^{76}Ge(^{37}Cl,4nγ) 1997VaZS

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	S. Kumar(a), J. Chen(b) and F. G. Kondev	NDS 137, 1 (2016)	31-May-2016

1997VaZS: E(^{37}Cl)=138 MeV; Chalk River TASCC Facility. Target: two stacked foils of ^{76}Ge each of 300 μg/cm^2. Detectors: 8π array, 20 Ge detectors, 72 BGO, ALF ball (24 CsI detectors). Measured: Eγ, Iγ, $\gamma\gamma$-coin, $\gamma\gamma\gamma$.

^{109}In Levels

E(level)[†]	J$^\pi$[‡]	Comments
0.0[c]	9/2$^+$	
1025.9[c] 7	11/2$^+$	
1099.0[#] 8	5/2$^+$	
1428.2[c] 7	13/2$^+$	
1713.0[#] 8	9/2$^+$	
1722.0[@] 8	7/2$^+$	
1899.6 10	13/2$^+$	
2101.6 9	19/2$^+$	
2195.2[c] 13	15/2$^+$	
2271.4[e] 9	13/2$^-$	
2317.0[@] 9	11/2$^+$	
2321.3 9	15/2$^+$	
2532.0[e] 10	15/2$^-$	
2868.5[e] 10	17/2$^-$	
2957.9[e] 10	19/2$^-$	
2995.4 12	17/2$^+$	
3068.0[i] 14	17/2$^-$	
3091.8[g] 11	19/2$^-$	
3122.5[e] 11	21/2$^-$	
3155.0[@] 9	15/2$^+$	
3202.2[g] 11	21/2$^-$	
3287.0[i] 17	19/2$^-$	
3410.3[g] 12	23/2$^-$	
3462.0[e] 12	23/2$^-$	
3518.0[i] 20	21/2$^-$	
3528.5 12	21/2$^+$	
3653.5 12	17/2$^+$	
3798.1 12	23/2$^+$	
3800.3[g] 14	25/2$^-$	
3845.0[i] 22	23/2$^-$	
4037.3[e] 13	25/2$^-$	
4097.2[@] 12	19/2$^+$	
4300.4[a] 12	21/2$^+$	
4354.4[d] 12	23/2$^+$	
4436.3[g] 16	27/2$^-$	
4508.3[h] 14	27/2$^-$	
4508.3+x[f]	(25/2$^-$)	Additional information 1. J$^\pi$: feeding to 19/2$^-$ level of band 8; also feeding 23/2$^-$ and 25/2$^-$ levels of band 11.
4565.3[d] 12	25/2$^+$	
4572.3 13	25/2$^+$	
4743.4[a] 12	25/2$^+$	
4756.3[@] 13	23/2$^+$	

Continued on next page (footnotes at end of table)

^{76}Ge(^{37}Cl,4nγ) 1997VaZS (continued)

^{109}In Levels (continued)

E(level)†	Jπ‡	E(level)†	Jπ‡	E(level)†	Jπ‡
4832.3[h] 16	29/2−	6433.2[d] 15	33/2+	8632.2[d] 25	41/2+
4927.6[d] 12	27/2+	6506.5[&] 15	(31/2+)	8785.8[@] 22	43/2+
5025.3[g] 19	29/2−	6638.7[b] 19	(35/2+)	8977[b] 3	(43/2+)
5219.5[@] 13	27/2+	6667.8[@] 17	35/2+	8980.9[&] 20	(43/2+)
5241.3[h] 19	31/2−	6927.2[d] 18	35/2+	9292.3+x[f] 23	(45/2−)
5275.3+x[f] 10	(29/2−)	7119.7[b] 21	(37/2+)	9317[d] 3	43/2+
5397.3[a] 13	29/2+	7150.8[&] 16	(35/2+)	9783.0[a] 22	45/2+
5424.6[d] 13	29/2+	7287.9[a] 17	37/2+	10104.8[@] 24	47/2+
5761.7[b] 18	(29/2+)	7384.3+x[f] 18	(37/2−)	10217.9[&] 23	(47/2+)
5796.3[h] 21	33/2−	7423.2[d] 21	37/2+	10428.3+x[f] 25	(49/2−)
5850.8[@] 13	31/2+	7641.8[@] 19	39/2+	11189.0[a] 25	(49/2+)
5917.8[d] 14	31/2+	7711.7[b] 23	(39/2+)	11634[@] 3	51/2+
6005.7[b] 15	(31/2+)	7980.9[&] 17	(39/2+)	11641.9[&] 25	(51/2+)
6263.0[a] 15	33/2+	8005.2[d] 23	39/2+	11730+x[f] 3	(53/2−)
6271.7[b] 16	(33/2+)	8310.3+x[f] 20	(41/2−)	13244+x[f] 3	(57/2−)
6293.3+x[f] 15	(33/2−)	8329[b] 3	(41/2+)	13338[@] 3	(55/2+)
6428.3[h] 24	(35/2−)	8463.0[a] 20	41/2+	14821+x[f] 3	(61/2−)

† From a least-squares fit to Eγ.
‡ From 1997VaZS, based on deduced transition multipolarities and band structures.
# Band(A): Band 1: ΔJ=2 band based on 5/2+ at 1099 keV.
@ Band(B): Band 2: ΔJ=2 band based on 7/2+ at 1722 keV.
& Band(C): Band 3: ΔJ=2 band based on 31/2+ at 6507 keV.
a Band(D): Band 4: ΔJ=2 band based on 21/2+ at 4300 keV.
b Band(E): Band 5: ΔJ=1 band based on (29/2+) at 5762 keV.
c Band(F): Band 6: ground state band.
d Band(G): Band 7: ΔJ=1 band based on 23/2+ at 4354 keV.
e Band(H): Band 8: ΔJ=1 band based on 13/2− at 2271 keV.
f Band(I): Band 9: ΔJ=2 band based on (25/2−) at 4508.3+x keV.
g Band(J): Band 11: ΔJ=1 band based on 19/2− at 3091 keV.
h Band(K): Band 10: ΔJ=1 band based on 27/2− at 4508 keV.
i Band(L): Band 12: ΔJ=1 band based on 17/2− at 3068 keV.

γ(^{109}In)

Eγ†	Ei(level)	Jiπ	Ef	Jfπ	Eγ†	Ei(level)	Jiπ	Ef	Jfπ
89 1	2957.9	19/2−	2868.5	17/2−	260 1	2532.0	15/2−	2271.4	13/2−
110 1	3202.2	21/2−	3091.8	19/2−	266 1	6271.7	(33/2+)	6005.7	(31/2+)
164 1	3122.5	21/2−	2957.9	19/2−	288 1	3410.3	23/2−	3122.5	21/2−
208 1	3410.3	23/2−	3202.2	21/2−	324 1	4832.3	29/2−	4508.3	27/2−
211 1	4565.3	25/2+	4354.4	23/2+	327 1	3845.0	23/2−	3518.0	21/2−
219 1	3287.0	19/2−	3068.0	17/2−	336 1	2868.5	17/2−	2532.0	15/2−
223 1	3091.8	19/2−	2868.5	17/2−	339 1	3462.0	23/2−	3122.5	21/2−
231 1	3518.0	21/2−	3287.0	19/2−	354 1	6271.7	(33/2+)	5917.8	31/2+
244 1	3202.2	21/2−	2957.9	19/2−	355 1	4927.6	27/2+	4572.3	25/2+
244 1	6005.7	(31/2+)	5761.7	(29/2+)	362 1	4927.6	27/2+	4565.3	25/2+

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^{76}Ge(^{37}Cl,4nγ) 1997VaZS (continued)

$\gamma(^{109}In)$ (continued)

E_γ †	E_i(level)	J_i^π	E_f	J_f^π	E_γ †	E_i(level)	J_i^π	E_f	J_f^π
367 *1*	6638.7	(35/2$^+$)	6271.7	(33/2$^+$)	830 *1*	7980.9	(39/2$^+$)	7150.8	(35/2$^+$)
390 *1*	3800.3	25/2$^-$	3410.3	23/2$^-$	838 *1*	3155.0	15/2$^+$	2317.0	11/2$^+$
396 *1*	4832.3	29/2$^-$	4436.3	27/2$^-$	842 *1*	2271.4	13/2$^-$	1428.2	13/2$^+$
402 *1*	1428.2	13/2$^+$	1025.9	11/2$^+$	856 *1*	2957.9	19/2$^-$	2101.6	19/2$^+$
409 *1*	5241.3	31/2$^-$	4832.3	29/2$^-$	866 *1*	6263.0	33/2$^+$	5397.3	29/2$^+$
422 *1*	2321.3	15/2$^+$	1899.6	13/2$^+$	874 *1*	1899.6	13/2$^+$	1025.9	11/2$^+$
426 *1*	5850.8	31/2$^+$	5424.6	29/2$^+$	888 *1*	7150.8	(35/2$^+$)	6263.0	33/2$^+$
443 *1*	4743.4	25/2$^+$	4300.4	21/2$^+$	891 *1*	4927.6	27/2$^+$	4037.3	25/2$^-$
454 *1*	5850.8	31/2$^+$	5397.3	29/2$^+$	893 *1*	2321.3	15/2$^+$	1428.2	13/2$^+$
463 *1*	5219.5	27/2$^+$	4756.3	23/2$^+$	926 *1*	8310.3+x	(41/2$^-$)	7384.3+x	(37/2$^-$)
470 *1*	5397.3	29/2$^+$	4927.6	27/2$^+$	942 *1*	4097.2	19/2$^+$	3155.0	15/2$^+$
471 *1*	4508.3	27/2$^-$	4037.3	25/2$^-$	974 *1*	7641.8	39/2$^+$	6667.8	35/2$^+$
476 *1*	5219.5	27/2$^+$	4743.4	25/2$^+$	982 *1*	9292.3+x	(45/2$^-$)	8310.3+x	(41/2$^-$)
481 *1*	7119.7	(37/2$^+$)	6638.7	(35/2$^+$)	990 *1*	3091.8	19/2$^-$	2101.6	19/2$^+$
493 *1*	5917.8	31/2$^+$	5424.6	29/2$^+$	990 *1*	5917.8	31/2$^+$	4927.6	27/2$^+$
494 *1*	6927.2	35/2$^+$	6433.2	33/2$^+$	1000 *1*	8980.9	(43/2$^+$)	7980.9	(39/2$^+$)
496 *1*	7423.2	37/2$^+$	6927.2	35/2$^+$	1009 *1*	6433.2	33/2$^+$	5424.6	29/2$^+$
497 *1*	5424.6	29/2$^+$	4927.6	27/2$^+$	1018 *1*	6293.3+x	(33/2$^-$)	5275.3+x	(29/2$^-$)
515 *1*	6433.2	33/2$^+$	5917.8	31/2$^+$	1021 *1*	3122.5	21/2$^-$	2101.6	19/2$^+$
536‡ *1*	3068.0	17/2$^-$	2532.0	15/2$^-$	1025 *1*	7287.9	37/2$^+$	6263.0	33/2$^+$
547 *1*	2868.5	17/2$^-$	2321.3	15/2$^+$	1026 *1*	1025.9	11/2$^+$	0.0	9/2$^+$
555 *1*	5796.3	33/2$^-$	5241.3	31/2$^-$	1053 *1*	3155.0	15/2$^+$	2101.6	19/2$^+$
576 *1*	4037.3	25/2$^-$	3462.0	23/2$^-$	1091 *1*	7384.3+x	(37/2$^-$)	6293.3+x	(33/2$^-$)
581 *1*	6005.7	(31/2$^+$)	5424.6	29/2$^+$	1099 *1*	1099.0	5/2$^+$	0.0	9/2$^+$
582 *1*	8005.2	39/2$^+$	7423.2	37/2$^+$	1101 *1*	3202.2	21/2$^-$	2101.6	19/2$^+$
589 *1*	5025.3	29/2$^-$	4436.3	27/2$^-$	1102 *1*	4565.3	25/2$^+$	3462.0	23/2$^-$
592 *1*	7711.7	(39/2$^+$)	7119.7	(37/2$^+$)	1104 *1*	2532.0	15/2$^-$	1428.2	13/2$^+$
595 *1*	2317.0	11/2$^+$	1722.0	7/2$^+$	1109 *1*	6506.5	(31/2$^+$)	5397.3	29/2$^+$
604 *1*	2317.0	11/2$^+$	1713.0	9/2$^+$	1136 *1*	10428.3+x	(49/2$^-$)	9292.3+x	(45/2$^-$)
614 *1*	1713.0	9/2$^+$	1099.0	5/2$^+$	1144 *1*	8785.8	43/2$^+$	7641.8	39/2$^+$
617 *1*	8329	(41/2$^+$)	7711.7	(39/2$^+$)	1175 *1*	8463.0	41/2$^+$	7287.9	37/2$^+$
623 *1*	1722.0	7/2$^+$	1099.0	5/2$^+$	1232 *1*	4354.4	23/2$^+$	3122.5	21/2$^-$
627 *1*	8632.2	41/2$^+$	8005.2	39/2$^+$	1237 *1*	10217.9	(47/2$^+$)	8980.9	(43/2$^+$)
631 *1*	5850.8	31/2$^+$	5219.5	27/2$^+$	1246 *1*	2271.4	13/2$^-$	1025.9	11/2$^+$
632 *1*	6428.3	(35/2$^-$)	5796.3	33/2$^-$	1295 *1*	2321.3	15/2$^+$	1025.9	11/2$^+$
636 *1*	4436.3	27/2$^-$	3800.3	25/2$^-$	1302 *1*	11730+x	(53/2$^-$)	10428.3+x	(49/2$^-$)
644 *1*	7150.8	(35/2$^+$)	6506.5	(31/2$^+$)	1305 *1*	4300.4	21/2$^+$	2995.4	17/2$^+$
647 *1*	4300.4	21/2$^+$	3653.5	17/2$^+$	1319 *1*	10104.8	47/2$^+$	8785.8	43/2$^+$
648 *1*	8977	(43/2$^+$)	8329	(41/2$^+$)	1320 *1*	9783.0	45/2$^+$	8463.0	41/2$^+$
654 *1*	5397.3	29/2$^+$	4743.4	25/2$^+$	1406‡ *1*	11189.0	(49/2$^+$)	9783.0	45/2$^+$
659 *1*	4756.3	23/2$^+$	4097.2	19/2$^+$	1424‡ *1*	11641.9	(51/2$^+$)	10217.9	(47/2$^+$)
674 *1*	2101.6	19/2$^+$	1428.2	13/2$^+$	1427 *1*	3528.5	21/2$^+$	2101.6	19/2$^+$
674 *1*	2995.4	17/2$^+$	2321.3	15/2$^+$	1428 *1*	1428.2	13/2$^+$	0.0	9/2$^+$
685 *1*	9317	43/2$^+$	8632.2	41/2$^+$	1514 *1*	13244+x	(57/2$^-$)	11730+x	(53/2$^-$)
687 *1*	1713.0	9/2$^+$	1025.9	11/2$^+$	1529 *1*	11634	51/2$^+$	10104.8	47/2$^+$
693 *1*	7980.9	(39/2$^+$)	7287.9	37/2$^+$	1552 *1*	3653.5	17/2$^+$	2101.6	19/2$^+$
708 *1*	4508.3	27/2$^-$	3800.3	25/2$^-$	1577‡ *1*	14821+x	(61/2$^-$)	13244+x	(57/2$^-$)
767 *1*	5275.3+x	(29/2$^-$)	4508.3+x	(25/2$^-$)	1697 *1*	3798.1	23/2$^+$	2101.6	19/2$^+$
767 *1*	2195.2	15/2$^+$	1428.2	13/2$^+$	1704‡ *1*	13338	(55/2$^+$)	11634	51/2$^+$
768 *1*	4565.3	25/2$^+$	3798.1	23/2$^+$	1712‡ *1*	1713.0	9/2$^+$	0.0	9/2$^+$
774 *1*	4572.3	25/2$^+$	3798.1	23/2$^+$	1722 *1*	1722.0	7/2$^+$	0.0	9/2$^+$
817 *1*	6667.8	35/2$^+$	5850.8	31/2$^+$	1727 *1*	3155.0	15/2$^+$	1428.2	13/2$^+$
826 *1*	4354.4	23/2$^+$	3528.5	21/2$^+$					

Continued on next page (footnotes at end of table)

^{76}Ge(^{37}Cl,4nγ) 1997VaZS (continued)

$\gamma(^{109}In)$ (continued)

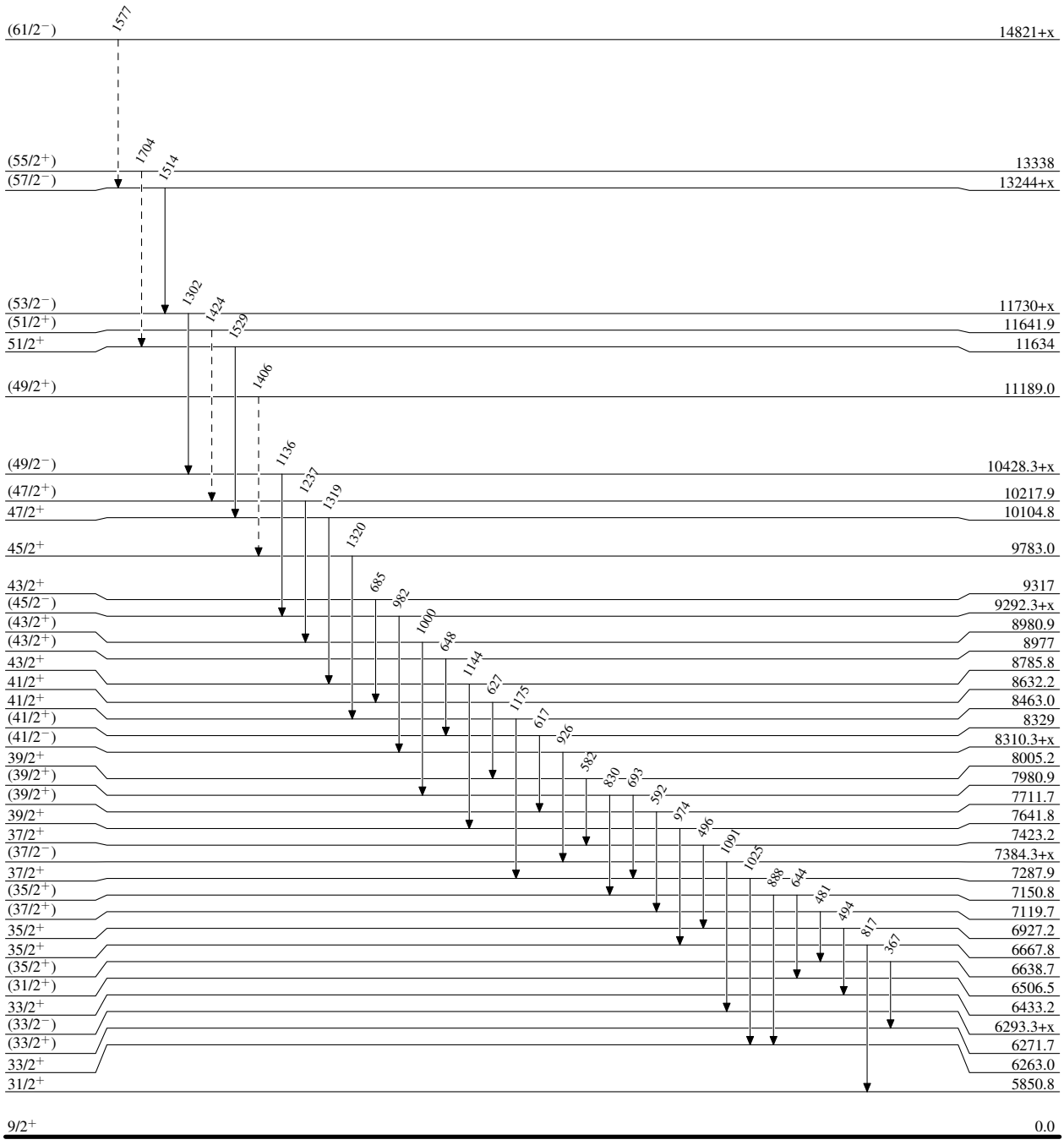
† $\Delta E\gamma$=1 keV was assumed by evaluators.
‡ Placement of transition in the level scheme is uncertain.

Legend

$^{76}Ge(^{37}Cl,4n\gamma)$ 1997VaZS

Level Scheme

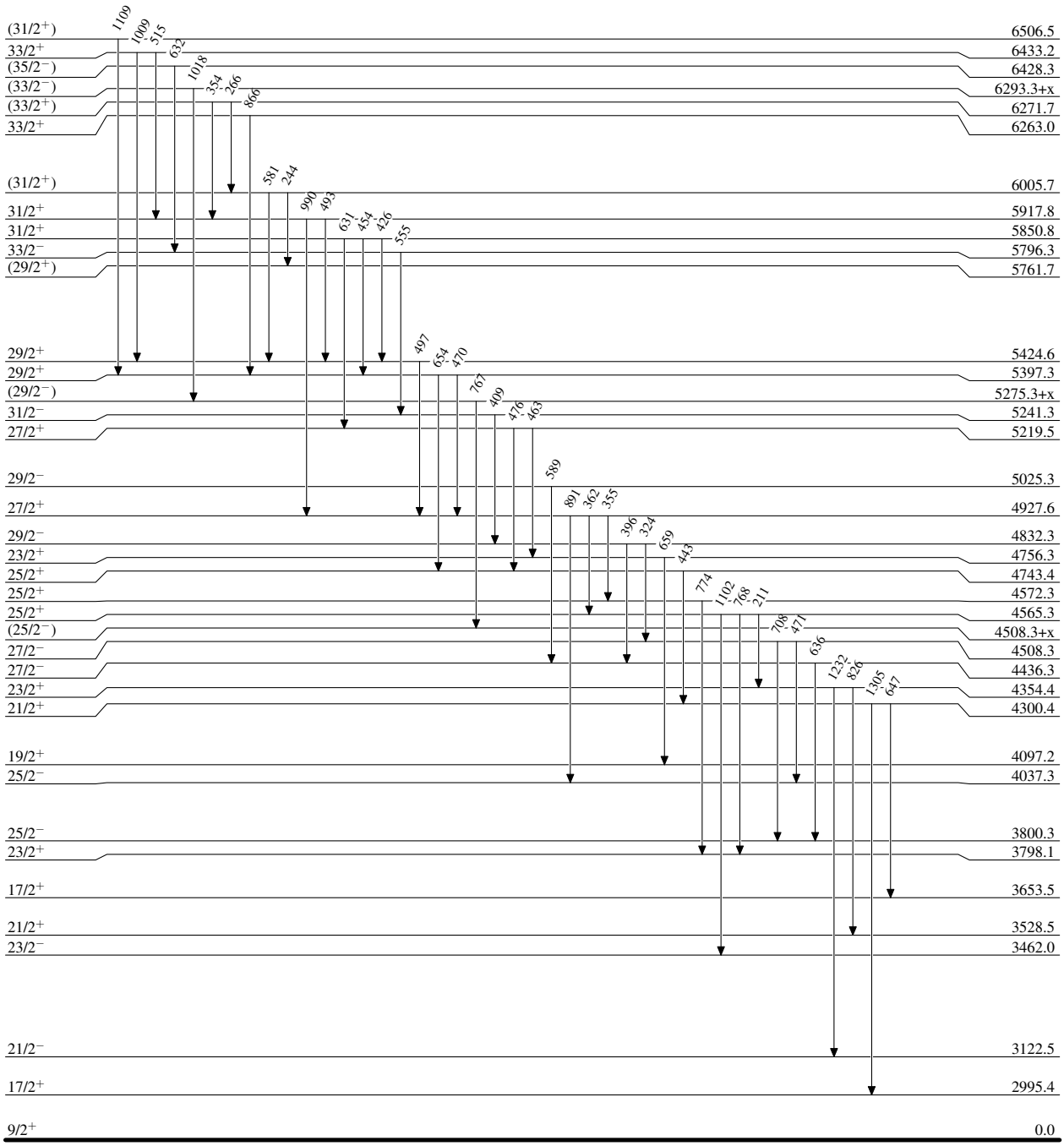
γ Decay (Uncertain)



$^{109}_{49}In_{60}$

^{76}Ge(^{37}Cl,4nγ) 1997VaZS

Level Scheme (continued)



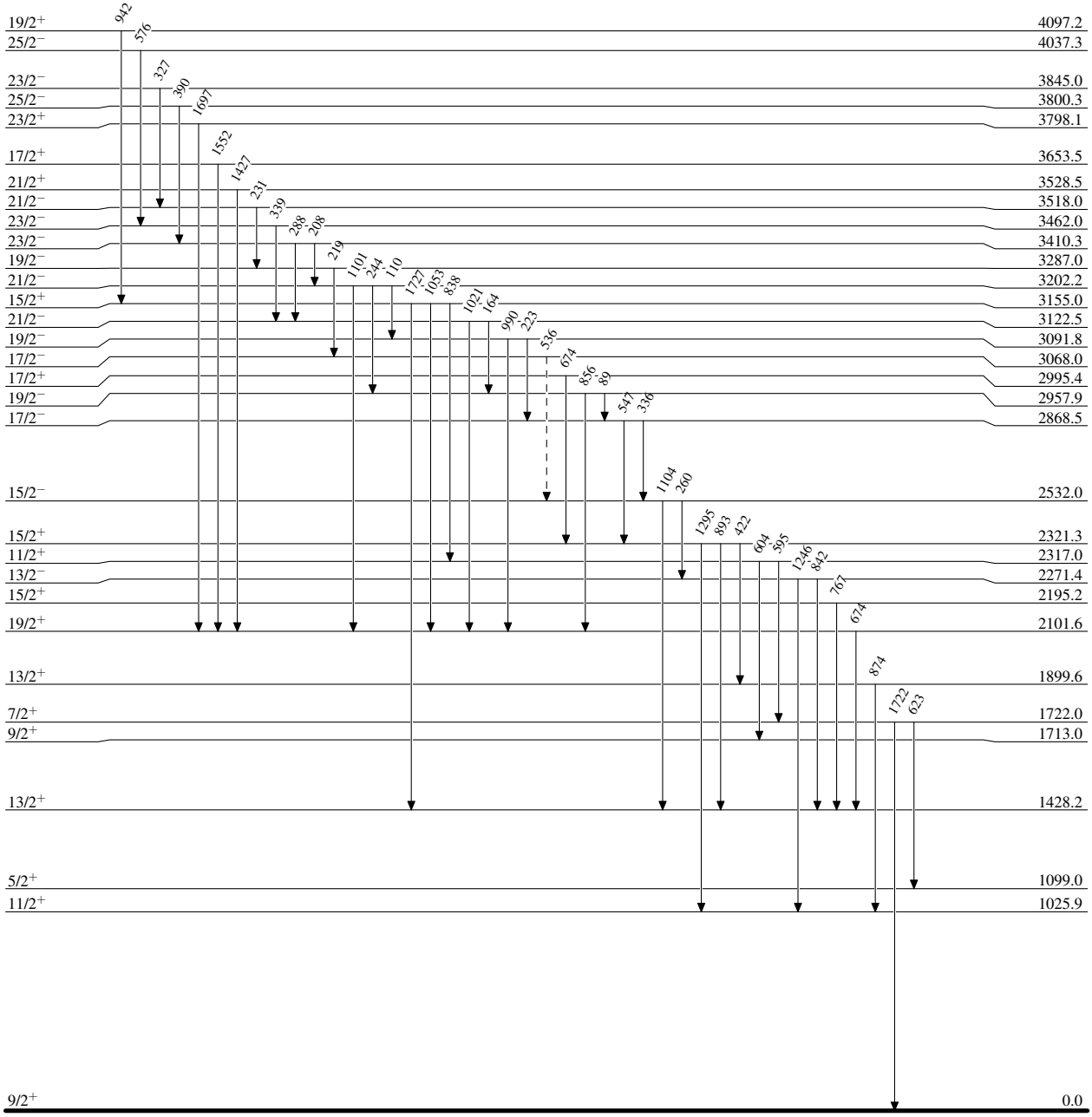
$^{109}_{49}In_{60}$

^{76}Ge(^{37}Cl,4nγ) 1997VaZS

Legend

γ Decay (Uncertain)

Level Scheme (continued)



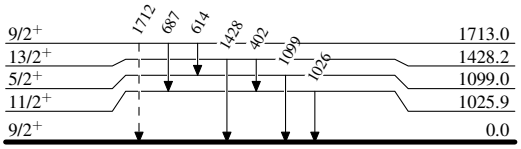
$^{109}_{49}In_{60}$

^{76}Ge(^{37}Cl,4nγ) 1997VaZS

Legend

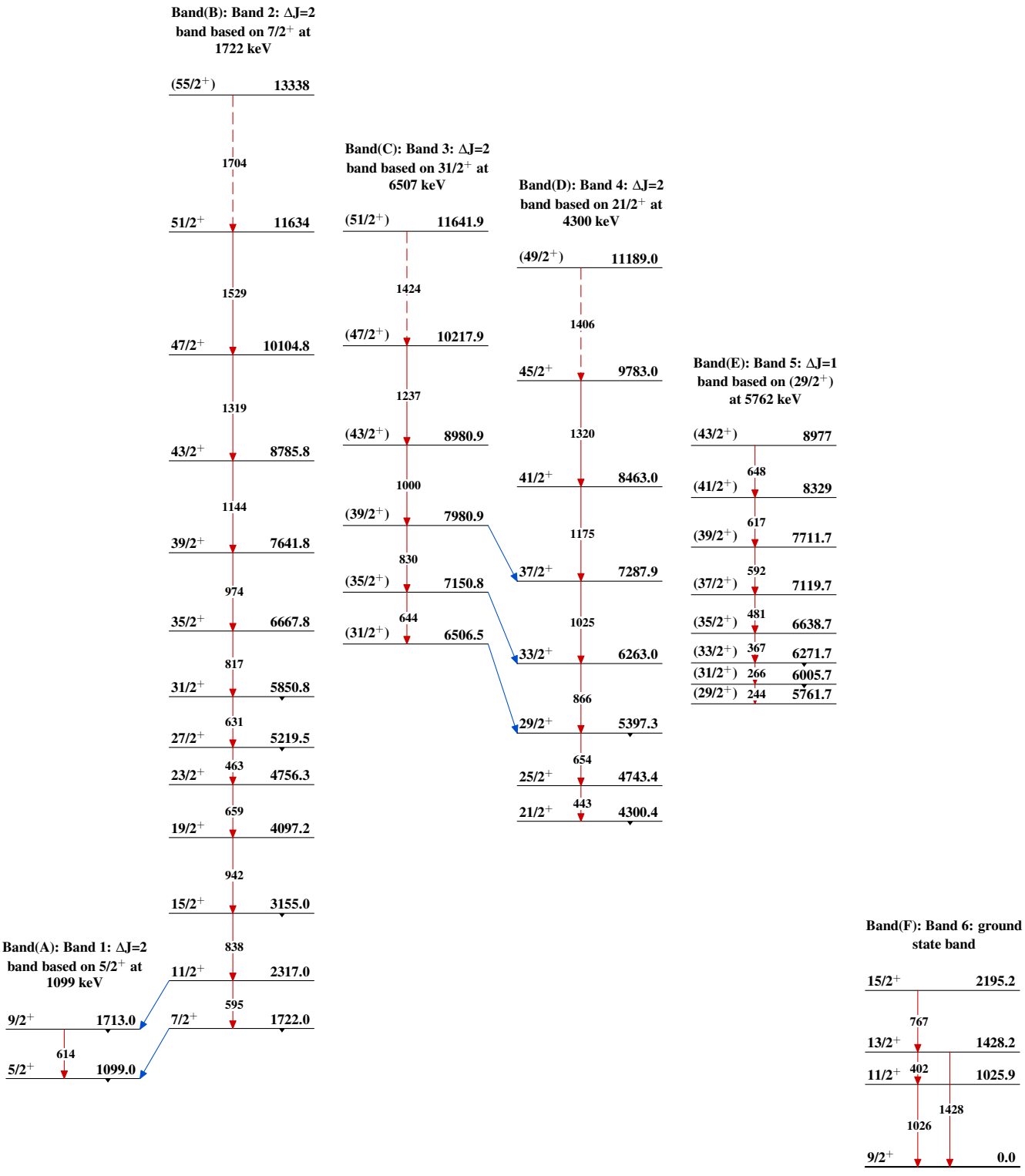
Level Scheme (continued)

γ Decay (Uncertain)



$^{109}_{49}In_{60}$

$^{76}Ge(^{37}Cl,4n\gamma)$ 1997VaZS



$^{76}Ge(^{37}Cl,4n\gamma)$ 1997VaZS (continued)