HPGe rates and Trigger rates in C-counters in ALPACA

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Definition for HPGe rates

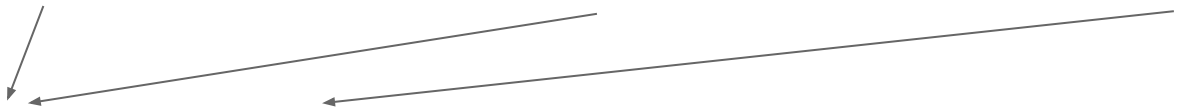
$$\text{Rate in channel X} = \frac{\text{Number of events in channel X with energy between 100-4500 keV}}{\text{Run time (very last timestamp - very first timestamp)}} \times \text{Livetime fraction in channel X}$$

To be comparable with MIDAS

All numbers

Run times:
Ba136-Oct: 132.4 h = 476640 s
Ba136-Nov: 63.6 h = 228960 s
Se76: 126.2 h = 454320 s

Ge	Ba136-Oct (counts)	live time (%)	Rate (counts/s)	Ba136-Nov (counts)	live time (%)	Rate (counts/s)	Se76-All (counts)	live time (%)	Rate (counts/s)
1	6.4510E+08	0.82	1650.54	2.4026E+08	0.609	1723.08	7.0118E+08	0.579	2665.56
2	3.9947E+08	0.835	1003.70	2.0096E+08	0.844	1039.94	6.1162E+08	0.855	1574.53
3	6.2723E+08	0.822	1600.89	3.1773E+08	0.822	1688.19	8.0430E+08	0.715	2476.00
4	5.6208E+08	0.827	1425.95	2.8428E+08	0.841	1476.34	7.5330E+08	0.765	2167.44
5	7.2248E+08	0.805	1882.95	3.6409E+08	0.812	1958.38	8.3367E+08	0.622	2950.13
6	4.0724E+08	0.834	1024.46	2.0572E+08	0.846	1062.06	6.2046E+08	0.859	1589.86
7	5.4898E+08	0.829	1389.36	2.7971E+08	0.826	1479.00	8.0864E+08	0.783	2273.16
8	6.5191E+08	0.82	1667.94	3.2993E+08	0.805	1790.04	8.4446E+08	0.667	2786.72



From Mario's slides

RESULTS COMPARISON: ALPACA-MIDAS (COUNTS/S)

ALPACA

	Ge1	Ge2	Ge3	Ge4	Ge5	Ge6	Ge7	Ge8	Run time
Ba136-Oct	1650	1004	1601	1426	1883	1024	1389	1668	132.4 h
Ba136-Nov	1723	1040	1688	1476	1958	1062	1479	1790	63.6 h
Se76	2666	1575	2476	2167	2950	1590	2273	2787	126.2 h

Good agreement!

From Igor's slides

MIDAS

Average HPGe-detectors rates at [100, 4500] keV

Run	Ge01	Ge02	Ge03	Ge04	Ge05	Ge06	Ge07	Ge08	exposition,s	files
Ba136 part 1	1830	1119	1771	1578	2118	1142	1540	1840	436191	1951
Ba136 part 2	1825	1144	1770	1580	2157	1173	1559	1855	212657	947
Ba136 total	1829	1127	1771	1579	2131	1152	1546	1845	648848	2898
Se76	2715	1705	2605	2326	3209	1725	2393	2915	452610	2411

Trigger rates in C-counters

- Trigger in at least on germanium detector with Energy >100 keV
- Calculate the number of events in the C-counters in a time window from the germanium trigger -200,1000 ns
- Correct rate by average livetime fraction (23% in Ba-Oct, 21% in Ba-Nov, 16% in Se, from Mario's slides) to compare with MIDAS

	Ba Oct (cts)	Rate (cts/s)	Ba Nov (cts)	Rate (cts/s)	Se (cts)	Rate (cts/s)
C1	7.2401E+08	6604	2.6520E+08	5516	6.8548E+08	7337
C2	1.1355E+09	10358	3.7257E+08	7749	9.2011E+08	9848
C1C2	4.4655E+08	4073	1.7906E+08	3724	4.8550E+08	5197
C0	5.5682E+08	5079	1.5785E+08	3283	2.6811E+08	2870
C3	8.3086E+08	7579	2.3157E+08	4816	4.3716E+08	4679
C1C2notC0	4.1058E+08	3745	1.6746E+08	3483	4.5720E+08	4894
C1C2notC0C3	1.7080E+08	1558	7.6304E+07	1587	2.2880E+08	2449