(HI,xnγ) 1996Ka43,1995Ka09

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

1996Ka43,1998KaZZ: ^{54}Fe(^{59}Co,3pn), E(^{59}Co)=230 MeV, LBL accelerator. Target: 2 foils of 400 μg/cm^2 self-supported. Detectors: 36 Ge detectors Gammasphere. Measured: γγ, γγγ, DCO. only level scheme is given.

1995Ka09: ^{55}Mn(^{58}Ni,3pn), E(^{58}Ni)=240 MeV, VICKSI accelerator, Berlin. Target: 2 mg/cm^2 on 23 mg/cm^2 Au backing. Detectors: OSIRIS spectrometer. Measured: Eγ, Iγ, γγ, also ^{106}Cd(α,n), Rossendorf cyclotron, Target: 10 mg/cm^2 Measured:γγ, γ(t) Detectors: LEPS, Ge(Li).

1998KaZZ : private communication through e-mail on 30 March 1998, the placement of band 3a and 3b was modified, compared to 1996Ka43.

^{109}Sn Levels

E(level)	J^{π}[†]	$T_{1/2}$[‡]	Comments
0.0	$5/2^+$		configuration: $\nu d_{5/2}$.
13.1 *3*	$7/2^+$		configuration: $\nu g_{7/2}$.
1239.0[#] *3*	$9/2^+$	≤0.2 ns	
1256.7[#] *4*	$11/2^+$		
1268.6[&] *4*	$11/2^-$	2.0 ns *2*	$T_{1/2}$: Other: 2.0 ns *3* using the centroid shift method in 1982An17.
1928.8[#] *3*	$13/2^+$		
2089.1[#] *4*	$15/2^+$		
2114.3[#] *4*	$17/2^+$	7 ns *1*	
2349.4[&] *4*	$15/2^-$	≤0.2 ns	
3264.3[@] *4*	$(19/2^+)$		
3299.1[&] *4*	$19/2^-$	≤0.2 ns	
3314.2 *4*	$19/2^-$	≤0.2 ns	
3344.3[@] *5*	$(21/2^+)$	≤0.2 ns	
3472.6 *4*	$21/2^+$	≤0.2 ns	
3525.7 *5*	$(19/2^-)$		
3862.4[@] *5*	$(23/2^+)$		
3924.6 *5*	$(23/2^+)$		
4260.1[a] *5*	$23/2^-$		
4449.4 *8*	$23/2^-$		
4607.7[e] *5*	$25/2^+$		
4982.9 *6*	$(27/2^+)$		
5128.5 *6*	$(27/2^+)$		
5170.2[c] *8*	$25/2^{(+)}$		
5283.8[a] *5*	$27/2^-$		
5448.7[e] *6*	$27/2^{(+)}$		
5848.0 *7*	$(31/2^+)$		
5991.0[c] *9*	$29/2^{(+)}$		
6222.3[a] *6*	$31/2^-$		
6335.3[e] *7*	$31/2^{(+)}$		
6823.0[c] *14*	$33/2^{(+)}$		
7192.6[e] *7*	$35/2^{(+)}$		
7231.3[a] *12*	$35/2^-$		
7723.0[c] *17*	$37/2^{(+)}$		
8121.8[e] *8*	$39/2^{(+)}$		
8261.3[a] *16*	$39/2^-$		
8538.8[f] *16*	$(37/2^-,39/2^+)$		
8725.0[c] *20*	$41/2^{(+)}$		

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(HI,xnγ) 1996Ka43,1995Ka09 (continued)

^{109}Sn Levels (continued)

E(level)	Jπ†	E(level)	Jπ†	E(level)	Jπ†
9142.9[e] 12	(43/2+)	12594[d] 3	(53/2+)	16756[e] 3	(63/2+)
9328.9[f] 12	(41/2−,43/2+)	12976.3[b] 24	(55/2−)	16777[f] 3	(65/2−,67/2+)
9345.3[a] 19	43/2−	13090.9[e] 21	(55/2+)	17718[d] 4	(69/2+)
9864.0[c] 22	45/2(+)	13153.3[a] 25	(55/2−)	17905[b] 3	(67/2−)
10131.9[f] 13	(45/2−,47/2+)	13486.9[f] 22	(57/2−,59/2+)	18729[f] 3	(69/2−,71/2+)
10284.9[e] 16	(47/2+)	13769[d] 3	(57/2+)	18878[e] 3	(67/2+)
10507.3[a] 21	47/2−	14425[b] 3	(59/2−)	19395[d] 4	(73/2+)
11067.9[f] 16	(49/2−,51/2+)	14638[a] 3	(59/2−)	19946[b] 3	(71/2−)
11148.0[c] 25	49/2(+)	14831.9[e] 24	(59/2+)	20908[f] 3	(73/2−,75/2+)
11581.9[e] 19	(51/2+)	14905[d] 3	(61/2+)	21273[d] 4	(77/2+)
11702.3[b] 23	(51/2−)	15010.9[f] 24	(61/2−,63/2+)	22215[b] 4	(75/2−)
11797.3[a] 23	(51/2−)	16068[b] 3	(63/2−)	23381[d] 4	(81/2+)
12186.9[f] 19	(53/2−,55/2+)	16224[d] 3	(65/2+)	24741[b] 4	(79/2−)
12342[c] 3	53/2(+)	16270[a] 3	(63/2−)		

† From 1996Ka43,1998KaZZ, based on previous known J^{π}'s and γ-ray properties based, DCO ratios, and band assignments.
‡ from 1995Ka09, unless otherwise stated.
# $\nu(d_{5/2})\otimes\nu(d_{5/2}g_{7/2})^{+2}$.
@ $\nu(d_{5/2})\otimes\nu(d_{5/2}g_{7/2})^{+4}$ and/or $\nu(g_{7/2})\otimes\nu(d_{5/2}g_{7/2})^{+4}$.
& $\nu(h_{11/2})\otimes\nu(d_{5/2}g_{7/2})^{+2}$.
[a] Band(A): Band 1.
[b] Band(B): Band 2.
[c] Band(C): Band 3a.
[d] Band(D): Band 3b.
[e] Band(E): Band 4.
[f] Band(F): Band 5.

γ(^{109}Sn)

E_i(level)	J_i^{π}	E_γ†	E_f	J_f^{π}	Mult.#	E_i(level)	J_i^{π}	E_γ†	E_f	J_f^{π}	Mult.#
13.1	7/2+	12.8	0.0	5/2+		3344.3	(21/2+)	1229.9 3	2114.3	17/2+	
1239.0	9/2+	1239.3 3	0.0	5/2+	(E2)	3472.6	21/2+	158.4 3	3314.2	19/2−	(E1)
1256.7	11/2+	1243.4 3	13.1	7/2+	(E2)			173.4 3	3299.1	19/2−	(E1)
1268.6	11/2−	29‡ 1	1239.0	9/2+				208.4 3	3264.3	(19/2+)	D
		1255.5 3	13.1	7/2+	M2+E3			1358.4 3	2114.3	17/2+	(E2)
1928.8	13/2+	672.0 3	1256.7	11/2+	(M1)	3525.7	(19/2−)	1176.3 3	2349.4	15/2−	
		690.1 3	1239.0	9/2+	(E2)	3862.4	(23/2+)	389.8 3	3472.6	21/2+	(E2)
2089.1	15/2+	160.4 3	1928.8	13/2+	(M1)	3924.6	(23/2+)	452.0 3	3472.6	21/2+	(M1)
		832.2 3	1256.7	11/2+	(E2)			580.3 3	3344.3	(21/2+)	(M1)
2114.3	17/2+	25.2 3	2089.1	15/2+		4260.1	23/2−	945.9 3	3314.2	19/2−	(E2)
		185.6 3	1928.8	13/2+	(E2)			961.0 3	3299.1	19/2−	(E2)
2349.4	15/2−	1080.7 3	1268.6	11/2−	(E2)	4449.4	23/2−	1135‡ 1	3314.2	19/2−	(E2)
3264.3	(19/2+)	1150.0 3	2114.3	17/2+		4607.7	25/2+	1135.1 3	3472.6	21/2+	(E2)
3299.1	19/2−	949.7 3	2349.4	15/2−	(E2)	4982.9	(27/2+)	1120.5 3	3862.4	(23/2+)	(E2)
		1184.8 3	2114.3	17/2+	(E1)	5128.5	(27/2+)	1203.9 3	3924.6	(23/2+)	(E2)
3314.2	19/2−	964.8 3	2349.4	15/2−	(E2)	5170.2	25/2(+)	721‡ 1	4449.4	23/2−	(E1)
		1199.8 3	2114.3	17/2+	(E1)			910‡ 1	4260.1	23/2−	

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(HI,xnγ) 1996Ka43,1995Ka09 (continued)

γ(^{109}Sn) (continued)

E_i(level)	J_i^π	E_γ[†]	E_f	J_f^π	Mult.[#]
5283.8	27/2$^-$	834[‡] *1*	4449.4	23/2$^-$	
		1023.7 *3*	4260.1	23/2$^-$	(E2)
5448.7	27/2$^{(+)}$	841.0 *3*	4607.7	25/2$^+$	(M1)
5848.0	(31/2$^+$)	865.1 *3*	4982.9	(27/2$^+$)	(E2)
5991.0	29/2$^{(+)}$	707[‡] *1*	5283.8	27/2$^-$	(E1)
		821[‡] *1*	5170.2	25/2$^{(+)}$	(E2)
6222.3	31/2$^-$	938.5 *3*	5283.8	27/2$^-$	(E2)
6335.3	31/2$^{(+)}$	886.6 *3*	5448.7	27/2$^{(+)}$	(E2)
6823.0	33/2$^{(+)}$	832[‡] *1*	5991.0	29/2$^{(+)}$	(E2)
7192.6	35/2$^{(+)}$	857.3 *3*	6335.3	31/2$^{(+)}$	(E2)
7231.3	35/2$^-$	1009[‡] *1*	6222.3	31/2$^-$	(E2)
7723.0	37/2$^{(+)}$	900[‡] *1*	6823.0	33/2$^{(+)}$	(E2)
8121.8	39/2$^{(+)}$	929.2 *3*	7192.6	35/2$^{(+)}$	(E2)
8261.3	39/2$^-$	1030[‡] *1*	7231.3	35/2$^-$	(E2)
8725.0	41/2$^{(+)}$	1002[‡] *1*	7723.0	37/2$^{(+)}$	(E2)
9142.9	(43/2$^+$)	1021[‡] *1*	8121.8	39/2$^{(+)}$	(E2)
9328.9	(41/2$^-$,43/2$^+$)	790[‡] *1*	8538.8	(37/2$^-$,39/2$^+$)	
		1207[‡] *1*	8121.8	39/2$^{(+)}$	
9345.3	43/2$^-$	1084[‡] *1*	8261.3	39/2$^-$	(E2)
9864.0	45/2$^{(+)}$	1139[‡] *1*	8725.0	41/2$^{(+)}$	(E2)
10131.9	(45/2$^-$,47/2$^+$)	803[‡] *1*	9328.9	(41/2$^-$,43/2$^+$)	(E2)
		989[‡] *1*	9142.9	(43/2$^+$)	
10284.9	(47/2$^+$)	1142[‡] *1*	9142.9	(43/2$^+$)	(E2)
10507.3	47/2$^-$	1162[‡] *1*	9345.3	43/2$^-$	(E2)
11067.9	(49/2$^-$,51/2$^+$)	936[‡] *1*	10131.9	(45/2$^-$,47/2$^+$)	(E2)
11148.0	49/2$^{(+)}$	1284[‡] *1*	9864.0	45/2$^{(+)}$	(E2)
11581.9	(51/2$^+$)	1297[‡] *1*	10284.9	(47/2$^+$)	(E2)
11702.3	(51/2$^-$)	1195[‡] *1*	10507.3	47/2$^-$	(E2)
11797.3	(51/2$^-$)	1290[‡] *1*	10507.3	47/2$^-$	(E2)
12186.9	(53/2$^-$,55/2$^+$)	1119[‡] *1*	11067.9	(49/2$^-$,51/2$^+$)	(E2)
12342	53/2$^{(+)}$	1194[‡] *1*	11148.0	49/2$^{(+)}$	(E2)
12594	(53/2$^+$)	1446[‡] *1*	11148.0	49/2$^{(+)}$	(E2)
12976.3	(55/2$^-$)	1179[‡] *1*	11797.3	(51/2$^-$)	(E2)
		1274[‡] *1*	11702.3	(51/2$^-$)	(E2)
13090.9	(55/2$^+$)	1509[‡] *1*	11581.9	(51/2$^+$)	(E2)
13153.3	(55/2$^-$)	1356[‡] *1*	11797.3	(51/2$^-$)	(E2)
13486.9	(57/2$^-$,59/2$^+$)	1300[‡] *1*	12186.9	(53/2$^-$,55/2$^+$)	(E2)
13769	(57/2$^+$)	1175[‡] *1*	12594	(53/2$^+$)	(E2)
		1427[‡] *1*	12342	53/2$^{(+)}$	Q
14425	(59/2$^-$)	1449[‡] *1*	12976.3	(55/2$^-$)	(E2)
14638	(59/2$^-$)	1485[‡] *1*	13153.3	(55/2$^-$)	(E2)
14831.9	(59/2$^+$)	1741[‡] *1*	13090.9	(55/2$^+$)	(E2)
14905	(61/2$^+$)	1136[‡] *1*	13769	(57/2$^+$)	(E2)
15010.9	(61/2$^-$,63/2$^+$)	1524[‡] *1*	13486.9	(57/2$^-$,59/2$^+$)	(E2)
16068	(63/2$^-$)	1643[‡] *1*	14425	(59/2$^-$)	(E2)
16224	(65/2$^+$)	1319[‡] *1*	14905	(61/2$^+$)	(E2)

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(HI,xnγ) 1996Ka43,1995Ka09 (continued)

γ(^{109}Sn) (continued)

E_i(level)	J_i^π	E_γ[†]	E_f	J_f^π	Mult.[#]
16270	(63/2$^-$)	1632[‡] *1*	14638	(59/2$^-$)	(E2)
16756	(63/2$^+$)	1924[‡] *1*	14831.9	(59/2$^+$)	(E2)
16777	(65/2$^-$,67/2$^+$)	1766[‡] *1*	15010.9	(61/2$^-$,63/2$^+$)	
17718	(69/2$^+$)	1494[‡] *1*	16224	(65/2$^+$)	(E2)
17905	(67/2$^-$)	1837[‡] *1*	16068	(63/2$^-$)	(E2)
18729	(69/2$^-$,71/2$^+$)	1952[‡] *1*	16777	(65/2$^-$,67/2$^+$)	
18878	(67/2$^+$)	2122[‡] *1*	16756	(63/2$^+$)	(E2)
19395	(73/2$^+$)	1677[‡] *1*	17718	(69/2$^+$)	(E2)
19946	(71/2$^-$)	2041[‡] *1*	17905	(67/2$^-$)	(E2)
20908	(73/2$^-$,75/2$^+$)	2179[‡] *1*	18729	(69/2$^-$,71/2$^+$)	
21273	(77/2$^+$)	1878[‡] *1*	19395	(73/2$^+$)	(E2)
22215	(75/2$^-$)	2269[‡] *1*	19946	(71/2$^-$)	(E2)
23381	(81/2$^+$)	2108[‡] *1*	21273	(77/2$^+$)	(E2)
24741	(79/2$^-$)	2526[‡@] *1*	22215	(75/2$^-$)	(E2)

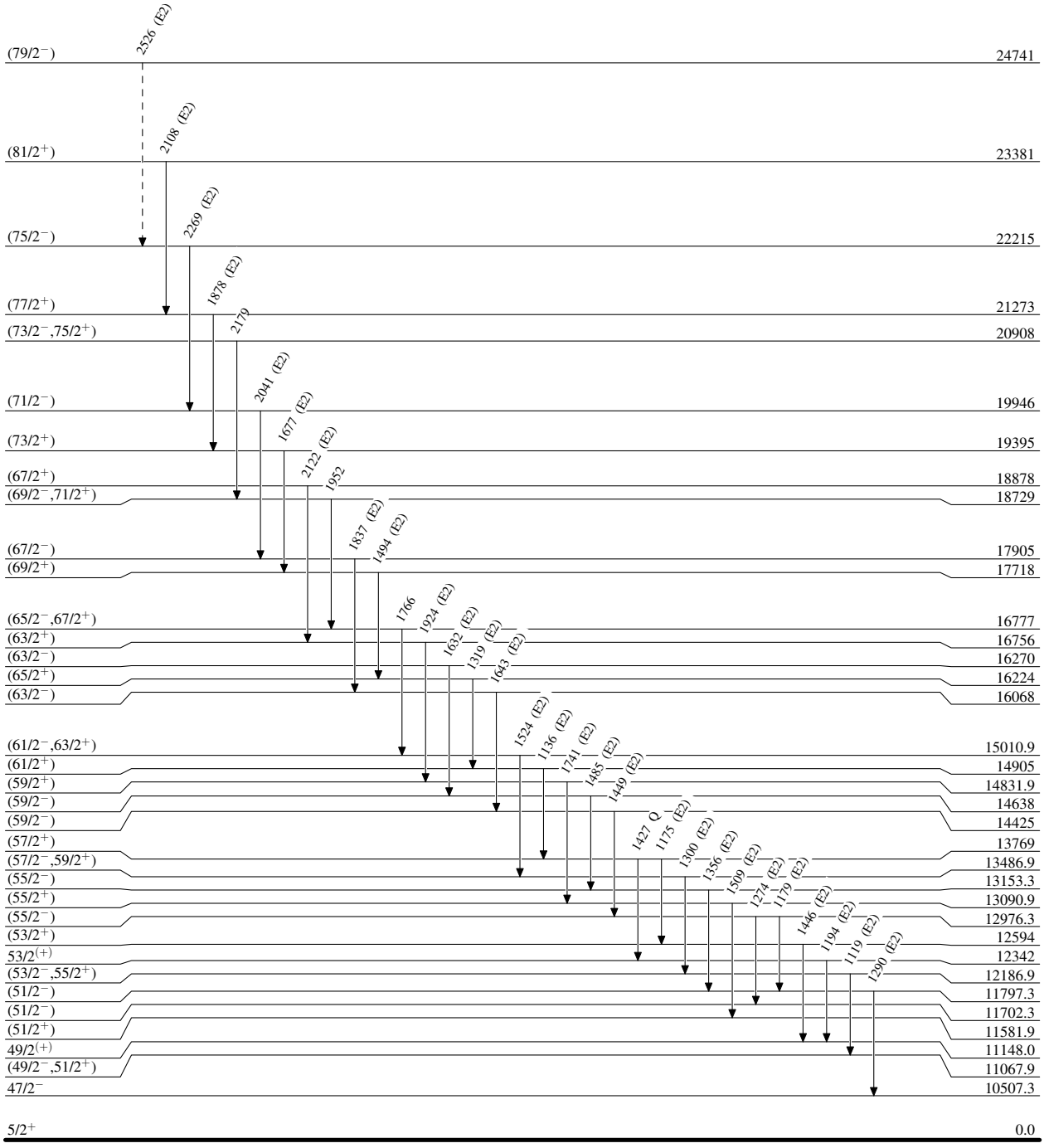
[†] from 1995Ka09; ΔEγ estimated by evaluators.
[‡] from 1996Ka43; ΔEγ estimated by evaluators.
[#] From DCO ratios in 1996Ka43, but values were not given by the authors.
[@] Placement of transition in the level scheme is uncertain.

Legend

(HI,xnγ) 1996Ka43,1995Ka09

Level Scheme

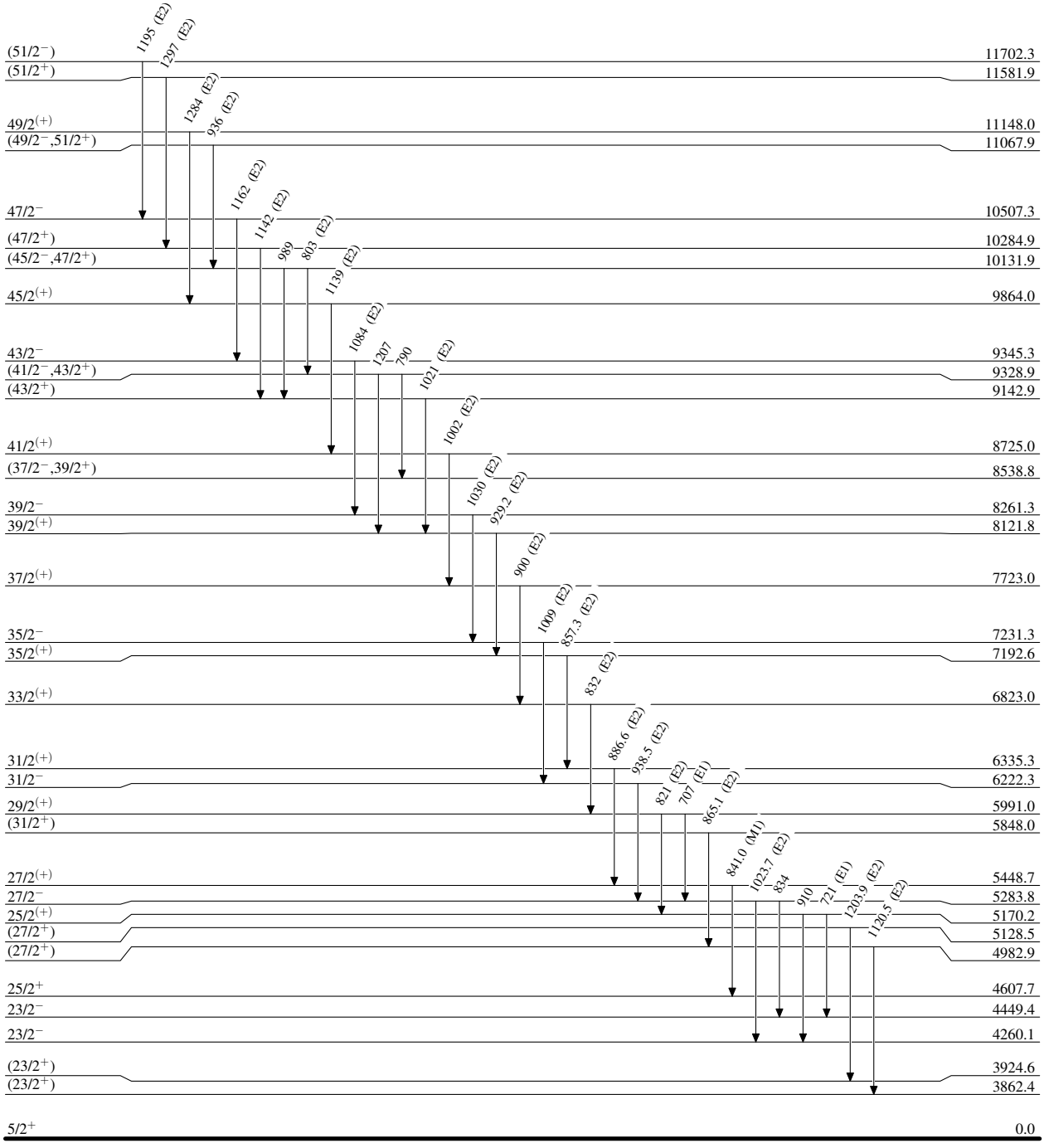
γ Decay (Uncertain)



$^{109}_{50}Sn_{59}$

(HI,xnγ) 1996Ka43,1995Ka09

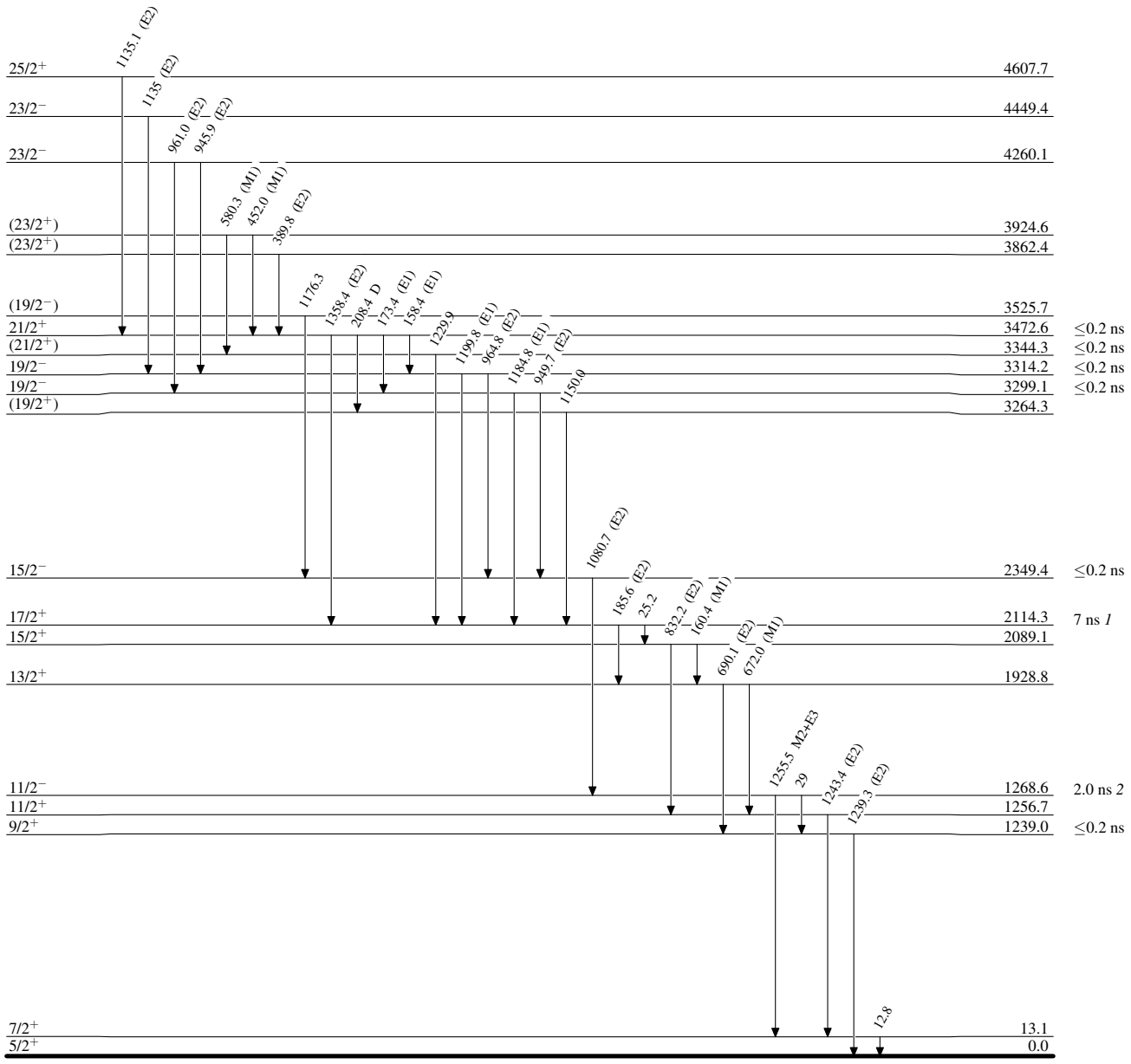
Level Scheme (continued)



$^{109}_{50}Sn_{59}$

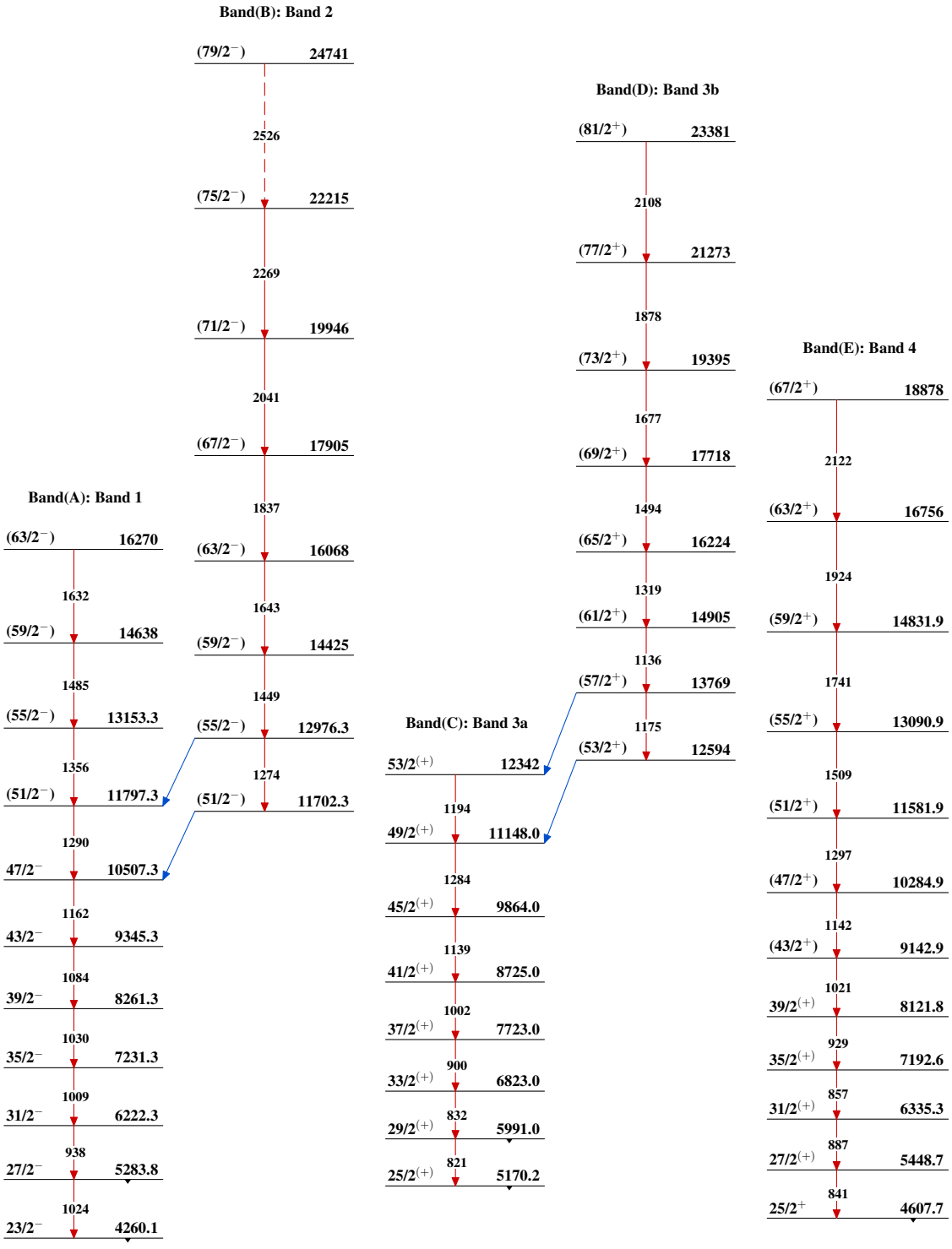
(HI,xnγ) 1996Ka43,1995Ka09

Level Scheme (continued)



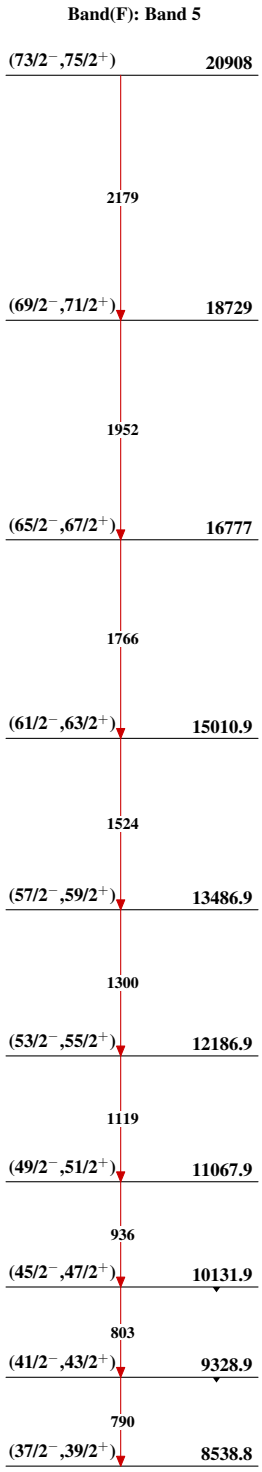
$^{109}_{50}Sn_{59}$

(HI,xnγ) 1996Ka43,1995Ka09



$^{109}_{50}Sn_{59}$

(HI,xnγ) 1996Ka43,1995Ka09 (continued)



$^{109}_{50}Sn_{59}$