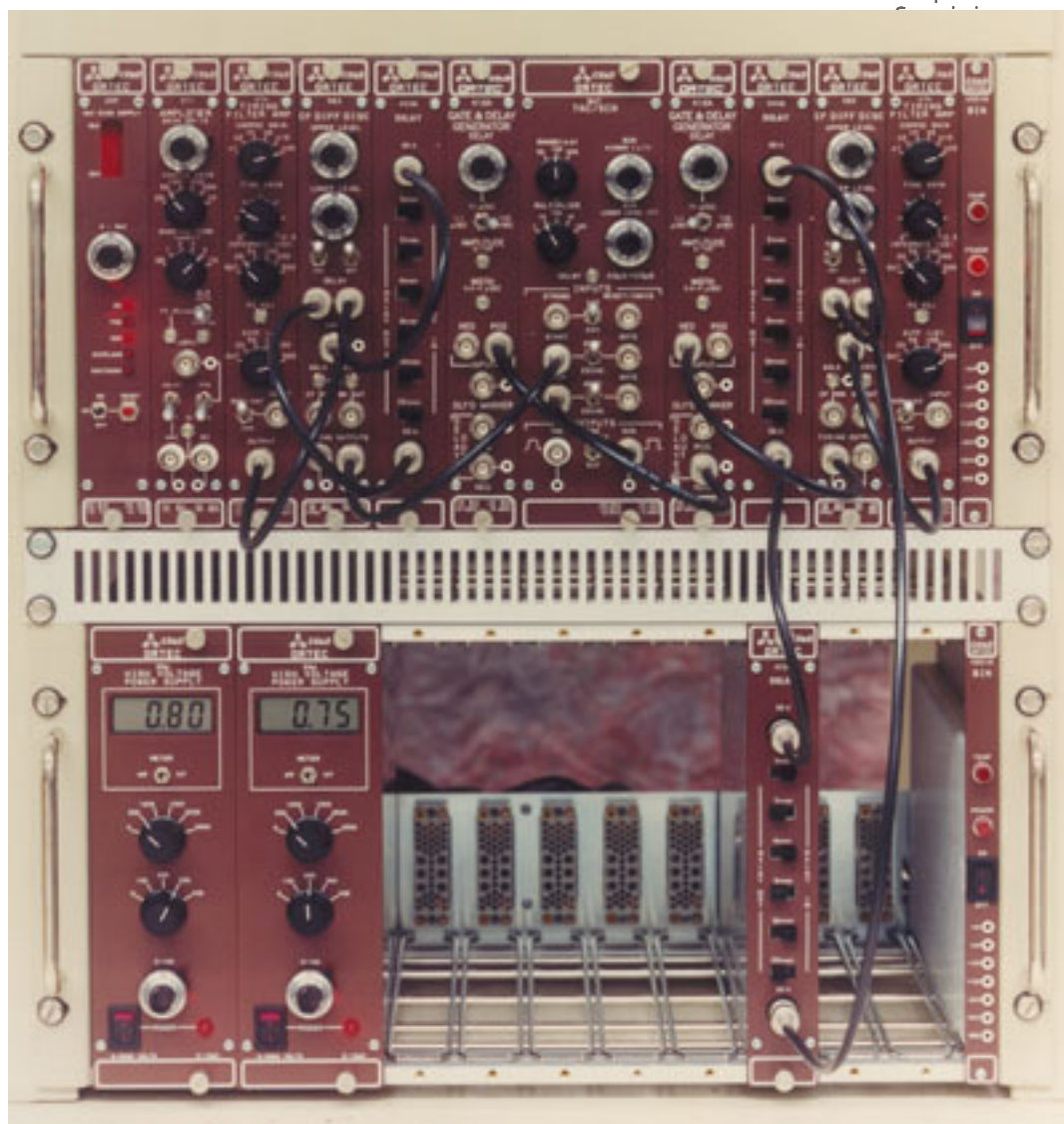
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A typical coincidence circuit





“Traditional” Electronics for Compton suppression: anti-coincidence

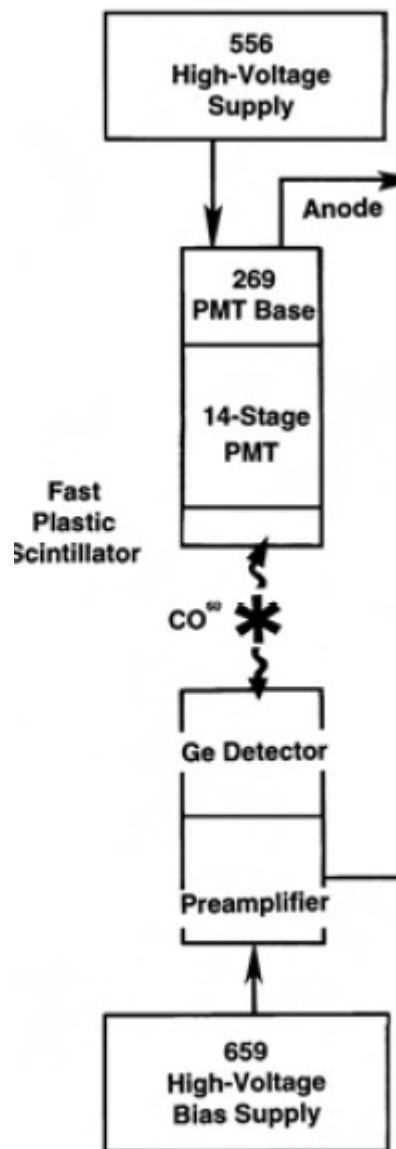


How to learn nuclear electronics

- *Go into the lab and “play” with settings using an oscilloscope*
- *Keep the book by Knoll next to you*
- *Have the user manual at hand (all available on internet nowadays)*



Digital electronics



- Digital box like flash ADC
- Collects time-stamped data
- And pulse shape
- All data is kept – nothing is thrown away.
- Needs more advanced data treatment



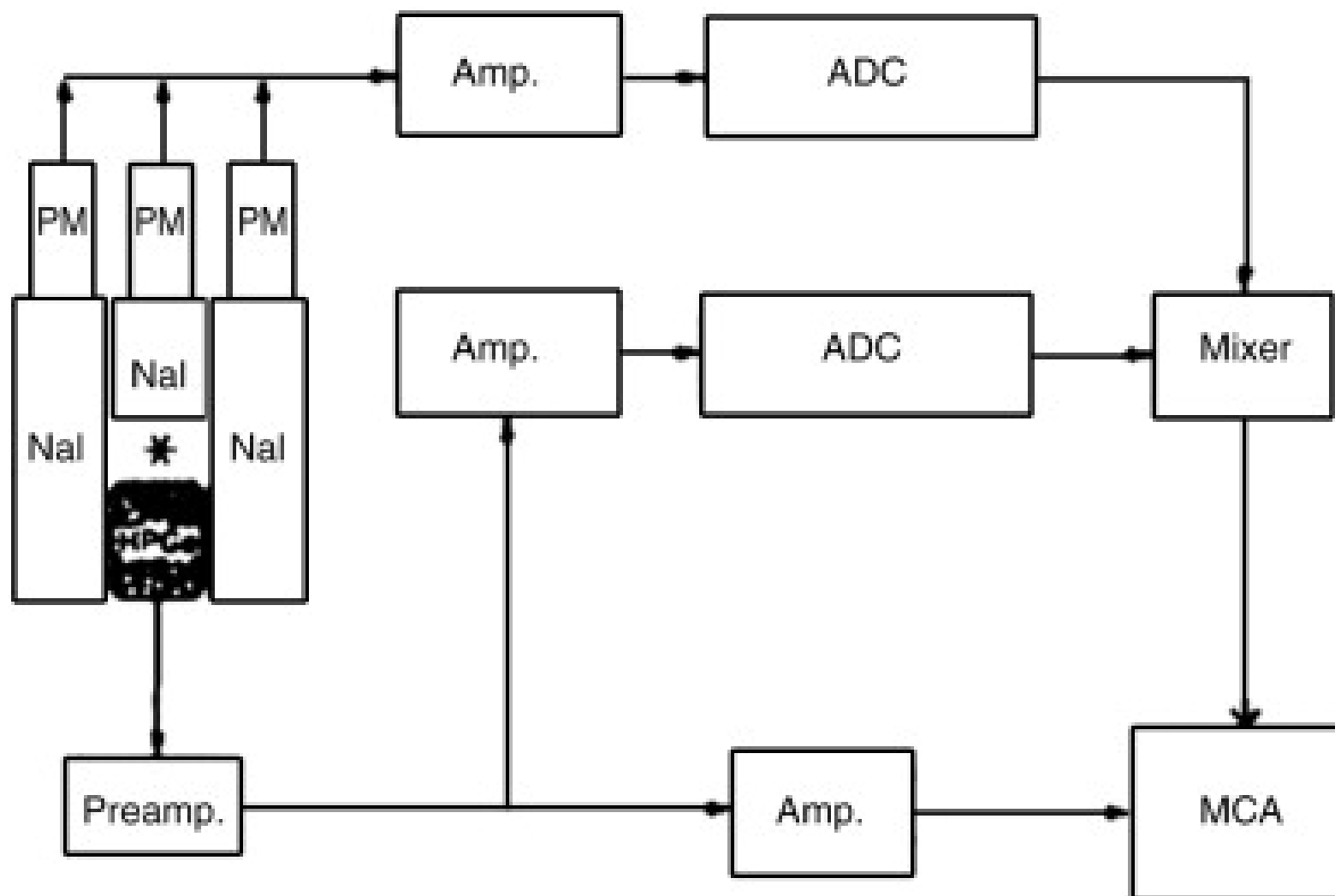
Time	ADC1	ADC2	ADC3
10	1046	-	-
32	1099	523	-
109	222	-	-
252	1324	523	656
260	1047	-	-
...			

**List mode data
("event-by-event")**

**Requires advanced (often "home-made") software to analyse data
(e.g. based on ROOT)**

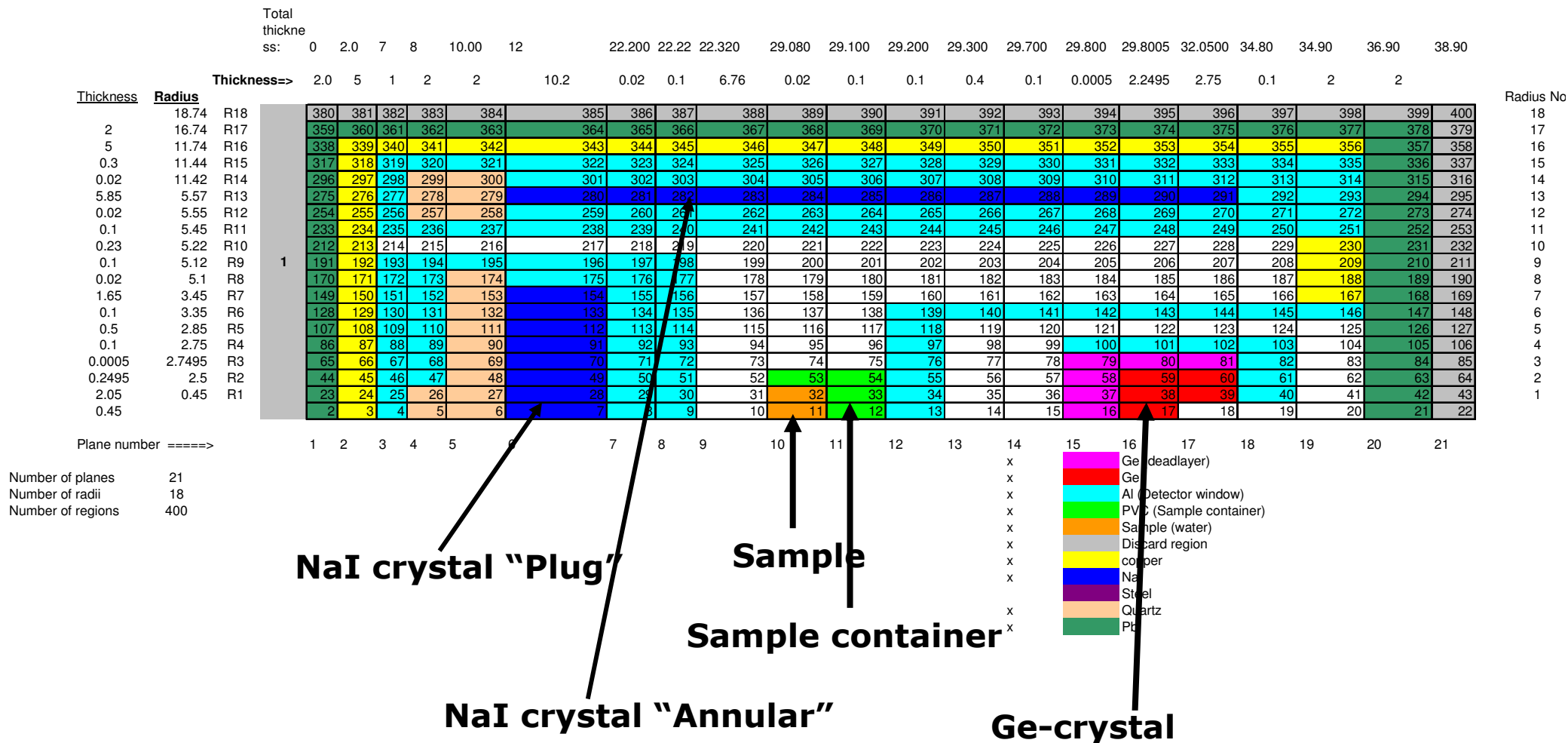


Compton suppression system





MODEL: COMPTON1.mor





Total
thickne
ss:

0 2.0 7 8 10.00 12 22.200 22.22 22.320 29.080 29.100 29.200 29.3

Thickness=>

2.0 5 1 2 2 10.2 0.02 0.1 6.76 0.02 0.1 0.1 0.

Thickness

Radius

	18.74	R18		380	381	382	383	384	385	386	387	388	389	390	391	
2	16.74	R17		359	360	361	362	363	364	365	366	367	368	369	370	
5	11.74	R16		338	339	340	341	342	343	344	345	346	347	348	349	
0.3	11.44	R15		317	318	319	320	321	322	323	324	325	326	327	328	
0.02	11.42	R14		296	297	298	299	300	301	302	303	304	305	306	307	
5.85	5.57	R13		275	276	277	278	279	280	281	282	283	284	285	286	
0.02	5.55	R12		254	255	256	257	258	259	260	261	262	263	264	265	
0.1	5.45	R11		233	234	235	236	237	238	239	240	241	242	243	244	
0.23	5.22	R10		212	213	214	215	216	217	218	219	220	221	222	223	
0.1	5.12	R9	1	191	192	193	194	195	196	197	198	199	200	201	202	
0.02	5.1	R8		170	171	172	173	174	175	176	177	178	179	180	181	
1.65	3.45	R7		149	150	151	152	153	154	155	156	157	158	159	160	
0.1	3.35	R6		128	129	130	131	132	133	134	135	136	137	138	139	
0.5	2.85	R5		107	108	109	110	111	112	113	114	115	116	117	118	
0.1	2.75	R4		86	87	88	89	90	91	92	93	94	95	96	97	
0.0005	2.7495	R3		65	66	67	68	69	70	71	72	73	74	75	76	
0.2495	2.5	R2		44	45	46	47	48	49	50	51	52	53	54	55	
2.05	0.45	R1		23	24	25	26	27	28	29	30	31	32	33	34	
0.45				2	3	4	5	6	7	8	9	10	11	12	13	

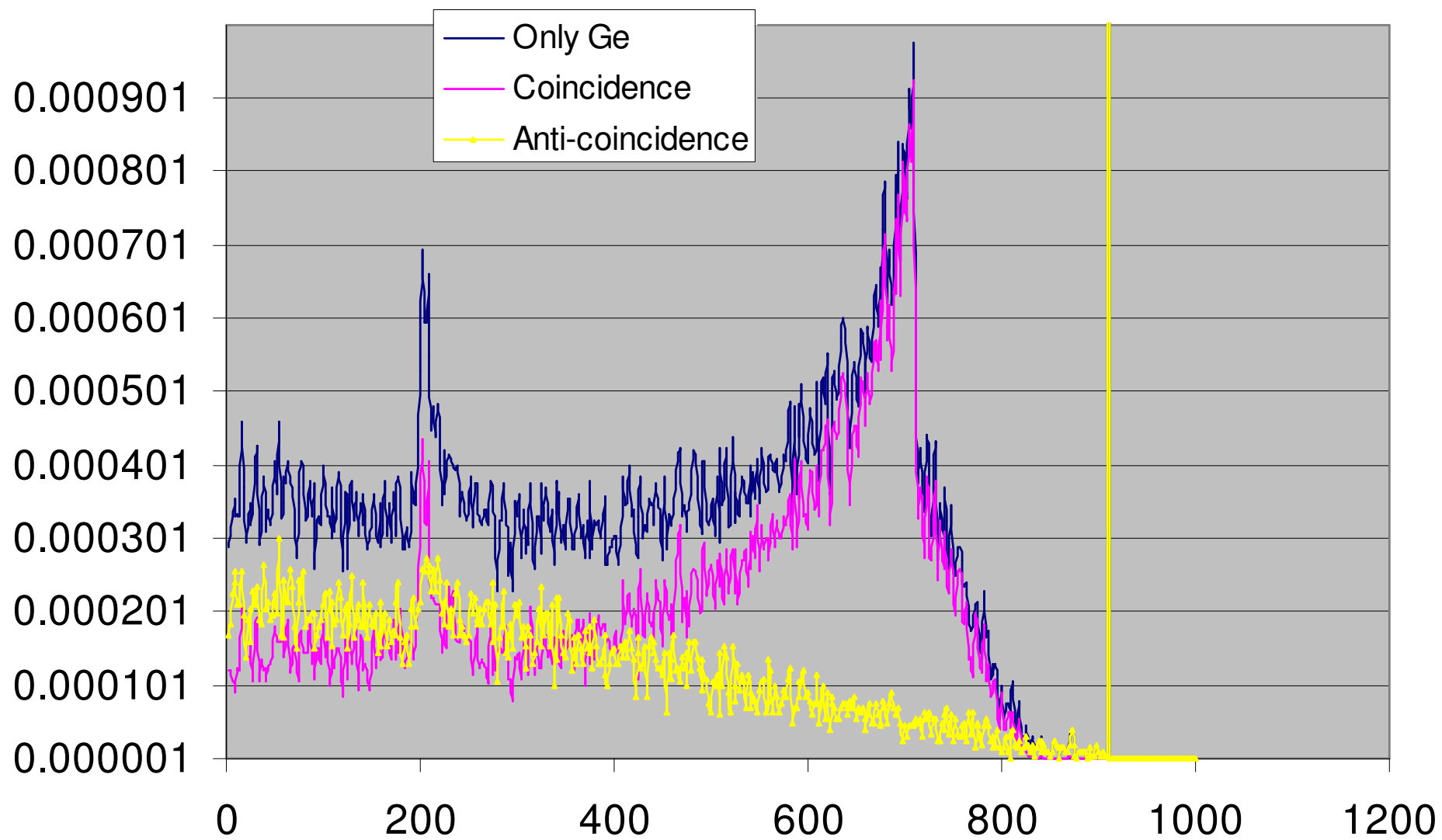
Plane number =====>

1 2 3 4 5 6 7 8 9 10 11 12 13

planes 21
radii 18
regions 400



EXERCISE EXERCISE





All spectra recorded with detector Ge1

