Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jean Blachot	NDS 111,1471 (2010)	1-May-2009

Q(β^-)=−3911 *18*; S(n)=7743.6 *16*; S(p)=7626 *5*; Q(α)=−2248.8 *23* 2012Wa38
Note: Current evaluation has used the following Q record −3913 177743.1 *187626* 5 −2250 4 2003Au03,2009AuZZ.

^{113}Sn Levels

For neutron resonance, see ^{112}Sn(n,γ) (1981MuZQ).
For gross structure of deeply bound hole states in odd tin isotopes observed with the (^{3}He,α) reaction, see 1978Ta22. For onset of neutron single-particle strengths with (α,^{3}He) at 183 MeV, see 1991Ma06.

Cross Reference (XREF) Flags

A	^{113}Sn IT decay (21.4 min)	F	^{112}Sn(n,γ) E=95 eV	K	^{115}Sn(p,t)
B	^{113}Sb ε decay	G	^{112}Sn(d,p),^{114}Sn(d,t)	L	^{114}Sn(p,d) IAS
C	^{110}Cd(α,nγ)	H	^{113}In(p,nγ)	M	^{100}Mo(^{18}O,5nγ)
D	^{111}Cd(α,2nγ)	I	^{113}In(p,3nγ)		
E	^{112}Cd(α,3nγ)	J	^{114}Sn(p,d)		

E(level)[@]	J$^\pi$[†]	T$_{1/2}$[#]	XREF	Comments
0.0	1/2$^+$	115.09 d *3*	ABCDEFGHIJKLM	%ε+%β^+=100 μ=−0.8791 *6* (1989Ra17) μ: atomic beam. T$_{1/2}$: from weighted average of 115.2 d *8* (1972Em01), 115.07 d *10* (1972La14), 115.09 d *4* (1980Ho17), 115.12 d *13* (1982RuZV), and 115.08 d *8* (1992Un01). The reduced-χ^2 = 0.03. Because this set of values is consistent, the Limited Relative Statistical Weight method (1985ZiZY, 1992Ra09) does not increase the uncertainty for the 1980Ho17 value even though it contributes 66% of the relative weight. If the 1980Ho17 uncertainty were increased from 0.04 to 0.056 in order to decrease its relative weight to 50%, the weighted average average would still be 115.09 with an uncertainty of 0.04. The very small reduced-χ^2 value suggests that the reported uncertainties are overestimated. Other measurements: 107 d (1959Bu08), 115.12 d *20* (1976MeZR, replaced by 1982RuZV), and 115.06 d 7 (1982HoZJ, replaced by 1992Un01). J$^\pi$: atomic beam (1976Fu06), L(d,p)=0.
77.389 *19*	7/2$^+$	21.4 min *4*	ABCDE GHIJK	%IT=91.1 *23*; %ε+%β^+=8.9 *23* (1961Sc12) T$_{1/2}$: from 1974Ho17. Others: 21 min *1* (1961Se08), 20 min *1* (1961Sc12). %IT from I(Kα x ray,^{113}In)/I(Kα x ray,^{113}Sn). J$^\pi$: atomic beam (1976Fu06), 77γ is M3(+E4).
409.83 *4*	5/2$^+$		BCD GHIJK	J$^\pi$: L(d,p)=2, σ(d,p)/σ(d,t) favors 5/2$^+$.
498.07 *5*	3/2$^+$	>0.35 ps	BCD FGHIJK	J$^\pi$: L(d,p)=2, σ(d,p)/σ(d,t) favors 3/2$^+$.
738.4[c] *3*	11/2$^-$	86 ns *2*	CDE GHIJ M	μ=−1.293 *16* (1989Ra17); Q=+0.41 *1* (1989Ra17) μ: μ and Q: differential perturbed angular distribution. J$^\pi$: L(d,p)=5, M2(+E3) γ to 7/2$^+$. T$_{1/2}$: unweighted av of 88 ns *3* (1973IsZQ), 89 ns *3* (1974Di18), 82.1 ns *17* (1974Br29).
1013.94 *14*	3/2$^+$	0.2 ps *1*	BCD GH	E(level): a level with L(d,p)=2 observed at 1014 *5*, may correspond to either 1013.22 or 1018.09 level. J$^\pi$: log *ft*=5.86 *3* from 5/2$^+$, M1+E2 γ to 1/2$^+$.
1018.08 *5*	5/2$^+$	1.0 ps *5*	BCD HI K	J$^\pi$: allowed ε decay from 5/2$^+$. E2 γ to 1/2$^+$.

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Adopted Levels, Gammas (continued)

^{113}Sn Levels (continued)

E(level)[@]	Jπ[†]	$T_{1/2}$[#]	XREF	Comments
1042 *25*	$3/2^+,5/2^+$		J	E(level): from (p,d), possibly same as 1018 level. Jπ: L(p,d)=2.
1140 *25*			J	
1248.7 *3*			D H	
1284.06 *11*	$5/2^+$	0.5 ps *2*	BCD HI	Jπ: E2 γ to $1/2^+$. log *ft*=6.93 *7* from $5/2^+$.
1303 *25*	$1/2^+$		J	Jπ: L(p,d)=0.
1314.07 *15*	$3/2^+$		BCD FGHI	Jπ: L(d,p)=2.
1355.90 *20*	$3/2^+$	0.7 ps *3*	CD HI	Jπ: M1 γ to $1/2^+$.
1472.54 *15*	$5/2^+$	0.8 ps *5*	CD HI	Jπ: γ(θ) gives 3/2,5/2. E2 to $1/2^+$ g.s.
1537 *5*	$(7/2^+,9/2^+)$		G	Jπ: L(d,p)=(4).
1539.0 *7*	$5/2^+$	0.6 ps *1*	CD HI	Jπ: M1+E2 γ to $1/2^+$.
1539.9 *4*	$(11/2^-)$	0.2 ps *1*	CD HI	Jπ: from γ(θ), γ to $11/2^-$.
1556.50 *10*	$3/2^+$		BCD FGHI	Jπ: allowed ε decay from $5/2^+$, M1 γ to $1/2^+$.
1646.06 *14*	$3/2^+,5/2^+$		BCD GH	Jπ: L(d,p)=2. E(level): the 1646 level in (d,p) could also correspond to the 1651 level.
1647.2 *3*			D	
1651.62 *17*	$5/2^+$		BCD H J	Jπ: L(p,d)=2, M1 γ to $7/2^+$.
1732.22 *17*	$(3/2^+,5/2^+)$		BCD H	Jπ: log *ft*=6.05 *5* from $5/2^+$.
1744.81 *14*	$3/2^+,5/2^+$	0.31 ps *8*	BCD GHIJ	Jπ: L(d,p)=2 at 1745 *5*.
1781.1 *3*	$9/2^-$	0.19 ps *7*	D HI	Jπ: M1+E2 γ to $11/2^-$ and γ to $7/2^+$.
1821.0 *3*	$1/2^+$		C GH J	Jπ: L(d,p)=0.
1831.0 *3*	$1/2^+$		C H J	Jπ: L(p,d)=0.
1867.28 *20*	$5/2^+$	0.33 ps *10*	CD HI	Jπ: M1,E2 γ to $3/2^+,5/2^+$, γ(θ) in ^{113}In(p,nγ).
1906.6[c] *4*	$15/2^-$	0.8 ps *2*	CDE GHI M	Jπ: stretched E2 to $11/2^-$.
1909.64 *18*	$(5/2^+,7/2^+)$		CD HI	Jπ: γ's to $3/2^+,5/2^+$, γ(θ) in ^{113}In(p,nγ).
1935.4 *4*	$(11/2^-)$	1.9 ps *8*	CD HI	Jπ: γ to $11/2^-$, M1+E2 γ to $11/2^-$.
1945.3 *4*	$(9/2^-)$	0.40 ps *20*	CD HI	Jπ: γ to $11/2^-$.
1952.1 *4*	$13/2^-$	1.0 ps *4*	CDE HI	Jπ: γ to $11/2^-$, γ(θ) in ^{113}In(p,nγ).
1957.05 *16*	$3/2^{(+)},5/2^{(+)}$		B	Jπ: log *ft*=6.40 *10* from $5/2^+$, γ to $1/2^+$ and $7/2^+$.
2031.4 *3*			D H	
2039.88 *19*	$7/2^+$	0.2 ps *1*	CD H	Jπ: γ's to $3/2^+,5/2^+$ and $5/2^+,7/2^+$. γ(θ) in ^{113}In(p,nγ).
2045.47 *20*	$(3/2^+,5/2^+)$		B E JK	Jπ: log *ft*=6.63 *12* from $5/2^+$, γ to $7/2^+$.
2050 *5*	$1/2^-,3/2^-$		G	E(level): probably not identical to 2045 level from γ decay. Jπ: L(d,p)=1.
2105 *5*	$(3/2^-)$		G	Jπ: L(d,p)=1, and from shell-model syst.
2128.14 *21*	$3/2^+,5/2^+$		B G	Jπ: L(d,p)=2 at 2129 *5*, the 2129 level in (d,p) does not seem to correspond to the 2134 level (no γ to g.s.).
2135.0 *3*			D H	
2176.27 *18*	$7/2^+$	0.3 ps *2*	D HI	Jπ: M1 γ to $5/2^+$ and $7/2^+$.
2200.7 *3*	$5/2^+$	>0.24 ps	CD GHI	Jπ: M1+E2 γ to $3/2^+$, γ(θ) in ^{113}In(p,nγ).
2258.6 *3*	$5/2^+$	0.3 ps *1*	CD HI	Jπ: from γ(θ) and linear polarization in (α,2nγ).
2275.8 *3*	$1/2^-,3/2^-$		D GH	Jπ: L(d,p)=1.
2336.7 *4*	$11/2^-$	0.35 ps *8*	CD HI	Jπ: γ to $11/2^-$.
2385.77 *25*	$7/2^+$	0.7 ps *6*	CD H	Jπ: γ's to $5/2^+$.
2410.8 *5*			D	
2448.38 *23*	$7/2^+$		CD HI	Jπ: M1+E2 γ to $5/2^+$.
2457.11 *22*			C H	
2467.9 *3*			H	
2506.0 *3*			CD H	
2512.0 *3*	(3/2,5/2)		CD H	Jπ: γ to $3/2^+,5/2^+$, γ(θ) in ^{113}In(p,nγ).
2538.27 *22*	$3/2^+,5/2^+$		B HI	Jπ: L(d,p)=2.
2540 *5*	$5/2^-,7/2^-$		G	Jπ: L(d,p)=3.
2540.0 *4*	$(15/2^-)$	0.07 ps *3*	CD H	Jπ: E2 γ to $11/2^-$.
2552.4 *3*	(3/2,5/2,7/2)		D H	Jπ: γ's to $3/2^+,5/2^+$, γ(θ) in ^{113}In(p,nγ).

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Adopted Levels, Gammas (continued)

^{113}Sn Levels (continued)

E(level)[@]	Jπ[†]	$T_{1/2}$[#]	XREF	Comments
≈2579			F	E(level): not the same as 2583 level with J^π between 7/2$^-$ and 15/2$^-$.
2582.3 *4*	(15/2$^-$)	0.22 ps *9*	CD HI	Jπ: E2 γ to 11/2$^-$.
2590.77 *22*	(3/2)		GHI	Jπ: L=1,2 (d,p).
2616.7 *5*			C HI	
2619.4 *4*			D	
2620 *5*	1/2$^+$		CD GHI	E(level): could correspond to 2617 or 2624 level, who have γ feeding to low J^π. Jπ: L(d,p)=0.
2624.04 *21*			CD H	
2649.0 *4*	(9/2$^-$)		CD H	
2662.8 *3*	(3/2$^+$,5/2$^+$)		CD HI	Jπ: γ to 3/2$^+$,5/2$^+$, γ(θ) in ^{113}In(p,nγ).
2671.1 *4*			CD H	
2675.3 *4*			D	E(level): from coin between 1284-583-808 gammas.
2700.4 *4*		0.4 ps *1*	D	
2717.8 *4*	(11/2$^-$)		D	Jπ: M1 γ to 11/2$^-$.
2749.7 *4*	17/2$^-$	0.21 ps *7*	D	Jπ: E2 γ to 13/2$^-$.
2764 *5*	(7/2)$^-$[‡]		G	Jπ: L(d,p)=3.
2777.9 *4*			CD GHI	
2780 *5*			F	
2806.6[c] *5*	19/2$^-$	0.31 ps *10*	CDE I M	Jπ: stretched (E2) to 15/2$^-$.
2851.6 *4*	(17/2$^-$)	1.2 ps *6*	D	
2862 *5*	(7/2)$^-$[‡]		G	Jπ: L(d,p)=3.
2888.9 *4*			CD H	
2915.9 *4*			D	
2932.2 *5*			B	
2956.5 *4*			CD H	
2975.0 *4*	(19/2$^-$)	0.28 ps *14*	CDE I M	
3004 *5*	1/2$^-$,3/2$^-$		G	Jπ: L(d,p)=1.
3080 *5*	(7/2)$^-$[‡]		G	Jπ: L(d,p)=3.
3091.2 *4*	19/2$^-$	0.45 ps *18*	DE I M	Jπ: (E2) to 15/2$^-$.
3128.7 *5*	21/2$^-$		CDE I	Jπ: M1,E2 to 19/2$^-$.
3130.3 *5*			D M	
3138.9 *6*			D	
3204 *5*	1/2$^-$,3/2$^-$		G	Jπ: L(d,p)=1.
3223.2 *5*	(19/2)$^-$	>1.4 ps	D M	Jπ: Q γ to 15/2$^-$.
3307 *5*	(7/2)$^-$[‡]		G	Jπ: L(d,p)=3.
3409.5[&] *6*	17/2		M	
3412.5 *4*			D	
3418 *5*	(7/2)$^-$[‡]		G	Jπ: L(d,p)=3.
3420.4 *5*	(21/2$^-$)		D M	Jπ: M1+E2 γ to (21/2$^-$).
3456.5 *5*			D	
3458.3 *5*	(23/2$^-$)		DE M	Jπ: M1,E2 to (21/2$^-$).
3494 *5*	(7/2)$^-$[‡]		G	Jπ: L(d,p)=3.
3499 *5*			G	
3539 *5*	(7/2)$^-$[‡]		G	Jπ: L(d,p)=3.
3584 *5*	(7/2)$^-$[‡]		G	Jπ: L(d,p)=3.
3680.4 *6*	(23/2$^-$)		E	Jπ: M1+E2 γ to (21/2$^-$).
3696 *5*	(7/2)$^-$[‡]		G	Jπ: L(d,p)=3.
3743 *5*	(7/2)$^-$[‡]		G	Jπ: L(d,p)=3.
3796 *5*	(7/2)$^-$[‡]		G	Jπ: L(d,p)=3.
3808 *5*	(7/2)$^-$[‡]		G	Jπ: L(d,p)=3.

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Adopted Levels, Gammas (continued)

^{113}Sn Levels (continued)

E(level)[@]	Jπ[†]	$T_{1/2}$[#]	XREF	Comments
3822 *5*	$(7/2)^{-}$[‡]		G	Jπ: L(d,p)=3.
3837.5 *6*	$(23/2^{-})$		D	
3846 *5*			G	
3873 *5*	$(7/2)^{-}$[‡]		G	Jπ: L(d,p)=3.
3901.9 *5*	$(23/2^{-})$	0.6 ps *2*	DE M	Jπ: (E2) γ to $19/2^{-}$.
3906 *2*	$(7/2)^{-}$[‡]		G	Jπ: L(d,p)=3.
3913.8 *6*	$(21/2^{-})$		D	Jπ: M1 γ to $(19/2^{-})$.
3960 *5*			G	
3972.1 *5*	$(23/2^{-})$	0.5 ps *2*	DE M	Jπ: M1+E2 γ to $(21/2^{-})$.
4022 *5*	(3/2)		G	
4044 *5*	$(7/2)^{-}$[‡]		G	Jπ: L(d,p)=3.
4051.8[&] *5*	21/2		M	
4058.0 *6*	$25/2^{+}$	0.69 ns *28*	DE M	Jπ: E1 γ to $23/2^{-}$, a three quasi-particle neutron configuration proposed by 1997Ka40. $T_{1/2}$: from γ-rf(t) in (α,2nγ).
4233 *5*	$(7/2)^{-}$[‡]		G	Jπ: L(d,p)=3.
4265 *5*	$(7/2)^{-}$[‡]		G	Jπ: L(d,p)=3.
4315 *5*	$(7/2)^{-}$[‡]		G	Jπ: L(d,p)=3.
4335 *5*			G	
4343 *5*	$(7/2)^{-}$[‡]		G	Jπ: L(d,p)=3.
4364 *5*			G	
4397 *5*	$(7/2)^{-}$[‡]		G	Jπ: L(d,p)=3.
4430 *5*	$(7/2)^{-}$[‡]		G	Jπ: L(d,p)=3.
4438 *5*			G	
4475.1 *6*	$(27/2^{+})$	>1.1 ps	DE M	Jπ: D+Q γ to (25/2).
4504 *5*			G	
4589 *5*	$(7/2)^{-}$[‡]		G	Jπ: L(d,p)=3.
4609 *5*	$(7/2)^{-}$[‡]		G	Jπ: L(d,p)=3.
4649 *5*			G	
4714.4 *6*	$(27/2^{-})$	0.31 ps *10*	DE M	Jπ: (E2) γ to $(23/2^{-})$.
4752.2[&] *6*	25/2		M	
4992 *5*	$(7/2)^{-}$[‡]		G	Jπ: L(d,p)=3.
5012 *5*	$(7/2)^{-}$[‡]		G	Jπ: L(d,p)=3.
5067 *5*	$(7/2)^{-}$[‡]		G	Jπ: L(d,p)=3.
5239 *5*	$(7/2)^{-}$[‡]		G	Jπ: L(d,p)=3.
5291 *5*	$(7/2)^{-}$[‡]		G	Jπ: L(d,p)=3.
5318 *5*			G	
5450 *5*	$(7/2)^{-}$[‡]		G	Jπ: L(d,p)=3.
5534.4[&] *6*	29/2		M	
5605.7 *8*	$31/2^{+}$		M	
5645.6[b] *7*	$31/2^{-}$		M	
5647 *5*	$(7/2)^{-}$[‡]		G	Jπ: L(d,p)=3.
6385.3[&] *7*	33/2		M	
6682.3[b] *9*	$35/2^{-}$		M	
7322.0[&] *9*	37/2		M	
7745.5 *25*	$1/2^{+}$		F	
7784.4[b] *10*	$39/2^{-}$		M	
7883.1[a] *10*	$39/2^{-}$		M	
8347.8[&] *10*	41/2		M	

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Adopted Levels, Gammas (continued)

^{113}Sn Levels (continued)

E(level)[@]	J^{π}[†]	XREF	Comments
8811.7[b] *10*	$43/2^-$	M	
9014.0[a] *10*	$43/2^-$	M	
9466.9[&] *11*	45/2	M	
9936.4[b] *11*	$47/2^-$	M	
10209.7[a] *11*	$47/2^-$	M	
10589.1[&] *12*	49/2	M	
11242.0[b] *12*	$51/2^-$	M	
11405.1[a] *12*	$51/2^-$	M	
11723.5[&] *13*	53/2	M	
11826 *50*	$9/2^+$	L	IAS of ^{113}In g.s.
12254 *50*	$1/2^-$	L	IAS of ^{113}In 392 level.
12513 *50*	$3/2^-$	L	IAS of ^{113}In 647 level.
12642.9[a] *13*	$55/2^-$	M	
12736.8[b] *13*	$(55/2^-)$	M	
13034.6[&] *14*	57/2	M	
14032.6[a] *14*	$59/2^-$	M	
14286.5[b] *14*	$59/2^-$	M	
14577.5[&] *15*	(61/2)	M	
15653.9[a] *15*	$(63/2^-)$	M	
15990.8[b] *18*	$(63/2^-)$	M	
16309.8[&] *18*	(65/2)	M	
17504.3[a] *18*	$(67/2^-)$	M	
18219.8?[&] *20*	(69/2)	M	

[†] J^{π} without comments are based on band assignments.
[‡] J is assigned to 7/2 from shell-model syst.
[#] In the ps range are from Doppler shift in (α,2nγ) (1991Vi09).
[@] From least-squares fit to γ energies.
[&] Band(A): ΔJ=2 band based on 17/2.
[a] Band(B): ΔJ=2 band based on $39/2^-$.
[b] Band(C): ΔJ=2 band based on $31/2^-$.
[c] Band(D): proposed neutron $h_{11/2}$ band. ΔJ=2 spacings.

Adopted Levels, Gammas (continued)

γ(^{113}Sn)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[‡]	δ	α[#]	Comments
77.389	7/2$^+$	77.38 *2*	100	0.0	1/2$^+$	M3+E4	0.13 *2*	181 *5*	B(M3)(W.u.)=0.0281 *15*; B(E4)(W.u.)=1.4×10^2 *5* Mult.,δ: see ^{113}Sn IT decay (21.4 min). B(M3)(W.u.): the calculated B(E4)(W.u.) gives 140 *50* which violates RUL.
409.83	5/2$^+$	332.41 *5*	100 *4*	77.389	7/2$^+$	M1+E2	−0.08 *2*		
		409.9 *2*	0.87 *11*	0.0	1/2$^+$				
498.07	3/2$^+$	88.25 *2*	3.4 *4*	409.83	5/2$^+$				
		420.7 *2*	0.3 *2*	77.389	7/2$^+$				
		497.96 *9*	100 *5*	0.0	1/2$^+$	M1+E2	0.12 *6*		B(M1)(W.u.)<0.49; B(E2)(W.u.)<44
738.4	11/2$^-$	661.0 *3*	100	77.389	7/2$^+$	M2(+E3)	<2.6	0.0133 *16*	B(M2)(W.u.)>0.015; B(E3)(W.u.)<3.0×10^2 Mult.,δ: from 1972Br38. RUL gives δ≤0.65, then B(M2)(W.u.)=0.10 *2*.
1013.94	3/2$^+$	603.0 *4*	0.65 *14*	409.83	5/2$^+$				
		936.7 *2*	100 *5*	77.389	7/2$^+$				
		1014.4 *3*	96 *6*	0.0	1/2$^+$	M1+E2	0.5 *1*		B(M1)(W.u.)=0.041 *21*; B(E2)(W.u.)=8 *5*
1018.08	5/2$^+$	608.2 *2*	100 *7*	409.83	5/2$^+$	M1+E2	3 *1*		B(M1)(W.u.)=0.006 *5*; B(E2)(W.u.)=1.1×10^2 *6*
		940.63 *6*	59 *3*	77.389	7/2$^+$	M1+E2	0.5 *2*		B(M1)(W.u.)=0.007 *4*; B(E2)(W.u.)=1.6 *13*
		1018.12 *6*	15 *3*	0.0	1/2$^+$	E2			B(E2)(W.u.)=1.4 *8*
1248.7		838.9 *3*	100	409.83	5/2$^+$				
1284.06	5/2$^+$	786.1 *3*	11 *1*	498.07	3/2$^+$				
		873.9 *4*	6.3 *3*	409.83	5/2$^+$	M1+E2	2.7 *8*		B(M1)(W.u.)=0.0004 *3*; B(E2)(W.u.)=3.0 *13*
		1206.3 *3*	9 *5*	77.389	7/2$^+$				
		1284.2 *2*	100 *5*	0.0	1/2$^+$	E2			B(E2)(W.u.)=8 *4*
1314.07	3/2$^+$	816.3 *3*	18.3 *22*	498.07	3/2$^+$				
		1314.0 *2*	100 *11*	0.0	1/2$^+$	M1			
1355.90	3/2$^+$	1356.0 *3*	100	0.0	1/2$^+$	M1+E2	0.14 *6*		B(M1)(W.u.)=0.012 *6*; B(E2)(W.u.)=0.10 *10*
1472.54	5/2$^+$	1472.8 *3*	100	0.0	1/2$^+$	E2			B(E2)(W.u.)=3.1 *20*
1539.0	5/2$^+$	1129.2 *7*	100	409.83	5/2$^+$	M1+E2	−2.5 *10*		B(M1)(W.u.)=0.0035 *25*; B(E2)(W.u.)=14 *3*
1539.9	(11/2$^-$)	801.5 *3*	100	738.4	11/2$^-$	M1+E2	−0.3 *1*		B(M1)(W.u.)=0.20 *10*; B(E2)(W.u.)=22 *18*
1556.50	3/2$^+$	242.6 *3*	2.2 *5*	1314.07	3/2$^+$				
		273.4 *8*	3.6 *4*	1284.06	5/2$^+$				E_γ: not reported in (α,2nγ).
		538.2 *2*	5.6 *4*	1018.08	5/2$^+$				
		1058.3 *2*	5.2 *5*	498.07	3/2$^+$				
		1146.6 *4*	43 *3*	409.83	5/2$^+$				
		1478.8 *2*	11.5 *15*	77.389	7/2$^+$				
		1557.0 *2*	100 *8*	0.0	1/2$^+$	M1+E2	0.2 *1*		
1646.06	3/2$^+$,5/2$^+$	1147.2 *4*	88 *22*	498.07	3/2$^+$				
		1568.9 *2*	34 *4*	77.389	7/2$^+$				
		1646.0 *2*	100 *15*	0.0	1/2$^+$				
1647.2		1149.3 *4*	100 *30*	498.07	3/2$^+$				
		1237.1 *4*	30 *15*	409.83	5/2$^+$				

$^{113}_{50}Sn_{63}$-6

Adopted Levels, Gammas (continued)

γ(^{113}Sn) (continued)

E_i(level)	J_i^π	E_γ †	I_γ †	E_f	J_f^π	Mult.‡	δ	Comments
1651.62	5/2+	1241.6 *3*	100 *20*	409.83	5/2+	M1		
		1574.3 *2*	50 *5*	77.389	7/2+	M1+E2	−1.0 *5*	
1732.22	(3/2+,5/2+)	448.3 *5*	4.8 *20*	1284.06	5/2+			
		718.4 *3*	7 *4*	1013.94	3/2+			
		1234.2 *3*	100 *13*	498.07	3/2+	M1		
		1654.6 *3*	13.0 *13*	77.389	7/2+			
1744.81	3/2+,5/2+	725.3 *10*	6 *3*	1018.08	5/2+			
		1247.1 *3*	15 *2*	498.07	3/2+	M1+E2	2.1 *15*	B(M1)(W.u.)=0.0006 +*8*−*6*; B(E2)(W.u.)=1.4 *6*
		1334.9 *2*	100 *5*	409.83	5/2+	M1+E2	0.6 *4*	B(M1)(W.u.)=0.014 *6*; B(E2)(W.u.)=2.2 *22*
		1667.5 *3*	41 *3*	77.389	7/2+			
1781.1	9/2−	1042.6 *5*	100 *5*	738.4	11/2−	M1+E2	−0.5 *3*	B(M1)(W.u.)=0.08 *4*; B(E2)(W.u.)=14 +*15*−*14* Mult.: δ=0.5 *3* or −1.6 *3*.
		1703.8 *4*	5 *2*	77.389	7/2+	[E1]		B(E1)(W.u.)=1.5×10^{-5} *8*
1821.0	1/2+	1821.0 *3*	100	0.0	1/2+			
1831.0	1/2+	1831.0 *3*	100	0.0	1/2+			
1867.28	5/2+	394.8 *3*	11.3 *25*	1472.54	5/2+			
		583.2 *3*	100 *5*	1284.06	5/2+	M1+E2	0.15 *10*	B(M1)(W.u.)=0.30 *10*; B(E2)(W.u.)=15 +*21*−*15*
1906.6	15/2−	1168.3 *3*	100	738.4	11/2−	E2		B(E2)(W.u.)=10 *3*
1909.64	(5/2+,7/2+)	1411.7 *2*	100 *14*	498.07	3/2+			
		1499.5 *3*	45 *9*	409.83	5/2+			
1935.4	(11/2−)	1196.9 *3*	100	738.4	11/2−	M1+E2	−5 *3*	B(M1)(W.u.)=0.0003 +*4*−*3*; B(E2)(W.u.)=3.6 *16*
1945.3	(9/2−)	1206.9 *3*	100	738.4	11/2−	M1+E2	0.15 *5*	B(M1)(W.u.)=0.031 *16*; B(E2)(W.u.)=0.4 *3*
1952.1	13/2−	1213.6 *3*	100	738.4	11/2−	M1+E2	3.4 *2*	B(M1)(W.u.)=0.0010 *4*; B(E2)(W.u.)=6.1 *25*
1957.05	3/2(+),5/2(+)	1458.9 *2*	85 *8*	498.07	3/2+			
		1547.2 *5*	≈100	409.83	5/2+			
		1880.1 *4*	33 *4*	77.389	7/2+			
		1956.9 *4*	100 *10*	0.0	1/2+			
2031.4		1621.6 *3*	100	409.83	5/2+			
2039.88	7/2+	172.7 *3*	80 *7*	1867.28	5/2+	M1+E2	0.4 *2*	B(M1)(W.u.)=5 *3*; B(E2)(W.u.)=2.0×10^4 *20*
		567.2 *3*	80 *7*	1472.54	5/2+	M1+E2	6 *3*	B(M1)(W.u.)=0.004 *4*; B(E2)(W.u.)=3.8×10^2 *20*
		684.0 *2*	100 *7*	1355.90	3/2+	E2		B(E2)(W.u.)=1.9×10^2 *10*
		755.8 *3*	47 *5*	1284.06	5/2+			
2045.47	(3/2+,5/2+)	573.0 *3*	53 *5*	1472.54	5/2+	(M1)		
		1547.9 *5*	≈100	498.07	3/2+			
		1635.3 *3*	63 *8*	409.83	5/2+			
		1968.3 *5*	35 *5*	77.389	7/2+			
2128.14	3/2+,5/2+	1718.3 *2*	100	409.83	5/2+			
2135.0		1725.2 *3*	100	409.83	5/2+			
2176.27	7/2+	892.1 *3*	64 *4*	1284.06	5/2+	M1+E2	−0.2 *1*	B(M1)(W.u.)=0.029 *20*; B(E2)(W.u.)=1.2 +*14*−*2* Mult.: δ=−0.2 *1* or −2.1 *6*.
		1766.4 *3*	100 *8*	409.83	5/2+	M1		B(M1)(W.u.)=0.006 *4*

$^{113}_{50}Sn_{63}$-7

Adopted Levels, Gammas (continued)

γ(^{113}Sn) (continued)

E_i(level)	J_i^π	E_γ †	I_γ †	E_f	J_f^π	Mult.‡	δ	Comments
2176.27	7/2+	2099.0 *3*	56 *4*	77.389	7/2+	M1		B(M1)(W.u.)=0.0020 *14*
2200.7	5/2+	1702.6 *3*	100	498.07	3/2+	M1+E2	−0.5 *3*	B(M1)(W.u.)<0.018; B(E2)(W.u.)<2.0
2258.6	5/2+	786.0 *3*	67 *25*	1472.54	5/2+			
		974.6 *4*	100 *8*	1284.06	5/2+			
2275.8	1/2−,3/2−	1866.0 *3*	100	409.83	5/2+			
2336.7	11/2−	1598.3 *3*	100	738.4	11/2−	M1+E2	1.9 *2*	B(M1)(W.u.)=0.0033 *10*; B(E2)(W.u.)=3.7 *9*
2385.77	7/2+	518.4 *5*	17 *7*	1867.28	5/2+			
		913.2 *3*	100 *30*	1472.54	5/2+	M1+E2	0.4 *2*	B(M1)(W.u.)=0.03 *3*; B(E2)(W.u.)=4 *+6−4*
		1101.8 *4*	14 *7*	1284.06	5/2+			
2410.8		543.5 *4*	100	1867.28	5/2+			
2448.38	7/2+	975.8 *3*	70.8	1472.54	5/2+			
		1092.6 *5*	7 *3*	1355.90	3/2+			
		1164.3 *3*	100	1284.06	5/2+	M1+E2	1.4 *6*	
2457.11		1959.1 *3*	100 *5*	498.07	3/2+			
		2047.2 *3*	14 *1*	409.83	5/2+			
2467.9		1969.8 *3*	100	498.07	3/2+			
2506.0		1034.0 *4*	66 *22*	1472.54	5/2+			
		1221.7 *3*	100 *10*	1284.06	5/2+			
2512.0	(3/2,5/2)	2013.9 *3*	100	498.07	3/2+			
2538.27	3/2+,5/2+	2040.3 *3*	100 *18*	498.07	3/2+			
		2128.3 *3*	60 *10*	409.83	5/2+			
2540.0	(15/2−)	633.3 *3*	70 *5*	1906.6	15/2−	M1+E2	−1.2 *8*	B(M1)(W.u.)=0.21 *19*; B(E2)(W.u.)=6.E+2 *5*
		1801.6 *3*	100 *5*	738.4	11/2−	E2		B(E2)(W.u.)=8 *4*
2552.4	(3/2,5/2,7/2)	1079.8 *4*	100 *66*	1472.54	5/2+			
		1268.4 *3*	100 *20*	1284.06	5/2+			
2582.3	(15/2−)	1843.8 *3*	100	738.4	11/2−			
2590.77	(3/2)	2092.9 *3*	12 *3*	498.07	3/2+			
		2180.7 *3*	100 *10*	409.83	5/2+			
2616.7		2206.9 *5*	100	409.83	5/2+			
2619.4		282.7 *3*	33 *13*	2336.7	11/2−			
		838.4 *4*	100 *13*	1781.1	9/2−			
		1881.0 *3*	60 *7*	738.4	11/2−			
2624.04		879.4 *3*	56 *3*	1744.81	3/2+,5/2+			
		1151.8 *5*	25 *13*	1472.54	5/2+			
		2213.9 *3*	100 *10*	409.83	5/2+			
2649.0	(9/2−)	1910.6 *3*	100	738.4	11/2−	(E2)		
2662.8	(3/2+,5/2+)	2164.7 *3*	100	498.07	3/2+			
2671.1		1932.7 *3*	100	738.4	11/2−			
2675.3		808.0 *4*	83 *33*	1867.28	5/2+			
		1202.8 *4*	100 *33*	1472.54	5/2+			
2700.4		363.7 *4*	56 *22*	2336.7	11/2−			
		748.4 *3*	100 *22*	1952.1	13/2−			

$^{113}_{50}Sn_{63}$-8

Adopted Levels, Gammas (continued)

γ(^{113}Sn) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[‡]	δ	Comments
2700.4		765.0 *4*	44 *22*	1935.4	(11/2$^-$)			
		1962.0 *3*	78 *22*	738.4	11/2$^-$			
2717.8	(11/2$^-$)	381.1 *5*	66 *33*	2336.7	11/2$^-$			
		772.5 *3*	100 *33*	1945.3	(9/2$^-$)	M1		
		1979.4 *3*	100 *33*	738.4	11/2$^-$			
2749.7	17/2$^-$	797.7 *3*	100	1952.1	13/2$^-$	(E2)		B(E2)(W.u.)=2.6×10^2 *9*
2777.9		2039.5 *3*	100 *12*	738.4	11/2$^-$			
2806.6	19/2$^-$	900.0 *3*	100	1906.6	15/2$^-$	E2		B(E2)(W.u.)=1.0×10^2 *3*
2851.6	(17/2$^-$)	899.1 *4*	100 *50*	1952.1	13/2$^-$			
		945.0 *2*	84 *11*	1906.6	15/2$^-$			
2888.9		2150.5 *3*	100	738.4	11/2$^-$			
2915.9		963.8 *2*	100 *17*	1952.1	13/2$^-$			
		1009.1 *5*	17 *8*	1906.6	15/2$^-$			
2932.2		1918.7 *8*	37 *15*	1013.94	3/2$^+$			
		2433.9 *8*	100 *19*	498.07	3/2$^+$			
		2854.4 *8*	48 *11*	77.389	7/2$^+$			
2956.5		1672.4 *3*	100	1284.06	5/2$^+$			
2975.0	(19/2$^-$)	225.3 *3*	60 *30*	2749.7	17/2$^-$	M1+E2	0.25 *5*	B(M1)(W.u.)=1.8 *13*; B(E2)(W.u.)=1.7×10^3 *15*
		392.7 *2*	61 *5*	2582.3	(15/2$^-$)			
		1068.3 *3*	100 *30*	1906.6	15/2$^-$	E2		B(E2)(W.u.)=20 *13*
3091.2	19/2$^-$	1184.7 *3*	100	1906.6	15/2$^-$	E2		B(E2)(W.u.)=17 *7*
3128.7	21/2$^-$	153.0	3 *1*	2975.0	(19/2$^-$)			
		322.4 *3*	100 *13*	2806.6	19/2$^-$	M1+E2	0.15 *5*	
3130.3		510.9 *5*	100 *57*	2619.4				
		1223.6 *4*	29 *14*	1906.6	15/2$^-$			
3138.9		1271.6 *5*	100	1867.28	5/2$^+$			
3223.2	(19/2)$^-$	1316.5 *3*	100	1906.6	15/2$^-$	Q		Mult.: From ^{100}Mo(^{18}O,5nγ).
3409.5	17/2	1502.6 *5*	100	1906.6	15/2$^-$	D		Mult.: From ^{100}Mo(^{18}O,5nγ).
3412.5		1502.8 *3*	100	1909.64	(5/2$^+$,7/2$^+$)			
3420.4	(21/2$^-$)	291.7 *2*	100 *11*	3128.7	21/2$^-$	M1+E2	0.35 *15*	
		613.9 *4*	39 *11*	2806.6	19/2$^-$	M1+E2	0.4 *1*	
3456.5		1546.8 *4*	100	1909.64	(5/2$^+$,7/2$^+$)			
3458.3	(23/2$^-$)	329.3 *3*	100	3128.7	21/2$^-$	M1+E2	0.16 *5*	
		651.1 *5*	3.4 *17*	2806.6	19/2$^-$			
3680.4	(23/2$^-$)	551.7 *3*	100	3128.7	21/2$^-$	M1+E2	>10	
3837.5	(23/2$^-$)	379.2 *4*	33 *17*	3458.3	(23/2$^-$)			
		708.7 *4*	100 *8*	3128.7	21/2$^-$	M1		
3901.9	(23/2$^-$)	678.7 *4*	44 *11*	3223.2	(19/2)$^-$	(E2)		B(E2)(W.u.)=6.E+1 *3*
		810.8 *3*	100	3091.2	19/2$^-$	(E2)		B(E2)(W.u.)=58 *20*
3913.8	(21/2$^-$)	1107.2 *3*	100	2806.6	19/2$^-$	M1		
3972.1	(23/2$^-$)	551.9 *3*	14 *14*	3420.4	(21/2$^-$)	M1+E2	>10	B(M1)(W.u.)<0.00067

$^{113}_{50}Sn_{63}$-9

Adopted Levels, Gammas (continued)

γ(^{113}Sn) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[‡]	δ	Comments
3972.1	(23/2$^-$)	843.7 *3*	100 *18*	3128.7	21/2$^-$	M1+E2	0.25 *5*	B(M1)(W.u.)=0.06 *3*; B(E2)(W.u.)=4 *3*
4051.8	21/2	642.0 *5*	100 *5*	3409.5	17/2	E2		
		960.7 *5*	73 *5*	3091.2	19/2$^-$	D		
4058.0	25/2$^+$	86.1 *2*	40 *20*	3972.1	(23/2$^-$)			
		599.1 *3*	100 *20*	3458.3	(23/2$^-$)	E1		B(E1)(W.u.)=1.4×10^{-6} *7*
4475.1	(27/2$^+$)	417.1 *3*	100	4058.0	25/2$^+$	M1+E2	0.4 *2*	B(M1)(W.u.)<0.27; B(E2)(W.u.)<3.2×10^2
4714.4	(27/2$^-$)	812.4 *3*	100	3901.9	(23/2$^-$)	(E2)		B(E2)(W.u.)=1.6×10^2 *6*
4752.2	25/2	700.3 *5*	88 *5*	4051.8	21/2	E2		
		850.5 *5*	100 *5*	3901.9	(23/2$^-$)	D		
5534.4	29/2	782.3 *5*	100 *4*	4752.2	25/2	E2		
		820.3 *5*	34.9 *18*	4714.4	(27/2$^-$)	D		
5605.7	31/2$^+$	1130.6 *5*	100	4475.1	(27/2$^+$)	E2		
5645.6	31/2$^-$	930.8 *5*	100	4714.4	(27/2$^-$)	E2		
6385.3	33/2	739.4 *5*	17.8 *9*	5645.6	31/2$^-$	D		
		851.3 *5*	100 *3*	5534.4	29/2	E2		
6682.3	35/2$^-$	1036.7 *5*	100	5645.6	31/2$^-$	E2		
7322.0	37/2	936.7 *5*	100	6385.3	33/2	E2		
7784.4	39/2$^-$	1102.3 *5*	100	6682.3	35/2$^-$	E2		
7883.1	39/2$^-$	1200.7 *5*	100	6682.3	35/2$^-$	E2		
8347.8	41/2	1025.7 *5*	100	7322.0	37/2	E2		
8811.7	43/2$^-$	928.4 *5*	≤14	7883.1	39/2$^-$	E2		
		1027.4 *5*	100 *4*	7784.4	39/2$^-$	E2		
9014.0	43/2$^-$	1130.8 *5*	91 *5*	7883.1	39/2$^-$	E2		
		1229.6 *5*	100 *5*	7784.4	39/2$^-$	E2		
9466.9	45/2	1119.1 *5*	100	8347.8	41/2	E2		
9936.4	47/2$^-$	1124.7 *5*	100	8811.7	43/2$^-$	E2		
10209.7	47/2$^-$	1195.7 *5*	100	9014.0	43/2$^-$	E2		
10589.1	49/2	1122.2 *5*	100	9466.9	45/2	E2		
11242.0	51/2$^-$	1305.6 *5*	100	9936.4	47/2$^-$	E2		
11405.1	51/2$^-$	1195.4 *5*	100	10209.7	47/2$^-$	E2		
11723.5	53/2	1134.4 *5*	100	10589.1	49/2	E2		
12642.9	55/2$^-$	1237.8 *5*	100	11405.1	51/2$^-$	E2		
12736.8	(55/2$^-$)	1494.8 *5*	100	11242.0	51/2$^-$	(E2)		
13034.6	57/2	1311.1 *5*	100	11723.5	53/2	E2		
14032.6	59/2$^-$	1389.7 *5*	100	12642.9	55/2$^-$	E2		
14286.5	59/2$^-$	1549.7 *5*	100	12736.8	(55/2$^-$)	(E2)		
14577.5	(61/2)	1542.9 *5*	100	13034.6	57/2	(E2)		
15653.9	(63/2$^-$)	1621.3 *5*	100	14032.6	59/2$^-$	(E2)		
15990.8	(63/2$^-$)	1704.3 *10*	100	14286.5	59/2$^-$	(E2)		
16309.8	(65/2)	1732.3 *10*	100	14577.5	(61/2)	(E2)		

$^{113}_{50}Sn_{63}$-10

Adopted Levels, Gammas (continued)

$\gamma(^{113}Sn)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[‡]
17504.3	(67/2$^-$)	1850.4 *10*	100	15653.9	(63/2$^-$)	(E2)
18219.8?	(69/2)	1910.8[@] *10*	100	16309.8	(65/2)	(E2)

[†] Average from (p,nγ), (p,3nγ), (α,2n), (α,3n) when they are given.
[‡] The M and δ are from (α,2nγ), unless otherwise noted.
[#] Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.
[@] Placement of transition in the level scheme is uncertain.

$^{113}_{50}Sn_{63}$-11

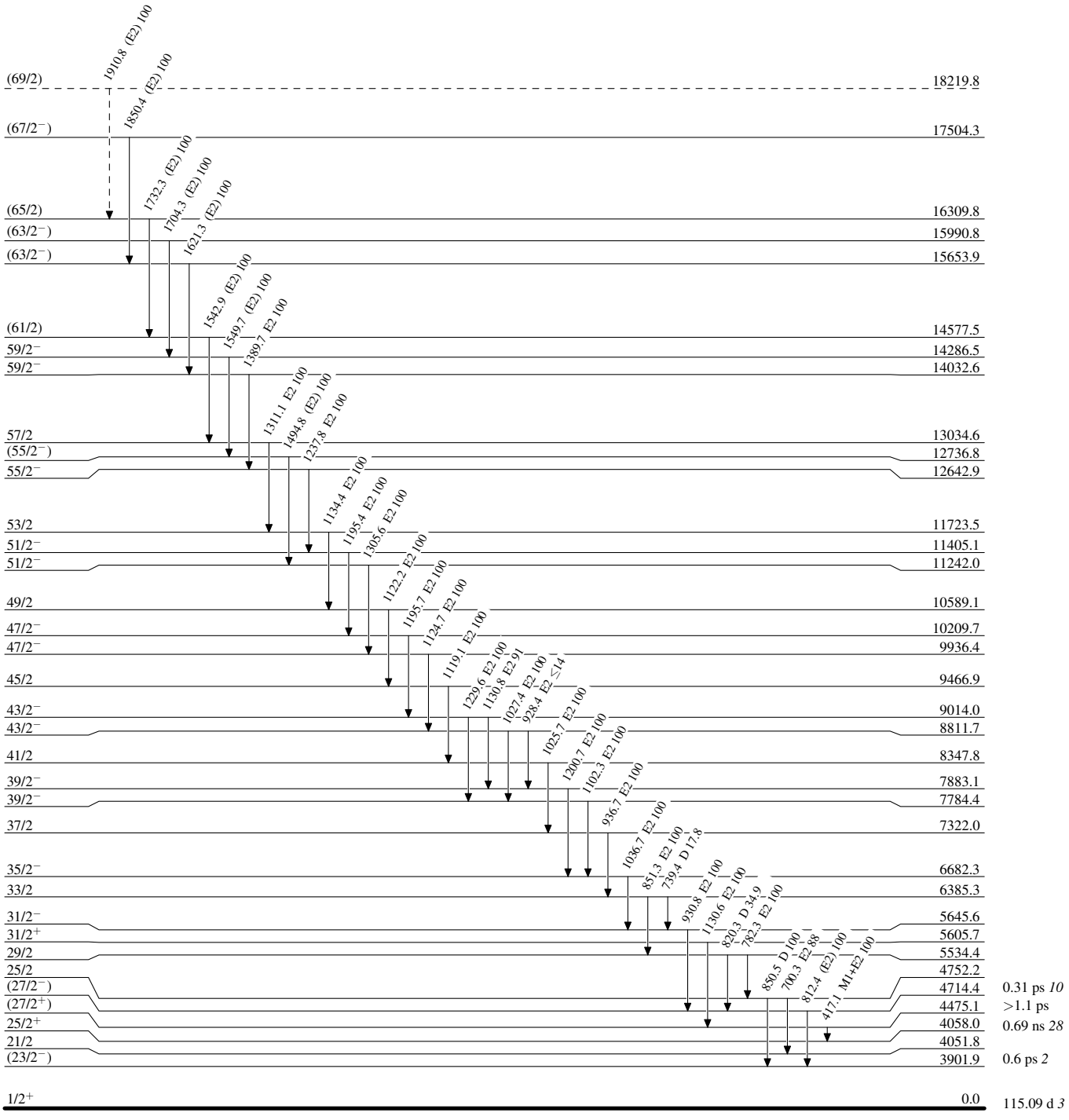
Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level

γ Decay (Uncertain)

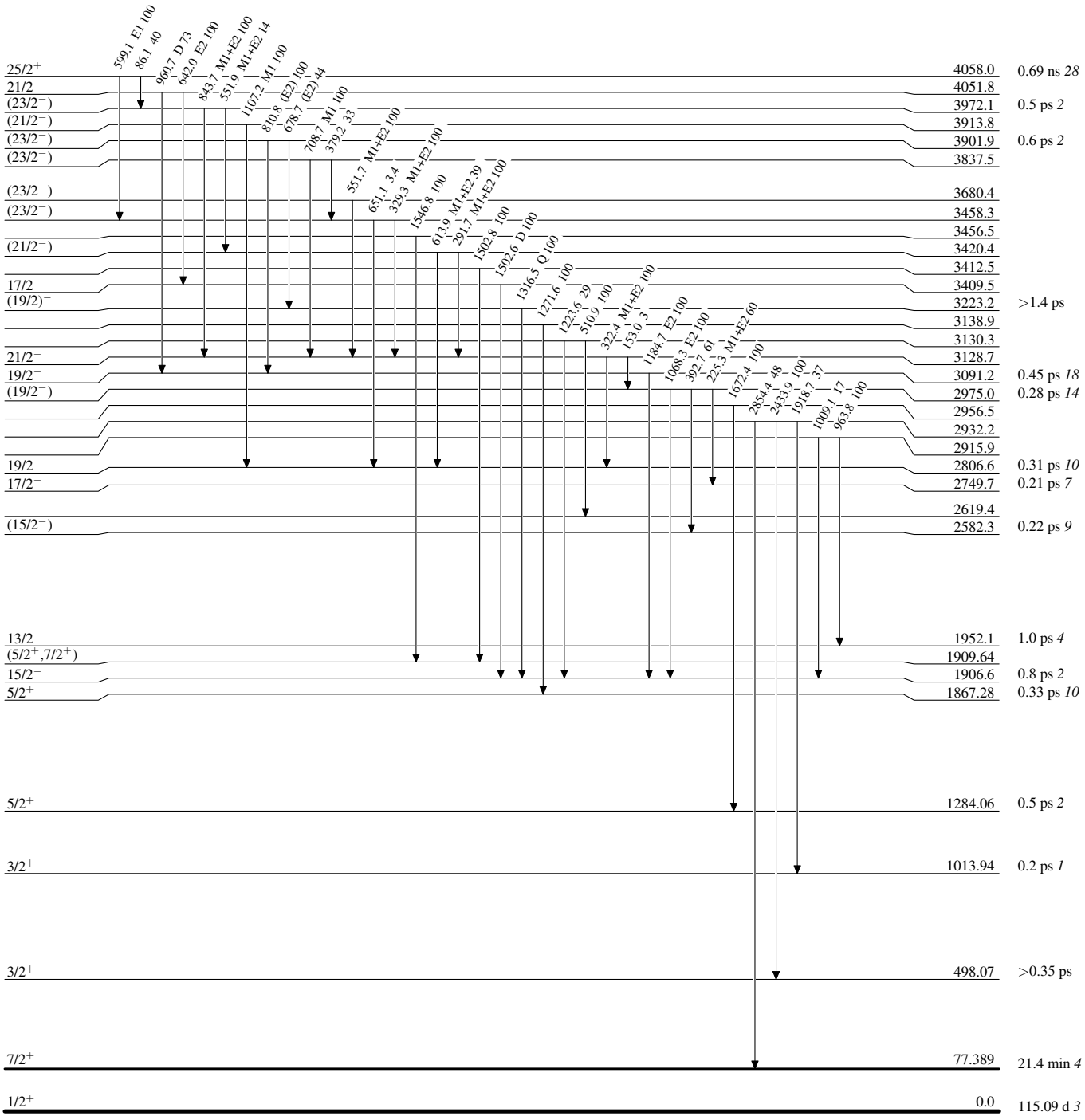


$^{113}_{50}Sn_{63}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

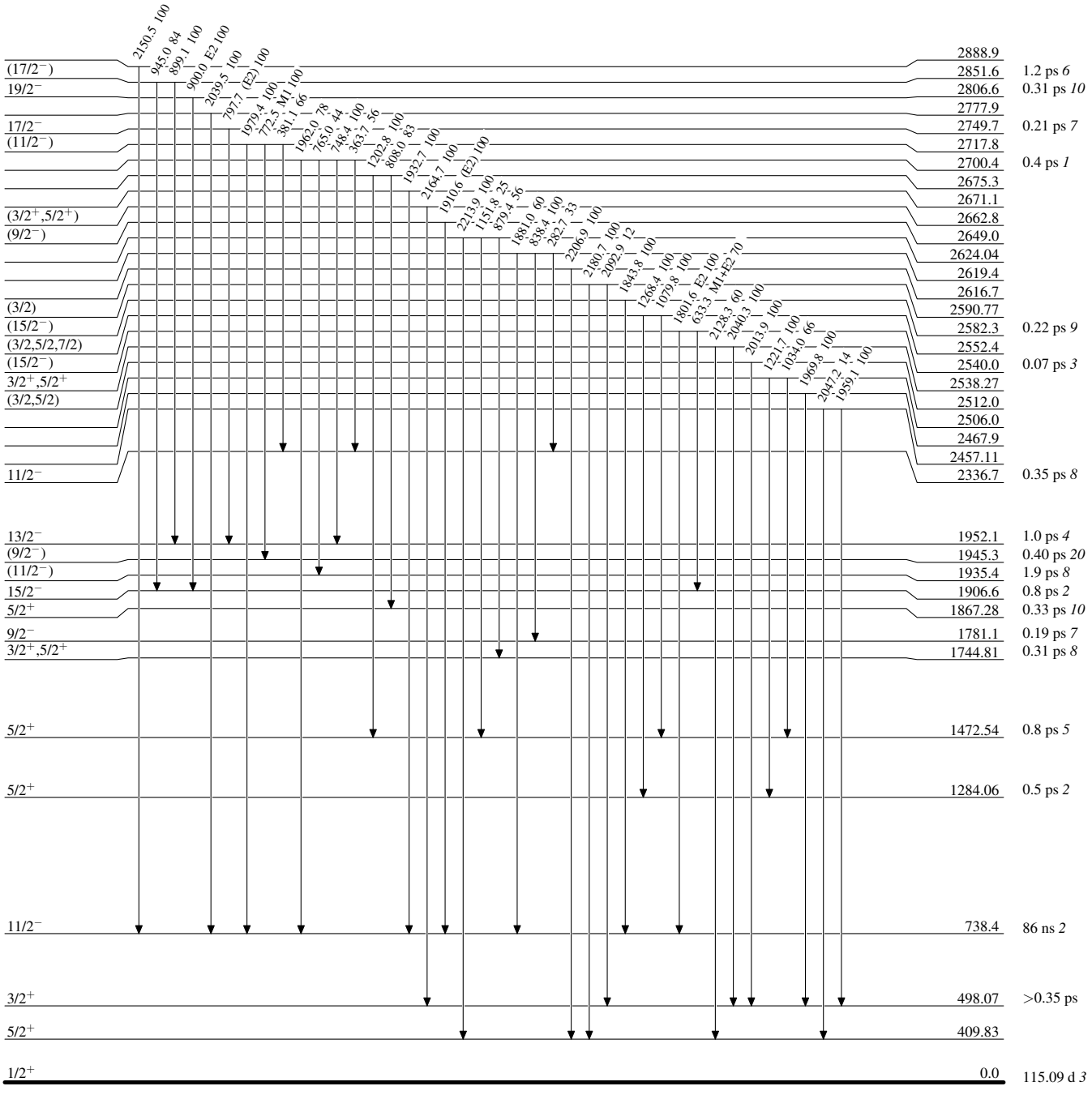


$^{113}_{50}Sn_{63}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

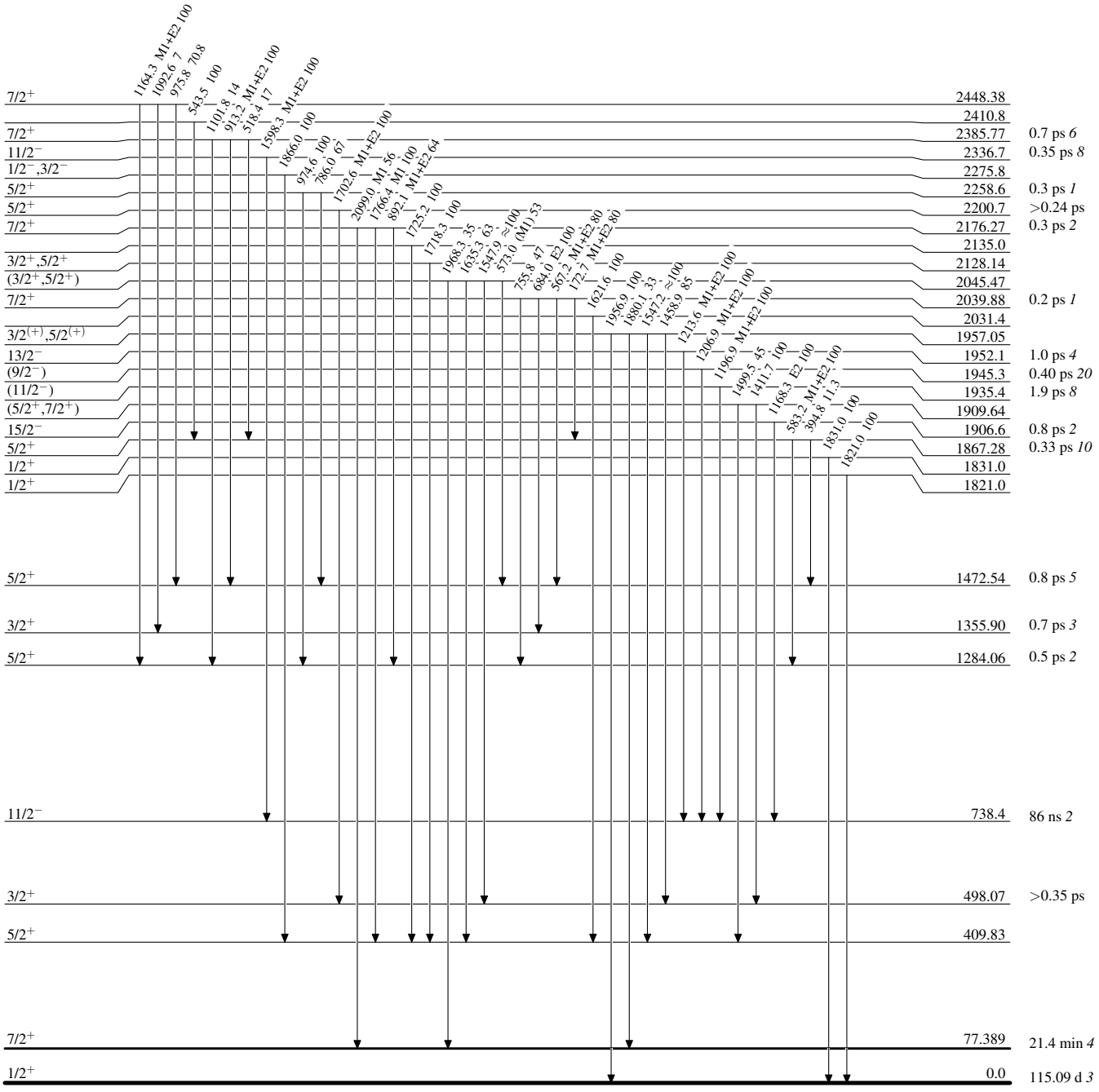


$^{113}_{50}Sn_{63}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

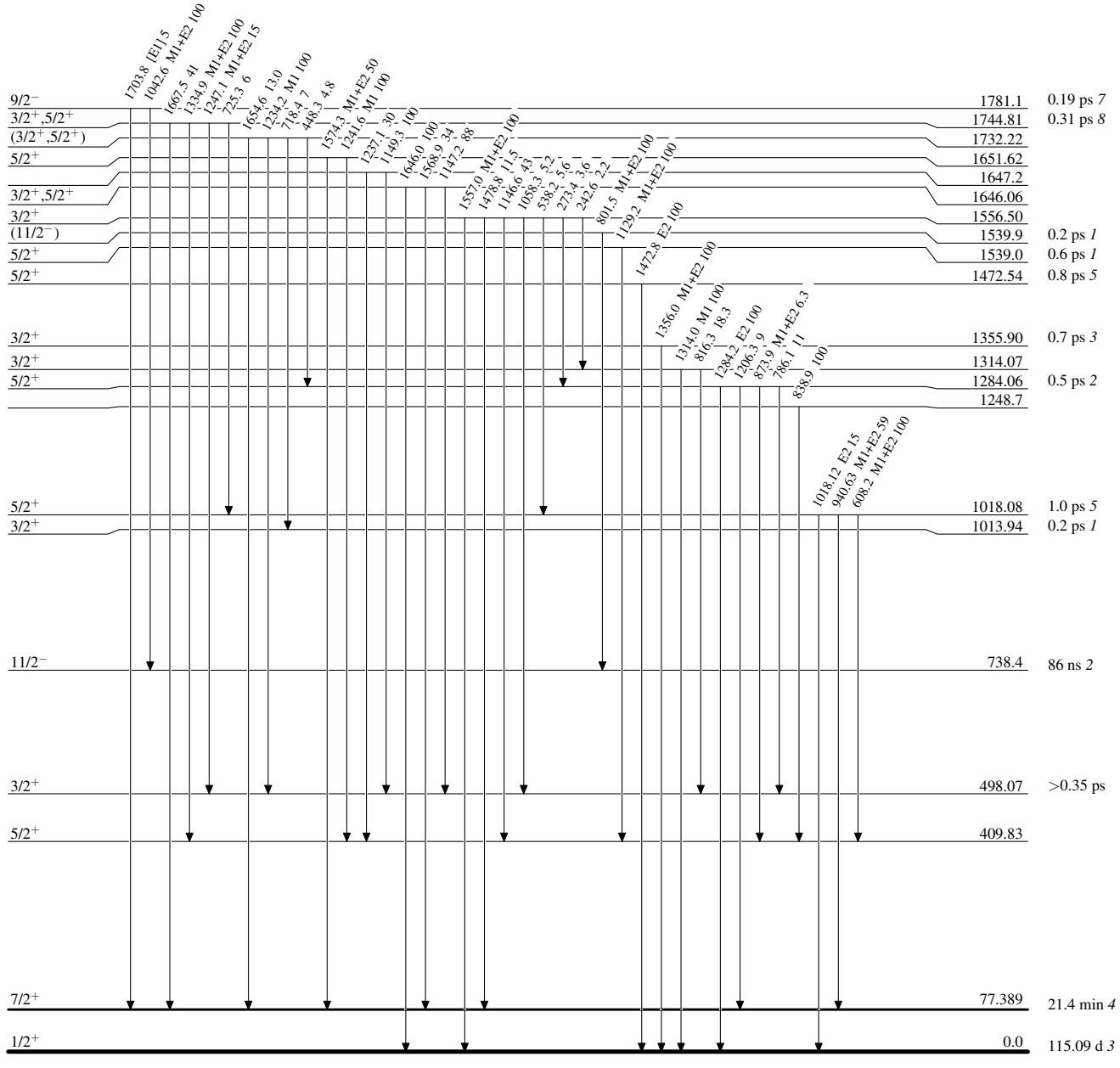


$^{113}_{50}Sn_{63}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

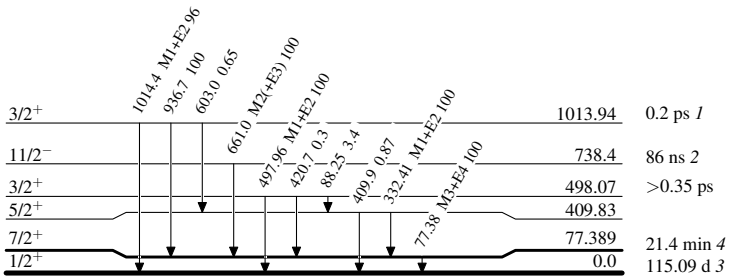


$^{113}_{50}Sn_{63}$

Adopted Levels, Gammas

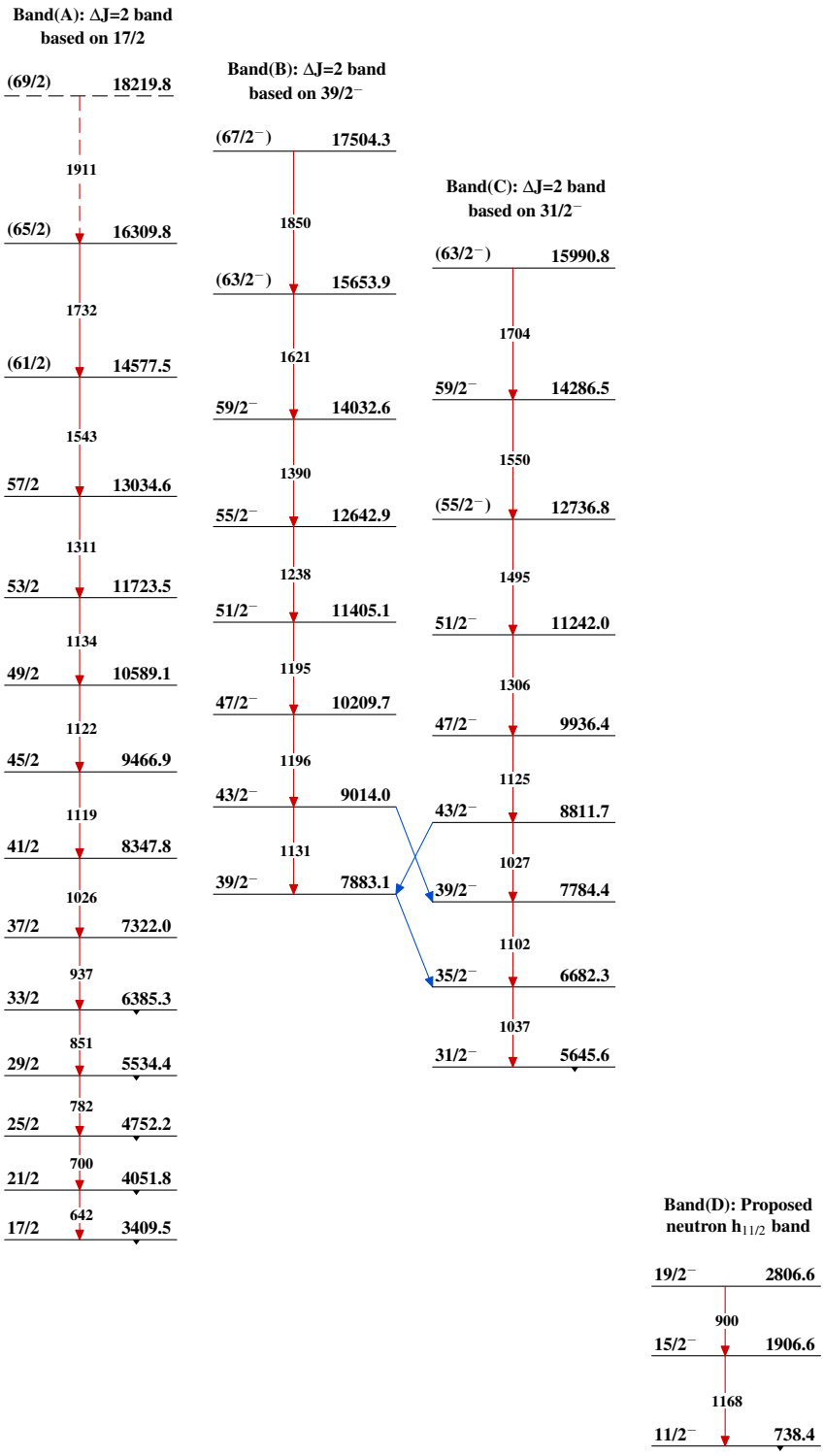
Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{113}_{50}Sn_{63}$

Adopted Levels, Gammas



$^{113}_{50}Sn_{63}$