^{54}Fe(^{58}Ni,3pnγ) 1998Je09,1995Ce01

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Jean Blachot	ENSDF	1-Jul-2008

1998Je09: ^{54}Fe(^{58}Ni,3pnγ) E=243 MeV. Measured: 95 Ge-BGO spectrometers,"GAMMASPHERE".

1995Ce01 (also 1993Jo07): ^{54}Fe(^{58}Ni,3pnγ) E=270 MeV. Measured: 15 Ge-BGO spectrometers, a 4π charge particle detector, 2π calorimeter (BaF2), and 11π neutron detectors. 420 million $\gamma\gamma$ coin between γ, n, α particles.

The level scheme is from 1998Je09. They have extended the level scheme given by 1995Ce01 by many transitions (noted), they have also shown one inconsistency with the level scheme of 1995Ce01. 1995Ce01 show the 836γ in parallel to the 990γ, while 1998Je09 place the 836 above the 990 and identify it as an E2 from DCO.

^{108}Sb Levels

E(level)[†]	J$^\pi$[#]	E(level)[†]	J$^\pi$[#]	E(level)[†]	J$^\pi$[#]	E(level)[†]	J$^\pi$[#]
0.0[a]	4$^+$	2100.5 *5*	9$^-$	3375.5[&] *4*	12$^-$	5062.6[&] *5*	16$^-$
259.5 *3*	5$^+$	2154.7[@] *4*	7$^-$	3377.4[@] *4*	12$^-$	5101.6[@] *5*	16$^-$
376.3 *4*	6$^+$	2246.0[@] *4*	8$^-$	3720.7[&] *4*	13$^-$	5159.8[a] *6*	15$^-$
409.4 *4*	5$^+$	2438.3[@] *4*	9$^-$	3764.3[@] *4*	13$^-$	5457.7 *8*	16$^-$
1137.0 *5*	7$^+$	2478.9[‡] *5*	9$^-$	3812.6[b] *5*	13$^-$	5560.0[&] *6*	17$^-$
1149.5[a] *4*	6$^+$	2510.4[a] *5*	10$^-$	3851.1 *5*	13$^-$	5611.2[@] *5*	17$^-$
1292.3 *4*	6$^+$	2538.8[‡] *5*	9$^-$	4040.6[a] *5*	13$^-$	5867.5[b] *8*	17$^-$
1385.2[a] *4*	7$^+$	2720.0[@] *4*	10$^-$	4057.1[b] *5*	14$^-$	5868.3[a] *7*	16$^-$
1404.0 *4*	6$^+$	2752.5[&] *5*	10$^-$	4173.2[@] *4*	14$^-$	6090.5[&] *6*	18$^-$
1467.8[b] *4*	8$^+$	2977.2[b] *4*	11$^-$	4176.1[&] *4*	14$^-$	6149.8[@] *5*	18$^-$
1468.3 *5*	7$^+$	3032.5[@] *4*	11$^-$	4571.1 *6*	15$^-$	6586.4 *8*	18$^-$
1512.7[a] *4*	8$^-$	3056.5[&] *4*	11$^-$	4595.5[&] *5*	15$^-$	6643.4[&] *7*	19$^-$
1571.3 *4*	7$^+$	3081.9[a] *6*	11$^-$	4613.0[@] *5*	15$^-$	6719.5[@] *6*	19$^-$
1880.8 *4*	7$^-$	3316.4 *5*	11$^-$	4961.3[a] *6*	14$^-$	6726.1[b] *10*	18$^-$
1987.2[b] *5*	9$^-$	3362.0[a] *4*	12$^-$	4999.6[b] *6*	16$^-$	7214.5[&] *7*	20$^-$

[†] From least-squares fit To Eγ's.
[‡] Level also fed by band #2 through, as yet, undefined gammas.
[#] From gammas, DCO ratios, decay patterns and systematics.
[@] Band(A): Band 1.
[&] Band(B): Band 2.
[a] Band(C): γ sequence.
[b] Band(D): γ sequence.

γ(^{108}Sb)

E$_\gamma$[†]	I$_\gamma$[†]	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Mult.[†]	Comments
91.4 *5*	35 *5*	2246.0	8$^-$	2154.7	7$^-$	M1	DCO= 0.95 *1*.
116.8 *5*	44 *6*	376.3	6$^+$	259.5	5$^+$	M1	DCO= 0.88 *1*.
127.5 *5*	15.6 *22*	1512.7	8$^-$	1385.2	7$^+$	E1	DCO= 0.88 *1*.
192.3[‡] *1*	30.0[‡] *4*	2438.3	9$^-$	2246.0	8$^-$	M1	DCO= 0.80 *1* (1998Je09).
236.0 *5*	26 *4*	1385.2	7$^+$	1149.5	6$^+$	M1	DCO= 0.93 *3*.
244.1[‡] *3*	2.0[‡] *2*	4057.1	14$^-$	3812.6	13$^-$	M1	DCO= 0.83 *12* (1998Je09).
259.5 *5*	100	259.5	5$^+$	0.0	4$^+$	M1	DCO= 0.81 *1*.
273.9[‡] *1*	2.7[‡] *4*	2154.7	7$^-$	1880.8	7$^-$	M1	DCO= 0.52 *12* (1998Je09).
279.0 *5*	10.2 *14*	1571.3	7$^+$	1292.3	6$^+$	M1	DCO= 1.11 *7*.
281.6[‡] *2*	93.4[‡] *3*	2720.0	10$^-$	2438.3	9$^-$	M1	DCO= 0.85 *1* (1998Je09).

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^{54}Fe(^{58}Ni,3pnγ) 1998Je09,1995Ce01 (continued)

γ(^{108}Sb) (continued)

E_γ †	I_γ †	E_i(level)	J_i^π	E_f	J_f^π	Mult. †	Comments
283# *1*		2438.3	9^-	2154.7	7^-		
292.4 *5*	12.0 *17*	4057.1	14^-	3764.3	13^-	M1	DCO= 0.98 *7*.
304.0‡ *1*	8.5‡ *2*	3056.5	11^-	2752.5	10^-	M1	DCO= 0.68 *6* (1998Je09).
312.5‡ *1*	76.3‡ *4*	3032.5	11^-	2720.0	10^-	M1	DCO= 0.91 *1* (1998Je09).
319.0‡ *1*	19.6‡ *3*	3375.5	12^-	3056.5	11^-	M1	DCO= 0.75 *5* (1998Je09).
329.5‡ *1*	2.8‡ *4*	3362.0	12^-	3032.5	11^-		DCO= 0.86 *12*.
338.4 *5*	12.4 *18*	4057.1	14^-	3720.7	13^-	M1	E_γ: poor fit. Level-energy difference=336.4. DCO= 0.99 *7*.
342.9‡ *3*	33.2‡ *12*	3720.7	13^-	3377.4	12^-	M1	DCO= 0.93 *4* (1998Je09).
344.2 *5*	88 *12*	3377.4	12^-	3032.5	11^-	M1	DCO= 1.04 *22*.
346.1‡ *1*	31.6‡ *11*	3720.7	13^-	3375.5	12^-	M1	E_γ: poor fit. Level-energy difference=345.2. DCO= 0.88 *8* (1998Je09).
358.0‡ *1*	5.7‡ *3*	3720.7	13^-	3362.0	12^-	M1	E_γ: poor fit. Level-energy difference=358.7. DCO= 0.70 *8* (1998Je09).
361.0‡ *3*	1.3‡ *4*	4173.2	14^-	3812.6	13^-	M1	DCO= 0.78 *16* (1998Je09).
375.7 *5*	10.3 *15*	1512.7	8^-	1137.0	7^+	E1	DCO= 1.02 *11*.
387.9‡ *1*	36.8‡ *2*	3764.3	13^-	3375.5	12^-	M1	E_γ: poor fit. Level-energy difference=388.8. DCO= 0.81 *2* (1998Je09).
397.5 *5*	6.7 *10*	4571.1	15^-	4173.2	14^-		DCO= 1.17 *11*.
400.2‡ *1*	6.4‡ *3*	3377.4	12^-	2977.2	11^-	M1	DCO= 0.82 *5* (1998Je09).
403.0‡ *1*	5.2‡ *3*	3764.3	13^-	3362.0	12^-	M1	E_γ: poor fit. Level-energy difference=402.3. DCO= 0.75 *6* (1998Je09).
408.9‡ *1*	31.2‡ *2*	4173.2	14^-	3764.3	13^-	M1	DCO= 0.90 *4* (1998Je09).
409.4 *5*	51 *7*	409.4	5^+	0.0	4^+	M1	DCO= 0.92 *3*.
419.4‡ *1*	9.2‡ *3*	4595.5	15^-	4176.1	14^-	M1	DCO= 0.71 *6* (1998Je09).
428.4 *5*	4.5 *19*	4999.6	16^-	4571.1	15^-		
434.9‡ *3*	1.7‡ *2*	3812.6	13^-	3377.4	12^-	M1	DCO= 0.79 *9* (1998Je09).
439.7‡ *1*	21.5‡ *3*	4613.0	15^-	4173.2	14^-	M1	DCO= 0.83 *3* (1998Je09).
450# *1*		2438.3	9^-	1987.2	9^-		
455.4‡ *1*	35.3‡ *3*	4176.1	14^-	3720.7	13^-	M1	DCO= 0.79 *5* (1998Je09).
467.1‡ *2*	13.8‡ *3*	5062.6	16^-	4595.5	15^-	M1	DCO= 0.90 *4* (1998Je09).
473.6 *5*	8.8 *21*	2720.0	10^-	2246.0	8^-	E2	DCO= 0.65 *12*.
488.6‡ *1*	18.2‡ *3*	5101.6	16^-	4613.0	15^-	M1	DCO= 0.97 *6* (1998Je09).
495.8‡ *3*	11.1‡ *3*	1880.8	7^-	1385.2	7^+	E1	DCO= 0.58 *6*.
497.4‡ *4*	6.1‡ *4*	5560.0	17^-	5062.6	16^-	M1	DCO= 0.96 *11* (1998Je09).
509.6‡ *1*	11.6‡ *4*	5611.2	17^-	5101.6	16^-	M1	DCO= 0.87 *5* (1998Je09).
519.9 *5*	22 *3*	1987.2	9^-	1467.8	8^+	E1	DCO= 1.00 *9*.
530.5‡ *2*	4.3‡ *4*	6090.5	18^-	5560.0	17^-	M1	DCO= 0.81 *8* (1998Je09).
534.8‡ *2*	3.7‡ *3*	3851.1	13^-	3316.4	11^-	E2	DCO= 1.34 *7* (1998Je09).
538.5‡ *2*	6.6‡ *3*	6149.8	18^-	5611.2	17^-	M1	DCO= 0.93 *8* (1998Je09).
546.2‡ *2*	1.5‡ *2*	3056.5	11^-	2510.4	10^-	M1	DCO= 0.98 *9*.
552.9‡ *2*	1.8‡ *4*	6643.4	19^-	6090.5	18^-	M1	DCO= 0.92 *10* (1998Je09).
556.3 *5*	8.2 *12*	4613.0	15^-	4057.1	14^-	M1	DCO= 1.40 *23*.
557.5‡ *2*	7.5‡ *4*	2438.3	9^-	1880.8	7^-	E2	DCO= 1.18 *6* (1998Je09).
569.6‡ *3*	1.5‡ *4*	6719.5	19^-	6149.8	18^-	M1	DCO= 0.76 *13* (1998Je09).
571.1‡ *2*	1.2‡ *3*	7214.5	20^-	6643.4	19^-	M1	DCO= 0.97 *15* (1998Je09).
571.3 *5*	6.3 *10*	3081.9	11^-	2510.4	10^-	E2	DCO= 0.86 *18*.
583.3 *5*	19 *3*	2154.7	7^-	1571.3	7^+	E1	DCO= 1.18 *13*.

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^{54}Fe(^{58}Ni,3pnγ) 1998Je09,1995Ce01 (continued)

γ(^{108}Sb) (continued)

E_γ [†]	I_γ [†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	Comments
594.0 *5*	17 *3*	3032.5	11^-	2438.3	9^-	E2	
623[#] *1*		3375.5	12^-	2752.5	10^-		
632.6[‡] *2*	3.9[‡] *3*	2100.5	9^-	1467.8	8^+	E1	DCO= 0.76 *8* (1998Je09).
657.0 *5*	8.5 *12*	3377.4	12^-	2720.0	10^-	E2	DCO= 1.72 *15*.
665[#] *1*		3720.7	13^-	3056.5	11^-		
674.8 *5*	10.3 *15*	2246.0	8^-	1571.3	7^+	E1	DCO= 0.89 *14*.
678.7[‡] *3*	2.3[‡] *4*	4040.6	13^-	3362.0	12^-	M1	DCO= 0.70 *13* (1998Je09).
680.1 *5*	8.6 *12*	4057.1	14^-	3377.4	12^-	E2	DCO= 1.73 *19*.
686[&] *2*		3720.7	13^-	3032.5	11^-		Tentative placement by 1995Ce01.
686.5 *5*	12.8 *18*	2154.7	7^-	1468.3	7^+	E1	DCO= 1.60 *12*.
721 *1*		4571.1	15^-	3851.1	13^-		
732.6[@] *5*	10.3[@] *15*	2246.0	8^-	1512.7	8^-	E2	DCO= 1.16 *52*.
732.6[@] *5*	10.3[@] *15*	3764.3	13^-	3032.5	11^-	E2	DCO= 1.16 *52*.
733[#] *1*		2720.0	10^-	1987.2	9^-		
743.2[‡] *3*	1.6[‡] *3*	3720.7	13^-	2977.2	11^-	E2	DCO= 1.08 *14* (1998Je09).
750.6 *5*	10.8 *16*	2154.7	7^-	1404.0	6^+	E1	DCO= 1.66 *23*.
760.6 *5*	15.1 *22*	1137.0	7^+	376.3	6^+	M1	DCO= 0.63 *5*.
773.0 *5*	6.2 *16*	1149.5	6^+	376.3	6^+	M1	DCO= 1.7 *4*.
777.5[‡] *2*	3.6[‡] *4*	3316.4	11^-	2538.8	9^-	E2	DCO= 1.25 *11* (1998Je09).
777.8[@] *5*	12.9[@] *19*	2246.0	8^-	1468.3	7^+	E1	DCO= 1.18 *9*.
777.8[@] *5*	12.9[@] *19*	2246.0	8^-	1467.8	8^+	E1	
[x]796.7 *5*	12 *4*						
797[#] *1*		4173.2	14^-	3377.4	12^-		I_γ: shown to be a strong γ in fig 1 of 1998Je09.
798[#] *1*		4176.1	14^-	3377.4	12^-		
801[#] *1*		4176.1	14^-	3375.5	12^-		
835.5[‡] *2*	3.9[‡] *4*	3812.6	13^-	2977.2	11^-	E2	DCO= 1.23 *7* (1998Je09).
837.6 *3*	2.1 *3*	3316.4	11^-	2478.9	9^-	E2	DCO= 1.44 *9* (1998Je09).
848.9 *5*	11 *5*	4613.0	15^-	3764.3	13^-	E2	DCO= 1.25 *22*.
851.7 *5*	16.8 *24*	3362.0	12^-	2510.4	10^-	E2	DCO= 1.49 *11*.
858.6 *5*	4.2 *7*	6726.1	18^-	5867.5	17^-	E2	DCO= 1.7 *6*.
862.5 *5*	16.1 *23*	2154.7	7^-	1292.3	6^+	E1	DCO= 0.87 *6*.
867.9 *5*	5.2 *8*	5867.5	17^-	4999.6	16^-	M1	DCO= 1.07 *23*.
874.0[‡] *3*	2.1[‡] *4*	3851.1	13^-	2977.2	11^-	E2	DCO= 1.53 *18* (1998Je09).
874[#] *1*		4595.5	15^-	3720.7	13^-		
876.6[‡] *2*	3.0[‡] *4*	2977.2	11^-	2100.5	9^-	E2	DCO= 1.22 *12* (1998Je09).
886.6 *5*	7.8 *22*	5062.6	16^-	4176.1	14^-		
886.6 *5*		5457.7	16^-	4571.1	15^-		
890.3 *5*	9.3 *14*	1149.5	6^+	259.5	5^+	M1	DCO= 0.53 *20*.
[x]893.8	4.8 *7*						
907.0[‡] *4*	1.4[‡] *4*	5868.3	16^-	4961.3	14^-	E2	DCO= 1.62 *19* (1998Je09).
920.7[‡] *2*	2.3[‡] *3*	4961.3	14^-	4040.6	13^-	M1	DCO= 0.83 *16* (1998Je09).
925.8 *5*	10.0 *14*	2438.3	9^-	1512.7	8^-	E2	DCO= 1.60 *17*.
928.5 *5*	5.0 *8*	5101.6	16^-	4173.2	14^-	(E2)	DCO= 0.80 *15*.
942.6 *5*	8.8 *13*	4999.6	16^-	4057.1	14^-	E2	DCO= 1.34 *13*.
958.5 *5*	4.4 *7*	4040.6	13^-	3081.9	11^-	E2	DCO= 1.45 *29*.
964[#] *1*		5560.0	17^-	4595.5	15^-		
989.7 *5*	14.4 *20*	2977.2	11^-	1987.2	9^-		DCO= 1.49 *16*.
994.3 *5*	5.2 *18*	1404.0	6^+	409.4	5^+	M1	DCO= 1.07 *19*.
998.3 *5*	22 *3*	2510.4	10^-	1512.7	8^-	E2	DCO= 1.40 *8*.
998.3[‡] *5*	22[‡] *3*	5611.2	17^-	4613.0	15^-	(E2)	DCO= 1.40 *8*.

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^{54}Fe(^{58}Ni,3pnγ) 1998Je09,1995Ce01 (continued)

γ(^{108}Sb) (continued)

E_γ[†]	I_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	Comments
1011.1[‡] *2*	3.1[‡] *3*	2478.9	9^-	1467.8	8^+	E1	DCO= 0.86 *15* (1998Je09).
1017.6 *5*	2.9 *5*	2154.7	7^-	1137.0	7^+	E1	
1028[#] *1*		6090.5	18^-	5062.6	16^-		
1028.1 *5*	4.8 *8*	1404.0	6^+	376.3	6^+	M1	DCO= 1.05 *18*.
1032.6 *5*	8 *3*	1292.3	6^+	259.5	5^+	M1	
1045.5[‡] *2*	2.3[‡] *3*	3032.5	11^-	1987.2	9^-	E2	DCO= 1.50 *16* (1998Je09).
1048.8 *5*	2.2 *4*	6149.8	18^-	5101.6	16^-		
1059.1 *5*	26 *4*	1468.3	7^+	409.4	5^+	E2	DCO= 1.68 *8*.
1071.0[‡] *2*	5.2[‡] *4*	2538.8	9^-	1467.8	8^+	E1	DCO= 0.93 *8* (1998Je09).
1084[#] *1*		6643.4	19^-	5560.0	17^-		
1091.3 *5*	46 *7*	1467.8	8^+	376.3	6^+	E2	DCO= 1.38 *7*.
1109[#] *1*		6719.5	19^-	5611.2	17^-		
1119.2[‡] *2*	2.7[‡] *3*	5159.8	15^-	4040.6	13^-	E2	DCO= 1.52 *14* (1998Je09).
1124[#] *1*		7214.5	20^-	6090.5	18^-		
1128.7[‡] *2*	2.5[‡] *3*	6586.4	18^-	5457.7	16^-	E2	DCO= 1.18 *12* (1998Je09).
1144.2 *5*	4.4 *16*	1404.0	6^+	259.5	5^+	M1	DCO= 1.60 *19*.
1149.5 *5*	26 *4*	1149.5	6^+	0.0	4^+	E2	DCO= 1.53 *10*.
1292.4 *5*	11.3 *16*	1292.3	6^+	0.0	4^+	E2	DCO= 1.59 *11*.
1311.7 *5*	6.9 *10*	1571.3	7^+	259.5	5^+	E2	DCO= 2.03 *8*.

[†] From 1995Ce01, unless otherwise noted. MULT are from DCO ratios.
[‡] From 1998Je09, $\Delta E\gamma$ assumed to be 1 keV.
[#] From figure 1 of 1998Je09.
[@] Multiply placed with undivided intensity.
[&] Placement of transition in the level scheme is uncertain.
[x] γ ray not placed in level scheme.

^{54}Fe(^{58}Ni,3pnγ) 1998Je09,1995Ce01

Level Scheme

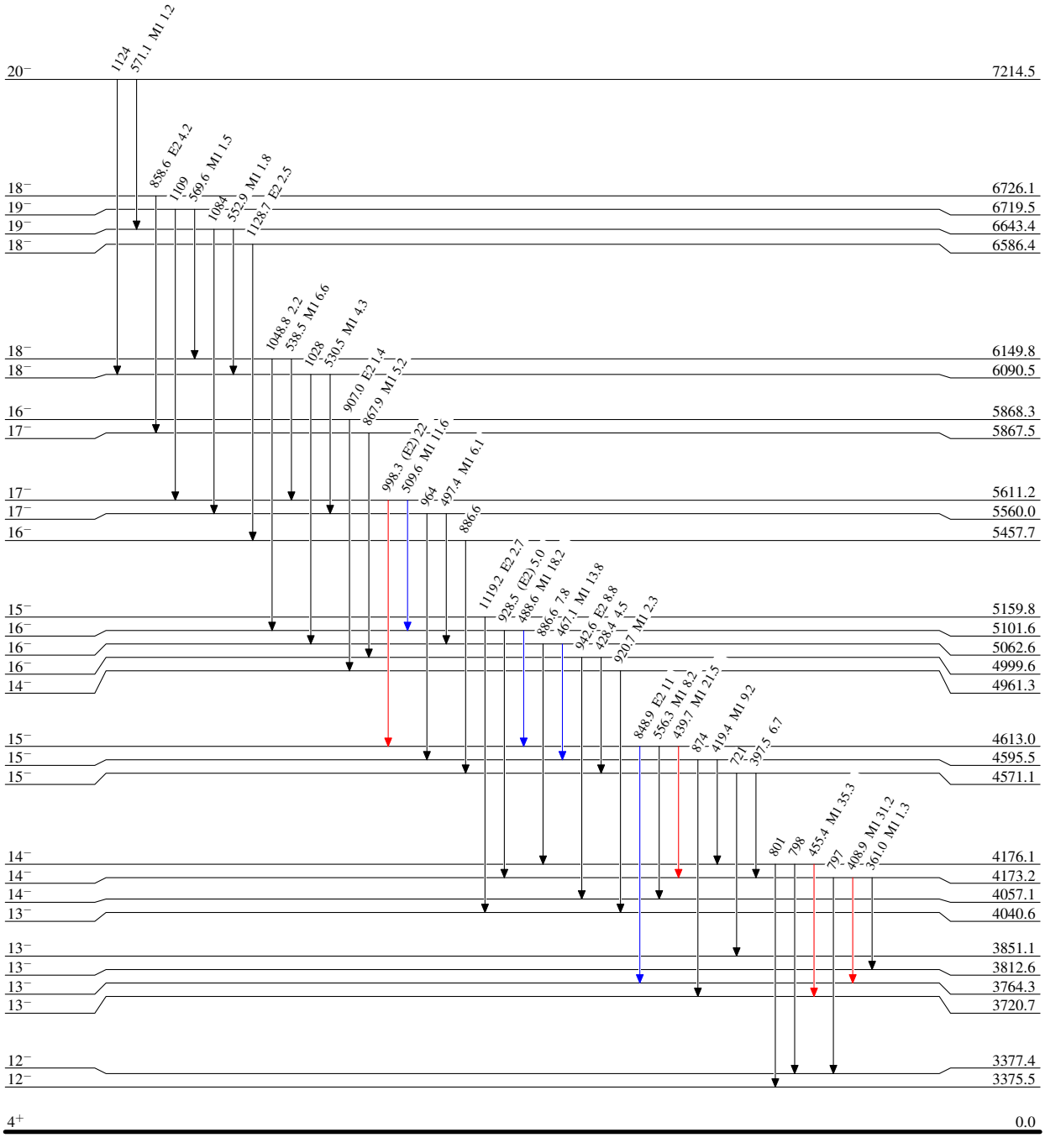
Intensities: Relative I_γ

Legend

$I_\gamma < 2\% \times I_\gamma^{max}$

$I_\gamma < 10\% \times I_\gamma^{max}$

$I_\gamma > 10\% \times I_\gamma^{max}$



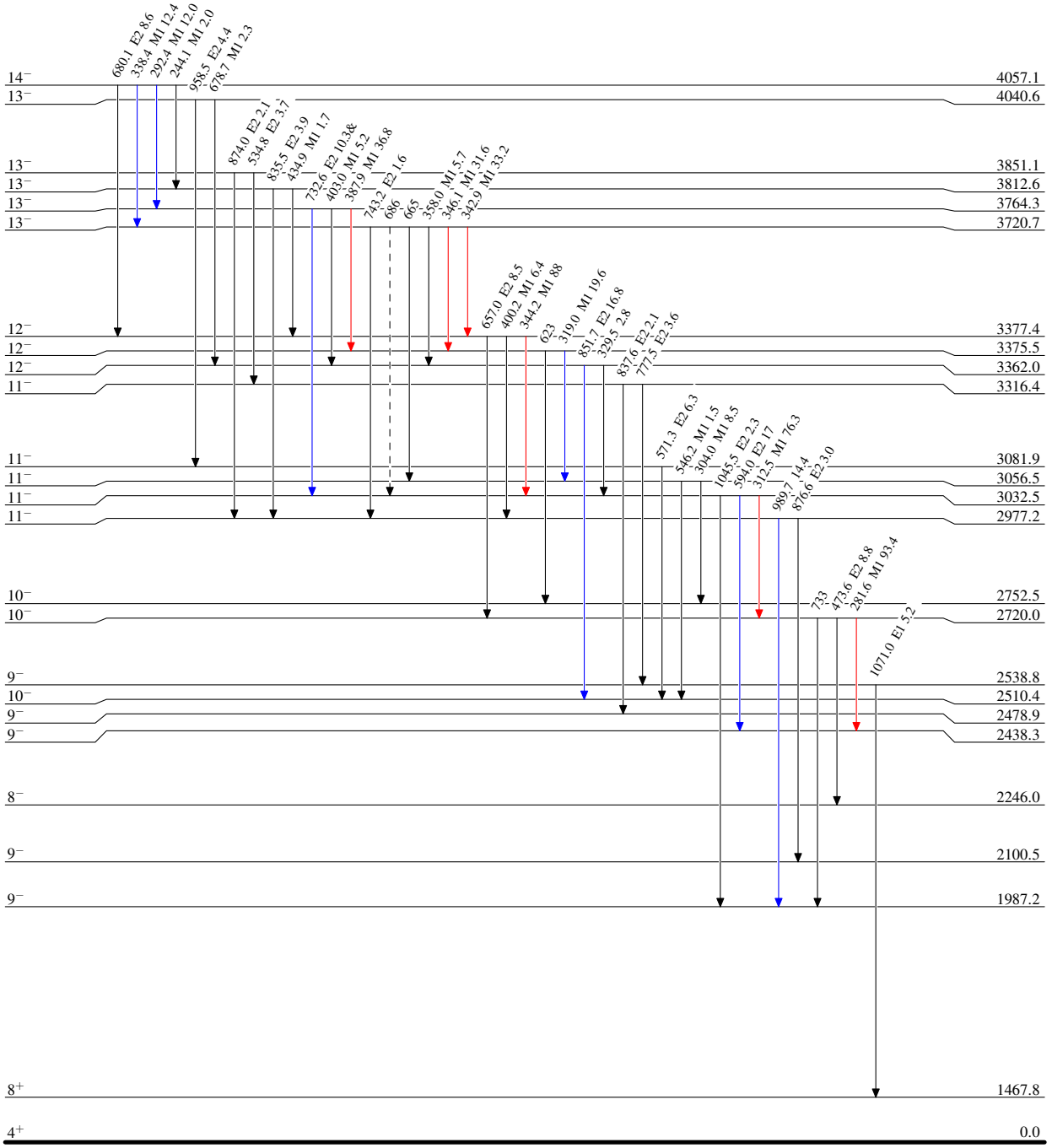
$^{108}_{51}Sb_{57}$

^{54}Fe(^{58}Ni,3pnγ) 1998Je09,1995Ce01

Level Scheme (continued)

Intensities: Relative I_γ
& Multiply placed: undivided intensity given

Legend
$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$
γ Decay (Uncertain)



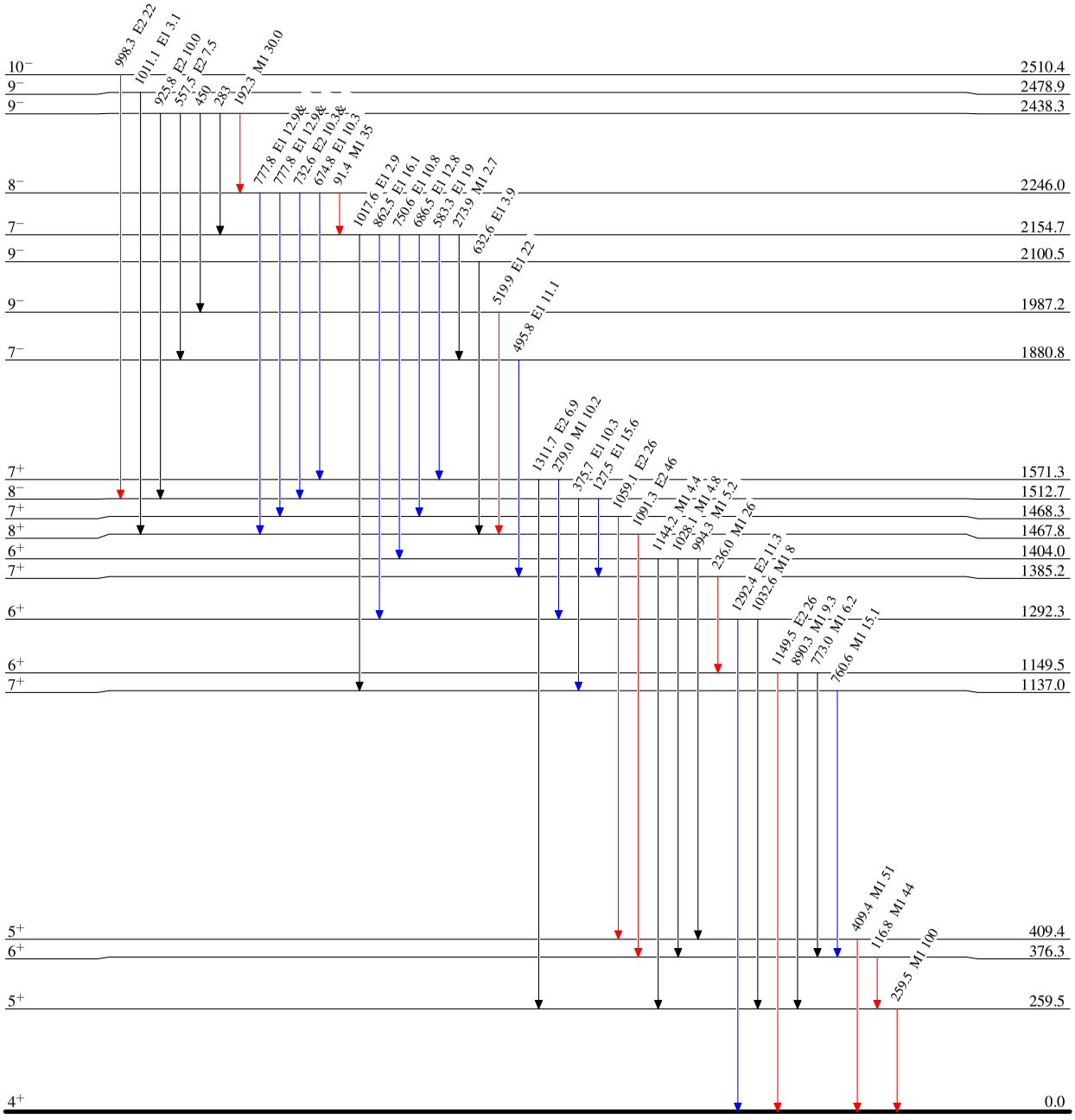
$^{108}_{51}Sb_{57}$

$^{54}Fe(^{58}Ni,3pn\gamma)$ 1998Je09,1995Ce01

Level Scheme (continued)

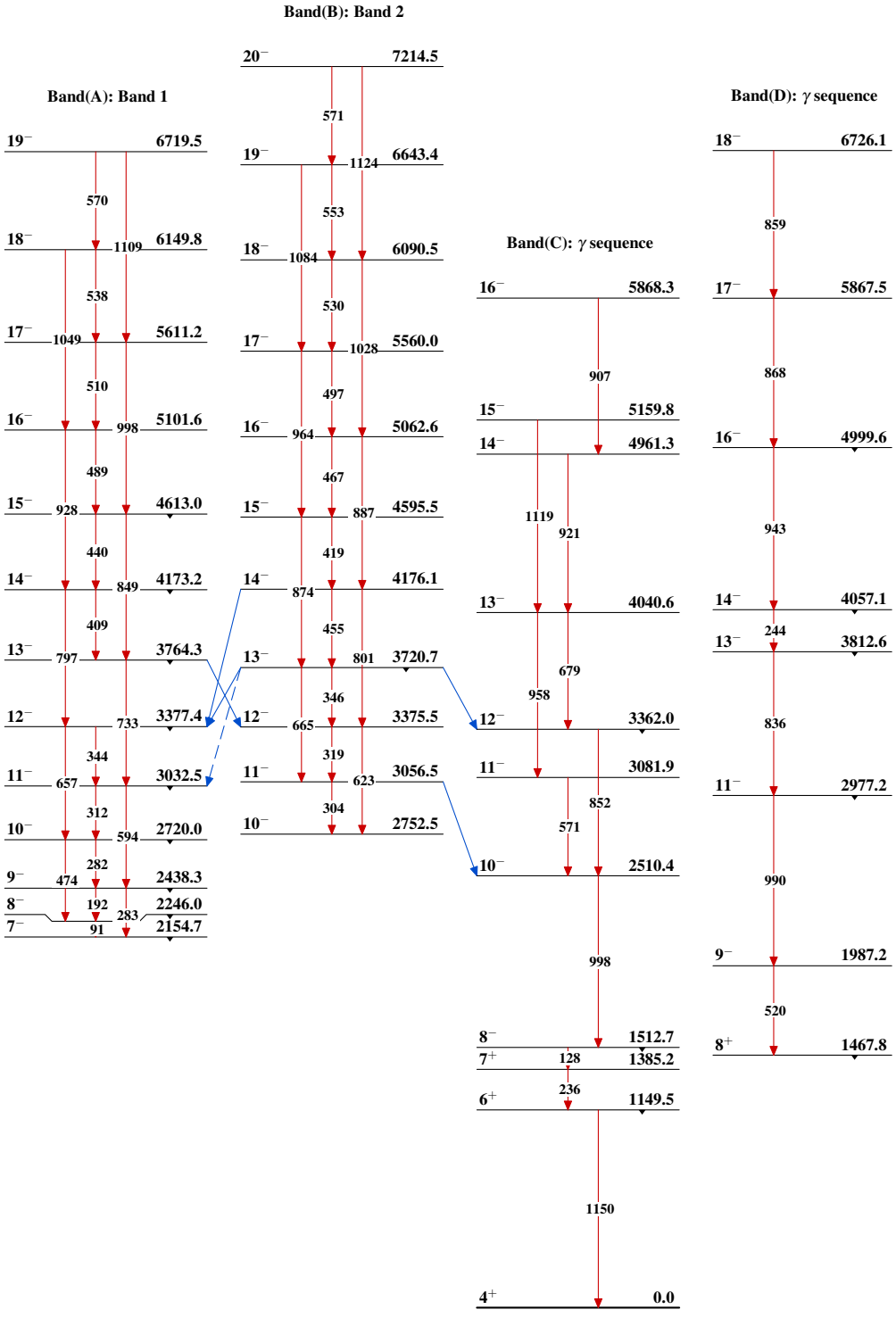
Intensities: Relative I_γ
& Multiply placed: undivided intensity given

Legend
$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$



$^{108}_{51}Sb_{57}$

$^{54}Fe(^{58}Ni,3pn\gamma)$ 1998Je09,1995Ce01



$^{108}_{51}Sb_{57}$