Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Alan L. Nichols, Balraj Singh, Jagdish K. Tuli	NDS 113,973 (2012)	15-Apr-2012

Q(β^-)=−9181.1 *4*; S(n)=12890 *16*; S(p)=6472.6 *11*; Q(α)=−3364.3 *6* 2012Wa38
Note: Current evaluation has used the following Q record −9181.07 38 *12896* 16 *6472.7 11*−3364.3 *6* 2011AuZZ.
S(2n)=23136.4 *7*, S(2p)=11272.9 *5* (2011AuZZ).
Values in 2003Au03: Q(β^-)=−9171 *26*, S(n)=12897 *19*, S(p)=6477 *10*, Q(α)=−3369 *10*, S(2n)=23126 *15*, S(2p)=11277 *10*.
Other reactions:
1997Fo03: ^{62}Ni(π^+,π^-),E=140-230 MeV, measured $\sigma(\theta)$.
1993Be02: ^{62}Ni(π^+,π^-),E=293.4 MeV, measured $\sigma(\theta)$.
1979ShZN: ^{58}Ni(^{14}N,^{10}B) E=155 MeV, measured $\sigma(\theta)$, DWBA.
1977Gr03: ^{58}Ni(α,p) E=6.26-9.12 MeV in steps of 20 keV, excitation functions measured to find resonances of large α width. The spectra show a large number of alpha-particle resonances, but their energies are not listed. Differential cross sections were measured at three angles. No evidence was found for levels with very large α widths; observed α width was concentrated in a small number of states, in qualitative agreement with the predictions of a weak coupling shell model.
1976Ca06: ^{64}Zn(γ,2n) E=8-30 MeV; measured σ, GDR width.
1970Co25: ^{64}Zn(γ,2n) E=12-40 MeV; measured σ, GDR.
Mass measurement: 2006Er03 (Penning trap method).
Additional information 1.
^{62}Zn produced and identified in deuteron and ^{3}He bombardment of Cu (1948Mi12), who also measured half-life.

^{62}Zn Levels

Cross Reference (XREF) Flags

A	^{62}Ga ε decay (116.121 ms)	G	^{58}Ni(^{12}C,^{8}Be)	M	^{61}Ni(^{3}He,2nγ)
B	^{40}Ca(^{28}Si,α2pγ) E=122 MeV	H	^{58}Ni(^{16}O,^{12}C)	N	Coulomb excitation
C	^{40}Ca(^{28}Si,α2pγ) E=125 MeV	I	^{60}Ni(^{3}He,n)	O	^{63}Cu(p,2nγ)
D	^{58}Ni(^{6}Li,pnγ)	J	^{60}Ni(α,2nγ),(^{3}He,nγ)	P	^{64}Zn(p,t)
E	^{58}Ni(^{6}Li,d),(pol ^{6}Li,D)	K	^{60}Ni(^{12}C,^{10}Be)		
F	^{58}Ni(^{7}Li,t)	L	^{60}Ni(^{16}O,^{14}C)		

E(level)[†]	J^{π}[‡]	$T_{1/2}$[#]	XREF	Comments
0.0[b]	0+	9.193 h *15*	ABCDEFGHIJKLMNOP	%ε+%β^+=100 $T_{1/2}$: weighted average of 9.186 h *13* (1982Gr10, from decay curve for two γ rays followed over 8 to 11 half-lives, but no details); 9.231 h *20*, 9.23 h *6* (1972Cr02,γ counting, average of measurements for four γ rays of 260, 394, 548 and 597 keV at two different energies of E(^{3}He) beam in ^{64}Zn(^{3}He,X) reaction; 9.34 h *4* and 9.39 h *5* at two other beam energies not used in the averaging procedure because of low counting rates and apparent discrepant results); 9.3 h *2* (1967Ro01, γ decay curve, but no details); 9.2 h *1* (1967An01, from decay curves for several conversion lines, but no other details); 9.13 h *3* (1964Ru06, $\gamma\gamma$ counting method, eight runs, but no other details); 9.3 h *2* (1954Nu27,γ counting, but no details). Others: 8.4 h *2* (1953Ku08, preliminary value from a composite decay curve of several activities produced), 9.33 h (1950Ha65, from positron decay curve), 9.5 h (1948Mi12, from electron counting using GM counter). Reduced χ^2=1.5. Uncertainty is obtained by multiplying uncertainty of 0.0125 by (reduced $\chi^2)^{1/2}$.
953.84[b] *9*	2+	2.93 ps *14*	ABCDEFGHIJKLMNOP	μ=+0.74 *20* (2002Ke02,2011StZZ) μ: from g factor=+0.37 *10* (2002Ke02) using projectile Coulomb excitation in inverse kinematics and transient magnetic fields. Data

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Adopted Levels, Gammas (continued)

^{62}Zn Levels (continued)

E(level)[†]	J^{π}[‡]	$T_{1/2}$[#]	XREF	Comments
				reanalyzed in 2010Mo14 with the same result of g=+0.37 *10*. J^{π}: E2 γ to 0^+. $T_{1/2}$: from evaluation by 2011PrZZ, based on mean lifetime measurements of 4.2 ps *7* (2007St16), 4.3 ps *3* (2002Ke02), 4.2 ps *3* (1981Wa09) and 2.5 ps *+10−20* (1977BrYO).
1804.67[c] *11*	2^+	2.63 ps *42*	ABCDE H JKLMNOP	J^{π}: E2 γ to 0^+.
2186.06[b] *13*	4^+	0.53 ps *+24−14*	BCDE GH JK MNOP	J^{π}: ΔJ=2, E2 γ to 0^+. $T_{1/2}$: other: 1.0 ps *7* from (α,2nγ).
2341.95 *23*	0^+		A E H M P	XREF: E(2360). J^{π}: L(p,t)=L(^{6}Li,d)=0.
2384.50[d] *15*	3^+	1.7 ps *11*	CD IJ MNO	J^{π}: ΔJ=1, M1+E2 γ to 2^+; not 1 from excitation function. $T_{1/2}$: >0.7 ps from DSAM, <2.8 ps from RDM, ^{58}Ni(^{6}Li,pnγ).
2743.60[c] *15*	4^+	2.36 ps *21*	BCDE H J M OP	J^{π}: ΔJ=2, E2 γ to 2^+; ΔJ=0, M1+E2 γ to 4^+; L(p,t)=4.
2803.14 *17*	2^+	0.146[@] ps *21*	A E H LM P	XREF: E(2840). J^{π}: L(^{6}Li,d)=L(p,t)=2. $T_{1/2}$: DSA in (^{3}He,2nγ). E(level): identified as one component of one-phonon mixed-symmetry 2^+ state (2010Al28).
2884.05 *25*	2^+	0.132[@] ps *21*	M P	J^{π}: γγ(θ) in (^{3}He,2nγ); L(p,t)=(2). $T_{1/2}$: DSA in (^{3}He,2nγ). E(level): identified as second component of one-phonon mixed-symmetry 2^+ state (2010Al28).
3042.9? *8*	(0^+)		A	
3060 *10*	2^+		P	J^{π}: L(p,t)=2.
3160 *10*	(2^+)		I P	J^{π}: L(^{3}He,n)=2+(3). L(p,t)=2 for doublet.
3181.2 *4*	(1^+)		A	
3209.86 *21*	4^+	0.250[@] ps *35*	CD GH kLM	E(level): 2010Al28 identify the 3209 *4+* state as a good candidate for a two-phonon mixed symmetry state. However, non-observation of expected transition to the one-phonon mixed symmetry 2^+ state at 2803 keV does not allow a confirmed identification of such an excitation. J^{π}: from γγ(θ) (2010Al28). $J^{\pi}=3^-$ is ruled out since such an adoption would give a large quadrupole (M2) admixture for 1023.7γ which is inconsistent with RUL.
3223.5 *4*	$3^{(-)}$		E M P	XREF: E(3190). J^{π}: L(p,t)=3 for 3216 *6* group; L(^{6}Li,d)=3 if the 3190 level corresponds to 3223 level.
3310 *50*	(4^+)		k	J^{π}: based on systematic trends and shell-model calculation (1990Bo27).
3374.2 *3*	(1^-)		A P	J^{π}: L(p,t)=(1).
3470 *10*	2^+		E P	J^{π}: L(p,t)=2.
3586.55[d] *23*	(5^+)	0.63 ps *+63−21*	CDE J M O	XREF: E(3540). J^{π}: γ(θ) and excit function, (^{6}Li,pnγ).
3590 *10*	(2^+)		P	J^{π}: L(p,t)=(2).
3640 *10*	2^+		E P	XREF: E(3680). J^{π}: L(p,t)=2.
3707.60[b] *24*	6^+	0.250[@] ps *35*	BCD J M O	J^{π}: ΔJ=2, E2 γ to 4^+. $T_{1/2}$: from DSAM in (^{3}He,2nγ). Others: 0.17 ps *+14−7* from (α,2nγ); 0.25 ps +17−7 in (^{6}Li,pnγ).
3730 *10*	$(3^-,4^+)$		P	J^{π}: L(p,t)=(3,4).
3830 *10*	2^+		P	J^{π}: L(p,t)=2. E(level): not the same as 3840 level seen in (^{6}Li,d) with L=1; evaluators assume 3840 is same as 3870 *30* L=1 level in

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Adopted Levels, Gammas (continued)

^{62}Zn Levels (continued)

E(level)[†]	J^{π}[‡]	$T_{1/2}$[#]	XREF	Comments
				(^{3}He,n).
3870 *20*	1^-		E HI	J^{π}: L(^{3}He,n)=L(^{6}Li,d)=1.
3920 *10*	(3^-,4^+)		P	J^{π}: L(p,t)=(3,4).
3960.5 *4*	(1^+)		A	
4008.4 *7*	0^+		E G M P	J^{π}: L(p,t)=0.
4021.6 *5*	(1^+)		A	
4040 *20*	(1^-)		E	J^{π}: L(^{6}Li,d)=(1).
4043.20[e] *24*	$(5)^-$	0.270[@] ps *42*	CD HIJKLM O	XREF: K(4170). J^{π}: 3,5 from $\gamma(\theta)$, linear polarization; 5 from excitation function in (^{6}Li,pnγ); π=− from L(^{6}Li,d); gammas to 4^+ states. $T_{1/2}$: from DSAM in (^{3}He,2nγ). Other: 0.69 ps *+14−49* in (^{6}Li,pnγ).
4090 *10*	(4^+)		P	J^{π}: L(p,t)=(4).
4217.6 *8*	(3^-)		M P	J^{π}: L(p,t)=(3).
4330 *20*	(2^+)		P	J^{π}: L(p,t)=(2).
4347.86[c] *24*	6^+[a]	0.48[@] ps *13*	BCD M	$T_{1/2}$: from DSAM in (^{3}He,2nγ). Other: 0.28 ps *+28−14* in (^{6}Li,pnγ).
4380 *20*	(4^+)		P	J^{π}: L(p,t)=(4).
4448.0 *3*	(1^+)		A P	
4515 *20*	6^+		E H k P	J^{π}: L(^{6}Li,d)=6.
4535.4? *8*			C M	
4600	(7^-)		k	J^{π}: systematic trends (1990Bo27).
4620 *20*	(0^+)		H P	J^{π}: L(p,t)=(0).
4680 *10*	4^+		P	J^{π}: L(p,t)=4.
4810 *30*	(2^+,3^-)		P	J^{π}: L(p,t)=(2,3).
4860 *30*	(3^-,4^+)		P	J^{π}: L(p,t)=(3,4).
4895.3 *4*	(1^+)		A P	
4904.7[e] *3*	(7^-)[a]	8.3 ps *35*	BCD J M O	$T_{1/2}$: other: 0.7 ps *+7−3* from (α,2nγ).
4910 *30*	(2^+)		E P	XREF: E(4960). J^{π}: L(p,t)=(2).
5050 *30*	(2^+)		G P	J^{π}: L(p,t)=(2).
5090 *20*	1^-		E P	J^{π}: L(^{6}Li,d)=1.
5123.5 *4*	$(7)^-$[a]	2.1 ps *14*	D K M	XREF: K(5190). $T_{1/2}$: <3.5 ps from RDM, >0.7 ps from DSAM in ^{58}Ni(^{6}Li,pnγ). J^{π}: 3,5,7 from $\gamma(\theta)$ and γ(lin pol); yrast population disfavors 3; transition strength arguments (RUL) restrict parity to be the same as that of 4042; 7^- supported by shell-model calculations (1990Bo27).
5131.0[f] *4*	(6^-)[a]	>0.7 ps	CD M	
5143.3[d] *5*	$(7)^+$[a]	0.42 ps *+21−14*	CD M	
5211.5 *5*	(1^+)		A P	
5240 *20*	(0^+)		P	J^{π}: L(p,t)=(0).
5340[&] *30*	0^+		E I	J^{π}: L(^{3}He,n)=0.
5370 *20*	(4^+)		H P	J^{π}: L(p,t)=(4).
5470			E	
5481.5[b] *6*	(8^+)	0.28 ps *+14−7*	CD M	
5560 *20*			P	
5700[&] *30*			HI	
5920.8? *17*	(1^+)		A	
6081.6[e] *5*	(9^-)	3.9 ps *32*	BCD	J^{π}: (7,9) from $\gamma(\theta)$, linear polarization and excitation

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Adopted Levels, Gammas (continued)

^{62}Zn Levels (continued)

E(level)†	J^{π}‡	XREF	Comments
			function in (^{6}Li,pnγ); same parity as that of 4904 level. $T_{1/2}$: 0.7 ps<$T_{1/2}$<7 ps from RDM and DSA, ^{58}Ni(^{6}Li,pnγ).
6113.7[f] *6*	(8$^-$)	BCD	
6300 *50*	(8$^+$)	K	J^{π}: systematic trends (1990Bo27).
6400		I	
6629.5 *21*		D H	
7200		P	
7400		P	
7422.5[e] *7*	(11$^-$)	BCD	J^{π}: ΔJ=2, Q γ to (9).
7422.7[f] *8*	(10$^-$)	BC	
7500.0[b] *9*	(10$^+$)	C	
7540 *50*	(8$^+$)	K	J^{π}: from shell-model calculations (1990Bo27).
7629.7 *9*		C	
7701.5? *12*		C	
7976.1[i] *7*	(9$^+$)	BC	
8300 *50*	(6$^+$)	K	J^{π}: from shell-model calculations (1990Bo27).
8437.2[j] *8*	(10$^+$)	BC	
9024.7[f] *8*	(12$^-$)	B	
9048.6[i] *7*	(11$^+$)	BC	
9214.0[e] *8*	(13$^-$)	BC	
9465.2[j] *8*	(12$^+$)	BC	
9800		P	
9823.7[k] *10*	(12$^+$)	B	
9960.4[i] *8*	(13$^+$)	B	
10247.4[g] *8*	(11$^+$)	C	
10300		P	
10316.4 *10*	(13$^+$)	C	
10375.1[j] *8*	(14$^+$)	BC	
10635.8[h] *8*	(12$^+$)	C	
10725.9[f] *10*	(14$^-$)	B	
10800		P	
11182.8[g] *8*	(13$^+$)	C	
11546.8[k] *9*	(14$^+$)	B	
11651.6[l] *8*	(13$^-$)	BC	
11755.8[h] *9*	(14$^+$)	C	
11788.3[i] *11*	(15$^+$)	B	
11961.6[j] *9*	(16$^+$)	BC	
12329.3[m] *8*	(14$^-$)	BC	
12536.7[g] *9*	(15$^+$)	C	
12812.9 *10*	(15$^-$)	BC	
12993.0[l] *8*	(15$^-$)	BC	
13156.3[k] *10*	(16$^+$)	B	
13236.6[h] *9*	(16$^+$)	C	
13400		P	
13726.7[m] *8*	(16$^-$)	BC	
14125.5[g] *9*	(17$^+$)	C	
14445.8 *9*	(17$^-$)	BC	
14541.8[l] *8*	(17$^-$)	BC	
14646.3 *12*	(16$^+$)	B	

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Adopted Levels, Gammas (continued)

^{62}Zn Levels (continued)

E(level)[†]	J^{π}[‡]	XREF	E(level)[†]	J^{π}[‡]	XREF
14832.3 *12*	(16$^+$)	B	20474.9[p] *11*	(21$^-$)	B
15041.8[n] *11*	(16$^+$)	B	20858.9[n] *16*	(22$^+$)	B
15049.6[h] *9*	(18$^+$)	C	21042.0[l] *11*	(23$^-$)	BC
15295.5[k] *13*	(18$^+$)	B	21617.5[o] *11*	(22$^-$)	BC
15415.6[m] *8*	(18$^-$)	BC	21853.8[q] *17*	(22$^+$)	B
15482.7[q] *16*	(16$^+$)	B	22784.4[p] *12*	(23$^-$)	B
15705.8 *14*	(19$^-$)	C	23185.7[m] *14*	(24$^-$)	BC
16372.9[g] *9*	(19$^+$)	C	23344.0[n] *19*	(24$^+$)	B
16374.6[l] *9*	(19$^-$)	BC	24057.0[o] *14*	(24$^-$)	BC
16574.8?[p] *15*	(17$^-$)	B	24469.8[q] *20*	(24$^+$)	B
16717.2 *10*	(18$^+$)	B	25349.4[p] *16*	(25$^-$)	B
16807		B	26176.1[n] *21*	(26$^+$)	B
16818.5[n] *11*	(18$^+$)	B	26746.8[o] *17*	(26$^-$)	BC
17350.7[q] *12*	(18$^+$)	B	27318.9[q] *22*	(26$^+$)	B
17365.8 *11*	(18$^-$)	B	28165.5[p] *19*	(27$^-$)	B
17408.6[o] *10*	(18$^-$)	BC	29475.2[n] *24*	(28$^+$)	B
17480.5[m] *9*	(20$^-$)	BC	29686.0[o] *21*	(28$^-$)	BC
17509.7 *14*	(18$^-$)	B	30437.0[q] *24*	(28$^+$)	B
17590.7[h] *11*	(20$^+$)	C	31216.6[p] *21*	(29$^-$)	B
18416.8[p] *12*	(19$^-$)	B	32922[o] *3*	(30$^-$)	BC
18504.6[l] *9*	(21$^-$)	BC	33362[n] *3*	(30$^+$)	B
18678.9[n] *12*	(20$^+$)	B	33800[q] *3*	(30$^+$)	B
19400.7[o] *9*	(20$^-$)	BC	34603.7[p] *24*	(31$^-$)	B
19478.7[q] *13*	(20$^+$)	B	36501[o] *3*	(32$^-$)	B
19507.7[g] *15*	(21$^+$)	C	38369[p] *3*	(33$^-$)	B
19602.4 *15*		B	40459[o] *3*	(34$^-$)	B
19679.7[m] *10*	(22$^-$)	BC	42521?[p] *3*	(35$^-$)	B

[†] From least-squares fit to the Eγ data of gamma-ray studies. Others are from particle data, averages taken when values of comparable precision are available.

[‡] For levels populated in high-spin studies; assignments above J=8 are based on $\gamma\gamma(\theta)$(DCO) data for selected transitions, band assignments, and comparisons with cranked-shell model calculations. Since full details of most high-spin studies are not available, no separate arguments for J^{π} assignments are given in this evaluation.

[#] From DSA and/or RDM in ^{58}Ni(^{6}Li,pnγ) and (^{3}He,2nγ), except as noted.

[@] Values from DSAM in (^{3}He,2nγ) are effective half-lives, thus should be considered as upper limits. The Be(λ)(W.u.) deduced from these half-lives should be considered as lower limits.

[&] From ^{60}Ni(^{3}He,n).

[a] From $\gamma(\theta)$, excitation, transition strength, linear polarization in ^{58}Ni(^{6}Li,pnγ).

[b] Band(A): g.s. band.

[c] Band(B): $K^{\pi}=2^+,\alpha=0$.

[d] Band(b): $K^{\pi}=2^+,\alpha=1$.

[e] Band(C): $K^{\pi}=3^-,\alpha=1$.

[f] Band(c): $K^{\pi}=3^-,\alpha=0$.

[g] Band(D): $K^{\pi}=(11^+),\alpha=1$. High-j valence configuration=$\pi f^{-1}_{7/2}\pi g^1_{9/2}\nu g^1_{9/2}$ gives maximum (terminating) spin of 21$^+$ with remaining three valence neutrons in $f_{5/2}p_{3/2}$ orbits. Experimental Q(intrinsic) from Doppler-shift data decrease from 1.0 *2* (J=15) to 0.25 *5* (for J=21) as the spin increases (1998Sv01).

[h] Band(d): $K^{\pi}=(11^+),\alpha=0$. See comments for $\alpha=1$ signature partner.

[i] Band(E): $K^{\pi}=(9^+),\alpha=1$.

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Adopted Levels, Gammas (continued)

^{62}Zn Levels (continued)

[j] Band(e): K^π=(9$^+$),α=0.
[k] Band(F): Band based on (12$^+$).
[l] Band(g): Band based on (13$^-$),α=1.
[m] Band(G): Band based on (14$^-$),α=0.
[n] Band(H): Well-deformed band based on 16$^+$. Percent population=2. Possible configuration=[22,02].
[o] Band(I): SD-1 band,α=0. Possible configurations=[22,23] or [22,13]; former is preferred. Band intensity ≈1%; Q(transition)=2.7 *+7−5* (1997Sv02), corresponding to β_2=0.45 *+10−7*. Probable configuration=$\nu f^{-2}_{7/2}\nu g^{+2}_{9/2}$ with possible contribution from configuration=$\nu f^{-2}_{7/2}\nu g^{+3}_{9/2}$ (1997Sv02).
[p] Band(i): SD-2 band,α=1. Possible configurations=[22,23] or [22,13]; former is preferred.
[q] Band(J): SD-3 band,α=0. Possible configurations=[22,22] or [22,24].

γ(^{62}Zn)

E$_i$(level)	J^π_i	E$_\gamma$[†]	I$_\gamma$[†]	E$_f$	J^π_f	Mult.[#]	δ[#]	Comments
953.84	2$^+$	953.8 *1*	100	0.0	0$^+$	E2		B(E2)(W.u.)=16.8 *8* (2011PrZZ)
1804.67	2$^+$	850.8 *1*	100 *5*	953.84	2$^+$	M1+E2	−3.6 *+7−10*	B(M1)(W.u.)=0.00057 *23*; B(E2)(W.u.)=18 *4* δ: from (^{3}He,2nγ). Others: −1.2 *+4−5* from ^{63}Cu(p,2nγ), −5.1 *+29−34* from (^{6}Li,pnγ).
		1804.8 *2*	70 *6*	0.0	0$^+$	E2		B(E2)(W.u.)=0.32 *6*
2186.06	4$^+$	1232.2 *1*	100	953.84	2$^+$	E2		B(E2)(W.u.)=26 *+7−12*
2341.95	0$^+$	1388.3 *3*	100	953.84	2$^+$			
2384.50	3$^+$	579.8 *2*	64 *7*	1804.67	2$^+$	M1+E2	−1.9 *+3−5*	B(M1)(W.u.)=0.006 *4*; B(E2)(W.u.)=110 *70*
		1430.7 *2*	100 *6*	953.84	2$^+$	M1+E2	−0.5 *1*	B(M1)(W.u.)=0.0022 *15*; B(E2)(W.u.)=0.5 *4* δ: +3.4 *+9−6* (^{3}He,2nγ).
2743.60	4$^+$	359.1 *2*	11 *3*	2384.50	3$^+$	M1+E2	−0.32 *22*	B(M1)(W.u.)=0.010 *4*; B(E2)(W.u.)=15 *+19−15*
		557.5 *2*	100 *4*	2186.06	4$^+$	M1+E2	−0.35 *3*	B(M1)(W.u.)=0.025 *3*; B(E2)(W.u.)=17 *4*
		938.9 *2*	79 *10*	1804.67	2$^+$	E2		B(E2)(W.u.)=9.3 *16* Mult.: δ(M3/E2)=−0.13 *+11−5*.
		1789.7 *9*	2 *1*	953.84	2$^+$			
2803.14	2$^+$	998.4 *4*	9 *2*	1804.67	2$^+$	(M1+E2)		
		1849.2[&] *2*	100[‡] *7*	953.84	2$^+$	(M1(+E2))	+0.03 *16*	B(M1)(W.u.)=0.020 *4*; B(E2)(W.u.)=0.01 *+10−1*
		2803.0[&] *5*	8[‡] *5*	0.0	0$^+$	[E2]		B(E2)(W.u.)=0.11 *7* E$_\gamma$: from ^{62}Ga decay only.
2884.05	2$^+$	1079.4 *4*	5 *2*	1804.67	2$^+$	[M1+E2]		
		1930.1[&] *4*	100[‡] *7*	953.84	2$^+$	(M1(+E2))	−0.32 *+30−36*	B(M1)(W.u.)=0.020 *5*; B(E2)(W.u.)=1.0 *+17−10*
		(2884.0[&] *5*)	<2[‡]	0.0	0$^+$	[E2]		B(E2)(W.u.)=0.014 *+15−14*
3042.9?	(0$^+$)	2089.0[a] *8*	100	953.84	2$^+$			
3181.2	(1$^+$)	2227.2 *4*	100 *4*	953.84	2$^+$			
		3181.3 *6*	16.0 *19*	0.0	0$^+$			
3209.86	4$^+$	(325.7)	<2	2884.05	2$^+$	[E2]		
		(406.7)	<2	2803.14	2$^+$	[E2]		
		1023.7[&] *2*	100[‡] *5*	2186.06	4$^+$	(M1(+E2))	+0.01 *18*	B(M1)(W.u.)=0.058 *10*; B(E2)(W.u.)=0.01 *+35−1*
		2256.5[&] *8*	40[‡] *8*	953.84	2$^+$	[E2]		B(E2)(W.u.)=0.75 *19*
3223.5	3$^{(-)}$	2269.6 *4*	100	953.84	2$^+$	D(+Q)	−0.10 *19*	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

$\gamma(^{62}Zn)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[#]	δ[#]	Comments
3374.2	(1−)	1032.0 *5*	20 *17*	2341.95	0+			
		1569.8 *4*	100 *17*	1804.67	2+			
		3373.5 *8*	60 *13*	0.0	0+			
3586.55	(5+)	843.0 *3*	97 *8*	2743.60	4+	M1+E2	−2.5 +*10*−*33*	B(M1)(W.u.)=0.004 +*3*−*4*; B(E2)(W.u.)=61 +*23*−*61*
		1202.1 *3*	100 *5*	2384.50	3+	E2		B(E2)(W.u.)=12 +*5*−*12*
		1400		2186.06	4+			
3707.60	6+	1521.5[&] *3*	100[‡]	2186.06	4+	E2		B(E2)(W.u.)=19 *3*
3960.5	(1+)	1156.7 *4*	54 *14*	2803.14	2+			
		1619.2 *4*	100 *14*	2341.95	0+			
4008.4	0+	2203.7 *7*	100	1804.67	2+			
4021.6	(1+)	1679.3 *6*	5.4 *34*	2341.95	0+			
		3068.1 *8*	10.7 *27*	953.84	2+			
		4021.7 *8*	100 *7*	0.0	0+			
4043.20	(5)−	833.2[&] *3*	18[‡] *8*	3209.86	4+	[E1]		B(E1)(W.u.)=0.00031 *15*
		1299.4[&] *4*	41[‡] *6*	2743.60	4+	(E1)		B(E1)(W.u.)=0.00019 *5*
		1857.5[&] *4*	100[‡] *5*	2186.06	4+	(E1)		B(E1)(W.u.)=0.00016 *3*
4217.6	(3−)	2031.5 *7*	100	2186.06	4+			
4347.86	6+	640.3 *2*	13 *5*	3707.60	6+	[M1+E2]		
		761.7 *6*	<5	3586.55	(5+)	[M1+E2]		
		1604.2[&] *3*	100[‡] *6*	2743.60	4+	E2		B(E2)(W.u.)=6.6 *19*
4448.0	(1+)	1644.7 *5*	19 *5*	2803.14	2+			
		2105.9 *4*	56 *6*	2341.95	0+			
		2643.9 *6*	24 *5*	1804.67	2+			
		3493.9 *7*	53 *6*	953.84	2+			
		4447.8 *9*	100 *7*	0.0	0+			
4535.4?		2349.3 *8*	100	2186.06	4+			
4895.3	(1+)	2092.5 *4*	100 *13*	2803.14	2+			
		3089.0 *10*	19 *8*	1804.67	2+			
		4894.4 *10*	89 *11*	0.0	0+			
4904.7	(7−)	370[a]		4535.4?				
		557.2 *5*	56 *10*	4347.86	6+	[E1]		B(E1)(W.u.)=0.00010 *5*
		861.5 *3*	14 *2*	4043.20	(5)−	[E2]		B(E2)(W.u.)=0.8 *4*
		1196.9 *5*	100 *4*	3707.60	6+	(E1(+M2))	−0.01 *13*	B(E1)(W.u.)=1.8×10^{-5} *8*; B(M2)(W.u.)=0.006 +*149*−*6*
5123.5	(7)−	1080.3 *3*	100	4043.20	(5)−	(E2)		B(E2)(W.u.)=13 *9*
5131.0	(6−)	1087.8 *3*	100	4043.20	(5)−	(M1+E2)	−4.7 *26*	B(M1)(W.u.)<0.0022; B(E2)(W.u.)<37
5143.3	(7)+	795.6 *6*	23 *3*	4347.86	6+	[M1+E2]		
		1556.7 *5*	100 *6*	3586.55	(5+)	(E2)		B(E2)(W.u.)=8 +*3*−*5*
5211.5	(1+)	2408.3 *7*	25 *8*	2803.14	2+			
		2869.8 *7*	33 *8*	2341.95	0+			
		4256.6 *9*	57 *8*	953.84	2+			
		5211.5 *11*	100 *1*	0.0	0+			
5481.5	(8+)	1773.7 *6*	100	3707.60	6+	[E2]		B(E2)(W.u.)=7.9 +*20*−*40*
5920.8?	(1+)	5920.5[a] *17*	100	0.0	0+			
6081.6	(9−)	1176.9 *4*	100	4904.7	(7−)	(E2)		B(E2)(W.u.)=4 *4*
6113.7	(8−)	983		5131.0	(6−)			
		1208.7 *7*		4904.7	(7−)			
6629.5		1506.0 *20*		5123.5	(7)−			
7422.5	(11−)	1341.5 *6*	100	6081.6	(9−)	Q		
7422.7	(10−)	1309		6113.7	(8−)			
		1341		6081.6	(9−)			
7500.0	(10+)	2018		5481.5	(8+)			
7629.7		1548		6081.6	(9−)			

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

$\gamma(^{62}Zn)$ (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f
7701.5?		279		7422.5	(11⁻)
7976.1	(9⁺)	1862		6113.7	(8⁻)
		1894		6081.6	(9⁻)
		2833		5143.3	(7)⁺
8437.2	(10⁺)	2355		6081.6	(9⁻)
9024.7	(12⁻)	1602		7422.7	(10⁻)
		1603		7422.5	(11⁻)
9048.6	(11⁺)	611		8437.2	(10⁺)
		1072		7976.1	(9⁺)
		1626		7422.5	(11⁻)
9214.0	(13⁻)	1791		7422.5	(11⁻)
9465.2	(12⁺)	416		9048.6	(11⁺)
		1028		8437.2	(10⁺)
		2043		7422.5	(11⁻)
9823.7	(12⁺)	2402		7422.5	(11⁻)
9960.4	(13⁺)	495		9465.2	(12⁺)
		911		9048.6	(11⁺)
		936		9024.7	(12⁻)
10247.4	(11⁺)	2747		7500.0	(10⁺)
10316.4	(13⁺)	851		9465.2	(12⁺)
		1268		9048.6	(11⁺)
10375.1	(14⁺)	415		9960.4	(13⁺)
		910		9465.2	(12⁺)
		1160.8 *4*		9214.0	(13⁻)
10635.8	(12⁺)	388.3 *3*		10247.4	(11⁺)
		3006		7629.7	
		3213		7422.5	(11⁻)
10725.9	(14⁻)	1512		9214.0	(13⁻)
		1701		9024.7	(12⁻)
11182.8	(13⁺)	546.9 *3*	100 *6*	10635.8	(12⁺)
		935.5 *5*	24 *2*	10247.4	(11⁺)
11546.8	(14⁺)	1724		9823.7	(12⁺)
		2333		9214.0	(13⁻)
11651.6	(13⁻)	2627		9024.7	(12⁻)
		4229		7422.5	(11⁻)
11755.8	(14⁺)	573.1 *3*	100 *6*	11182.8	(13⁺)
		1119.8 *4*	64 *4*	10635.8	(12⁺)
11788.3	(15⁺)	1827		9960.4	(13⁺)
11961.6	(16⁺)	1586		10375.1	(14⁺)
12329.3	(14⁻)	677.7 *4*	100 *10*	11651.6	(13⁻)
		3116		9214.0	(13⁻)
		3305		9024.7	(12⁻)
12536.7	(15⁺)	780.6 *3*	100 *7*	11755.8	(14⁺)
		1353.8 *5*	68 *5*	11182.8	(13⁺)
12812.9	(15⁻)	2437		10375.1	(14⁺)
12993.0	(15⁻)	663.6 *3*	100 *7*	12329.3	(14⁻)
		1342.0 *10*	95 *23*	11651.6	(13⁻)
		1447		11546.8	(14⁺)
13156.3	(16⁺)	1610		11546.8	(14⁺)
13236.6	(16⁺)	699.6 *3*	88 *6*	12536.7	(15⁺)
		1481.2 *4*	100 *6*	11755.8	(14⁺)
13726.7	(16⁻)	733.6 *3*	100 *8*	12993.0	(15⁻)
		913		12812.9	(15⁻)
		1397.6 *4*	76 *6*	12329.3	(14⁻)
14125.5	(17⁺)	888.7 *3*	100 *6*	13236.6	(16⁺)

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Adopted Levels, Gammas (continued)

$\gamma(^{62}Zn)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f
14125.5	(17+)	1589.0 *6*	79 *6*	12536.7	(15+)
14445.8	(17−)	719		13726.7	(16−)
		1633		12812.9	(15−)
		2483		11961.6	(16+)
14541.8	(17−)	815.0 *3*	100 *8*	13726.7	(16−)
		1385		13156.3	(16+)
		1549.3 *5*	92 *8*	12993.0	(15−)
		2581		11961.6	(16+)
14646.3	(16+)	2858		11788.3	(15+)
14832.3	(16+)	3043		11788.3	(15+)
15041.8	(16+)	3495		11546.8	(14+)
15049.6	(18+)	924.1 *4*	75 *6*	14125.5	(17+)
		1813.0 *5*	100 *6*	13236.6	(16+)
15295.5	(18+)	2140		13156.3	(16+)
15415.6	(18−)	873.7 *3*	78 *7*	14541.8	(17−)
		969		14445.8	(17−)
		1689.2 *5*	100 *7*	13726.7	(16−)
15705.8	(19−)	1260		14445.8	(17−)
16372.9	(19+)	1323.3 *6*	94 *12*	15049.6	(18+)
		2246.7 *8*	100 *12*	14125.5	(17+)
16374.6	(19−)	959.0 *8*	81 *22*	15415.6	(18−)
		1833.1 *5*	100 *8*	14541.8	(17−)
		1928		14445.8	(17−)
16717.2	(18+)	1675		15041.8	(16+)
		1884		14832.3	(16+)
		2071		14646.3	(16+)
		4757		11961.6	(16+)
16818.5	(18+)	1777		15041.8	(16+)
		4856		11961.6	(16+)
17350.7	(18+)	1868		15482.7	(16+)
		5388		11961.6	(16+)
17365.8	(18−)	3639		13726.7	(16−)
17408.6	(18−)	2963		14445.8	(17−)
		3682[a]		13726.7	(16−)
17480.5	(20−)	1105.9 *4*	48 *4*	16374.6	(19−)
		2065.4 *6*	100 *8*	15415.6	(18−)
17590.7	(20+)	1217.5 *7*	33 *6*	16372.9	(19+)
		2541.4 *9*	100 *11*	15049.6	(18+)
18416.8	(19−)	1842[a]		16574.8?	(17−)
		3001[a]		15415.6	(18−)
18504.6	(21−)	1024.3 *4*	57 *6*	17480.5	(20−)
		2130.3 *8*	100 *11*	16374.6	(19−)
18678.9	(20+)	1860		16818.5	(18+)
		1962		16717.2	(18+)
19400.7	(20−)	1891		17509.7	(18−)
		1992.7[&] *12*	0.14[‡] *7*	17408.6	(18−)
		2035		17365.8	(18−)
		3027		16374.6	(19−)
		3983[&]	≈0.08[‡]	15415.6	(18−)
19478.7	(20+)	2127		17350.7	(18+)
		4184		15295.5	(18+)
19507.7	(21+)	3134.7 *12*	100	16372.9	(19+)
19679.7	(22−)	1174.6 *12*	40 *20*	18504.6	(21−)
		2199.5 *7*	100 *8*	17480.5	(20−)
20474.9	(21−)	2058		18416.8	(19−)

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Adopted Levels, Gammas (continued)

$\gamma(^{62}Zn)$ (continued)

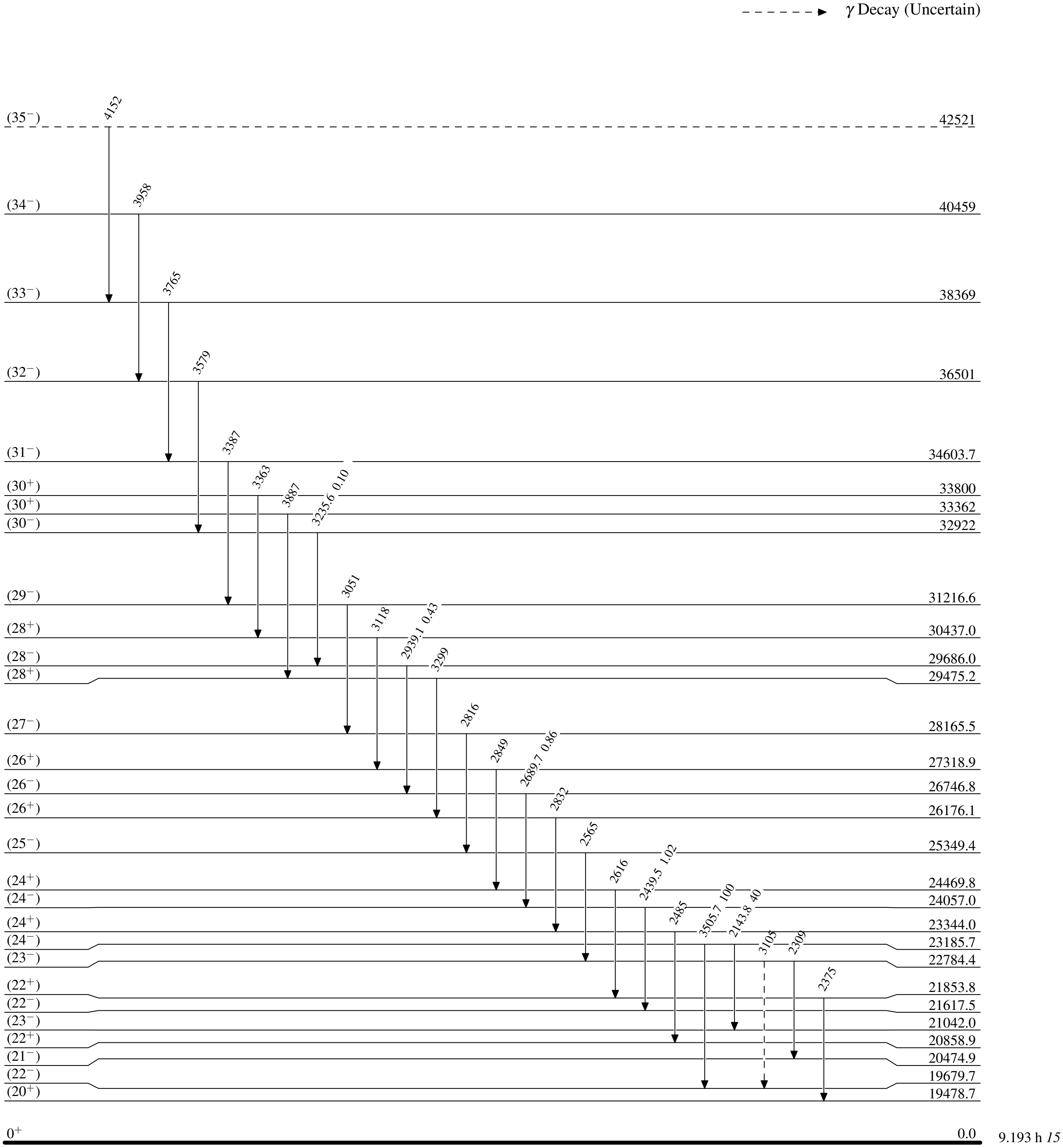
E_i(level)	J_i^π	E_γ [†]	I_γ [†]	E_f	J_f^π
20474.9	(21⁻)	2994		17480.5	(20⁻)
20858.9	(22⁺)	2180		18678.9	(20⁺)
21042.0	(23⁻)	1362.3 *7*	56 *7*	19679.7	(22⁻)
		2537.4 *9*	100 *11*	18504.6	(21⁻)
21617.5	(22⁻)	2015		19602.4	
		2215.3[&] *8*	0.93[‡] *13*	19400.7	(20⁻)
		3115[@]		18504.6	(21⁻)
21853.8	(22⁺)	2375		19478.7	(20⁺)
22784.4	(23⁻)	2309		20474.9	(21⁻)
		3105[a]		19679.7	(22⁻)
23185.7	(24⁻)	2143.8 *12*	40 *10*	21042.0	(23⁻)
		3505.7 *14*	100 *20*	19679.7	(22⁻)
23344.0	(24⁺)	2485		20858.9	(22⁺)
24057.0	(24⁻)	2439.5[&] *9*	1.02[‡] *15*	21617.5	(22⁻)
24469.8	(24⁺)	2616		21853.8	(22⁺)
25349.4	(25⁻)	2565		22784.4	(23⁻)
26176.1	(26⁺)	2832		23344.0	(24⁺)
26746.8	(26⁻)	2689.7[&] *10*	0.86[‡] *13*	24057.0	(24⁻)
27318.9	(26⁺)	2849		24469.8	(24⁺)
28165.5	(27⁻)	2816		25349.4	(25⁻)
29475.2	(28⁺)	3299		26176.1	(26⁺)
29686.0	(28⁻)	2939.1[&] *12*	0.43[‡] *11*	26746.8	(26⁻)
30437.0	(28⁺)	3118		27318.9	(26⁺)
31216.6	(29⁻)	3051		28165.5	(27⁻)
32922	(30⁻)	3235.6[&] *14*	0.10[‡] *5*	29686.0	(28⁻)
33362	(30⁺)	3887		29475.2	(28⁺)
33800	(30⁺)	3363		30437.0	(28⁺)
34603.7	(31⁻)	3387		31216.6	(29⁻)
36501	(32⁻)	3579		32922	(30⁻)
38369	(33⁻)	3765		34603.7	(31⁻)
40459	(34⁻)	3958		36501	(32⁻)
42521?	(35⁻)	4152		38369	(33⁻)

[†] Weighted averages of all available data. Intensities are relative branching ratios, unless stated otherwise.
[‡] Relative intensity within the SD-1 band.
[#] From $\gamma(\theta)$ and RUL, $^{60}Ni(\alpha,2n\gamma)$, $^{58}Ni(^{6}Li,pn\gamma)$, $^{61}Ni(^{3}He,2n\gamma)$.
[@] Level-energy difference=3113.
[&] Be(λ)(W.u.) values should be considered as lower limit since the level half-lives are effective values, not corrected for side feeding.
[a] Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level



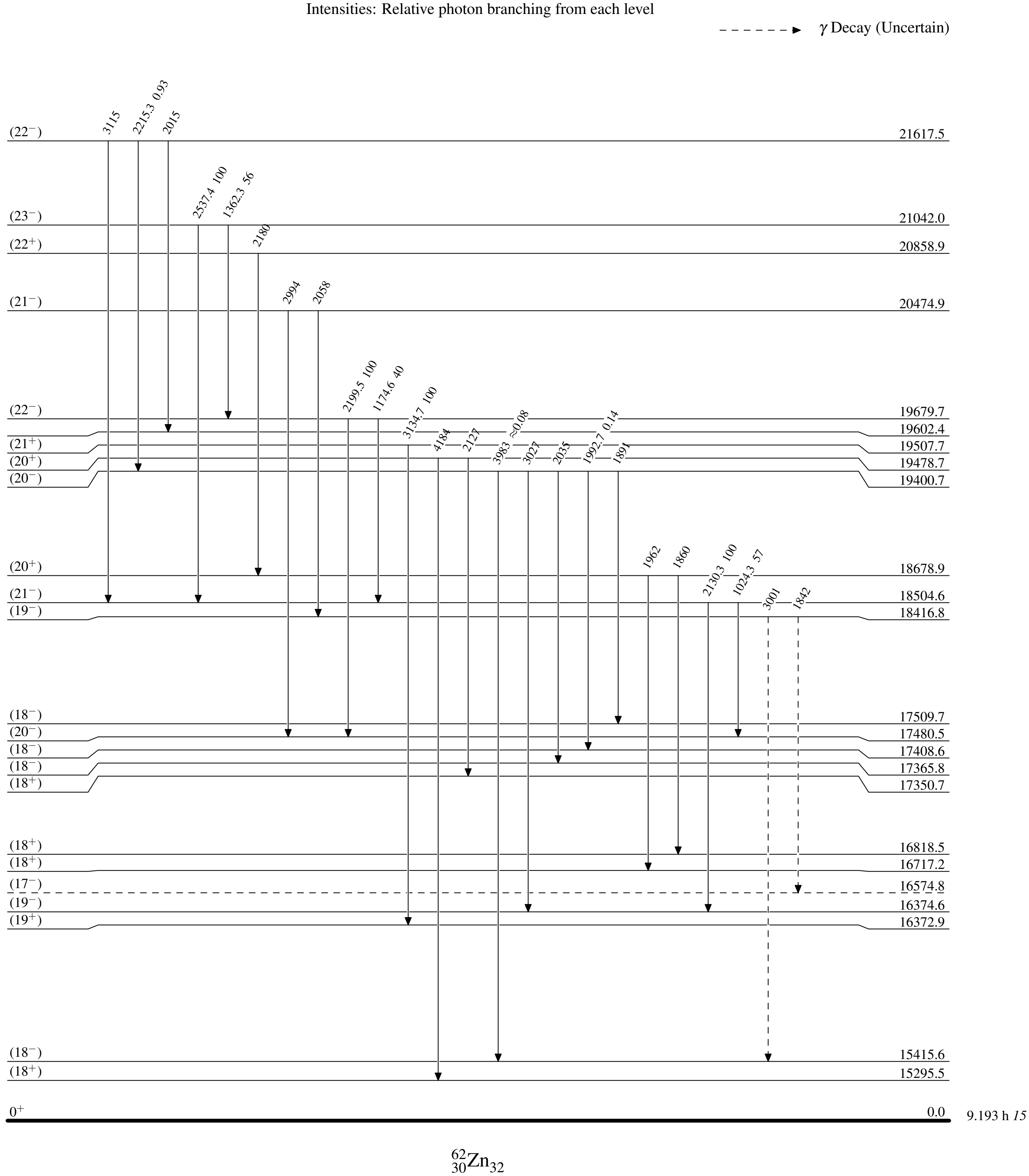
$^{62}_{30}Zn_{32}$

Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level



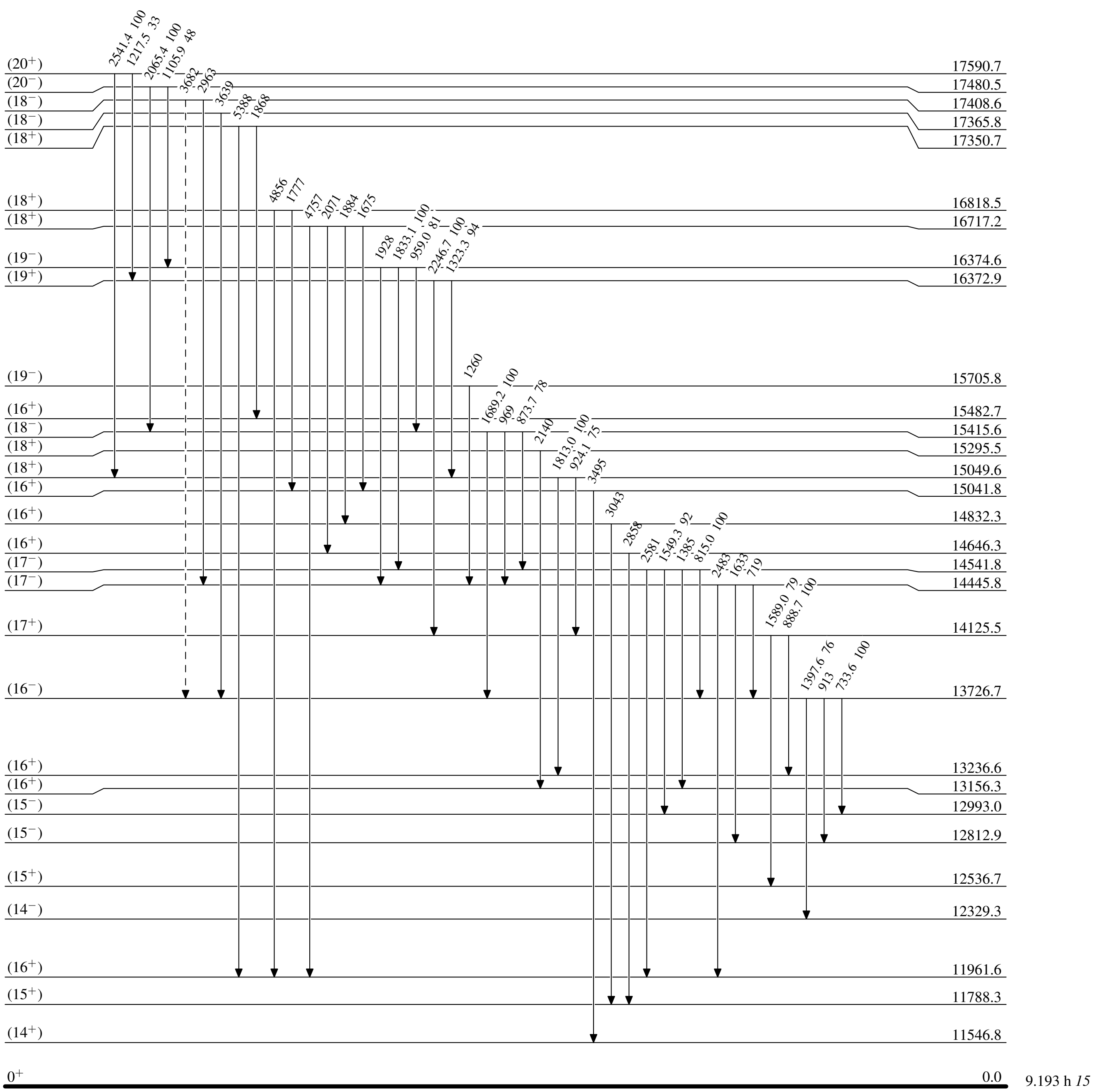
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

γ Decay (Uncertain)

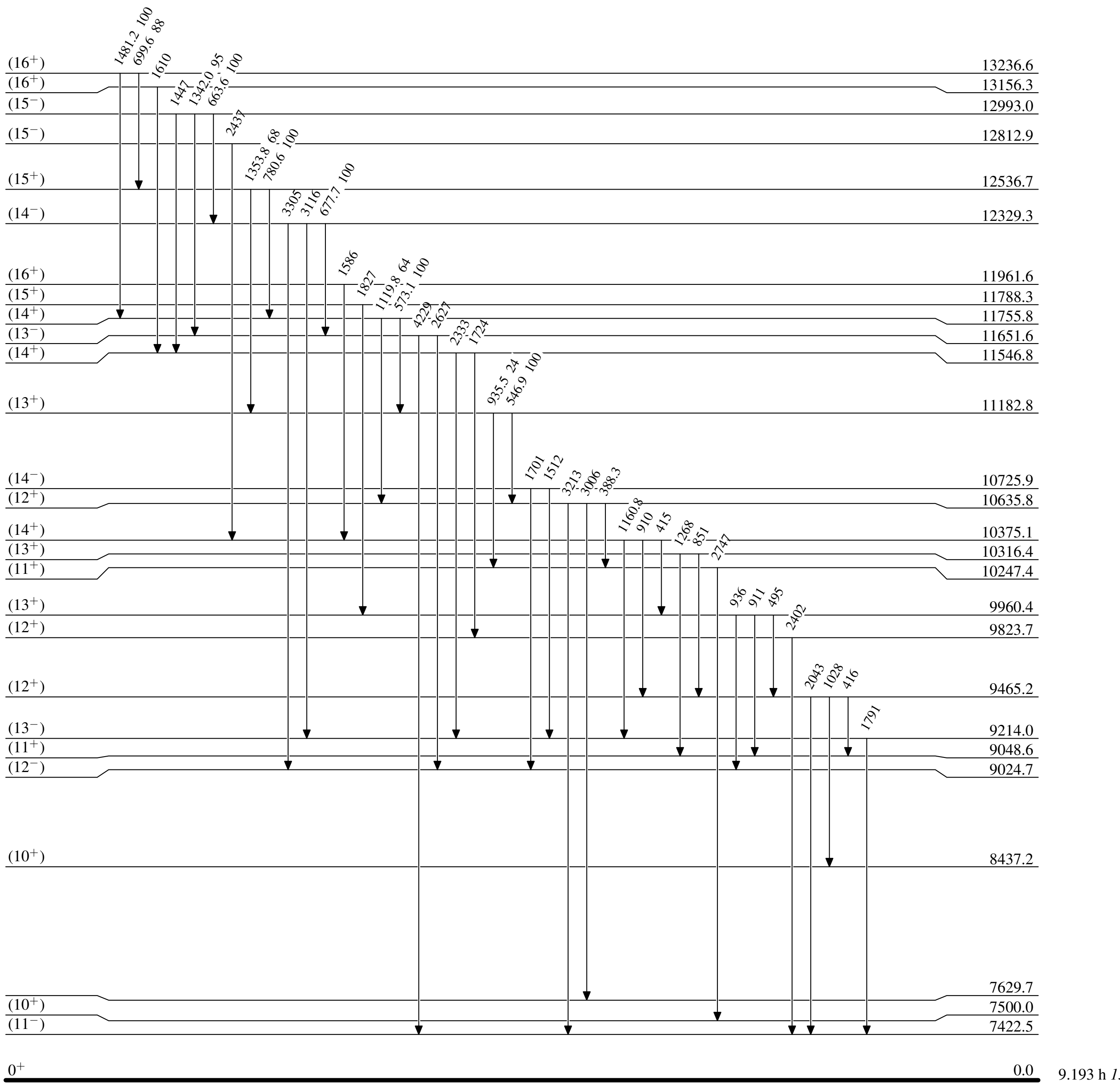


$^{62}_{30}Zn_{32}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

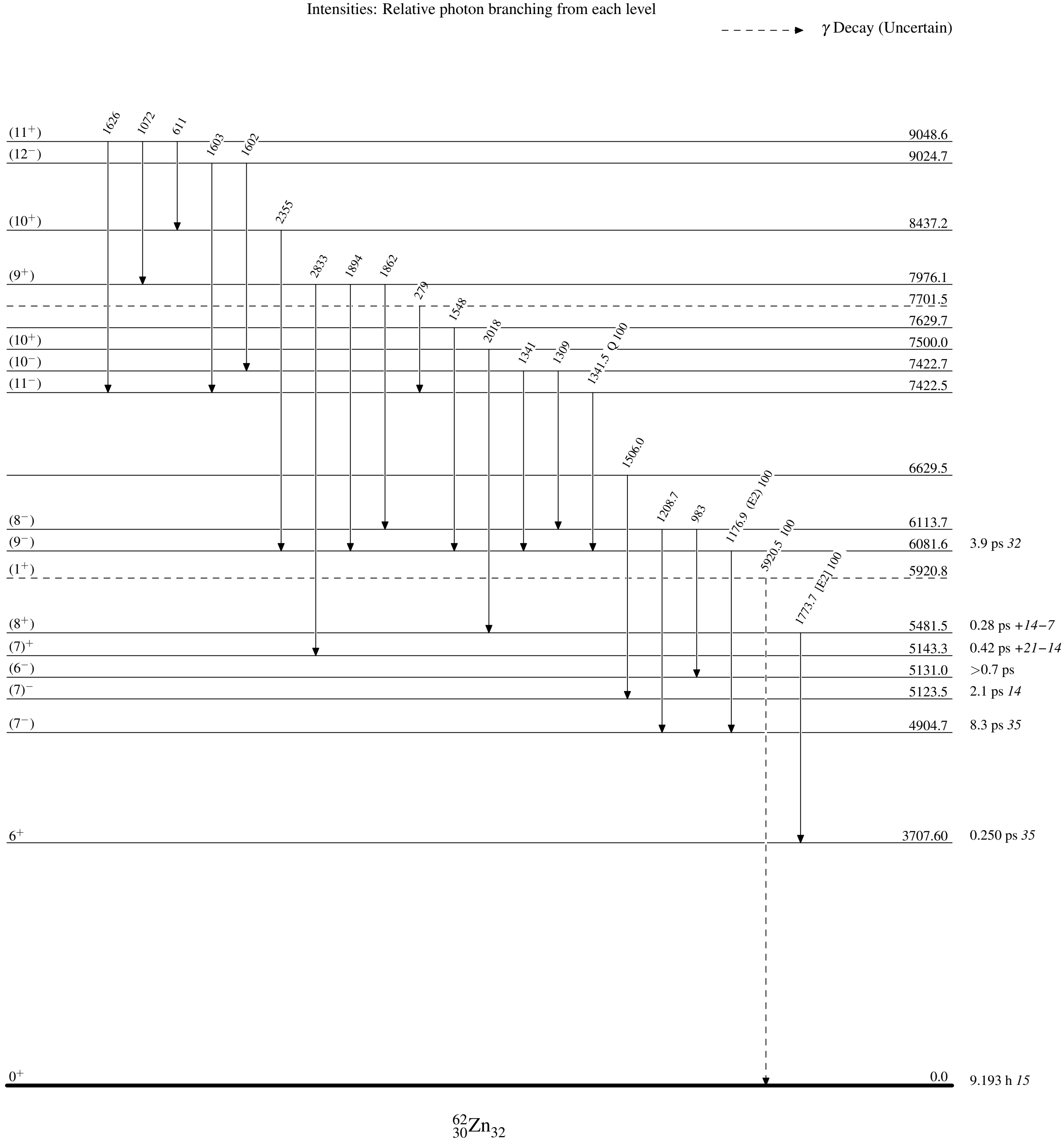


$^{62}_{30}Zn_{32}$

Adopted Levels, Gammas

Level Scheme (continued)

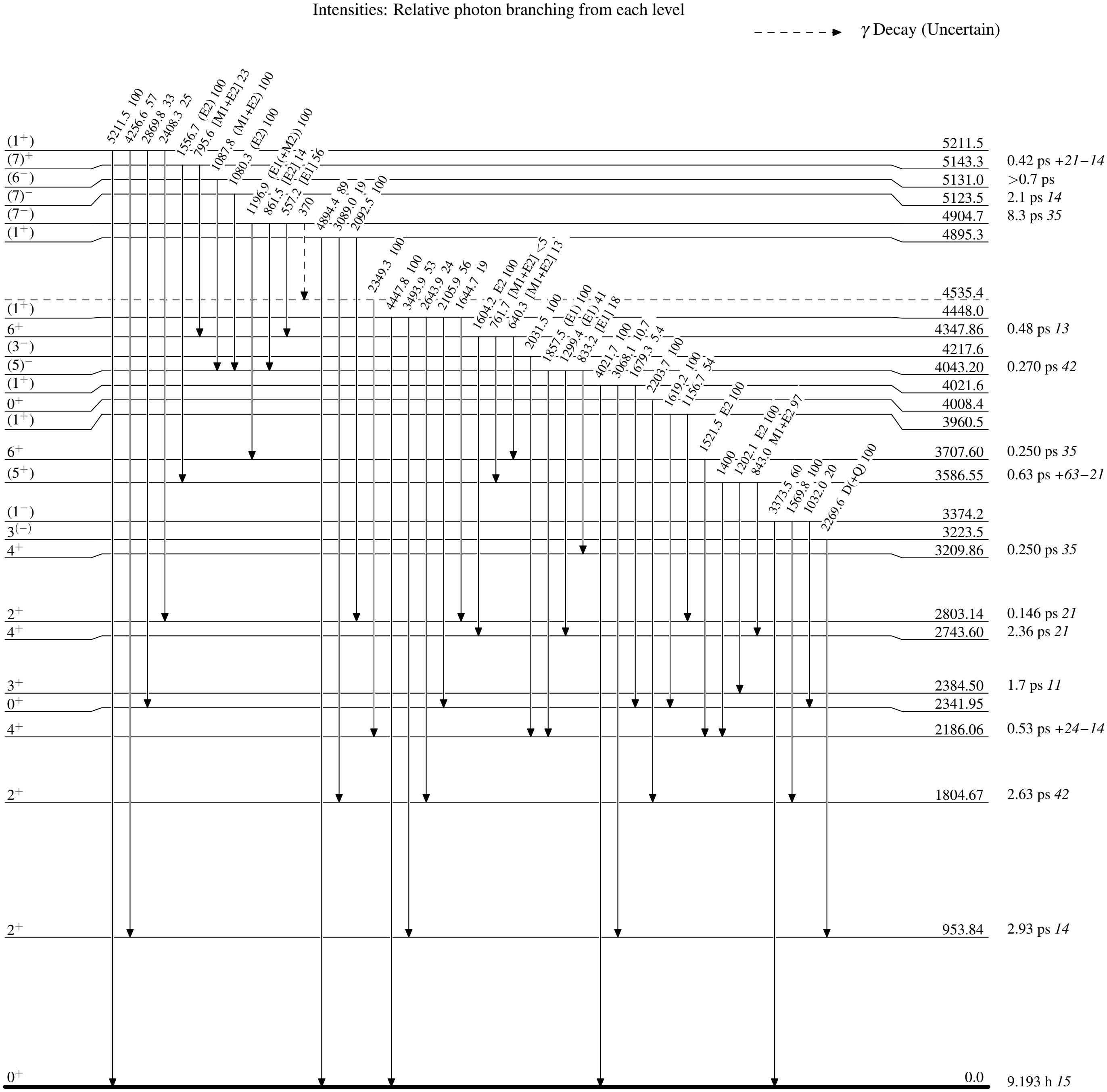
Intensities: Relative photon branching from each level



Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

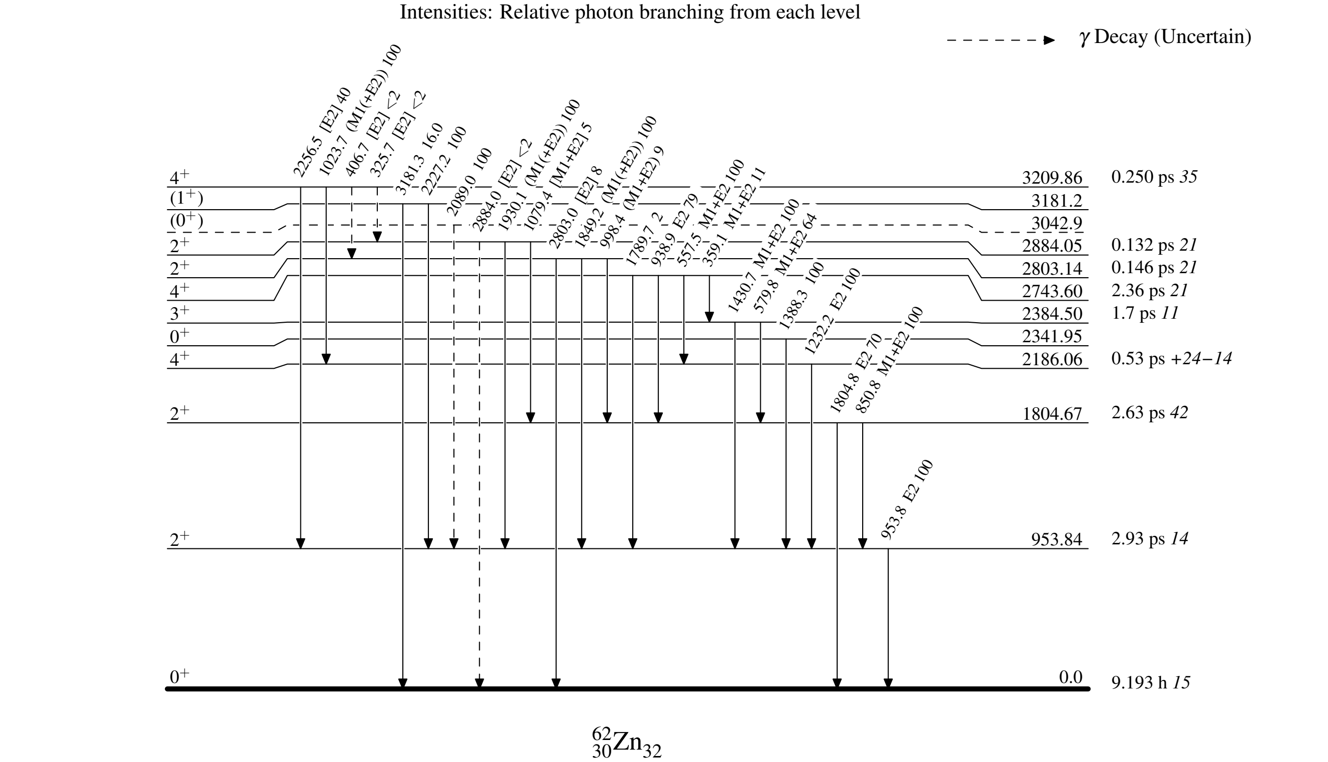


$^{62}_{30}Zn_{32}$

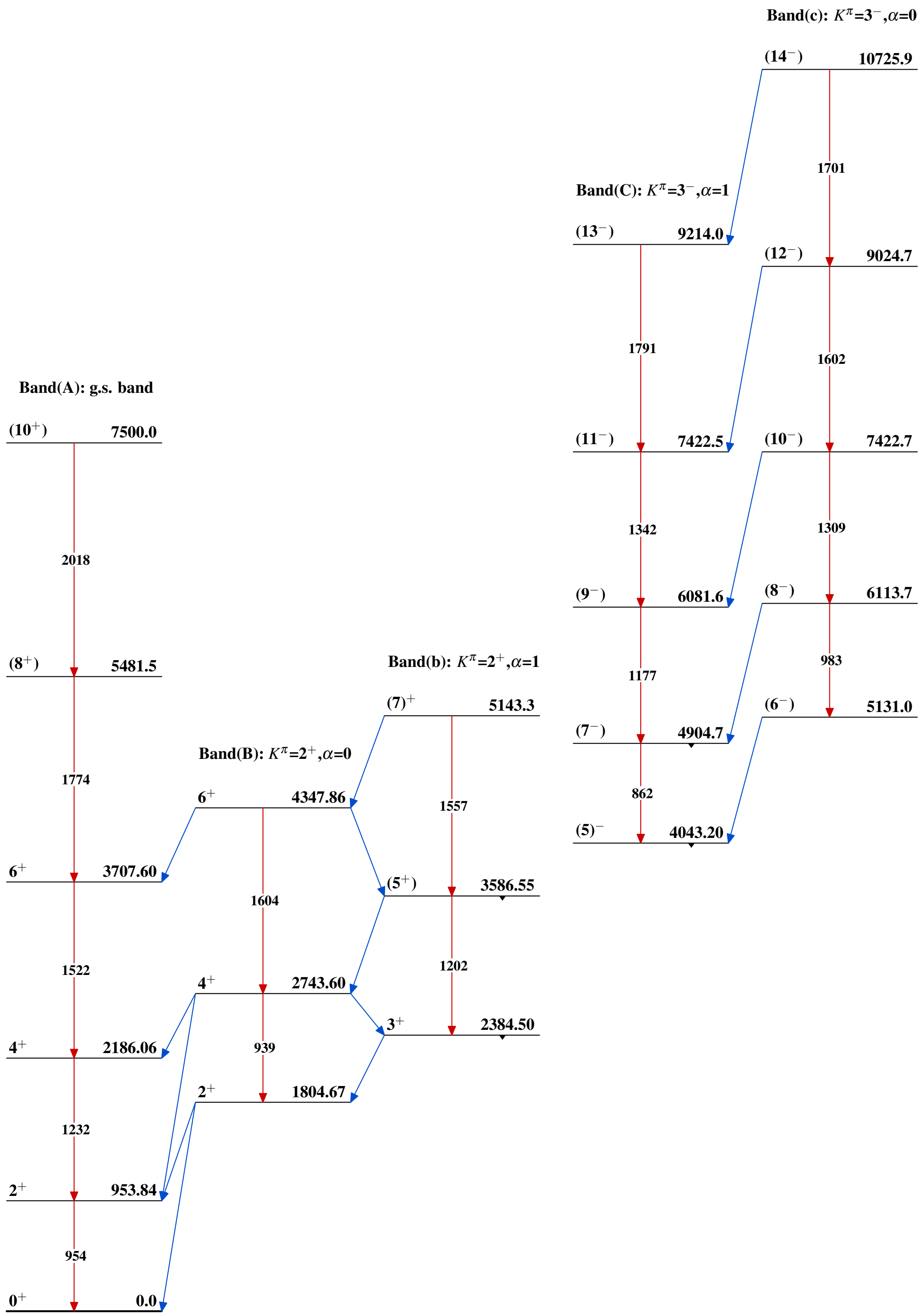
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

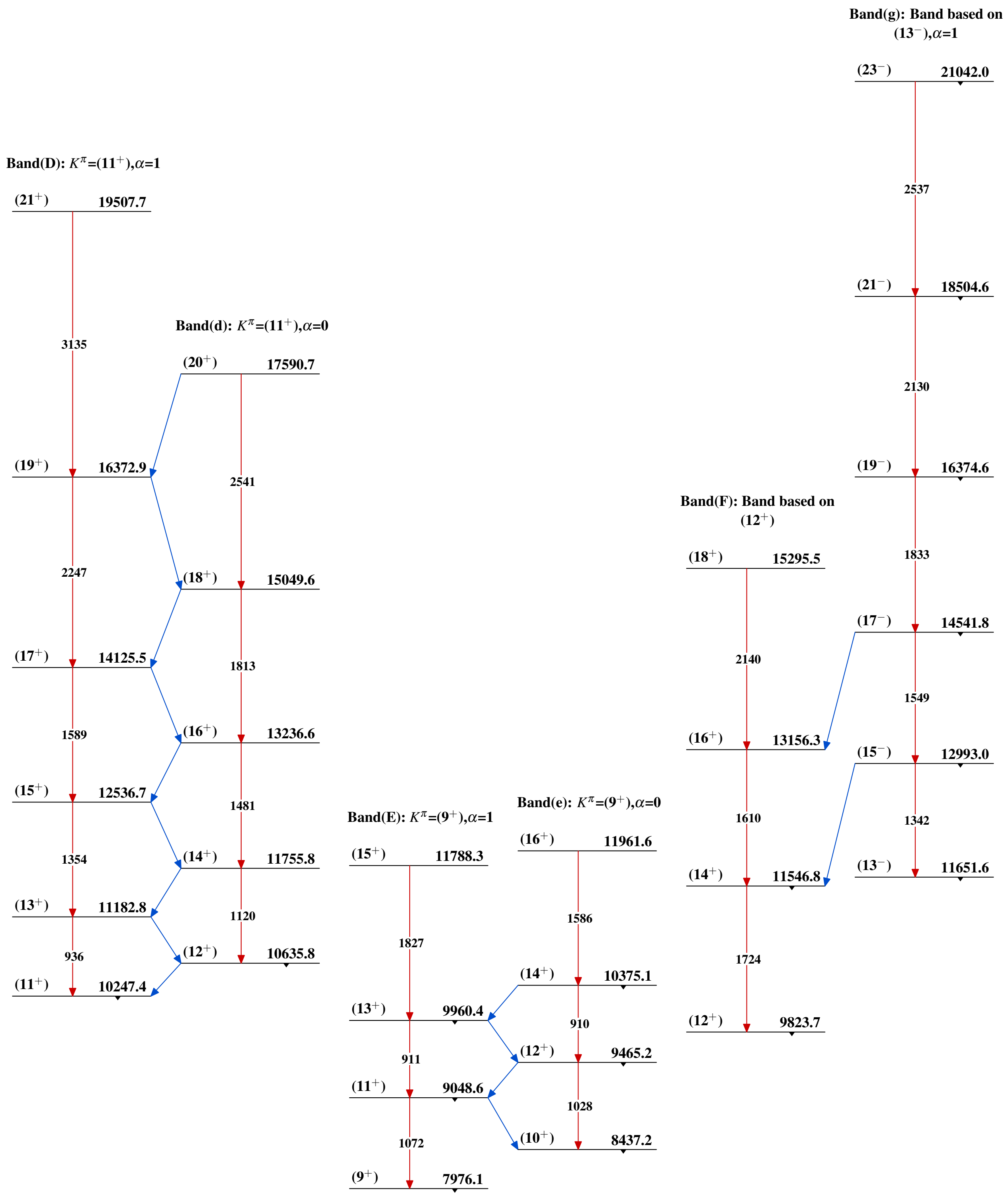


Adopted Levels, Gammas



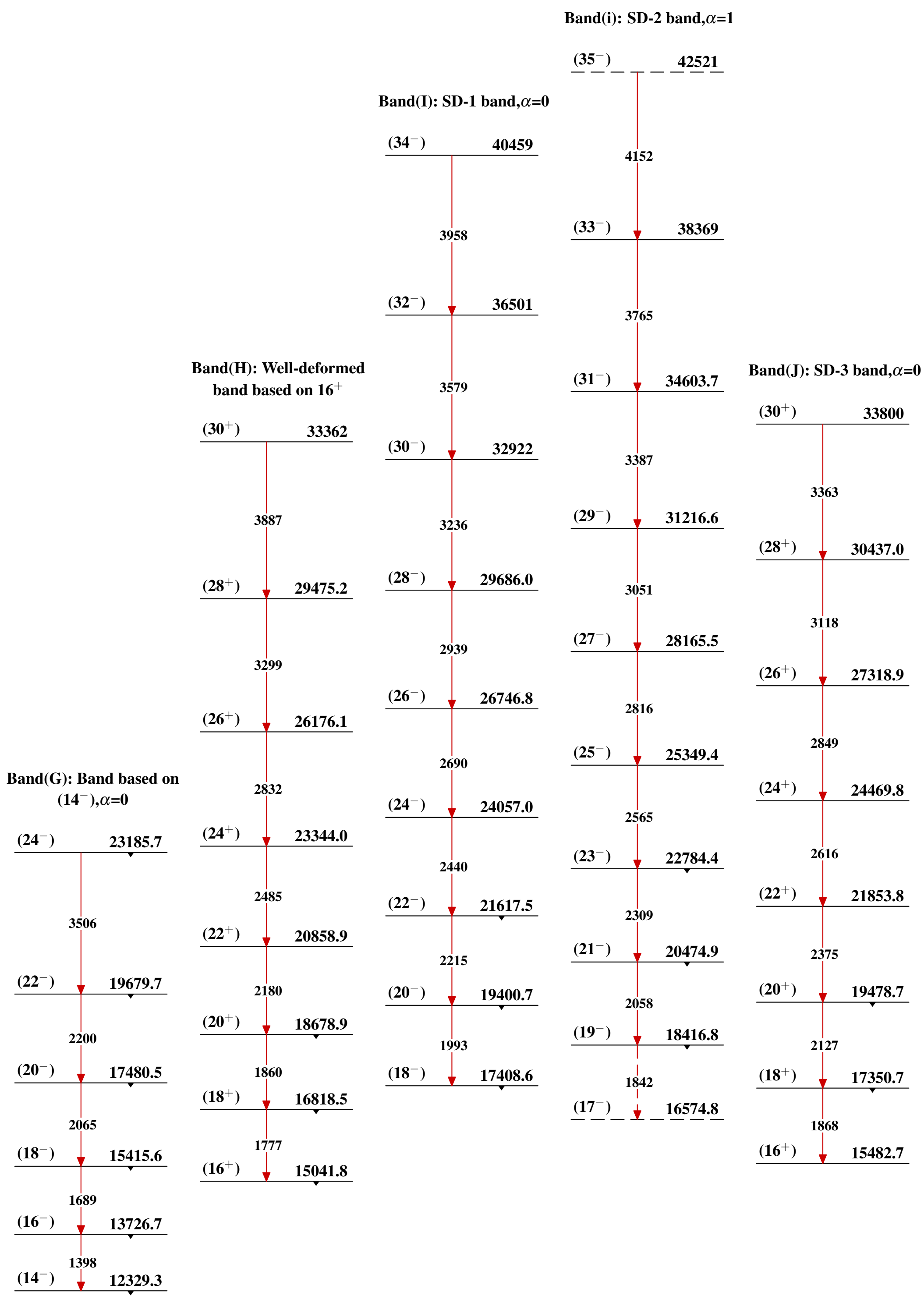
$^{62}_{30}Zn_{32}$

Adopted Levels, Gammas (continued)



$^{62}_{30}Zn_{32}$

Adopted Levels, Gammas (continued)



$^{62}_{30}Zn_{32}$

Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh and Jun Chen	NDS 178, 41 (2021).	12-Nov-2021

$Q(\beta^-)=-7171.2$ *15*; S(n)=11861.9 *15*; S(p)=7713.1 *6*; $Q(\alpha)=-3955.7$ *7* 2021Wa16
$Q(2\varepsilon)=1095.0$ *7*, S(2n)=20978.6 *8*, S(2p)=13835.5 *6* (2021Wa16).
Mass excess measurements: 2018Ki21, 2008Go23, 2007Ke09, 2005Ch60, 1977De20, 1976De21.
Other reactions:
^{59}Co(^{6}Li,n) E=39.7, 90 MeV: 1984Bo45: Measured $\sigma(\theta)$, reaction mechanism.
^{60}Ni(α,p):IAR E=7.260-7.450 MeV: 1976Fo06: Measured resonance strengths. Other: 1961No04.
^{60}Ni(α,α'):IAR E=14.6-20.9 MeV: 1975Lu06: Si telescope, $\sigma(\theta)$, deduced isospin mixing for ^{64}Zn at excitations of 17.6-23.5 MeV.
^{61}Ni(α,n) E=53 MeV: 1984Bo45, 1979Bo45: $\sigma(\theta)$, reaction mechanism.
Additional information 1.
^{64}Zn(t,t) E=12 MeV: 1972Hu06: measured $\sigma(\theta)$. Deduced optical model-parameters.
^{64}Zn(^{6}Li,^{6}Li), (^{7}Li,^{7}Li): 1991Bo48.
^{27}Al(^{37}Cl,X) and ^{48}Ti(^{16}O,X): 1984Mi09 (scission mechanism for excited ^{64}Zn nucleus).
^{63}Cu(^{16}O,^{15}N): 1975We20 E=38-51 MeV. Reaction mechanism.
^{60}Ni(^{18}O,^{14}C): 1973RoYT, 1972HeYV.
^{64}Zn(π^+,π^-): 1993Be02: E=293.4 MeV, measured $\sigma(\theta)$.
^{64}Zn(π^+,π^-): 1997Fo03: E=140-230 MeV, measured $\sigma(\theta)$.
^{64}Zn(K$^-$,X): 1980De11, calculated atomic level shifts.
^{64}Zn(^{7}Li,tα) E=42 MeV: 2001To07 (also 1999Ut03): measured triton and α spectra, $\sigma(\theta)$, deduced astrophysical S factors.
^{64}Zn(^{10}Be,^{10}Be),((^{11}Be,^{11}Be),E(c.m.)=24.5 MeV: 2014DiZV: measured $\sigma(\theta)$ for elastic scattering at REX-ISOLDE facility of CERN, and analyzed using CDCC with optical model calculations.
Giant-dipole resonances: 1981Do12 (^{64}Zn(e,p)); 1977TaYW (^{64}Zn(γ,α)); 1973Ya04 (^{64}Zn(γ,n), (γ,np)); 1972ClZK (^{64}Zn(γ,p)); 1970Co25 (^{64}Zn(γ,n), (γ,2n), (γ,np)).
Isotope shifts: 1970Le23. Theory: 1982Fo09.
There are several high-spin studies: ^{12}C(^{54}Fe,2pγ) from 1994Cr05; ^{40}Ca(^{28}Si,4pγ) E=115 MeV from 1998Ga11; ^{40}Ca(^{28}Si,4pγ) E=120 MeV from 1997Fu08; ^{40}Ca(^{28}Si,4pγ) E=122 MeV from 2004Ka18; ^{51}V(^{16}O,p2nγ),^{59}Co(^{7}Li,2nγ) from 1977We10, 1978We15, and 1977Al14; ^{61}Ni(α,nγ),^{56}Fe(^{11}B,2npγ) from 1980Si02 and 1978Si02; ^{61}Ni(α,nγ),(HI,xnγ) from 1978Ne02 and 1976Ch11. While there is general agreement between all these studies below about 5 MeV excitation, above this energy, there are major differences even when the same reaction is used as in 2004Ka18, 1998Ga11 and 1997Fu08. Since the statistics in $\gamma\gamma$ coincidences is the highest in 2004Ka18, where Gammasphere array has been used, evaluators have adopted the high-spin level scheme from 2004Ka18 with the exception of few cases where results of 2004Ka18 are in clear disagreement with other experiments, the results of which are considered by evaluators as more definitive. Such cases are noted in comments. It should also be mentioned that complete details of data are not available from 2004Ka18. Requests by evaluators for obtaining such details from the authors of 2004Ka18 were unsuccessful. Full details of data are also missing in 1998Ga11 and 1997Fu08, although, some were obtained as priv. comm. (1996GaZZ) from authors of 1998Ga11. Several levels proposed by 1998Ga11, 1997Fu08 and 1994Cr05, but not reported by 2004Ka18 have been omitted here. See individual datasets for details.
In the opinion of the evaluators, there are several incomplete or discrepant aspects of the high-spin portion of the level scheme which need to be resolved in further experiments.

^{64}Zn Levels

Cross Reference (XREF) Flags

A	^{64}Cu β^- decay (12.7006 h)	N	^{62}Ni(^{3}He,n)	Others:	
B	^{64}Ga ε decay (2.627 min)	O	^{63}Cu(p,γ) E=1.3-3.2 MeV	AA	^{64}Zn(μ^-,X)
C	^{12}C(^{54}Fe,2pγ)	P	^{63}Cu(p,γ) E=2050 keV	AB	^{64}Zn(n,n$'$)
D	^{40}Ca(^{28}Si,4pγ) E=115 MeV	Q	^{63}Cu(p,γ) E=2.1-3.1 MeV	AC	^{64}Zn(n,n$'\gamma$)
E	^{40}Ca(^{28}Si,4pγ) E=120 MeV	R	^{63}Cu(p,γ) E=2098 keV	AD	^{64}Zn(p,p$'$),(pol p,p$'$)
F	^{40}Ca(^{28}Si,4pγ) E=122 MeV	S	^{63}Cu(p,γ) E=3217,3251 keV	AE	^{64}Zn(p,p$'\gamma$)
G	^{51}V(^{16}O,p2nγ),^{59}Co(^{7}Li,2nγ)	T	^{63}Cu(p,γ) E=3.46 MeV	AF	^{64}Zn(d,d$'$),(pol d,d)
H	^{60}Ni(^{6}Li,d)	U	^{63}Cu(p,n):resonances	AG	^{64}Zn(^{3}He,^{3}He$'$)
I	^{60}Ni(^{7}Li,t)	V	^{63}Cu(d,n),(pol d,n)	AH	^{64}Zn(α,α')

J	^{60}Ni(^{16}O,^{12}C)	W	^{63}Cu(^{3}He,d)	AI	^{64}Zn(^{16}O,^{16}O′),(^{12}C,^{12}C′)
K	^{61}Ni(α,nγ),^{56}Fe(^{11}B,2npγ)	X	^{63}Cu(α,t)	AJ	Coulomb excitation
L	^{61}Ni(α,nγ),(HI,xnγ)	Y	^{64}Zn(γ,γ′)	AK	^{66}Zn(p,t)
M	^{62}Ni(^{12}C,^{10}Be),(^{16}O,^{14}C)	Z	^{64}Zn(e,e′)		

E(level)[†]	J^{π}[‡]	$T_{1/2}$[#]	XREF	Comments
0.0[&]	0+	stable[@]	ABCDEFGHIJKLMNOPQRST VWXYZ	XREF: Others: AB, AC, AD, AE, AF, AG, AH, AI, AJ, AK Evaluated rms charge radius $<r^2>^{1/2}$=3.9283 fm *15* (2013An02). Evaluated $\delta<r^2>$(^{66}Zn,^{64}Zn)=−0.162 fm^2 *2* (2013An02). Measured change in isotope shift $\delta\nu$(^{68}Zn,^{64}Zn)=−141.2 MHz *12*(stat) *66*(syst) (2019Xi07, collinear laser spectroscopy at ISOLDE, CERN), with laser wavelength of 480.7254 nm to match the Doppler shifted transition. Measured change in charge radius $\delta<r^2>$(^{68}Zn,^{64}Zn)=−0.279 fm^2 *4*(stat) *34*(syst) (2019Xi07, collinear laser spectroscopy at ISOLDE, CERN), with laser wavelength of 480.7254 nm to match the Doppler shifted transition. J^{π}: hyperfine structure measurements: 1929Sc01, 1931Mu02. $T_{1/2}$: see footnote for lower limits for double β decay. Additional information 2.
991.54[&] *5*	2+	1.94 ps *5*	BCDEFGHIJKLMNOPQRST VWXYZ	XREF: Others: AB, AC, AD, AE, AF, AG, AH, AI, AJ, AK β_2=0.260 *18* (1987Ja04) μ=+0.89 *14* (2005Le12,2010Mo14,2020StZV) Q=−0.143 *21* (1976Ne06,1977Ne05,1981Ko06,2016St14, 2021StZZ) XREF: J(960)N(1024)AB(920). Additional information 3. E(level): level energy held fixed in least-squares adjustment. J^{π}: E2 γ to 0+. β_2: from (p,p′). Others: see (e,e′); (n,n′); (p,p′); (d,d′); (^{3}He,^{3}He′) and (α,α′). β_2(pol p,p′)=0.26, 0.25 (1993Mo15). Negative sign is indicated by 1991Ku30 from an analysis of σ(θ)(α,α′) data. μ: from transient fields in Coul. ex. (2005Le12,2010Mo14). Others: +0.89 *9* (2002Ke02), +0.92 *20* (1979Fa06), +0.84 *18*, +1.04 *24* (1978BeZJ,1979BrZP). 2010Mo14 reanalyzed their previously measured g factor of +0.45 *3* in 2005Le12 using a different procedure for precession effect, and obtained the same value. Uncertainty of 0.06 in 2010Mo14 increased to 0.14 in 2020StZV evaluation. Q: from electron scattering (1976Ne06,1977Ne05, value of −0.124 *11* reanalyzed by 1981Ko06 to −0.143 *21*. Others: −0.32 *6* or −0.26 *6* (1988Sa32, reorientation method in Coulomb excitation; −0.135 *14* ((e,e′), 1972Li12); −0.01 *+9−5* (Coul. ex., 2003KoZQ). $T_{1/2}$: weighted average of 1.97 ps *6* (DSA in Coul. Ex.,2005Le12); 1.87 ps *6* (DSA in Coul. Ex.,2002Ke02); 2.06 ps *17* ((γ,γ′),1981Ca10); 2.8 ps *7* (RDDS in (^{16}O,p2nγ),1977Al14); 1.71 ps *21* (line shape in Coul. ex., 1973Fi15) and 2.16 ps *15* ((γ,γ′),1971ImZY). Values deduced from B(E2) values in Coul. Ex. and (e,e′) are somewhat lower: 1.76 ps *4* (from B(E2)=0.168 *4*,1988Sa32); 1.82 ps *10* (from B(E2)=0.162 *9* and 1.83 ps *13* from B(E2)=0.161 *12*,1975Th01); 1.73 ps *15* (from B(E2)=0.170 *15*, 1962St02). Weighted average of all the values is 1.84 ps 4. 2001Ra27 evaluation quotes 1.86 ps 17 from weighted average of 15 values (B(E2) in Coul. Ex.: 1988Sa32,1975Th01,1962St02,1960An07, 1956Te26; Doppler-shift method in Coul. Ex.: 1973Fi15; Doppler-shift

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Adopted Levels, Gammas (continued)

^{64}Zn Levels (continued)

E(level)[†]	J^{π}[‡]	$T_{1/2}$[#]	XREF	Comments
				in (^{16}O,p2nγ): 1977Al14; (γ,γ′): 1981Ca10,1977Ca14,1972ArZD,1965Ta13; (e,e′): 1977Ne05,1976Ne06,1970Af04.
1799.41[a] *4*	2+	2.0 ps *2*	BCDEFGH JKLM OPQRST VW Z	XREF: Others: AC, AD, AE, AF, AH, AJ, AK XREF: J(1750). J^{π}: E2 γ to 0+. $T_{1/2}$: from B(E2)(↑)=0.00170 *12* ((e,e′), 1977Ne05). Others (from (α,nγ), (^{11}B,2npγ)): 1.4 ps *7* (1977Al14), 2.1 ps *14* (1977We10), 1.8 ps *+6−3* (1976Ch11), >1.0 ps (1978Si02).
1910.26 *4*	0+	0.95 ns *5*	B H KL OPQR T W	XREF: Others: AC, AD, AE, AF, AH, AK XREF: AF(1960)AK(1940). J^{π}: E0 transition to 0+. $T_{1/2}$: γce(t) in (p,p′γ) (1985Pa07). Others (from (α,nγ),(^{11}B,2npγ)): 2.4 ps *+10−6* (1976Ch11), >1.0 ps (1978Si02).
2306.72[&] *5*	4+	0.776 ps *28*	CDEFGH JKLM OPQRST VW Z	XREF: Others: AC, AD, AE, AF, AH, AJ, AK μ=+2.0 *6* (2005Le12,2010Mo14,2020StZV) XREF: M(2400)V(2230). μ: from transient fields in Coul. ex. (2005Le12, 2010Mo14 reanalyzed previously measured g factor in 2005Le12 of +0.53 *16* using a different procedure for precession effect, and obtained g factor=+0.49 *15*. J^{π}: γ(θ) and γ(lin pol) in (α,nγ),(^{11}B,2npγ). B(E4)=0.00034 *10* from (e,e′). $T_{1/2}$: from DSA method in Coul. ex. (2005Le12). Others: 0.21 ps *+11−8* ((n,n′γ),1985Ko27); 0.29 ps *8* (α,nγ),((^{11}B,2npγ),1978Si02); 1.0 ps *6* (1977We10) and 0.8 ps *3* (1976Le31) in (^{16}O,p2nγ),(^{7}Li,2nγ); 0.44 ps *9* (1976Ch11) in (α,nγ).
2609.52 *7*	0+	0.20 ps *8*	B H KL OPQR T W	XREF: Others: AC, AD, AE, AK J^{π}: E0 transition to 0+. $T_{1/2}$: weighted average of 0.15 ps *+6−3* ((n,n′γ), 1985Ko27); 0.36 ps *10* (α,nγ),((^{11}B,2npγ), 1978Si02); 1.0 ps *+6−4* ((α,nγ), 1976Ch11).
2736.57[a] *6*	4+	1.5 ps *3*	CDEFGh KL OPQRST w	XREF: Others: AC, AD, AE, AH, AJ, AK XREF: AH(2780). J^{π}: 937γ(θ,lin pol) in (α,nγ),(^{11}B,2npγ). $T_{1/2}$: from (α,nγ),(^{11}B,2npγ). Weighted average of 1.2 ps *3* (1980Si02); 3.5 ps *21*, 1.7 ps *7* (1977We10); 3.5 ps *14* (1977Al14); 2.1 ps *7* (1976Ch11).
2793.5 *4*	2+	0.049 ps *14*	h KL OPQRST w	XREF: Others: AC, AD, AE, AK J^{π}: L(p,t)=2 from 0+. $T_{1/2}$: from (α,nγ),(^{11}B,2npγ) (1978Si02). Other: <0.009 ps (1976Ch11).
2979.94 *15*	3+	0.30 ps *+39−11*	jKL nOPQRST	XREF: Others: AC, AD, AE XREF: j(2960)n(2930). J^{π}: γ(θ, lin pol) in (α,nγ),(^{11}B,2npγ). $T_{1/2}$: from (n,n′γ) (1985Ko27). Others: >2.6 ps (1976Ch11), >1.0 ps (1978Si02) in (α,nγ),(^{11}B,2npγ).
2998.54[b] *17*	3−	0.152 ps *4*	CDEFGH jKL nOP rST wX Z	XREF: Others: AB, AC, AD, AE, AF, AG, AH, AJ, AK μ=+1.5 *9* (2005Le12,2020StZV) B(E3)↑=0.040 *7* (1976Ne06)

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Adopted Levels, Gammas (continued)

^{64}Zn Levels (continued)

E(level)†	J^{π}‡	$T_{1/2}$#	XREF	Comments
				β_3=0.235 *16* (1987Ja04) XREF: H(2980)j(2960)n(2930)X(3040)AB(3300)AK(3020). μ: from transient fields in Coul. ex. (2005Le12). B(E3)↑: from (e,e′). Others: see (e,e′) and (α,α'). 2002Ki06 quote 0.034 *5* from average of 0.040 *7* (1976Ne06) and 0.0307 *23* (1970Af04). β_3: from (p,p′). Others: see (e,e′); (n,n′); (p,p′); (d,d′); (^{3}He,^{3}He′); (α,α'). β_3(pol p,p′)=0.22, 0.21 (1993Mo15). J^{π}: L(e,e′)=3. Strong population in (p,p′) and other inelastic scattering experiments identifies this as an octupole state. $T_{1/2}$: from DSA method in Coul. ex. (2005Le12). Others: 0.097 ps *21* ((n,n′γ),1985Ko27); 0.080 ps *21* (α,nγ),((^{11}B,2npγ),1978Si02); >1.0 ps (1976Ch11).
3005.73 *14*	2^+	0.057 ps *8*	KL OP r T w	XREF: Others: AC, AD, AE J^{π}: $\gamma(\theta$,lin pol) in (α,nγ),(^{11}B,2npγ). $T_{1/2}$: weighted average of 0.069 ps *+21−14* ((n,n′γ), 1985Ko27); 0.080 ps *21* (α,nγ),((^{11}B,2npγ), 1978Si02); 0.056 ps *15*, 0.045 ps *12* ((α,nγ), 1976Ch11).
3071.4 *7*	$(1,2^+)$		O	XREF: Others: AE J^{π}: prominent γ to 0^+; 1^+ proposed in (p,γ) E=1.3-3.2 MeV.
3077.77 *13*	4^+	0.55 ps *6*	CDEFG KLM OPQ ST w	XREF: Others: AC, AD, AH, AJ, AK XREF: AK(3110). J^{π}: $\gamma(\theta$,lin pol) in (α,nγ),(^{11}B,2npγ). Also L(p,p′)=L(α,α')=4. $T_{1/2}$: from DSA in Coul. ex. (2005Le12). Others: 0.42 ps *+28−10* ((n,n′γ), 1985Ko27); 0.42 ps *11* (α,nγ),((^{11}B,2npγ),1978Si02); 1.0 ps *3* ((^{7}Li,2nγ),1977We10); 1.4 ps *+10−6* ((α,nγ), 1976Ch11).
3094.64 *9*	$(3)^+$	0.090 ps *11*	KL OPQR T Vw	XREF: Others: AC, AD, AE XREF: V(3120). J^{π}: $\gamma(\theta$, lin pol) in (α,nγ),(^{11}B,2npγ). J=3 is favored over J=2. $T_{1/2}$: weighted average of 0.083 ps *+21−7* ((n,n′γ), 1985Ko27); 0.087 ps *21* (α,nγ),((^{11}B,2npγ), 1978Si02); 0.13 ps *3* ((α,nγ), 1976Ch11).
3186.84 *6*	1^+	0.042 ps *10*	B KL P R T	XREF: Others: AC, AD, AE J^{π}: log *ft*=5.14 from 0^+. $T_{1/2}$: from DSA in (n,n′γ) (1985Ko27). Others: from (α,nγ), (^{11}B,2npγ): 0.26 ps *13* (1980Si02), 0.40 ps *+21−12* (1976Ch11). Noting a large discrepancy in $T_{1/2}$ results, 1985Ko27 repeated their measurement and obtained a consistent $T_{1/2}$=0.042 ps.
3196.9 *4*	(2,3)		K P ST	XREF: Others: AD, AE J^{π}: $\gamma(\theta)$ in (α,nγ),(^{11}B,2npγ) for 2205γ.
3205.98 *9*	$(3)^+$	0.18 ps *5*	KL P R T	XREF: Others: AC, AD J^{π}: $\gamma(\theta$,lin pol) in (α,nγ),(^{11}B,2npγ) gives 3^+ (poor fit for 2^+), but a 1295γ to 0^+ (reported in (p,γ) and (n,n′γ), not in (α,nγ), (^{11}B,2npγ)) is inconsistent with J=3. $T_{1/2}$: weighted average of 0.16 ps *+15−6* ((n,n′γ), 1985Ko27); 0.15 ps *5* (α,nγ),((^{11}B,2npγ), 1980Si02); 0.33 ps *+14−8* ((α,nγ), 1976Ch11).
3240 *20*	(0^+)			XREF: Others: AK

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Adopted Levels, Gammas (continued)

^{64}Zn Levels (continued)

E(level)†	J^π‡	$T_{1/2}$#	XREF	Comments
				J^π: L(p,t)=0.
3261.94 *9*	1	0.4 ps +*7*−*2*	B H KL P R T W	XREF: Others: AC, AD, AE J^π: log *ft*=6.1 from 0^+; γ to 0^+. $T_{1/2}$: from (n,n′γ) (1985Ko27). Others (from (α,nγ),(^{11}B,2npγ)): 0.042 ps *14* (1980Si02); 0.014 ps *8* (1976Ch11). Noting a large discrepancy in $T_{1/2}$ results, 1985Ko27 repeated their measurement and obtained a consistent $T_{1/2}$=0.4 ps.
3285 *3*	(1^- to 5^-)		S	J^π: 1^-,2,3,4,5^- from primary γ from (3^-).
3297.17 *14*	$(2)^+$	0.27 ps *5*	KL P R T	XREF: Others: AC, AD, AK J^π: $\gamma(\theta$,lin pol) in (α,nγ),(^{11}B,2npγ) and L(p,p′)=2. $T_{1/2}$: from (α,nγ),(^{11}B,2npγ). Weighted average of 0.23 ps *7* (1980Si02), 0.31 ps *7* ((α,nγ) (1976Ch11)).
3306.85 *15*	(4^+)	0.26 ps *8*	F K P	XREF: Others: AD, AK XREF: AD(3305). J^π: $\gamma(\theta$,lin pol) in (α,nγ),(^{11}B,2npγ). $T_{1/2}$: from (^{11}B,2npγ) 1980Si02.
3321.8? *12*	(1)		B	XREF: B(?). J^π: weak ε branch (log *ft*=7.1) from 0^+; γ to 0^+.
3365.99 *6*	1^+	0.023 ps *8*	B KL P RST vw Y	XREF: Others: AC, AD, AE XREF: L(?)AC(?). J^π: log *ft*=5.04 from 0^+. $T_{1/2}$: from (α,nγ),(^{11}B,2npγ) (1980Si02). Others: 0.026 ps +*19*−*15* (1976Ch11), 0.028 ps *5* (in (γ,γ′)).
3369.86 *13*	3^+	0.35 ps +*14*−*10*	K P T vw	XREF: Others: AC, AD, AK XREF: AK(3340). J^π: $\gamma(\theta$,lin pol) in (^{11}B,2npγ); but L(p,p′)=(1)+2 for a 3367 doublet and L(p,t)=2 for a 3340 group suggest 2^+. E(level): there may be an additional 2^+ level near this energy as suggested by L(p,t) and L(p,p′). $T_{1/2}$: from (α,nγ),(^{11}B,2npγ) (1980Si02).
3414 *3*	(1^- to 5^-)		S v	XREF: Others: AK XREF: AK(3410). J^π: 1^-,2,3,4,5^- from primary γ from (3^-).
3425.13 *10*	1^+	0.031 ps *7*	B KL PQR T v Y	XREF: Others: AC, AD, AE XREF: L(?)AC(?). J^π: log *ft*=5.63 from 0^+. $T_{1/2}$: from (α,nγ),(^{11}B,2npγ) (1980Si02). Others: <0.010 ps (1976Ch11), 0.044 ps *11* (in (γ,γ′)).
3452.0 *10*	(1,2^+)		T	XREF: Others: AE XREF: T(3454). J^π: γ to 0^+.
3458.66 *17*	(2,3)	0.24 ps *6*	K P R T	XREF: Others: AC J^π: $\gamma(\theta$,lin pol) in (α,nγ),(^{11}B,2npγ). $T_{1/2}$: from (α,nγ),(^{11}B,2npγ) (1980Si02). Other: 0.17 ps +*42*−*8* (1985Ko27) in (n,n′γ).
3465 *5*	$(5,4,6)^-$			XREF: Others: AD J^π: L(p,p′)=5.
3500 *10*			W	XREF: Others: AK
3538.7? *10*	(2^+ to 6^+)			XREF: Others: AE

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Adopted Levels, Gammas (continued)

^{64}Zn Levels (continued)

E(level)†	J$^\pi$‡	T$_{1/2}$#	XREF	Comments
				J$^\pi$: 2$^+$,3,4,5,6$^+$ from γ to 4$^+$.
3545.9? *9*	(0 to 3$^+$)		P T	XREF: Others: AD, AE J$^\pi$: 0,1,2,3$^+$ from γ to 1$^+$.
3552.3 *3*	4$^+$	>1.0 ps	K R T	XREF: Others: AD J$^\pi$: $\gamma(\theta$,lin pol) in (α,nγ),(^{11}B,2npγ) and γ to 2$^+$; but J=4 inconsistent with a tentative 3551γ to 0$^+$ (in (p,γ)). There may be two different levels near 3552. T$_{1/2}$: from 1980Si02.
3586.9 *21*				XREF: Others: AD, AE XREF: AD(3576).
3597.24 *20*	(2$^+$,3,4$^+$)		K PQ T	XREF: Others: AC, AD, AE, AK J$^\pi$: γs to 4$^+$, 2$^+$. Excitation function in (p,γ) suggests 4$^+$, whereas, L(p,t)=(2) suggests 2$^+$.
3601.9 *10*	(1,2$^+$)		R	XREF: Others: AK J$^\pi$: γ to 0$^+$.
3606.5 *5*	(0$^+$ to 4$^+$)		jK	J$^\pi$: 0$^+$,1,2,3,4$^+$ from γ to 2$^+$.
3620.7 *10*	(2$^+$ to 6$^+$)		jK	J$^\pi$: 2$^+$,3,4,5,6$^+$ from γ to 4$^+$.
3628.4 *5*	(4)$^+$	0.16 ps *5*	jK T	XREF: Others: AD J$^\pi$: L(p,p′)=4; γ to 2$^+$. T$_{1/2}$: from 1980Si02.
3630? *3*	(0$^+$,6$^-$)		j PQ	E(level): in (p,γ) E=2050 keV, 1980Er05 adopted this energy from (p,p′) (1967Br10,1974Au04). This level is most likely different from that in (p,p′) (E=3633 *5* in 1987Ja04) due to different J^π values for the two levels. J$^\pi$: comparison of measured yield in (p,γ),E=2050 keV with Hauser-Feshbach calculations.
3680 *3*	(1$^-$ to 5$^-$)		n S w	J$^\pi$: 1$^-$,2,3,4,5$^-$ from primary γ from (3$^-$).
3698.9 *7*			n w	XREF: Others: AD, AE, AH XREF: ah(3720). J$^\pi$: L(α,α')=3 for a 3720 group suggests 3$^-$ for 3699 or 3718.
3701.4 *4*	1$^-$	0.025 ps *4*	H n P w Y	XREF: Others: AC XREF: H(3680)Y(3704). J$^\pi$: from $\gamma(\theta)$ in (γ,γ'); L(^{6}Li,d)=1. T$_{1/2}$: from (γ,γ').
3710.0 *7*	(2$^+$)		n T w	XREF: Others: AD, AE XREF: T(3707). J$^\pi$: γs to 0$^+$, 4$^+$.
3718.4 *3*	(0$^+$ to 4$^+$)	0.031 ps *10*	K n P T w	XREF: Others: AD, AE, AH XREF: ah(3720). J$^\pi$: 0$^+$,1,2,3,4$^+$ from γ to 2$^+$; L(α,α')=3 for a 3720 group suggests 3$^-$ for 3699 or 3718. T$_{1/2}$: from 1980Si02.
3759 *3*	(1$^-$ to 5$^-$)		n S	XREF: Others: AD J$^\pi$: 1$^-$,2,3,4,5$^-$ from primary γ from (3$^-$).
3780 *10*	2$^+$		n	XREF: Others: AK J$^\pi$: L(p,t)=2.
3795.03 *10*	1$^+$		B PQR T	XREF: Others: AD, AE J$^\pi$: log *ft*=5.58 from 0$^+$.
3815.4 *5*	(0$^+$ to 4$^+$)		h K w	XREF: Others: AD J$^\pi$: 0$^+$,1,2,3,4$^+$ from γ to 2$^+$.
3819.65 *21*	(0$^+$ to 4$^+$)		h PQ T w	XREF: Others: AD J$^\pi$: 0$^+$,1,2,3,4$^+$ from γ to 2$^+$.
3850.5 *4*	($\leq$3)$^{(+)}$	<0.7 ps	Kl sT Vw	XREF: Others: AC, AD

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Adopted Levels, Gammas (continued)

^{64}Zn Levels (continued)

E(level)[†]	J^{π}[‡]	$T_{1/2}$[#]	XREF	Comments
				J^{π}: γ to 2^+. L(d,n)=1 from $3/2^-$ for a 3850 *50* group suggests 0^+ to 3^+. $T_{1/2}$: from 1980Si02.
3853.27 *21*	5^+	>2 ps	Kl P sT w	XREF: Others: AD J^{π}: $\gamma(\theta$,lin pol) in $(\alpha,n\gamma)$,(^{11}B,2npγ). $T_{1/2}$: from 1980Si02.
3863.7 *10*	(2^+ to 6^+)		K w	XREF: Others: AD J^{π}: γ to 4^+.
3880 *3*	(0^+ to 4^+)		h R	J^{π}: 0^+,1,2,3,4^+ from primary γ from (2^+).
3898.5 *3*	(2^+,3,4^+)	0.038 ps *10*	h K PQR T	XREF: Others: AC, AD J^{π}: γs to 2^+, 4^+. $T_{1/2}$: from 1980Si02.
3924.69[b] *16*	5^-	<1.4 ps	CDEFG KL PQ	XREF: Others: AD J^{π}: $\gamma(\theta$,lin pol) in $(\alpha,n\gamma)$,(^{11}B,2npγ). Also L(p,p′)=5. $T_{1/2}$: from 1977Al14. Others: <1.7 ps (1977We10), >0.35 ps (1980Si02). $T_{1/2}$(3924.7 level) not lower than ≈0.7 ps from RUL=1 for B(M2)(W.u.).
3932.0 *4*	(4,5)		K	XREF: Others: AD, AK XREF: AK(3920). J^{π}: $\gamma(\theta$,lin pol) in $(\alpha,n\gamma)$,(^{11}B,2npγ). L(p,t)=(2) is inconsistent. There may be an additional 2^+ level near this energy.
3951.9 *6*	(4^+,3^+)		K T	XREF: Others: AC, AD, AH, AK XREF: AC(?)AK(3920). J^{π}: L(p,p′)=4; γ to 2^+.
3993.36[&] *8*	6^+	0.12 ps *3*	CDEFG KL	XREF: Others: AD J^{π}: $\gamma(\theta$,lin pol) in $(\alpha,n\gamma)$,(^{11}B,2npγ). Also L(p,p′)=6. $T_{1/2}$: from 1980Si02. Others: 0.15 ps *3* (1977We10), <0.14 ps (1976Le31).
4020.4 *4*	$(2)^+$		K P T	XREF: Others: AD, AK XREF: AK(4010). J^{π}: L(p,p′)=2 and γ to 4^+. L(p,t)=(0) is inconsistent. There may be an additional 0^+ level near this energy.
4039.7 *4*	(0^+ to 4^+)		K P T	XREF: Others: AD J^{π}: 0^+,1,2,3,4^+ from γ to 2^+.
4076.55 *20*	$(5)^+$	0.49 ps *+24−17*	CDEF KL T	XREF: Others: AD J^{π}: $\gamma(\theta$,lin pol) in $(\alpha,n\gamma)$,(^{11}B,2npγ); L(p,p′)=4. Assignment of 6^+ by 2004Ka18 in (^{28}Si,4pγ) on the basis of ΔJ=2 deduced from $\gamma\gamma(\theta)$ of 1340γ is inconsistent with $\gamma(\theta$,pol) data for 1340γ in 1980Si02 from $(\alpha,n\gamma)$,(^{11}B,2n2pγ). $T_{1/2}$: from 1980Si02.
4110 *3*	$(2)^+$		T	XREF: Others: AD, AK XREF: AD(4107)AK(4120). E(level): from ^{63}Cu(p,γ) E=3.46 MeV. J^{π}: L(p,p′)=2.
4140 *3*	$(2,1)^+$		n T	XREF: Others: AD, AE XREF: AD(4132). E(level): from ^{63}Cu(p,γ) E=3.46 MeV. J^{π}: L(p,p′)=2; possible γ to 0^+.

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Adopted Levels, Gammas (continued)

^{64}Zn Levels (continued)

E(level)[†]	J^{π}[‡]	$T_{1/2}$[#]	XREF	Comments
4153.1? *22*			n P	XREF: Others: AD
4156.53 *19*	5^-	0.11 ps *3*	CDEF KLmn ST w	XREF: Others: AD, AH XREF: AD(4164)AH(4190). J^{π}: ΔJ=2, E2 γ from 7^-; ΔJ=1 γ to (4^+); analyzing power in (pol p,p′) for a group at 4164 *10*. $T_{1/2}$: from 1980Si02.
4159.5 *18*	1	7.7 fs *25*	n P w y	XREF: Others: AD XREF: AD(4159). J^{π}: from γ(θ) in (γ,γ′). $T_{1/2}$: from (γ,γ′).
4181.7 *5*			jK n w	XREF: Others: AC, AD XREF: AC(?).
4205.2 *4*	$(4,3)^+$		n PQ T w	XREF: Others: AC, AD, AK XREF: AC(?)ak(4230). J^{π}: L(p,p′)=4; γ to 2^+.
4219 *10*	$(4)^+$		n	XREF: Others: AD, AK XREF: ak(4230). J^{π}: L(p,p′)=4.
4236.71[a] *10*	6^+	0.13 ps *4*	CDEFG KL n	XREF: Others: AD J^{π}: γ(θ,lin pol) in (α,nγ),(^{11}B,2npγ). Also L(p,p′)=6. $T_{1/2}$: from 1980Si02. Others: 1.3 ps *2* (1977We10), 42 ps *21* (1977Al14).
4260 *3*			T	
4288.6 *4*	$(4)^+$		K Z	XREF: Others: AD, AK J^{π}: L(p,p′)=4. Also L(e,e′)=2+4.
4304.1 *22*	(1^- to 5^-)		S	XREF: Others: AK J^{π}: 1^-,2,3,4,5^- from primary γ from (3^-).
4310 *3*			T	
4319.1 *22*	$(4,3)^+$		T w	XREF: Others: AC, AD, AK XREF: AC(?)AK(4340). J^{π}: L(p,p′)=4; γ to 2^+.
4362.1 *22*	$(2,1,3)^+$		ST w	XREF: Others: AD, AK XREF: AD(4351). E(level): from ^{63}Cu(p,γ) E=3.46 MeV. J^{π}: L(p,p′)=2.
4370 *3*	3^-		T w	XREF: Others: AD, AH, AK XREF: AD(4385)AH(4370)AK(4410). E(level): from ^{63}Cu(p,γ) E=3.46 MeV. J^{π}: L(α,α′)=3; L(p,t)=(3). L(p,p′)=(1).
4380 *3*			T	
4420 *3*	$(4,3)^+$		T vw	XREF: Others: AD E(level): from ^{63}Cu(p,γ) E=3.46 MeV. J^{π}: L(p,p′)=4. L(d,n)=1 from $3/2^-$ for 4420 *50* gives 0^+ to 3^+.
4454.68 *15*	1^+	3.2 fs *6*	B vw Y	XREF: Others: AC, AD J^{π}: log *ft*=5.44 from 0^+; but L(p,p′)=1 for a 4453 *10* group gives negative parity, unless an unnatural parity state is populated in (p,p′). $T_{1/2}$: from (γ,γ′).
4470 *3*	(0^+)		T vw	XREF: Others: AD, AK XREF: AK(4480). J^{π}: L(p,t)=(0).
4488 *10*	$(4,3,5)^+$		w	XREF: Others: AD J^{π}: L(p,p′)=4.
4504 *10*				XREF: Others: AD
4522 *10*				XREF: Others: AD

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Adopted Levels, Gammas (continued)

^{64}Zn Levels (continued)

E(level)[†]	J^{π}[‡]	$T_{1/2}$[#]	XREF	Comments
4538 *10*	$(4,3,5)^+$			XREF: Others: AD J^{π}: L(p,p′)=4.
4560 *3*			T	XREF: Others: AC, AD XREF: AC(?). E(level): from ^{63}Cu(p,γ) E=3.46 MeV.
4573 *10*	$(1^-,0^-,2^-)$		J	XREF: Others: AD, AK J^{π}: L(p,p′)=(1).
4608.75 *20*	(1)		B	XREF: Others: AD XREF: AD(4593). J^{π}: log *ft*≈6.3 from 0^+.
4615 *10*	$(4,3,5)^+$			XREF: Others: AD J^{π}: L(p,p′)=4.
4626 *10*				XREF: Others: AD
4634.87 *9*	7^-	94 ps *6*	CDEFG KLM	XREF: Others: AD, AH μ=1.6 *3* (1983Ba69,2020StZV) XREF: M(4650)AD(4648). J^{π}: $\gamma(\theta$,lin pol) in (α,nγ),(^{11}B,2npγ) and L(p,p′)=7. $T_{1/2}$: weighted average of 105 ps *13*, 99 ps *10* (1977We10); 90 ps *10*, 80 ps *14* (1977Al14). μ: integral PAC method, recoil into gas and vacuum (1983Ba69).
4638.2 *5*				XREF: Others: AD
4664 *3*	(1)	41 fs *12*	Y	XREF: Others: AD, AK XREF: Y(?). J^{π}: from $\gamma(\theta)$ in (γ,γ'). $T_{1/2}$: from (γ,γ') for %Iγ(to g.s.)=100.
4668.93 *19*	(6^-)		CDEF L	XREF: Others: AD, AK J^{π}: ΔJ=1 γs to 5^- and $(5)^+$. Negative parity proposed in (^{28}Si,4pγ) (2004Ka18), (1998Ga11), but positive parity proposed by 1998Ga11.
4684 *3*	(1^- to 5^-)		S	XREF: Others: AD, AK XREF: AD(4702). J^{π}: 1^-,2,3,4,5^- from primary γ from (3^-).
4713.15 *21*	(1)		B	XREF: Others: AD J^{π}: weak ε branch (log *ft*≈6.0) from 0^+.
4729 *10*				XREF: Others: AD
4751 *10*	$(4^+,3^+,5^+)$		w	XREF: Others: AD, AK J^{π}: L(p,p′)=4.
4761 *10*			w	XREF: Others: AD, AH, AK
4786 *10*	$(4^+,3^+,5^+)$		w	XREF: Others: AD, AK J^{π}: L(p,p′)=4.
4797 *10*			w	XREF: Others: AD
4816 *10*	$(2^+,1^+,3^+)$		w	XREF: Others: AD, AK J^{π}: L(p,p′)=2.
4823.5 *6*	(5,6,7)		L	XREF: Others: AD, AK XREF: AD(4831). J^{π}: γ to (5^+) and heavy-ion excitation.
4851 *10*	$(4^+,3^+,5^+)$			XREF: Others: AD, AK J^{π}: L(p,p′)=4.
4902 *10*	$(4^+,3^+,5^+)$			XREF: Others: AD, AK J^{π}: L(p,p′)=4.
4935 *10*	$(3^-,2^-,4^-)$			XREF: Others: AD, AK J^{π}: L(p,p′)=3.
4947 *10*	(2^+)			XREF: Others: AD, AK XREF: ak(4980). J^{π}: L(p,t)=2 for a 4980 *30* group.

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Adopted Levels, Gammas (continued)

^{64}Zn Levels (continued)

E(level)[†]	J^{π}[‡]	$T_{1/2}$[#]	XREF	Comments
4980.87[b] *17*	7^-	1.3 ps *4*	CDEFG KL	XREF: Others: AD XREF: AD(4970). J^{π}: ΔJ=2, E2 γ to 5^-; L(p,p′)=7. $T_{1/2}$: from 1977We10. Other: 3.1 ps *7* (1977Al14).
5005 *10*	2^+		w	XREF: Others: AD, AK XREF: AK(4980). J^{π}: L(p,p′)=2; L(p,t)=2 for a 4980 *30* group.
5038 *10*			w	XREF: Others: AD, AK
5050 *10*	(0 to 3)$^{(+)}$		vw	XREF: Others: AD, AH, AK J^{π}: L(d,n)=1 from $3/2^-$ for a 5050 *50* group.
5066.8 *20*			vw	XREF: Others: AC, AD, AK XREF: AC(?).
5081 *10*			w	XREF: Others: AD, AK
5110 *10*			n w	XREF: Others: AD, AK
5121 *10*	$(2,1,3)^+$		n w	XREF: Others: AD J^{π}: L(p,p′)=2.
5138 *10*			n w	XREF: Others: AD
5151.71 *12*	(7^-)		C F L n w	XREF: Others: AD, AK J^{π}: ΔJ=2 γ to 5^-.
5160 *10*			n w	XREF: Others: AD, AK
5171 *10*			w	XREF: Others: AD, AK
5191 *10*	$(3,2,4)^-$		n w	XREF: Others: AD, AK J^{π}: L(p,p′)=3.
5197 *10*			n	XREF: Others: AD
5211 *10*			n	XREF: Others: AD, AK
5224 *10*			n	XREF: Others: AD, AK
5234 *10*			n	XREF: Others: AD, AK
5256 *10*			n	XREF: Others: AD
5267 *10*			n	XREF: Others: AD
5292 *10*			n w	XREF: Others: AD
5307 *10*			M w	XREF: Others: AD XREF: M(5300).
5319 *10*			w	XREF: Others: AD
5329 *10*			w	XREF: Others: AD
5337 *10*				XREF: Others: AD
5351 *10*				XREF: Others: AD
5361 *10*				XREF: Others: AD
5375 *10*	(3^-)			XREF: Others: AD, AH J^{π}: L(α,α')=3 for 5370 *45* group.
5384 *10*				XREF: Others: AD
5398 *10*				XREF: Others: AD
5413 *10*				XREF: Others: AD
5425 *10*				XREF: Others: AD
5443 *10*				XREF: Others: AD
5457 *10*				XREF: Others: AD
5474 *10*				XREF: Others: AD
5485 *10*	(0 to 3)$^{(+)}$		V	XREF: Others: AD J^{π}: L(d,n)=(1) from $3/2^-$ for 5480 *50* group.
5495 *10*	(4^+)		Z	XREF: Others: AD XREF: Z(5500). J^{π}: L=4, E4 excitation in (e,e′).
5517 *10*				XREF: Others: AD
5530 *10*				XREF: Others: AD
5545 *10*				XREF: Others: AD
5553 *10*				XREF: Others: AD
5564 *10*				XREF: Others: AD

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Adopted Levels, Gammas (continued)

^{64}Zn Levels (continued)

E(level)[†]	J$^{\pi}$[‡]	T$_{1/2}$[#]	XREF	Comments
5576 *10*				XREF: Others: AD
5588 *10*				XREF: Others: AD
5601 *10*				XREF: Others: AD
5613 *10*				XREF: Others: AD
5623.75 *21*	(8$^-$)		CDEF L	XREF: Others: AD J$^{\pi}$: ΔJ=2 γ to (6$^-$).
5642 *10*				XREF: Others: AD
5652 *10*				XREF: Others: AD
5665 *10*				XREF: Others: AD
5676 *10*				XREF: Others: AD
5689 *10*				XREF: Others: AD
5699.38 *18*	(8$^-$)		C F LM	XREF: Others: AD XREF: M(5700). J$^{\pi}$: ΔJ=1 γ to (7$^-$); ΔJ=2 γ to (6$^-$).
5719 *10*				XREF: Others: AD
5729 *10*				XREF: Others: AD
5737 *10*				XREF: Others: AD
5760 *10*				XREF: Others: AD
5770 *10*				XREF: Others: AD
5780 *10*				XREF: Others: AD
5792 *10*				XREF: Others: AD
5812 *10*				XREF: Others: AD, AH J$^{\pi}$: L(α,α')=5 for a 5800 *45* group suggests 5$^-$ for one of the levels.
5822 *10*				XREF: Others: AD
5833 *10*				XREF: Others: AD
5844 *10*				XREF: Others: AD
5860 *10*				XREF: Others: AD
5872 *10*				XREF: Others: AD
5882 *10*				XREF: Others: AD
5893 *10*				XREF: Others: AD
5909 *10*				XREF: Others: AD
5920 *10*				XREF: Others: AD
5933 *10*				XREF: Others: AD
5936.0 *7*	(8$^+$)		CDEF	J$^{\pi}$: ΔJ=(2) γ to 6$^+$.
5951.7 *5*	(9$^-$)		EF L	XREF: Others: AD J$^{\pi}$: ΔJ=2 γ to 7$^-$; γ to (8$^-$).
6031.5[a] *4*	(8$^+$)		CDEF	J$^{\pi}$: ΔJ=2 γ to 6$^+$; γ to 7$^-$.
6124.0 *4*	(8$^+$)		CDEF	E(level): see comment for 6126 level. J$^{\pi}$: ΔJ=2 γ to 6$^+$; ΔJ=1 γ to 7$^-$.
6124.7[b] *4*	(9$^-$)		CDE L	E(level),J$^{\pi}$: only one level proposed by 2004Ka18 in (^{28}Si,4pγ) E=122 MeV. 1998Ga11, 1997Fu08 and 1994Cr05 proposed two levels near this energy with *J*$^{\pi}$=8$^+$ and 9$^-$, respectively, with the placement of 1144γ from 9$^-$. This placement also proposed by 1978Ne02 in (α,nγ) and ^{56}Fe(^{14}N,αpnγ) based on 1144γ(θ) result consistent with ΔJ=2, Q γ to 7$^-$ level.
6262.1 *6*	(7,8,9$^-$)		C	J$^{\pi}$: γ to 7$^-$.
6300 *50*			M	
6377.0 *22*	(7,8,9$^-$)		F J	XREF: J(6390). J$^{\pi}$: γ to 7$^-$; yrast pattern of population.
6700 *50*			M	
6830			J	
6963.0 *4*	(9)		C	J$^{\pi}$: ΔJ=1 γ to (8$^-$); γ to (9$^-$).
6998.1 *5*	(11$^-$)	0.97 ps *21*	CDEFG KL	E(level): in (α,nγ),(^{11}B,2npγ); (^{28}Si,4pγ) E=115 MeV; and (^{54}Fe,2pγ), this level corresponds to 5681, 9$^-$ where

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Adopted Levels, Gammas (continued)

^{64}Zn Levels (continued)

E(level)[†]	J^{π}[‡]	XREF	Comments
			the placement of 1046γ was differently ordered. J^{π}: ΔJ=2, E2 γ to (9^-). $T_{1/2}$: from 1977We10. Other: 4.0 ps *5* (1977Al14). This half-life was assigned (1977We10,1977Al14) to 5681, 9^- level; but with the reassignment of the 1314-1046 cascade, evaluators assign the half-life to 6998 level.
7000	(4^+)	Z	J^{π}: L=4, E4 excitation in (e,e′).
7062.4 *4*	(10^-)	F	J^{π}: ΔJ=2 γ to (8^-).
7118.9 *4*	(10^+)	CDEF	J^{π}: ΔJ=2 γ to (8^+); γ to (9^-).
7212.4 *7*	(11^-)	F	J^{π}: ΔJ=2 γ to (9^-).
7334.7 *5*	(10^+)	C	J^{π}: ΔJ=2 γ to (8^+).
7380		M Y	XREF: M(7400).
7556.2 *22*	(10^-)	F	J^{π}: γ to (9^-).
7579.1[b] *4*	(11^-)	C	J^{π}: ΔJ=2 γ to (9^-).
7806.0 *10*	(10^+)	C	J^{π}: ΔJ=2 γ to (8^+).
7900 *50*		M	
7902 *3*	(9,10,11^-)	C	J^{π}: γ to (9^-).
7946.5 *21*	(10^+)	C	J^{π}: ΔJ=2 γ to (8^+).
8157.1 *21*	(10^+)	C	J^{π}: ΔJ=(2) γ to (8^+).
8181.1 *11*	(10^-)	F	J^{π}: γ to (9^-).
8302.8 *6*	(12^-)	F	J^{π}: γ to (11^-).
8322.1 *22*	(11)	F	J^{π}: γ to (10^+).
8426.1 *4*	(11^-)	DEF	J^{π}: γs to (9^-) and (11^-).
8580.4 *5*	(12^+)	CDEF	J^{π}: ΔJ=2 γ to (10^+); γ to (11^-).
8995.4 *10*	(12^+)	C	J^{π}: ΔJ=2 γ to (10^+).
9363.7 *8*	(11^-)	F	J^{π}: γs to (9^-) and (10^-).
9440.3 *6*	(11^-)	F	J^{π}: γ to (10^+).
9666 *3*	(14)	EF	J^{π}: γ to (12).
9772 *2*	(2^+)	R	Additional information 4. E(level): proton capture state, E(p)(lab)=2098 keV. J^{π}: γs to 0^+ and 4^+.
9803.5 *7*	(11^-)	F	J^{π}: γ to (10^-); ΔJ=2 γ from (13^-).
9948.4[d] *6*	(12^-)	F	J^{π}: ΔJ=1 γ to (11^-); ΔJ=2 γ to (10^-).
10.31×10^3 *50*		Q	Additional information 5. E(level): average proton-resonance, E(p)=2.1-3.1 MeV range in the c.m. system.
10460.2[c] *6*	(13^-)	D F	J^{π}: ΔJ=2 γ to (11^-); γ to (12^-).
10872	(3^-)	S	Additional information 6. E(level),J^{π}: proton resonance state, E(p)=3217 resonance, identified as $g_{9/2}$ IAR of 1546 level in ^{64}Cu, with γ decay similar to the decay of 3251 keV resonance (1976Fo06).
10906	(3^-)	S	Additional information 7. E(level),J^{π}: proton resonance state, E(p)=3251 resonance, identified as $g_{9/2}$ IAR of 1589 level in ^{64}Cu; spin from Iγ(90°)/Iγ(0°) of primary transitions. Parity from decay modes and lack of 3^+ in the parent nucleus ^{64}Cu.
11023.4[d] *6*	(14^-)	D F	J^{π}: ΔJ=1 γ to (13^-); γ to (12^-).
11120	(2^+)	T	Additional information 8. E(level): proton-resonance state from E(p)(lab)=3.46 MeV and S(p)(^{64}Zn)=7713.1 keV *6* (2021Wa16). J^{π}: γ rays to 0^+ and 4^+.
11464[e] *4*	(15)	F	J^{π}: γ to (14).
11626.4[c] *7*	(15^-)	D F	J^{π}: ΔJ=1 γ to (14^-); ΔJ=2 γ to (13^-).
12335.7[d] *7*	(16^-)	D F	J^{π}: γs to (14^-) and (15^-).

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Adopted Levels, Gammas (continued)

^{64}Zn Levels (continued)

E(level)†	Jπ‡	$T_{1/2}$#	XREF	Comments
12468[f] *4*	(16)		F	Jπ: γ to (15).
13082.1[c] *7*	(17⁻)		D F	Jπ: ΔJ=1 γ to (16⁻); γ to (15⁻).
13324[e] *4*	(17)		F	Jπ: γs to (15) and (16).
13948.1[d] *8*	(18⁻)		D F	Jπ: ΔJ=1 γ to (17⁻); ΔJ=2 γ to (16⁻).
14391[f] *3*	(18)		F	Jπ: γs to (16) and (17).
14857 *6*			F	Jπ: γ from (19).
14862.5[c] *8*	(19⁻)		D F	Jπ: ΔJ=1 γ to (18⁻); ΔJ=2 γ to (17⁻).
15.42×10³ *94*	1⁻	4.6 MeV *+16−15*		XREF: Others: AH %EWSR=19 for E1 isoscalar giant dipole resonance (ISGDR) strength.
15423.6[e] *25*	(19)		F	Jπ: γs to (17) and (18).
15.7×10³ *5*	2⁺	6.43 MeV *65*		XREF: Others: AH %EWSR=113 for E2 isoscalar giant quadrupole resonance (ISGQR) strength.
15939 *7*			F	Jπ: γ from (20).
15945.0[d] *9*	(20⁻)		D F	Jπ: ΔJ=2 γ to (18⁻); γ to (19⁻).
16686.8[f] *25*	(20)		F	Jπ: γs to (18) and (19).
17084 *5*			F	Jπ: γ from (21).
17087.2[c] *10*	(21⁻)		D F	Jπ: ΔJ=2 γ to (19⁻); γ to (20⁻).
17853[e] *4*	(21)		F	Jπ: γs to (19) and (20).
18.34×10³ *70*	0⁺	9.21 MeV *114*		XREF: Others: AH %EWSR=64 for E0 isoscalar giant monopole resonance (ISGMR) strength.
18483.3[d] *11*	(22⁻)		D F	Jπ: ΔJ=2 γ to (20⁻); γ to (21⁻).
19365[f] *4*	(22)		F	Jπ: γ to (20).
19775.6[c] *13*	(23⁻)		D F	Jπ: ΔJ=2 γ to (21⁻); γ to (22⁻).
20657[e] *5*	(23)		F	Jπ: γ to (21).
21297.5[d] *15*	(24⁻)		F	Jπ: γs to (22⁻) and (23⁻).
22892.7[c] *17*	(25⁻)		F	Jπ: γ to (23⁻).
24868.6[d] *18*	(26⁻)		F	Jπ: γ to (24⁻).
25.6×10³ *12*	1⁻	12.6 MeV *32*		XREF: Others: AH %EWSR=68 for E1 isoscalar giant dipole resonance (ISGDR) strength.

† From a least-squares fit to Eγ data for levels populated in γ-ray studies, assuming ΔEγ=3 keV for high-energy γ rays from proton capture and resonance states. Normalized χ^2=0.92. Energies of levels populated only in particle-transfer reactions are primarily from (p,p′). Due to high level density and limited resolution, correspondence of levels, above ≈3.5 MeV excitation, from different reactions is somewhat ambiguous.

‡ In cases where L(p,p′) is used, parity is $(-1)^L$ and spin is L for levels up to 3.2 MeV, with the possibility of L-1, L, L+1 for higher levels, although J=L is the most likely choice, which is listed first, followed by less likely J=L−1 and J=L−2. For levels above ≈5 MeV populated in in-beam high-spin studies, J^π values are based on γ(θ), γγ(θ) (DCO), band associations, and assumption of ascending spins with excitation energy.

Mainly from DSA method in (α,nγ),(^{11}B,2npγ) (also (α,nγ) and (n,n′γ)). Values quoted from 1977Al14 are from recoil distance method (RDDS) in (^{11}B,2npγ). Above 3458 values are available from (^{11}B,2npγ) only. For some of the levels, values from different studies are in disagreement and are noted under comments.

@ Double β decay to ^{64}Ni is possible with Q value=1095.7 *7*. From measurements of double β decay, lower limits of half-life for decay to ^{64}Ni g.s. have been determined (generally at 90% confidence level): $T_{1/2}(2\nu2K)$: ≥1.1×10^{19} y (2011Be39, also 2010Be41, 2009Be27, 2008Be02); $T_{1/2}(\varepsilon\beta^+)$: ≥1.1×10^{18} y (2009Da16), ≥1.3×10^{20} y (2007Ki13); $T_{1/2}(2\varepsilon)$: ≥3.3×10^{17} y

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{64}Zn Levels (continued)

(2009Da16); $T_{1/2}(2\beta^+)$: >10×10^{17} y (1952Fr23); $T_{1/2}(0\nu2\varepsilon)$: ≥3.2×10^{20} y (2011Be39), ≥1.19×10^{17} y (2007Bl15), ≥9.52×10^{16} y (2006Zu02,2006Wi12), ≥1.0×10^{18} y (2005Da47); $T_{1/2}(0\nu\varepsilon\beta^+)$: >1.2×10^{22} y (2020Az05), ≥8.5×10^{20} y (2011Be39), ≥5.07×10^{18} y (2006Zu02,2006Wi12), ≥3.6×10^{18} y (2005Da47), >2.8×10^{16} y (2003Ki08), 1.1×10^{19} y *9* (1995Bi24, from observed 511 keV peak, but systematic effects were not estimated); $T_{1/2}(2\nu\varepsilon\varepsilon)$: >6.0×10^{16} y (2003Ki08, also 2005Zu01,2001Zu03); $T_{1/2}(2\nu\varepsilon\beta^+)$: ≥9.4×10^{20} y (2011Be39), ≥8.9×10^{18} y (2005Da47); $T_{1/2}(0\nu+2\nu,\beta^+\varepsilon)$>2.3×10^{18} y (1985No03); $T_{1/2}(0\nu+2\nu,2\varepsilon)$>8×10^{15} y (1953Be33). Others $T_{1/2}$: 1999TsZZ, 2002Tr04 (evaluation).

[&] Band(A): g.s. band.

[a] Band(B): Band based on 2^+.

[b] Band(C): Band based on 3^-.

[c] Band(D): Collective (strongly coupled) band,α=1. Configuration=$\pi[(f^{-1}_{7/2})(p_{3/2}f^2_{5/2}(g^1_{9/2}] \otimes \nu[(p_{3/2}f_{5/2})^4(g^2_{9/2})]$; also [11,02] in the notation used by 2004Ka18, implying one proton hole in $f_{7/2}$ and one proton in $g_{9/2}$ orbitals, no neutron hole in $f_{7/2}$ orbital and 2 neutrons in $g_{9/2}$ orbital.

[d] Band(d): Collective (strongly coupled) band based,α=0. See configuration listed above for its signature partner.

[e] Band(E): Strongly coupled band,α=1.

[f] Band(e): Strongly coupled band,α=0.

$\gamma(^{64}Zn)$

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[‡]	δ[‡]	α[@]	$I_{(\gamma+ce)}$	Comments
991.54	2^+	991.53 *5*	100	0.0	0^+	E2				B(E2)(W.u.)=20.0 *5* E_γ: NRM weighted average of 10 values from different datasets where uncertainties are given. This procedure increases the uncertainty in one of the discrepant values (991.16 *4* in (^{28}Si,4pγ) E=115 MeV) from 0.04 keV to 0.15 keV. Regular weighted average is 991.37 *7*, but with reduced χ^2=6.9, while unweighted average is 991.41 *8*. Removal of the 991.16 *4* value gives weighted average of 991.56 *5*.
1799.41	2^+	807.85 *6*	100.0 *16*	991.54	2^+	E2+M1	−3.9 *7*			B(M1)(W.u.)=0.00099 *+47−27*; B(E2)(W.u.)=39 *4* E_γ: NRM weighted average of ten values. δ: from weighted average of −4.6 *10* in (n,n′γ) (1985Ko42); −3.3 *7* in (α,nγ),(^{11}B,2npγ) (1978Si02); −5.5 *40* in ^{51}V(^{16}O,p2nγ),^{59}Co(^{7}Li,2nγ) (1977We10); and −4.5 *15* (1964Se02) in (p,p′γ). Others: −1.3 *3* (1978We15), −0.08 *3* (1977We10), −0.45 *5* (1977Al14) in ^{51}V(^{16}O,p2nγ), ^{59}Co(^{7}Li,2nγ); −0.57 *+13−27* (1976Br12) in (α,nγ),(HI,xnγ). Evaluators prefer high value of δ(E2/M1) (dominant E2) for transition from the second 2^+ to first 2^+ from a trend in other even-even nuclei.
		1799.34 *11*	29.6 *7*	0.0	0^+	E2				B(E2)(W.u.)=0.225 *+25−22* E_γ: weighted average of ten values. I_γ: NRM weighted average of ten values. Weighted average is 30.3 *16*, but with reduced χ^2=15.
1910.26	0^+	110.7 *1*	3.4 *11*	1799.41	2^+	[E2]		0.447		B(E2)(W.u.)=76 *24* E_γ,I_γ: from ^{64}Ga ε decay.
		918.77 *5*	100.0 *34*	991.54	2^+	E2				B(E2)(W.u.)=0.057 *3* E_γ: weighted average of five values. I_γ: from ^{64}Ga ε decay. Mult.: from ce data in (p,p′γ).
		1910		0.0	0^+	E0			0.64 *13*	Mult.: transition seen only in ce data from (p,p′γ). $I_{(\gamma+ce)}$: I(ce+pair). q_K^2(E0/E2)=6.0 *5*, X(E0/E2)=2.25 *19*, ρ^2(E0)=0.0038 *4* (1985Pa07,1986Pa23,2005Ki02).
2306.72	4^+	1315.15 *5*	100	991.54	2^+	E2				B(E2)(W.u.)=12.2 *+5−4* E_γ: weighted average of seven values.
2609.52	0^+	809[a]	<0.5	1799.41	2^+	[E2]				B(E2)(W.u.)<4.5 E_γ,I_γ: from (α,nγ),(^{11}B,2npγ). Iγ<2.0 in (p,p′γ) (1985Pa07).
		1617.93 *19*	100	991.54	2^+	E2				B(E2)(W.u.)=17 *+11−5* E_γ: NRM weighted average of five values. Mult.: from ce data in (p,p′γ).
		2610		0.0	0^+	E0			0.0030 *6*	Mult.: transition seen only in ce data from (p,p′γ).

From ENSDF

$^{64}_{30}Zn_{34}$-15

Adopted Levels, Gammas (continued)

$\gamma(^{64}Zn)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[‡]	δ[‡]	α[@]	Comments
									$I_{(\gamma+ce)}$: I(pair+ce). q^2_K(E0/E2)=0.027 *6*, X(E0/E2)=0.031 *7*, ρ^2(E0)=0.015 *7* (1985Pa07,1986Pa23,2005Ki02).
2736.57	4^+	429.77 *13*	9.3 *6*	2306.72	4^+	M1+E2	−0.25 *9*		B(M1)(W.u.)=0.014 *+4−3*; B(E2)(W.u.)=8 *+7−5* E_γ: NRM weighted average of eight values. I_γ: weighted average of eight values. δ: Other: +1.7 *5* or −0.2 *3* (1977We10) in ^{51}V(^{16}O,p2nγ).
		937.17 *6*	100.0 *19*	1799.41	2^+	E2			B(E2)(W.u.)=30 *+8−5* E_γ: weighted average of nine values.
		1745.4 *5*	4.8 *8*	991.54	2^+	(E2)			B(E2)(W.u.)=0.064 *+20−15* E_γ: weighted average of three values with consistent Iγ values. I_γ: NRM weighted average of three values. Others: 23 *6* (n,n′γ); 33 (p,p′γ); 42 *4* in (p,γ) E=2050 keV; 154 *13* in (p,γ) E=2098 keV are too high and in severe disagreement.
2793.5	2^+	1802.1 *4*	100	991.54	2^+	M1+E2	+0.7 *5*		B(M1)(W.u.)=0.052 *+26−23*; B(E2)(W.u.)=13 *+13−10*
		2793.0[a] *15*		0.0	0^+				γ reported in (p,p′γ) only.
2979.94	3^+	1180.58 *15*	100 *4*	1799.41	2^+	M1+E2	−0.05 *3*		B(M1)(W.u.)=0.028 *+17−14*; B(E2)(W.u.)=0.08 *+16−7* E_γ: weighted average of three values.
		1987.0 *7*	61 *14*	991.54	2^+	M1+E2	+0.26 *3*		B(M1)(W.u.)=0.0033 *+20−17*; B(E2)(W.u.)=0.10 *+6−5* E_γ,I_γ: unweighted average of three values.
2998.54	3^-	1197 *1*	≈4	1799.41	2^+	[E1]			B(E1)(W.u.)≈0.000062 E_γ,I_γ: from (n,n′γ).
		2007.03 *18*	100 *3*	991.54	2^+	(E1)			B(E1)(W.u.)=3.29×10^{-4} *11* E_γ: NRM weighted average of eight values.
		2997	0.5 *3*	0.0	0^+	[E3]			B(E3)(W.u.)=72 *+44−35* γ from ^{61}Ni(α,nγ),^{56}Fe(^{11}B,2npγ) only. B(E3)(W.u.) from B(E3)=0.040 *7* ((e,e′),1976Ne06). Other: 70 *50* from $T_{1/2}$ and E3 γ branching.
3005.73	2^+	1092[a] *1*	7.5	1910.26	0^+	[E2]			B(E2)(W.u.)≈12.6 γ reported in (p,p′γ) only. Considered as uncertain by evaluators.
		1206.2 *2*	77 *5*	1799.41	2^+	M1+E2	+0.6 *5*		B(M1)(W.u.)=0.050 *+15−21*; B(E2)(W.u.)=21 *+24−16* E_γ,I_γ: weighted average of three values.
		2014.3 *2*	100 *7*	991.54	2^+	M1(+E2)	−0.06 *10*		B(M1)(W.u.)=0.019 *+5−4*; B(E2)(W.u.)<0.25 E_γ: weighted average of three values.
		3005.5 *4*	65 *7*	0.0	0^+	E2			B(E2)(W.u.)=0.69 *+13−11* E_γ: weighted average of three values. I_γ: weighted average of two values.
3071.4	(1,2$^+$)	1272 *1*	100	1799.41	2^+				
		3071 *1*	39	0.0	0^+				
3077.77	4^+	341.2 *3*	11 *1*	2736.57	4^+	M1(+E2)	<0.5	0.0036 *9*	B(M1)(W.u.)=0.055 *+24−20*; B(E2)(W.u.)<230 E_γ: weighted average of three values.

$^{64}_{30}Zn_{34}$-16

Adopted Levels, Gammas (continued)

$\gamma(^{64}Zn)$ (continued)

E_i(level)	J^π_i	E_γ †	I_γ †	E_f	J^π_f	Mult. ‡	δ ‡	Comments
								I_γ: from ^{54}Fe,2pγ). Others: 120 *13* (α,nγ),(^{11}B,2npγ); 38 *10* (α,nγ),(HI,xnγ); 24 *6* (p,γ) E=2050 keV. δ: from RUL(E2)<300. In (α,nγ),(^{11}B,2npγ) reaction, 1980Si02 quote δ=−1.2 *2* but in a footnote also state that δ for this transition is not determined from experiment.
3077.77	4$^+$	770.95 *15*	100 *10*	2306.72	4$^+$	M1+E2	−0.19 *8*	B(M1)(W.u.)=0.045 *6*; B(E2)(W.u.)=4.6 *+45−30* E_γ: weighted average of seven values. δ: others: −0.4 *1* (1978Ne02) in (α,nγ),(HI,xnγ), −0.54 *12* (1978We15) in ^{51}V(^{16}O,p2nγ).
		2086.8 *3*	78 *9*	991.54	2$^+$	E2		B(E2)(W.u.)=0.71 *+11−9* E_γ: weighted average of seven values. Level-energy difference=2086.2. I_γ: weighted average of four values. Others: 190 *8* in (^{28}Si,4pγ) E=122 MeV; 113 *9* in (α,nγ),(^{11}B,2npγ); 141 *9* (p,γ) E=2025 keV are in disagreement.
3094.64	(3)$^+$	1295.1 *2*	19 *9*	1799.41	2$^+$	[M1+E2]		B(M1)(W.u.)=0.018 *+8−7*; B(E2)(W.u.)=18 *8* E_γ: weighted average of two values. I_γ: unweighted average of three values. B(M1)(W.u.) for pure M1; B(E2)(W.u.) for pure E2.
		2103.1 *1*	100 *7*	991.54	2$^+$	M1+E2		B(M1)(W.u.)=0.022 *+4−3*; B(E2)(W.u.)=8.4 *+14−11* E_γ: weighted average of two values. δ: +9.4 *15* or +0.40 *5* (for J=3); +0.6 *4* (for J=2). B(M1)(W.u.) for pure M1; B(E2)(W.u.) for pure E2.
3186.84	1$^+$	577.3 *1*	0.76 *15*	2609.52	0$^+$	[M1]		B(M1)(W.u.)=0.0090 *+35−24* E_γ,I_γ: from ^{64}Ga ε only.
		1276.52 *16*	47.6 *11*	1910.26	0$^+$	(M1)		B(M1)(W.u.)=0.052 *+16−10* E_γ: weighted average of five values. I_γ: from ^{64}Ga ε decay. Other three available values are either imprecise or in disagreement.
		1387.34 *10*	100.0 *26*	1799.41	2$^+$	[M1+E2]		B(M1)(W.u.)=0.085 *+26−16*; B(E2)(W.u.)=75 *+24−15* E_γ: weighted average of four values. I_γ: in (α,nγ),(^{11}B,2npγ) value is low by a factor of ≈9. B(M1)(W.u.) for pure M1; B(E2)(W.u.) for pure E2.
		2195.34 *10*	80.4 *18*	991.54	2$^+$	[M1+E2]		B(M1)(W.u.)=0.017 *+5−3*; B(E2)(W.u.)=6.1 *+19−12* E_γ: weighted average of five values. I_γ: from ^{64}Ga ε decay. Other three available values are either imprecise or in disagreement. B(M1)(W.u.) for pure M1; B(E2)(W.u.) for pure E2.
		3186.8 *2*	1.5 *3*	0.0	0$^+$	[M1]		B(M1)(W.u.)=1.1×10^{-4} *+4−3* E_γ,I_γ: from ^{64}Ga ε decay. Other Iγ: 41 *8* (p,γ) 2098 keV; 18 in (p,′γ) are in disagreement.
3196.9	(2,3)	1397.4 *4*	52 *5*	1799.41	2$^+$			
		2205.3 *8*	100 *5*	991.54	2$^+$			
		3200[a] *3*	18	0.0	0$^+$			γ reported in (p,p′γ) only.

$^{64}_{30}Zn_{34}$-17

$\gamma(^{64}Zn)$ (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.‡	δ‡	Comments
3205.98	(3)$^+$	898.8 *5*	13 *2*	2306.72	4$^+$	[M1+E2]		B(M1)(W.u.)=0.017 *+7−4*; B(E2)(W.u.)=36 *+15−8* B(M1)(W.u.) for pure M1; B(E2)(W.u.) for pure E2.
		1295.1[a] *7*	10 *5*	1910.26	0$^+$			γ not reported in (α,nγ),(^{11}B,2npγ). It is considered (by evaluators) as highly questionable since it involves M3 transition, with unrealistically large B(M3)(W.u.)=1.9×10^7 *+7−4*.
		1406.57 *8*	100.0 *10*	1799.41	2$^+$	M1+E2	−0.25 *9*	B(M1)(W.u.)=0.033 *+13−8*; B(E2)(W.u.)=1.8 *+16−10*
		2214.0 *5*	3.1 *10*	991.54	2$^+$	[M1+E2]		B(M1)(W.u.)=0.00028 *+11−6*; B(E2)(W.u.)=0.096 *+36−21* γ reported in (α,nγ),(^{11}B,2npγ) only. B(M1)(W.u.) for pure M1; B(E2)(W.u.) for pure E2.
		3205[a] *3*		0.0	0$^+$			γ reported in (p,γ) E=2098 keV only, highly questionable as required mult=[M3].
3261.94	1	1352[a] *1*	<6	1910.26	0$^+$			I_γ: from ^{64}Ga ε decay.
		1461.3[a] *1*	<4.5	1799.41	2$^+$			E_γ,I_γ: from ^{64}Ga ε decay. This γ was reported in (p,γ) E=2050 keV; and in (p,p′γ), with Iγ=24 in the latter work. It fits poorly in the decay scheme.
		2270.40 *10*	100 *5*	991.54	2$^+$			E_γ: weighted average of four values.
		3261.7 *2*	6.2 *4*	0.0	0$^+$			E_γ,I_γ: from ^{64}Ga ε decay. Other Iγ=90 *10* (p,γ) 2098 keV; ≈67 (n,n′γ) are in disagreement.
3297.17	(2)$^+$	1498 *1*	29 *11*	1799.41	2$^+$	[M1+E2]		B(M1)(W.u.)=0.0041 *+17−15*; B(E2)(W.u.)=3.1 *+14−12* γ reported only in (p,γ) E=2098 keV. B(M1)(W.u.) for pure M1; B(E2)(W.u.) for pure E2.
		2305.54 *14*	100 *14*	991.54	2$^+$	[M1+E2]		B(M1)(W.u.)=0.0039 *+11−8*; B(E2)(W.u.)=1.24 *+35−25* B(M1)(W.u.) for pure M1; B(E2)(W.u.) for pure E2.
		3299 *1*	42 *19*	0.0	0$^+$	[E2]		B(E2)(W.u.)=0.087 *+37−34* γ reported only in (p,γ) E=2098 keV.
3306.85	(4$^+$)	512[a]	0.5 *5*	2793.5	2$^+$	[E2]		B(E2)(W.u.)<59 γ from (α,nγ),(^{11}B,2npγ) only.
		1000.15 *15*	100	2306.72	4$^+$	M1(+E2)	+0.07 *20*	B(M1)(W.u.)=0.084 *+39−24*; B(E2)(W.u.)<14 E_γ: from (p,γ) E=2050 keV. In several in-beam studies (1998Ga11,1994Cr05, 1978Ne02), a 1000γ deexcited a level at 4078, but in (α,nγ),(^{11}B,2npγ), 1980Si02 reported the placement from 4078 level as incorrect and placed it from 3307 level, as also proposed in (p,γ). In (^{28}Si,4pγ) study of 2004Ka18, a 999.9γ is placed from both the 3307 and 4078 levels. δ: from 1980Si02. Other: −0.1 *2* (1978Ne02).
3321.8?	(1)	1411.3 *15*	100 *29*	1910.26	0$^+$			
		3322 *2*	58 *16*	0.0	0$^+$			
3365.99	1$^+$	756.58 *10*	9.0 *5*	2609.52	0$^+$	[M1]		B(M1)(W.u.)=0.11 *+6−3* γ reported in ^{64}Ga ε decay only. Eγ and Iγ data for four higher energy γ rays from the 3366 level have been taken from ^{64}Ga ε decay. These are reported in other datasets, but with imprecise energies and intensities, as compared to the data in ε decay.
		1455.84 *12*	13.9 *7*	1910.26	0$^+$	[M1]		B(M1)(W.u.)=0.023 *+12−6* E_γ,I_γ: from ^{64}Ga ε decay. This γ reported in (p,γ) E=2050 keV; and (p,p′γ) but with imprecise energies and intensities.

$^{64}_{30}Zn_{34}$-18

$\gamma(^{64}Zn)$ (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.‡	δ‡	Comments
3365.99	1^+	1566.50 *18*	15.7 *9*	1799.41	2^+	[M1+E2]		B(M1)(W.u.)=0.021 +*11*−*6*; B(E2)(W.u.)=14 +*8*−*4* E_γ,I_γ: from ^{64}Ga ε decay. This γ reported in (p,γ) E=2050 keV; (p,p′γ); and (α,nγ),(HI,xnγ), but with imprecise energies and intensities. B(M1)(W.u.) for pure M1; B(E2)(W.u.) for pure E2.
		2374.30 *10*	50.5 *13*	991.54	2^+	[M1+E2]		B(M1)(W.u.)=0.019 +*10*−*5*; B(E2)(W.u.)=5.7 +*30*−*15* E_γ,I_γ: from ^{64}Ga ε decay. This γ reported in (p,γ) E=2050 keV; (p,γ) E=2098 keV; (p,p′γ); (α,nγ),(^{11}B,2npγ) and (α,nγ),(HI,xnγ), but with imprecise energies and intensities. B(M1)(W.u.) for pure M1; B(E2)(W.u.) for pure E2.
		3365.80 *10*	100 *3*	0.0	0^+	[M1]		B(M1)(W.u.)=0.013 +*7*−*4* E_γ,I_γ: from ^{64}Ga ε decay. This γ reported in (p,γ) E=2050 keV; (p,γ) E=2098 keV; (p,p′γ); (α,nγ),(^{11}B,2npγ) and (α,nγ),(HI,xnγ), but with imprecise energies and intensities.
3369.86	3^+	633.40 *15*	25 *6*	2736.57	4^+	[M1+E2]		B(M1)(W.u.)=0.034 +*16*−*12*; B(E2)(W.u.)=1.4×10^2 +*7*−*5* γ reported in (p,γ) E=2.05 MeV only. B(M1)(W.u.) for pure M1; B(E2)(W.u.) for pure E2.
		1570.3 *2*	100 *5*	1799.41	2^+	M1+E2	−0.40 *6*	B(M1)(W.u.)=0.0077 +*31*−*22*; B(E2)(W.u.)=0.84 +*42*−*31*
		2377.8 *6*	57 *5*	991.54	2^+	[M1+E2]		B(M1)(W.u.)=0.0015 +*6*−*4*; B(E2)(W.u.)=0.44 +*18*−*13* I_γ: weighted average of values from (α,nγ),(^{11}B,2npγ); (p,γ) E=2050 keV; and (n,n′γ). B(M1)(W.u.) for pure M1; B(E2)(W.u.) for pure E2.
3425.13	1^+	419.5[a] *4*	0.5 *5*	3005.73	2^+	[M1+E2]		B(M1)(W.u.)<0.092; B(E2)(W.u.)<890 γ reported in (α,nγ),(^{11}B,2npγ) only. B(M1)(W.u.) for pure M1; B(E2)(W.u.) for pure E2.
		1514.7 *2*	4.8 *8*	1910.26	0^+	[M1]		B(M1)(W.u.)=0.0068 +*23*−*16* E_γ,I_γ: from ^{64}Ga ε decay. γ reported in (p,p′γ).
		1625.87 *20*	24.9 *17*	1799.41	2^+	[M1+E2]		B(M1)(W.u.)=0.029 +*9*−*6*; B(E2)(W.u.)=18 +*6*−*4* E_γ,I_γ: from ^{64}Ga ε decay. Other: Iγ: 71 *5* in (p,γ) E=2.05 MeV. Tentative γ also reported in (n,n′γ). B(M1)(W.u.) for pure M1; B(E2)(W.u.) for pure E2.
		2433.6 *2*	13.2 *12*	991.54	2^+	[M1+E2]		B(M1)(W.u.)=0.0045 +*14*−*9*; B(E2)(W.u.)=1.3 +*4*−*3* E_γ,I_γ: from ^{64}Ga ε decay. γ reported in (p,γ) E=2098 keV. B(M1)(W.u.) for pure M1; B(E2)(W.u.) for pure E2.
		3424.97 *15*	100 *5*	0.0	0^+	[M1]		B(M1)(W.u.)=0.0123 +*37*−*23* E_γ,I_γ: from ^{64}Ga ε decay. γ reported in (p,γ) E=2050 keV; (p,γ) E=2098 keV; (p,p′γ); (α,nγ),(^{11}B,2npγ) and (α,nγ),(HI,xnγ), but with imprecise energies.
3452.0	$(1,2^+)$	1542 *1*	100	1910.26	0^+			
3458.66	(2,3)	1659.2 *2*	100 *7*	1799.41	2^+			
		2467.1 *3*	82 *9*	991.54	2^+			I_γ: from (α,nγ),(^{11}B,2npγ). Other: 144 *11* in (p,γ) E=2.05 MeV.

$^{64}_{30}Zn_{34}$-19

γ(^{64}Zn) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[‡]	δ[‡]	Comments
3458.66	(2,3)	3455[a] *1*		0.0	0$^+$			γ reported only in (p,γ) E=2.098 keV as the strongest transition from a 3458 level. The placement is considered tentative by evaluators.
3538.7?	(2$^+$ to 6$^+$)	1232 *1*	100	2306.72	4$^+$			
3545.9?	(0 to 3$^+$)	284 *1*	52	3261.94	1			
		359 *2*	100	3186.84	1$^+$			
		1747.65[a] *15*		1799.41	2$^+$			γ reported only in (p,γ) E=2.05 MeV.
3552.3	4$^+$	1246.7 *4*	100 *6*	2306.72	4$^+$	M1+E2	−0.16 *10*	B(M1)(W.u.)<0.0057; B(E2)(W.u.)<0.39 γ reported in (^{11}B,2npγ). This γ may correspond to a 1245γ (unplaced) in (p,p′γ) and a 1247.2 *2* (unplaced) in (p,γ) E=2050 keV.
		2559.7 *4*	85 *6*	991.54	2$^+$	[E2]		B(E2)(W.u.)<0.15 This γ may correspond to a 2560γ (unplaced) in (p,p′γ).
		3551[a] *1*	42 *15*	0.0	0$^+$			γ reported in (p,γ) E=2.098 keV. Evaluators treat this γ as highly questionable as ΔJ^π requires mult=E4 and an unrealistic large B(E4)(W.u.)<2.1×10^6.
3586.9		390 *2*	100	3196.9	(2,3)			
3597.24	(2$^+$,3,4$^+$)	860.5 *3*	57 *14*	2736.57	4$^+$			γ reported only in (p,γ) E=2.05 MeV.
		1290.5 *3*	100 *9*	2306.72	4$^+$			
		2606.0 *5*	82 *9*	991.54	2$^+$			
3601.9	(1,2$^+$)	3602 *1*	100	0.0	0$^+$			
3606.5	(0$^+$ to 4$^+$)	2614.9 *5*	100	991.54	2$^+$			
3620.7	(2$^+$ to 6$^+$)	1314.0 *10*	100	2306.72	4$^+$			
3628.4	(4)$^+$	2636.8 *5*	100	991.54	2$^+$	[E2]		B(E2)(W.u.)=1.8 *+8−5*
3698.9		502.0 *5*	100	3196.9	(2,3)			
3701.4	1$^-$	3701.3 *4*	100	0.0	0$^+$	[E1]		B(E1)(W.u.)=3.3×10^{-4} *+6−5*
3710.0	(2$^+$)	1099 *1*	7	2609.52	0$^+$			
		1406 *1*	100	2306.72	4$^+$			E_γ: fits poorly. Eγ=1403 from level-energy difference.
		≈3710		0.0	0$^+$			
3718.4	(0$^+$ to 4$^+$)	2726.8 *3*	100	991.54	2$^+$			
3795.03	1$^+$	1185.4 *1*	4.4 *24*	2609.52	0$^+$			γ reported in ^{64}Ga ε decay only.
		1995.9 *2*	100 *6*	1799.41	2$^+$			E_γ,I_γ: from ^{64}Ga ε decay. γ reported in (p,γ) E=2050 keV.
		2803.3 *3*	39 *4*	991.54	2$^+$			E_γ,I_γ: from ^{64}Ga ε decay. γ reported in (p,γ) E=2098 keV.
		3795.1 *3*	74 *5*	0.0	0$^+$			E_γ,I_γ: from ^{64}Ga ε decay. γ reported in (p,γ) E=2050 keV and (p,γ) E=2098 keV.
3815.4	(0$^+$ to 4$^+$)	2016.0 *5*	100	1799.41	2$^+$			
3819.65	(0$^+$ to 4$^+$)	2020.2 *2*	100	1799.41	2$^+$			
3850.5	(≤3)$^{(+)}$	1116[a]		2736.57	4$^+$			γ reported in (α,nγ),(^{11}B,2npγ).
		2051.0 *4*	22.0 *25*	1799.41	2$^+$			γ reported in (α,nγ),(^{11}B,2npγ).
		2859.2 *6*	100 *4*	991.54	2$^+$			
3853.27	5$^+$	1116.7 *2*	100.0 *5*	2736.57	4$^+$	M1+E2	−1.00 *15*	B(M1)(W.u.)<0.0046; B(E2)(W.u.)<6.1
		1547[a]	0.5 *5*	2306.72	4$^+$	[M1+E2]		B(M1)(W.u.)<3.0×10^{-5}; B(E2)(W.u.)<0.021 γ reported in (α,nγ),(^{11}B,2npγ). B(M1)(W.u.) for pure M1; B(E2)(W.u.) for pure E2.

$^{64}_{30}$Zn$_{34}$-20

$\gamma(^{64}Zn)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[‡]	δ[‡]	Comments
3863.7	(2^+ to 6^+)	1557.0 *10*	100	2306.72	4^+			
3898.5	(2^+,3,4^+)	1162.5 *5*	20 *7*	2736.57	4^+			γ reported in (p,γ) E=2.09 MeV.
		2906.5 *4*	100 *13*	991.54	2^+			
3924.69	5^-	617.9 *5*	8.3 *5*	3306.85	(4^+)	[E1]		B(E1)(W.u.)>6.7×10^{-5}
		848		3077.77	4^+	[E1]		
		926.2 *5*	19 *4*	2998.54	3^-	E2		B(E2)(W.u.)>4.1
		1187.4 *10*	16 *1*	2736.57	4^+	[E1]		B(E1)(W.u.)>1.8×10^{-5}
		1618.4 *5*	100 *1*	2306.72	4^+	E1+M2	+0.12 *4*	B(E1)(W.u.)>4.6×10^{-5}; B(M2)(W.u.)>0.53 Mult.,δ: from 1978We15 in ^{51}V(^{16}O,p2nγ). RUL(M2)=1 for B(M2)(W.u.) suggests $T_{1/2}$(3924.7 level) not lower than ≈0.7 ps.
3932.0	(4,5)	935[a]		2998.54	3^-			
		1625.3 *4*	100	2306.72	4^+			
3951.9	(4^+,3^+)	2960.4 *6*	100	991.54	2^+			
3993.36	6^+	1686.60 *6*	100	2306.72	4^+	E2		B(E2)(W.u.)=23 *+8−5*
4020.4	$(2)^+$	1283.4 *7*	100 *20*	2736.57	4^+			γ reported in (p,γ) E=2.05 MeV.
		3029.0 *5*	100 *20*	991.54	2^+			
4039.7	(0^+ to 4^+)	3048.1 *4*	100	991.54	2^+			
4076.55	$(5)^+$	999.7[a] *6*		3077.77	4^+			I_γ: <39 from 2004Ka18 in (^{28}Si,4pγ). Others: 33 *5* (1994Cr05), 77 *19* (1998Ga11), 127 *21* (1978Ne02) in (α,nγ),(HI,xnγ) where a 999.7 *3* γ was assigned from only the 4077 level. But 1980Si02 in (α,nγ),(^{11}B,2npγ) do not support the placement of this γ from 4077 level, based on the absence of (1000γ)(771γ) coincidences.
		1340.2 *4*	100.0 *16*	2736.57	4^+	M1+E2	−0.49 *11*	B(M1)(W.u.)=0.015 *+8−5*; B(E2)(W.u.)=3.4 *+22−16* E_γ: unweighted average of all available values.
		1771.5[a] *2*		2306.72	4^+			I_γ: 26 *4* (1994Cr05,2004Ka18), 100 *19* (1998Ga11). But this γ was not detected by 1980Si02 in (α,nγ) and (^{11}B,2npγ), the authors gave an upper limit of 0.1 for branching ratio. Placement or existence of 1773.2 *10* γ in 2004Ka18 is considered uncertain. If M1, B(M1)(W.u.)=0.0014 *4*. If E2, B(E2)(W.u.)=0.8 *3*.
4140	$(2,1)^+$	≈4140		0.0	0^+			
4156.53	5^-	851		3306.85	(4^+)			
		1079.2 *4*	43 *11*	3077.77	4^+	(E1)		B(E1)(W.u.)=0.00070 *+30−20* I_γ: unweighted average of two available intensities.
		1159.0[a] *4*	46 *10*	2998.54	3^-	[E2]		B(E2)(W.u.)=39 *+16−11* E_γ: reported in (α,nγ),(^{11}B,2np) (1980Si02) only, considered as uncertain (evaluators).
		1850.4 *8*	100 *10*	2306.72	4^+	[E1]		B(E1)(W.u.)=0.00032 *+13−7* E_γ: unweighted average of available values.
4159.5	1	3168	85	991.54	2^+			E_γ,I_γ: from (γ,γ').
		4159	100	0.0	0^+			If E1, B(E1)(W.u.)=0.00041 *12*. If M1, B(M1)(W.u.)=0.021 *6*. E_γ,I_γ: from (γ,γ').
4181.7		1875.0 *5*		2306.72	4^+			γ reported in (α,nγ),(^{11}B,2npγ).

$^{64}_{30}Zn_{34}$-21

Adopted Levels, Gammas (continued)

γ(^{64}Zn) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[‡]	Comments
4181.7		2381[a] *2*		1799.41	2+		γ reported in (n,n′γ).
4205.2	(4,3)+	3213.6 *4*	100	991.54	2+		
4236.71	6+	1500.1 *3*	100.0 *22*	2736.57	4+	E2	B(E2)(W.u.)=26 +*12*−*6*
		1935.3[a] *7*	45 *3*	2306.72	4+	(E2)	B(E2)(W.u.)=3.3 +*15*−*8* E_γ: γ from (^{28}Si,4pγ) study of 2004Ka18 only. It is treated as uncertain due to poor fit in level scheme (level-energy difference gives 1930.0) and non-observation in other γ-ray studies.
4288.6	(4)+	1552.0 *4*	100	2736.57	4+		
4319.1	(4,3)+	3327 *3*		991.54	2+		E_γ: from (n,n′γ).
4454.68	1+	2544.4 *2*	20 *4*	1910.26	0+	[M1]	B(M1)(W.u.)=0.052 +*16*−*12*
		2655.2 *2*	34 *6*	1799.41	2+	[M1+E2]	B(M1)(W.u.)=0.078 +*22*−*17*; B(E2)(W.u.)=19 +*5*−*4* B(M1)(W.u.) for pure M1; B(E2)(W.u.) for pure E2.
		3462.4 *10*	5.8 *12*	991.54	2+	[M1+E2]	B(M1)(W.u.)=0.0060 +*19*−*15*; B(E2)(W.u.)=0.85 +*27*−*21* B(M1)(W.u.) for pure M1; B(E2)(W.u.) for pure E2.
		4454.3 *10*	100 *6*	0.0	0+	[M1]	B(M1)(W.u.)=0.049 +*12*−*8* B(M1)(W.u.)=0.049 +*12*−*8*
4560		3564[a] *3*		991.54	2+		
4608.75	(1)	3617.1 *2*	100 *18*	991.54	2+		
		4609 *2*	≈32	0.0	0+		
4634.87	7−	398.17 *6*	20.7 *9*	4236.71	6+	E1	B(E1)(W.u.)=1.23×10^{-5} *9*
		641.48 *5*	100.0 *6*	3993.36	6+	E1	B(E1)(W.u.)=1.42×10^{-5} *9*
4664	(1)	4664		0.0	0+		If E1, B(E1)(W.u.)=0.00010 *3*. If M1, B(M1)(W.u.)=0.0053 *13*.
4668.93	(6−)	512.2 *2*	19 *4*	4156.53	5−	D	I_γ: from (^{28}Si,4pγ) E=115 MeV. Other: 102 *15* in (^{54}Fe,2pγ).
		592.4 *1*	67 *11*	4076.55	(5)+	D(+Q)	I_γ: unweighted average of two values.
		744.8 *6*	100 *8*	3924.69	5−	D(+Q)	E_γ: unweighted average of available values.
4713.15	(1)	2103.6 *2*	100 *23*	2609.52	0+		
		2913[a] *2*	6	1799.41	2+		
		4712 *2*	≈11	0.0	0+		
4823.5	(5,6,7)	746.9 *5*		4076.55	(5)+		
4980.87	7−	743.5 *10*	7.0 *9*	4236.71	6+	[E1]	B(E1)(W.u.)=4.3×10^{-5} +*21*−*11*
		824.7 *2*	21.0 *11*	4156.53	5−	E2	B(E2)(W.u.)=12 +*6*−*3* I_γ: other: 100 *10* in (^{54}Fe,2pγ).
		1056.1 *1*	100.0 *17*	3924.69	5−	E2	B(E2)(W.u.)=17 +*8*−*4*
5066.8		2760[a] *2*		2306.72	4+		
5151.71	(7−)	516.8 *1*	57 *7*	4634.87	7−		I_γ: from (^{54}Fe,2pγ).
		1227.3 *2*	100 *14*	3924.69	5−	Q	
5623.75	(8−)	954.8 *1*	100 *3*	4668.93	(6−)	Q	
		990 *1*		4634.87	7−		
5699.38	(8−)	547.8 *2*	7 *2*	5151.71	(7−)	D	I_γ: from (^{54}Fe,2pγ). Other: 46 *2* in (^{28}Si,4pγ) E=122 MeV.
		1030.4 *2*	88 *11*	4668.93	(6−)	Q	I_γ: unweighted average of two values.
		1064.0 *4*	100 *5*	4634.87	7−		
5936.0	(8+)	1698.5 *10*	33 *7*	4236.71	6+		
		1942.8 *10*	100 *6*	3993.36	6+	(Q)	

Adopted Levels, Gammas (continued)

γ(^{64}Zn) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[‡]	Comments
5951.7	(9⁻)	328		5623.75	(8⁻)		
		971.1 *5*	≈12	4980.87	7⁻	Q	
		1313.50[#] *16*	100	4638.2			E_γ: from 1996GaZZ. Other: 1315 (2004Ka18).
6031.5	(8⁺)	1395.6 *10*	22 *3*	4634.87	7⁻		I_γ: from (^{28}Si,4pγ) E=115 MeV. Other: 74 *3* in (^{28}Si,4pγ) E=122 MeV.
		1794.5 *17*	67 *6*	4236.71	6⁺		I_γ: from (^{54}Fe,2pγ). Other: 112 *6* in (^{28}Si,4pγ) E=115 MeV.
		2038.9 *5*	100 *6*	3993.36	6⁺	Q	
6124.0	(8⁺)	502		5623.75	(8⁻)		
		1488.5 *10*	47 *3*	4634.87	7⁻		
		1887.0 *4*	19 *4*	4236.71	6⁺	Q	I_γ: from (^{54}Fe,2pγ). Other: 51 *3* in (^{28}Si,4pγ) E=115 MeV.
		2130.6 *6*	100 *4*	3993.36	6⁺	Q	
6124.7	(9⁻)	1143.8 *4*	100	4980.87	7⁻	Q	Mult.: ΔJ=2 γ from γ(θ) in (α,nγ),(HI,xnγ) (1978Ne02) and DCO ratio (1994Cr05) in (^{54}Fe,2pγ). 2004Ka18, in (p,γ) E=122 MeV, propose ΔJ=1 from γγ(θ)(DCO) and γ(anisotropy) ratio, but their results seem consistent with ΔJ=2 also.
6262.1	(7,8,9⁻)	1627.2 *6*	100	4634.87	7⁻		
6377.0	(7,8,9⁻)	1741		4634.87	7⁻		
6963.0	(9)	838.3 *3*	100 *11*	6124.7	(9⁻)		
		1263.4 *5*	36 *7*	5699.38	(8⁻)	D	Mult.: from DCO ratio.
6998.1	(11⁻)	1046.45[#] *10*	100	5951.7	(9⁻)	E2	B(E2)(W.u.)=31 *+9−6*
7062.4	(10⁻)	1363.0 *4*	100	5699.38	(8⁻)	Q	
7118.9	(10⁺)	993.0[&] *10*	134[&] *6*	6124.0	(8⁺)		I_γ: from (^{28}Si,4pγ) E=115 MeV. Iγ<25 for 997.6γ in (^{54}Fe,2pγ).
		993.0[&] *10*	101[&] *5*	6124.7	(9⁻)		I_γ: from (^{28}Si,4pγ) E=115 MeV. Iγ<25 for 997.6γ in (^{54}Fe,2pγ).
		1088.0 *5*	100 *5*	6031.5	(8⁺)	Q	E_γ: unweighted average of two values.
		1166		5951.7	(9⁻)		
		1181.8 *13*	29 *1*	5936.0	(8⁺)	Q	E_γ: unweighted average of two values. I_γ: from (^{54}Fe,2pγ). Other: 55 *3* in (^{28}Si,4pγ) E=115 MeV.
7212.4	(11⁻)	1260.3 *7*	100	5951.7	(9⁻)	Q	
7334.7	(10⁺)	1210.7 *3*	100	6124.0	(8⁺)	Q	
7556.2	(10⁻)	1605		5951.7	(9⁻)		
7579.1	(11⁻)	1454.3 *2*	100	6124.7	(9⁻)	Q	
7806.0	(10⁺)	1869.9 *7*	100	5936.0	(8⁺)	Q	
7902	(9,10,11⁻)	1776.9		6124.7	(9⁻)		
7946.5	(10⁺)	1915 *2*	100	6031.5	(8⁺)	Q	
8157.1	(10⁺)	2221 *2*	100	5936.0	(8⁺)	(Q)	
8181.1	(10⁻)	2229.8		5951.7	(9⁻)		
8302.8	(12⁻)	1304.9 *5*	100	6998.1	(11⁻)		
8322.1	(11)	1204		7118.9	(10⁺)		
8426.1	(11⁻)	1307.15 *9*	100 *3*	7118.9	(10⁺)		
		1429.1 *10*	16.7 *18*	6998.1	(11⁻)		E_γ: γ not reported in (^{28}Si,4pγ) E=122 MeV.
		2048		6377.0	(7,8,9⁻)		
8580.4	(12⁺)	154.30 *5*	2.5 *3*	8426.1	(11⁻)		
		259		8322.1	(11)		

$^{64}_{30}Zn_{34}$-23

$\gamma(^{64}Zn)$ (continued)

E_i(level)	J^{π}_i	E_{γ} †	I_{γ} †	E_f	J^{π}_f	Mult. ‡	Comments
8580.4	(12$^+$)	1462.5 *10*	100 *4*	7118.9	(10$^+$)	Q	E_{γ}: unweighted average of available values.
		1583.3# *10*	87 *3*	6998.1	(11$^-$)		
8995.4	(12$^+$)	1189.4 *3*	100	7806.0	(10$^+$)	Q	
9363.7	(11$^-$)	1808		7556.2	(10$^-$)		
		3414		5951.7	(9$^-$)		
9440.3	(11$^-$)	2321.9 *9*	100	7118.9	(10$^+$)		
9666	(14)	1086		8580.4	(12$^+$)		
9772	(2$^+$)	5873	7.4 *16*	3898.5	(2$^+$,3,4$^+$)		
		5892	10 *4*	3880	(0$^+$ to 4$^+$)		
		5975	11 *3*	3795.03	1$^+$		
		6172	11 *4*	3601.9	(1,2$^+$)		
		6224	17.4 *23*	3552.3	4$^+$		
		6313	11 *4*	3458.66	(2,3)		
		6344	12.3 *23*	3425.13	1$^+$		
		6407	11 *3*	3365.99	1$^+$		
		6469	16 *4*	3297.17	(2)$^+$		
		6514	8.0 *28*	3261.94	1		
		6569	19.6 *22*	3205.98	(3)$^+$		
		6585	12.4 *13*	3186.84	1$^+$		
		6681	21 *6*	3094.64	(3)$^+$		
		6768	20.7 *14*	3005.73	2$^+$		
		6795	20.9 *26*	2979.94	3$^+$		
		6977	17.1 *14*	2793.5	2$^+$		
		7040	9.7 *26*	2736.57	4$^+$		
		7162	7.9 *29*	2609.52	0$^+$		
		7464	16 *6*	2306.72	4$^+$		
		7861	10.0 *7*	1910.26	0$^+$		
		7972	93 *29*	1799.41	2$^+$		
		8782	100 *9*	991.54	2$^+$		
		9772	36 *7*	0.0	0$^+$		
9803.5	(11$^-$)	1622.5 *8*	100 *62*	8181.1	(10$^-$)		
		2743		7062.4	(10$^-$)		
9948.4	(12$^-$)	508.1 *5*		9440.3	(11$^-$)		
		584.8 *5*	86 *5*	9363.7	(11$^-$)	D	
		2886 *1*	25 *2*	7062.4	(10$^-$)	Q	
		2950 *1*	100 *5*	6998.1	(11$^-$)	D	
10.31×10^3		6110	6.9 *12*	4205.2	(4,3)$^+$		
		6390	3.4 *11*	3924.69	5$^-$		
		6410	8.6 *14*	3898.5	(2$^+$,3,4$^+$)		
		6490	12.2 *16*	3819.65	(0$^+$ to 4$^+$)		
		6510	9.5 *19*	3795.03	1$^+$		
		6680	2.3 *9*	3630?	(0$^+$,6$^-$)		
		6710	11.2 *17*	3597.24	(2$^+$,3,4$^+$)		

$^{64}_{30}Zn_{34}$-24

γ(^{64}Zn) (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.‡	Comments
10.31×10^3		6890	12.4 *19*	3425.13	1$^+$		
		7220	22 *4*	3094.64	(3)$^+$		
		7230	14 *4*	3077.77	4$^+$		
		7330	25 *4*	2979.94	3$^+$		
		7520	25 *3*	2793.5	2$^+$		
		7570	20 *3*	2736.57	4$^+$		
		7700	6.9 *12*	2609.52	0$^+$		
		8000	26 *3*	2306.72	4$^+$		
		8400	11.0 *17*	1910.26	0$^+$		
		8510	60 *7*	1799.41	2$^+$		
		9320	100 *12*	991.54	2$^+$		
		10310	45 *6*	0.0	0$^+$		
10460.2	(13$^-$)	512.0 *5*		9948.4	(12$^-$)		
		656.7 *5*	50.0 *17*	9803.5	(11$^-$)	Q	
		1020.0 *5*	100 *3*	9440.3	(11$^-$)		
		2158.3 *9*	72 *3*	8302.8	(12$^-$)		
		3247 *1*	48.3 *17*	7212.4	(11$^-$)	Q	
		3461 *1*	92 *3*	6998.1	(11$^-$)	Q	
10872	(3$^-$)	6568	26	4304.1	(1$^-$ to 5$^-$)		
		6719	16	4156.53	5$^-$		
		7113	11	3759	(1$^-$ to 5$^-$)		
		7192	16	3680	(1$^-$ to 5$^-$)		
		7458	21	3414	(1$^-$ to 5$^-$)		
		7513	11	3365.99	1$^+$		E_γ: 7506 from level-energy difference.
		7588[a]		3285	(1$^-$ to 5$^-$)		
		7674	26	3196.9	(2,3)		
		7799	32	3077.77	4$^+$		
		7871	74	2998.54	3$^-$		
		7891	26	2979.94	3$^+$		
		8080	47	2793.5	2$^+$		
		8134	42	2736.57	4$^+$		
		8568	26	2306.72	4$^+$		
		9073	47	1799.41	2$^+$		
		9881	100	991.54	2$^+$		
		10872[a]	5.3	0.0	0$^+$		
10906	(3$^-$)	6222	7.7	4684	(1$^-$ to 5$^-$)		
		6541	12	4362.1	(2,1,3)$^+$		
		6601	15	4304.1	(1$^-$ to 5$^-$)		
		6752	19	4156.53	5$^-$		
		7051	12	3853.27	5$^+$		
		7061	12	3850.5	($\leq$3)$^{(+)}$		
		7621	12	3285	(1$^-$ to 5$^-$)		
		7707	15	3196.9	(2,3)		

From ENSDF

$^{64}_{30}Zn_{34}$-25

Adopted Levels, Gammas (continued)

γ(^{64}Zn) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[‡]	Comments
10906	(3⁻)	7832	19	3077.77	4⁺		
		7904	58	2998.54	3⁻		
		7924	12	2979.94	3⁺		
		8113	19	2793.5	2⁺		
		8167	12	2736.57	4⁺		
		8601	15	2306.72	4⁺		
		9106	38	1799.41	2⁺		
		9914	100	991.54	2⁺		
		10906[a]	3.9	0.0	0⁺		
11023.4	(14⁻)	563.3 *3*	100.0 *5*	10460.2	(13⁻)	D	
		1074.7 *5*	24.3 *6*	9948.4	(12⁻)		
		2720 *1*	1.68 *15*	8302.8	(12⁻)		
11120	(2⁺)	6560	≥6.1	4560			
		6650	≥5.3	4470	(0⁺)		
		6700	≥3.4	4420	(4,3)⁺		
		6740	≥2.6	4380			
		6750	≥5.3	4370	3⁻		
		6760	≥2.5	4362.1	(2,1,3)⁺		
		6800	3.4 *2*	4319.1	(4,3)⁺		
		6810	≥1.9	4310			
		6860	≥6.7	4260			
		6910	9.9 *3*	4205.2	(4,3)⁺		
		6960	6 *4*	4156.53	5⁻		
		6980	≥2.3	4140	(2,1)⁺		
		7010	≥1.1	4110	(2)⁺		
		7040	1.5 *3*	4076.55	(5)⁺		
		7080	11.5 *24*	4039.7	(0⁺ to 4⁺)		
		7100	4 *4*	4020.4	(2)⁺		
		7170	1.29 *14*	3951.9	(4⁺,3⁺)		
		7220	10.6 *10*	3898.5	(2⁺,3,4⁺)		
		7268	≥2.5	3853.27	5⁺		
		7270	9 *8*	3850.5	(≤3)$^{(+)}$		
		7300	11.0 *24*	3819.65	(0⁺ to 4⁺)		
		7320	6.2 *24*	3795.03	1⁺		
		7400	≥6.7	3718.4	(0⁺ to 4⁺)		
		7420	9.5 *4*	3710.0	(2⁺)		E_γ: 7410 from level-energy difference.
		7490	3.2 *13*	3628.4	(4)⁺		
		7520	7 *5*	3597.24	(2⁺,3,4⁺)		
		7570	7 *5*	3552.3	4⁺		
		7575	8 *6*	3545.9?	(0 to 3⁺)		
		7660	13 *4*	3458.66	(2,3)		
		7670	≥1.8	3452.0	(1,2⁺)		
		7690	8.6 *24*	3425.13	1⁺		

$^{64}_{30}Zn_{34}$-26

$\gamma(^{64}Zn)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[‡]	Comments
11120	(2$^+$)	7750	29 *11*	3369.86	3$^+$		
		7755	16 *3*	3365.99	1$^+$		
		7820	37 *3*	3297.17	(2)$^+$		
		7860	15.3 *24*	3261.94	1		
		7910	32 *7*	3205.98	(3)$^+$		
		7920	3.5 *3*	3196.9	(2,3)		
		7930	13.4 *19*	3186.84	1$^+$		
		8020	25 *11*	3094.64	(3)$^+$		
		8040	20 *8*	3077.77	4$^+$		
		8110	25 *3*	3005.73	2$^+$		
		8120	35 *16*	2998.54	3$^-$		
		8140	36.4 *24*	2979.94	3$^+$		
		8330	37.0 *6*	2793.5	2$^+$		
		8380	19.6 *15*	2736.57	4$^+$		
		8510	6.5 *13*	2609.52	0$^+$		
		8810	36.8 *15*	2306.72	4$^+$		
		9210	27 *4*	1910.26	0$^+$		
		9320	57 *9*	1799.41	2$^+$		
		10130	100 *4*	991.54	2$^+$		
		11120	48 *3*	0.0	0$^+$		
11464	(15)	1792[a]		9666	(14)		
11626.4	(15$^-$)	603.0 *3*	100.0 *4*	11023.4	(14$^-$)	D	
		1166 *1*	51.0 *4*	10460.2	(13$^-$)	Q	
12335.7	(16$^-$)	709.5 *3*	100 *6*	11626.4	(15$^-$)		
		1312.5 *9*	88 *6*	11023.4	(14$^-$)		
12468	(16)	1003		11464	(15)		
13082.1	(17$^-$)	746.4 *3*	100.0 *5*	12335.7	(16$^-$)	D	
		1455.2 *5*	100 *6*	11626.4	(15$^-$)		
13324	(17)	856		12468	(16)		
		1860		11464	(15)		
13948.1	(18$^-$)	865.8 *5*	45.0 *5*	13082.1	(17$^-$)	D	I_γ: other: 122 *10* in (^{28}Si,4pγ) E=115 MeV.
		1613.3 *6*	100.0 *19*	12335.7	(16$^-$)	Q	
14391	(18)	1067		13324	(17)		
		1924		12468	(16)		
14862.5	(19$^-$)	914.5 *5*	97.1 *10*	13948.1	(18$^-$)	D	
		1779.6 *6*	100.0 *10*	13082.1	(17$^-$)	Q	
15423.6	(19)	561		14862.5	(19$^-$)		
		1032		14391	(18)		
		2099		13324	(17)		
15945.0	(20$^-$)	1082.1 *5*	45.8 *10*	14862.5	(19$^-$)		
		1997.4 *6*	100.0 *13*	13948.1	(18$^-$)	Q	
16686.8	(20)	742		15945.0	(20$^-$)		
		1263		15423.6	(19)		

$^{64}_{30}Zn_{34}$-27

Adopted Levels, Gammas (continued)

$\gamma(^{64}Zn)$ (continued)

E_i(level)	J^{π}_i	E_{γ}[†]	I_{γ}[†]	E_f	J^{π}_f	Mult.[‡]	Comments
16686.8	(20)	2296		14391	(18)		
17087.2	(21⁻)	1142.0 *5*	19 *4*	15945.0	(20⁻)		I_{γ}: other: 68 *16* in (^{28}Si,4pγ) E=115 MeV.
		2225.1 *10*	100.0 *18*	14862.5	(19⁻)	Q	
17853	(21)	769		17087.2	(21⁻)		
		1167		16686.8	(20)		
		2429		15423.6	(19)		
18483.3	(22⁻)	1395.6 *9*	28.4 *14*	17087.2	(21⁻)		
		2538.6 *10*	100.0 *20*	15945.0	(20⁻)	Q	
19365	(22)	2678		16686.8	(20)		
19775.6	(23⁻)	1292		18483.3	(22⁻)		
		2688.5 *10*	100 *5*	17087.2	(21⁻)	Q	
20657	(23)	2804		17853	(21)		
21297.5	(24⁻)	1523		19775.6	(23⁻)		
		2814 *1*	100 *4*	18483.3	(22⁻)		
22892.7	(25⁻)	3117 *1*	100	19775.6	(23⁻)		
24868.6	(26⁻)	3571 *1*		21297.5	(24⁻)		

[†] When a level is populated in two or more datasets, averages of values are taken where uncertainties are given. Additional comments are also provided for certain individual γ rays.

[‡] From $\gamma(\theta)$ and/or γ(lin pol) in (α,nγ),(^{11}B,2npγ). (1980Si02,1978Si02). RUL (for E2 and M2) also used when $T_{1/2}$ known. Mult=Q (most likely E2) from ΔJ=2, quadrupole transition; mult=D or D+Q for ΔJ=1 (or in rare cases ΔJ=0), dipole or dipole+quadrupole transition. For some of the transitions, especially, for high-spin (J≥4) levels, multipolarities are also established in ^{51}V(^{16}O,p2nγ),^{59}Co(^{7}Li,2nγ) from $\gamma(\theta)$, γ(pol) and level lifetimes.

[#] Ordering of 1314-1046-1583 cascade above the 4636, 7⁻ level is from (^{28}Si,4pγ) (2004Ka18 and 1997Fu08). Others: 1046-1314-1583 cascade in 1998Ga11, 1047-1582 cascade in 1994Cr05 with no 1314γ reported, only the 1046γ (placed above 4636, 7⁻ level) reported in (α,nγ),(^{11}B,2npγ) (1980Si02,1978Ne02).

[@] 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.

[&] Multiply placed with intensity suitably divided.

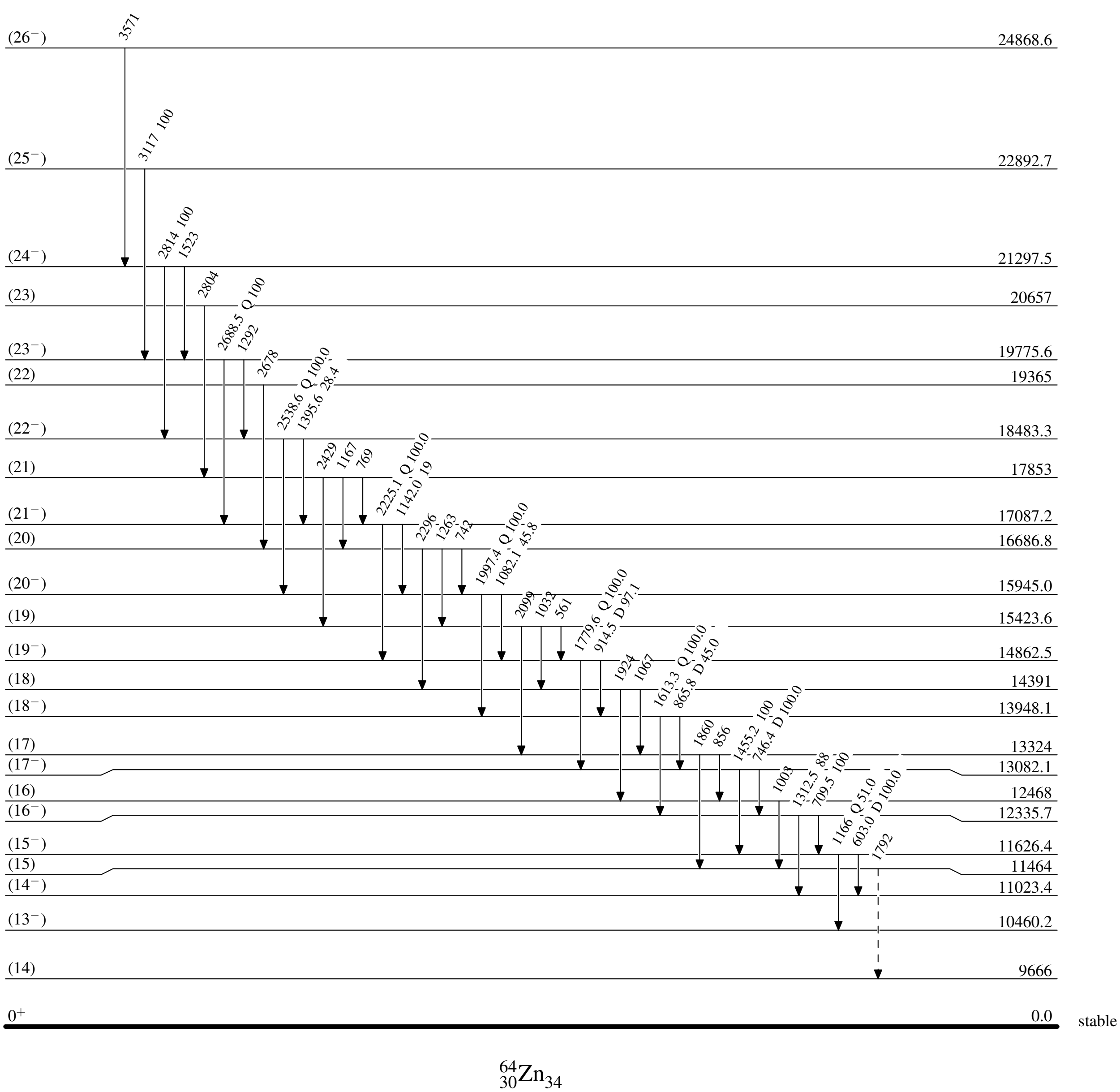
[a] Placement of transition in the level scheme is uncertain.

$^{64}_{30}Zn_{34}$-28

Adopted Levels, Gammas

Level Scheme

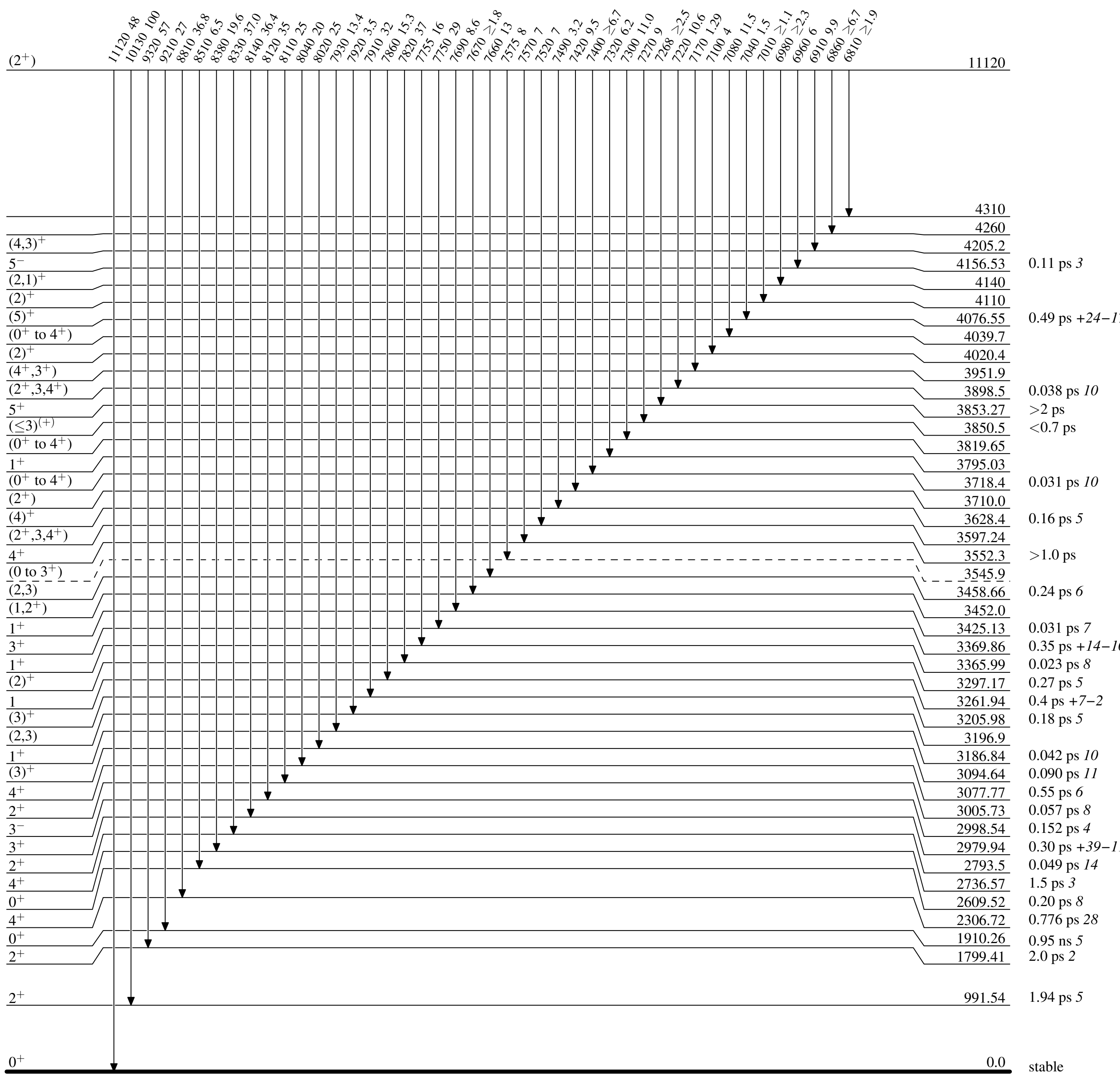
Intensities: Relative photon branching from each level



Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



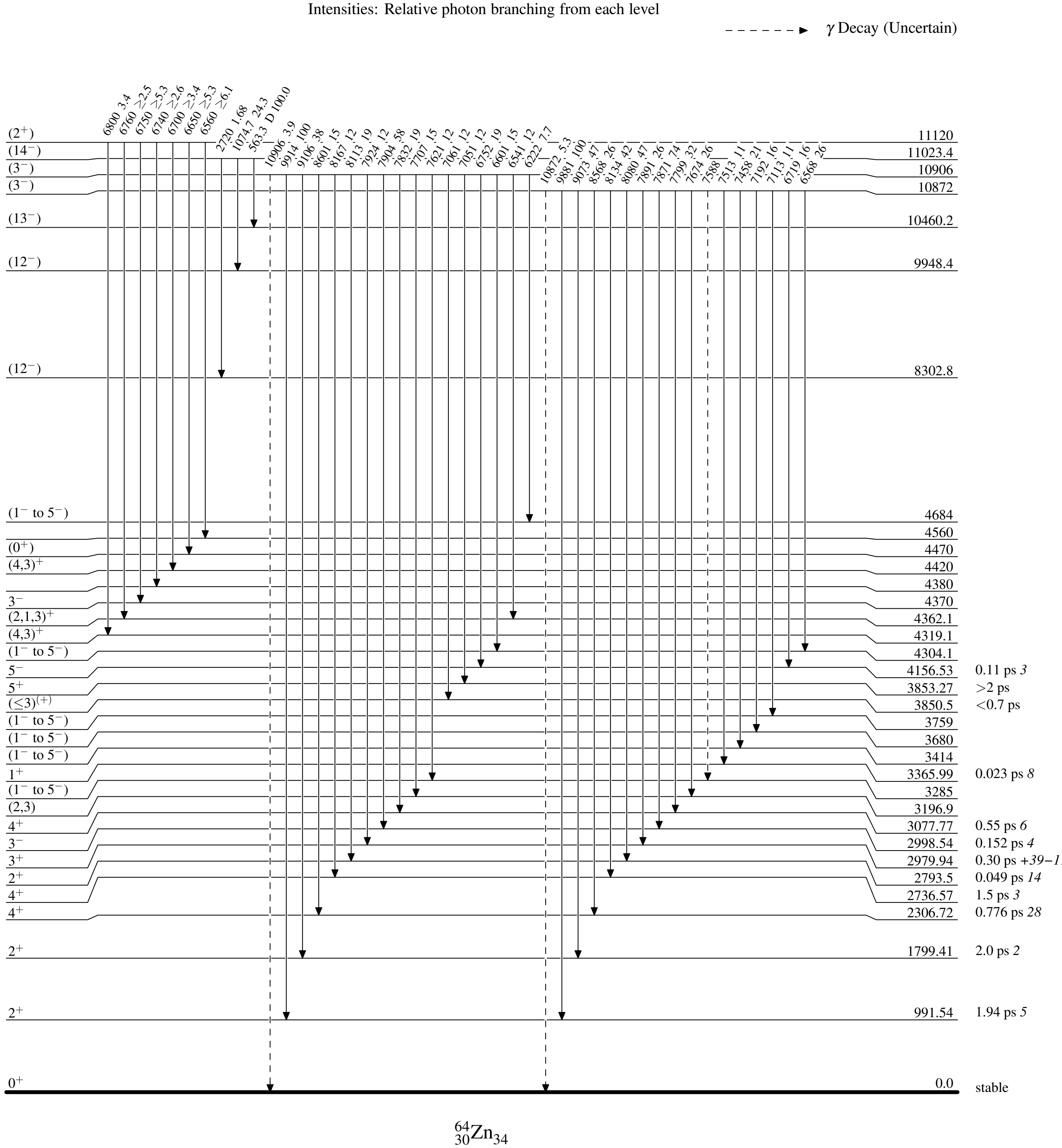
$^{64}_{30}Zn_{34}$

Adopted Levels, Gammas

Legend

Level Scheme (continued)

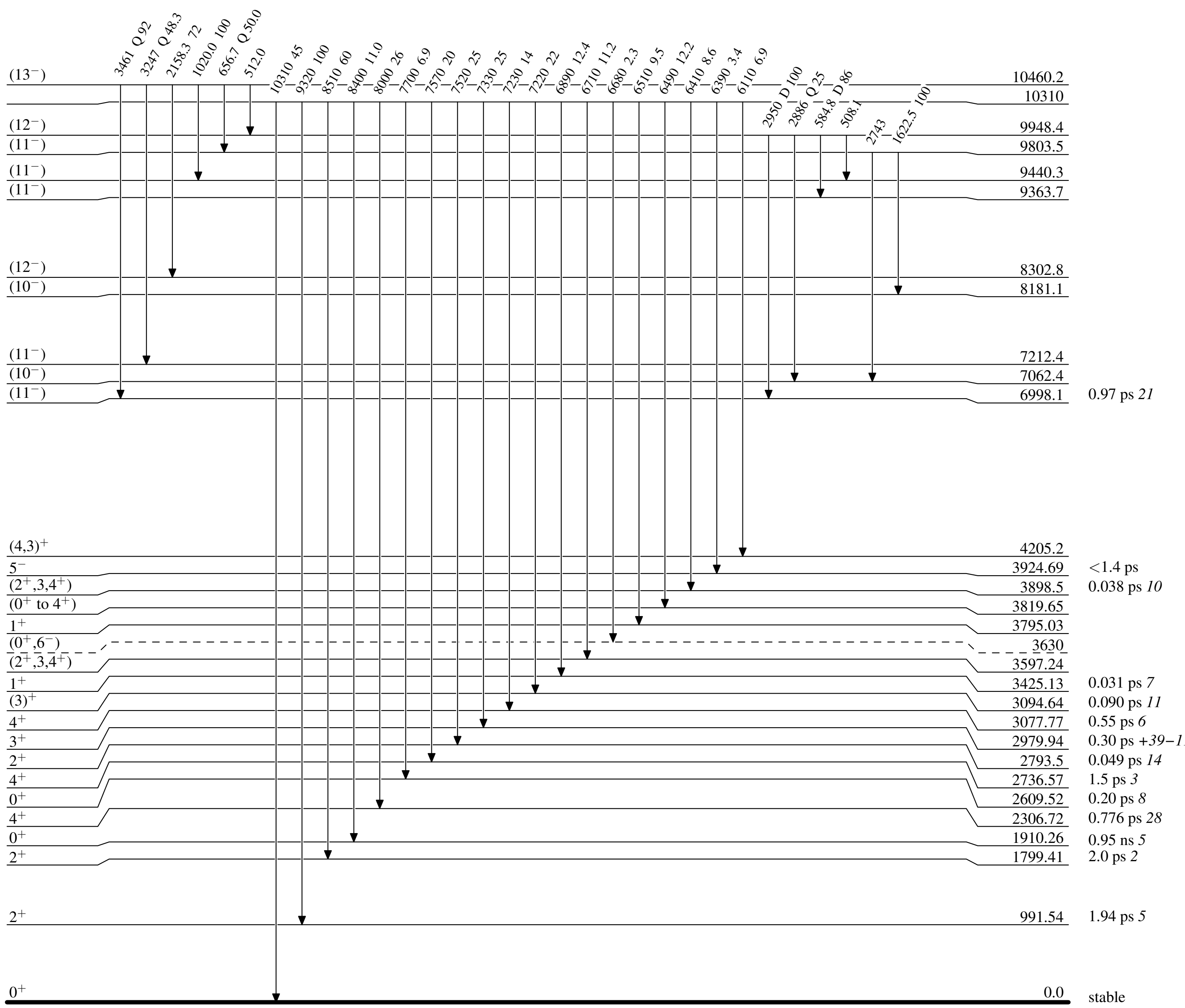
Intensities: Relative photon branching from each level



Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

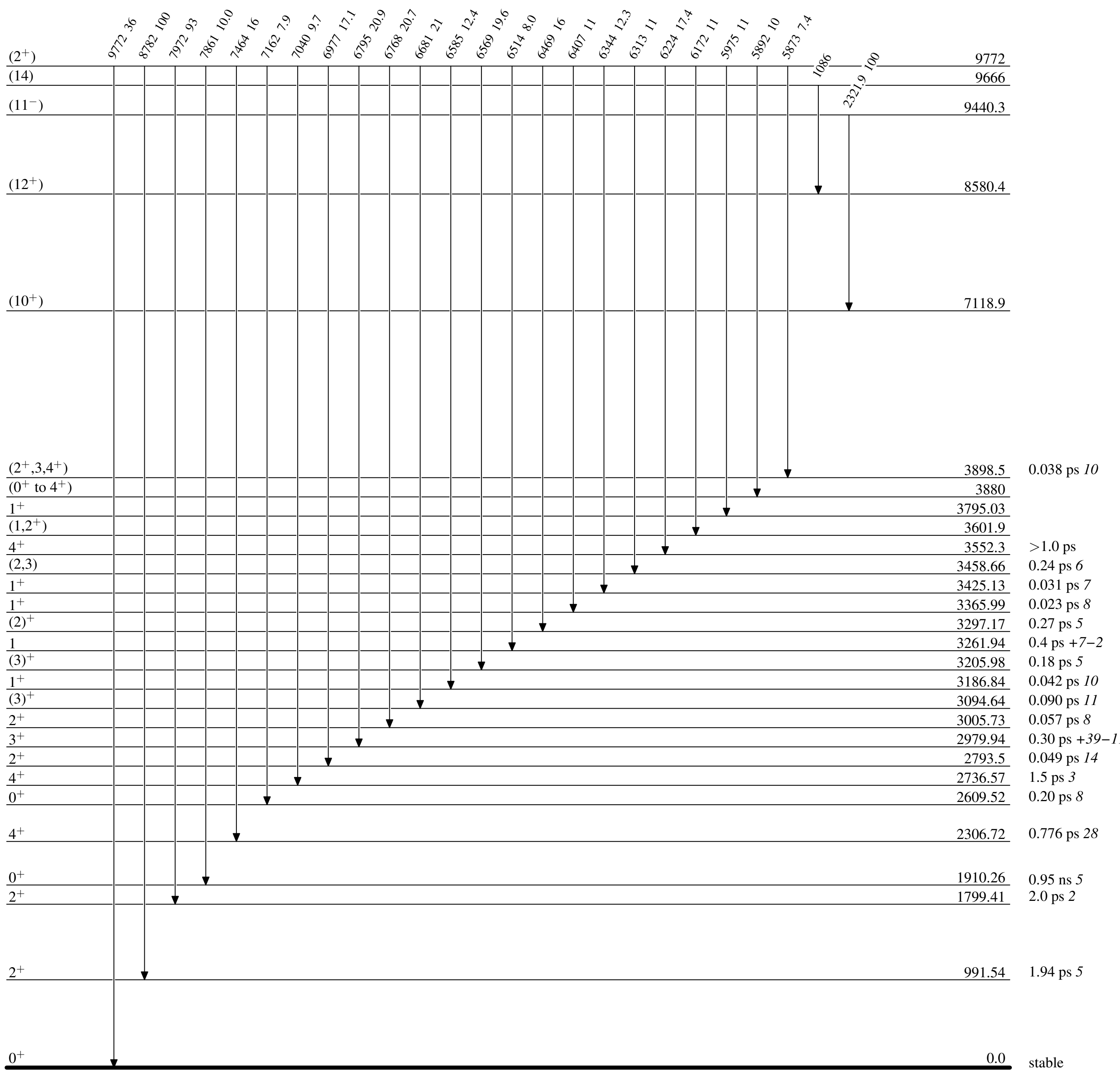


$^{64}_{30}Zn_{34}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

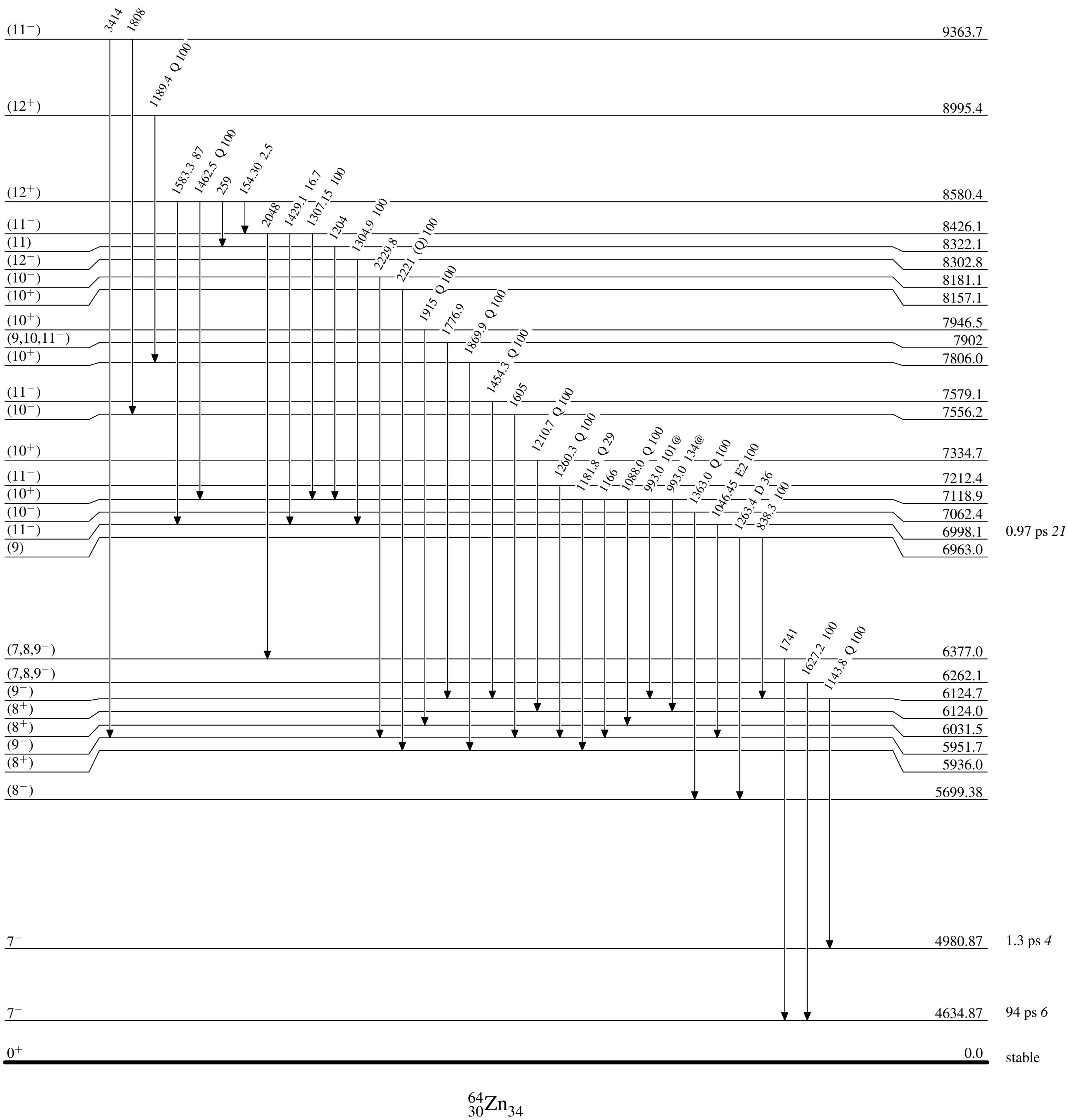


$^{64}_{30}Zn_{34}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
@ Multiply placed: intensity suitably divided



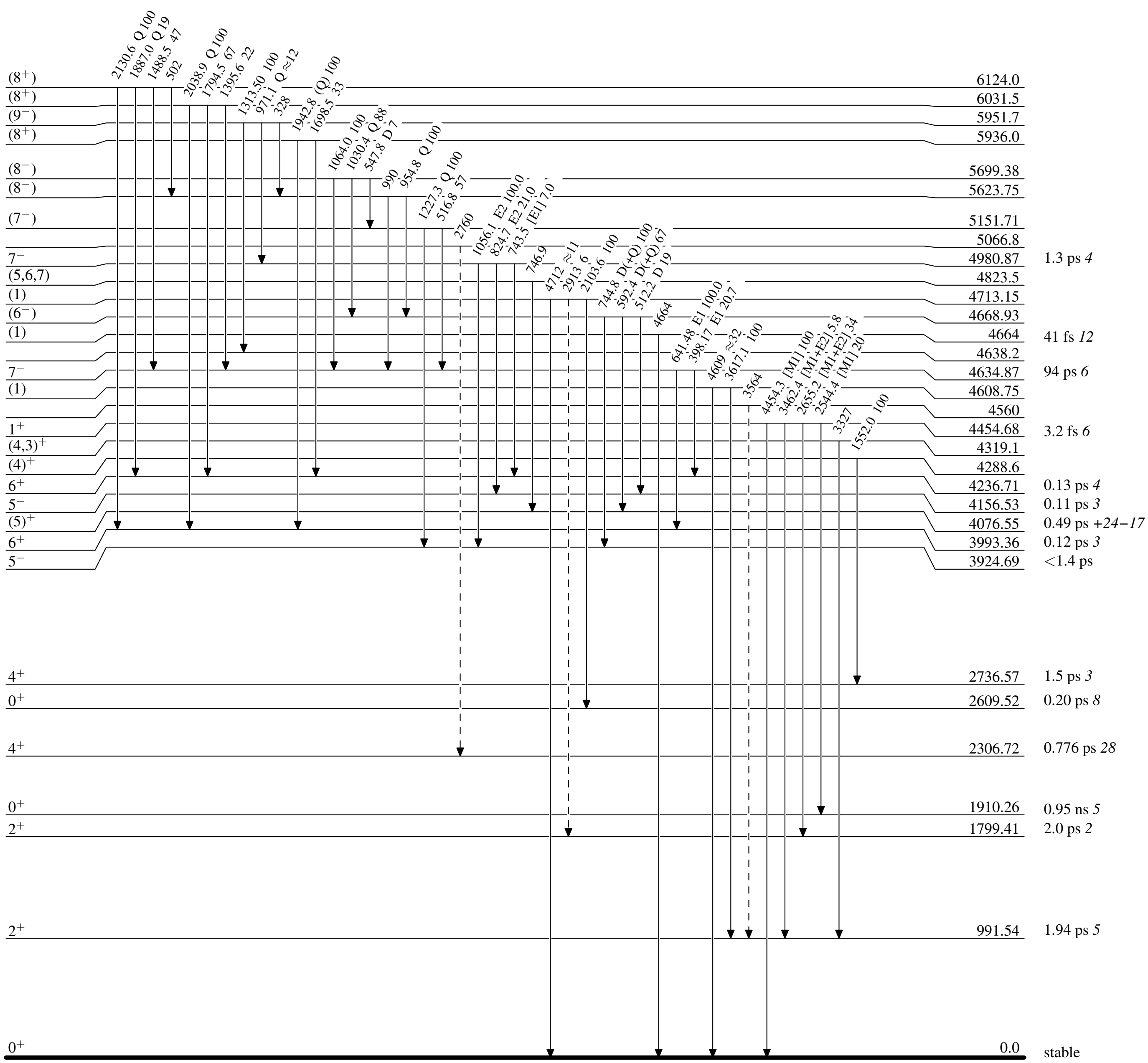
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level
@ Multiply placed: intensity suitably divided

γ Decay (Uncertain)



$^{64}_{30}Zn_{34}$

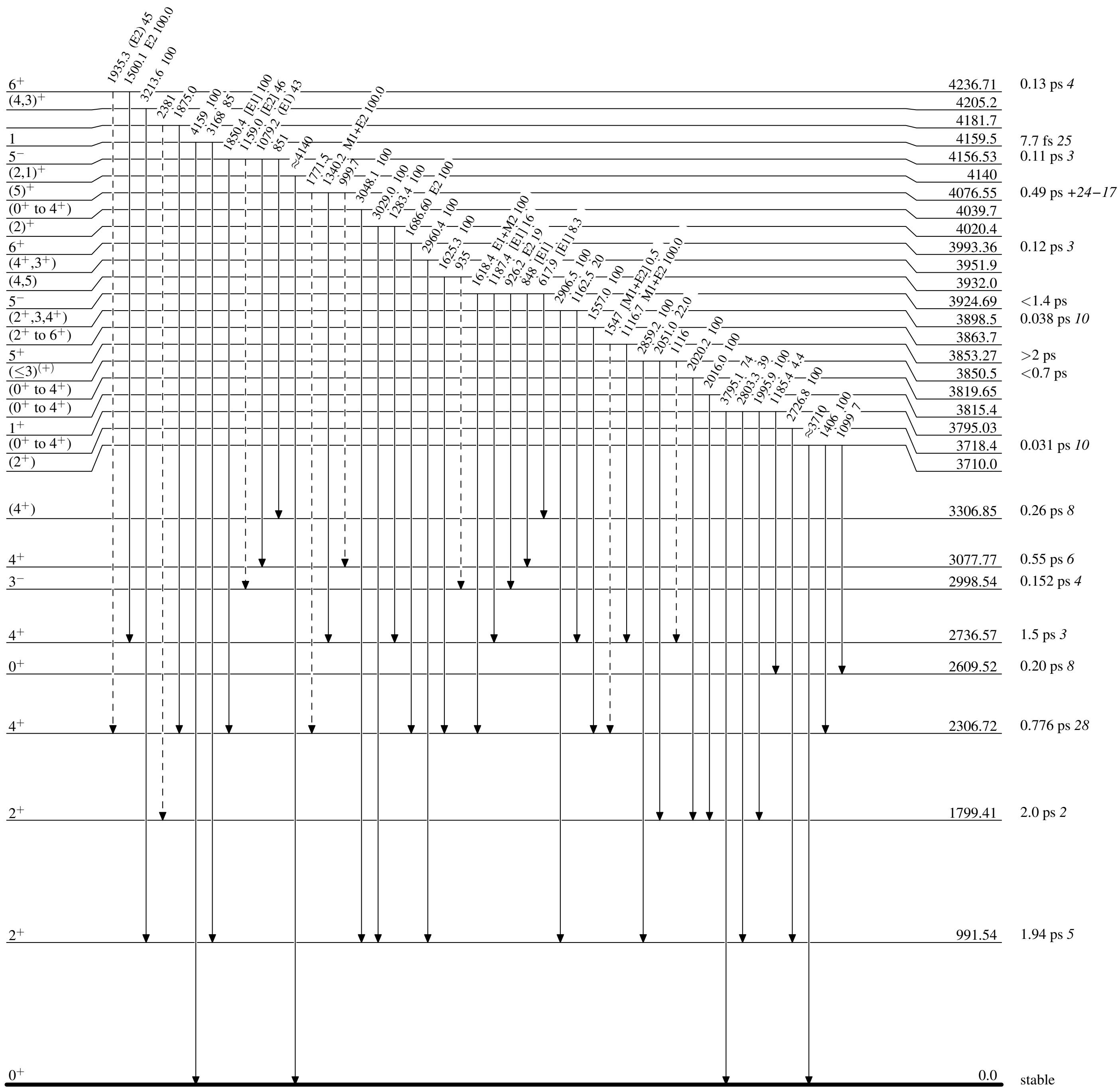
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level
@ Multiply placed: intensity suitably divided

- - - - - ► γ Decay (Uncertain)



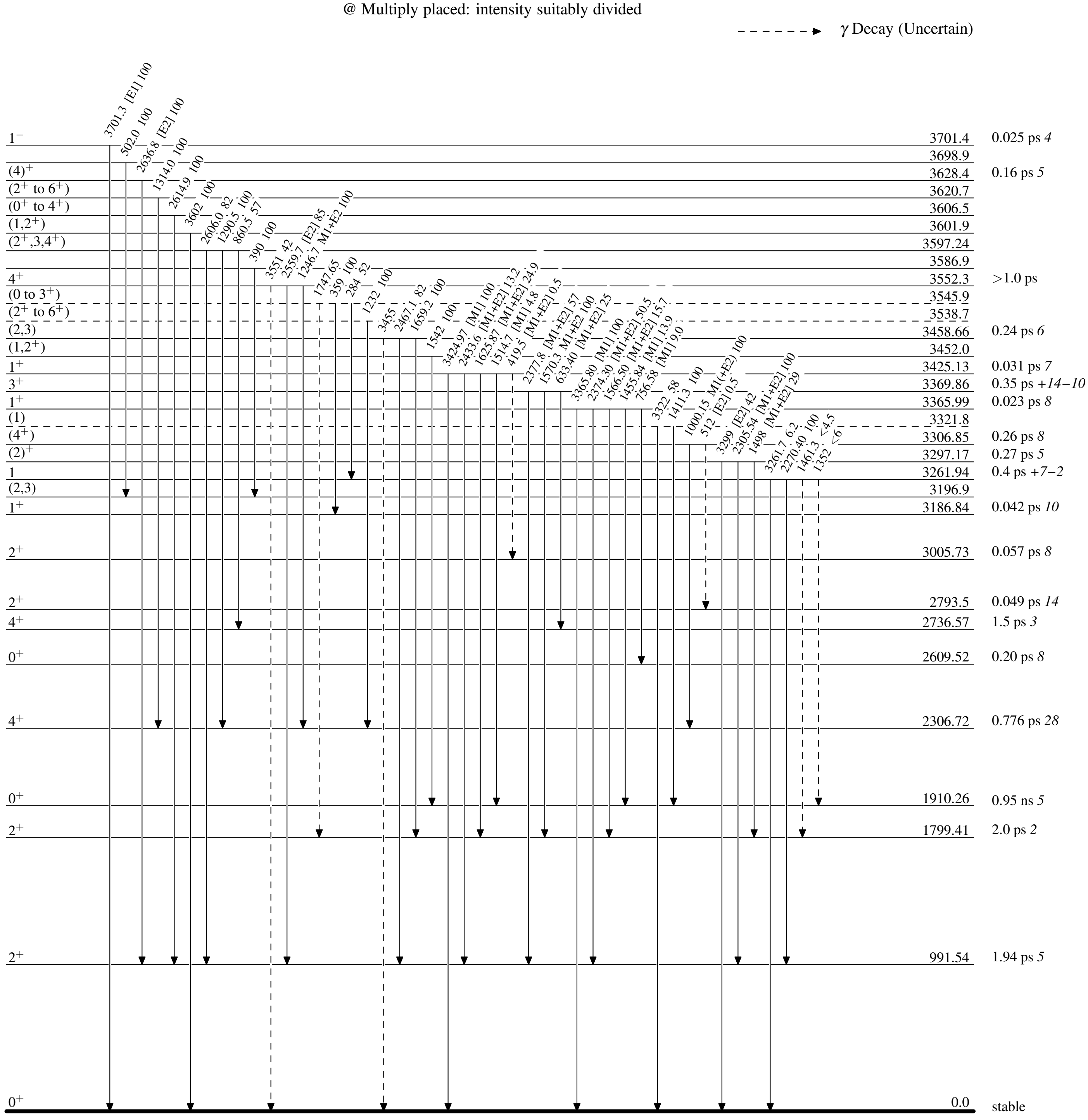
$^{64}_{30}Zn_{34}$

Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level
@ Multiply placed: intensity suitably divided



$^{64}_{30}Zn_{34}$

Adopted Levels, Gammas

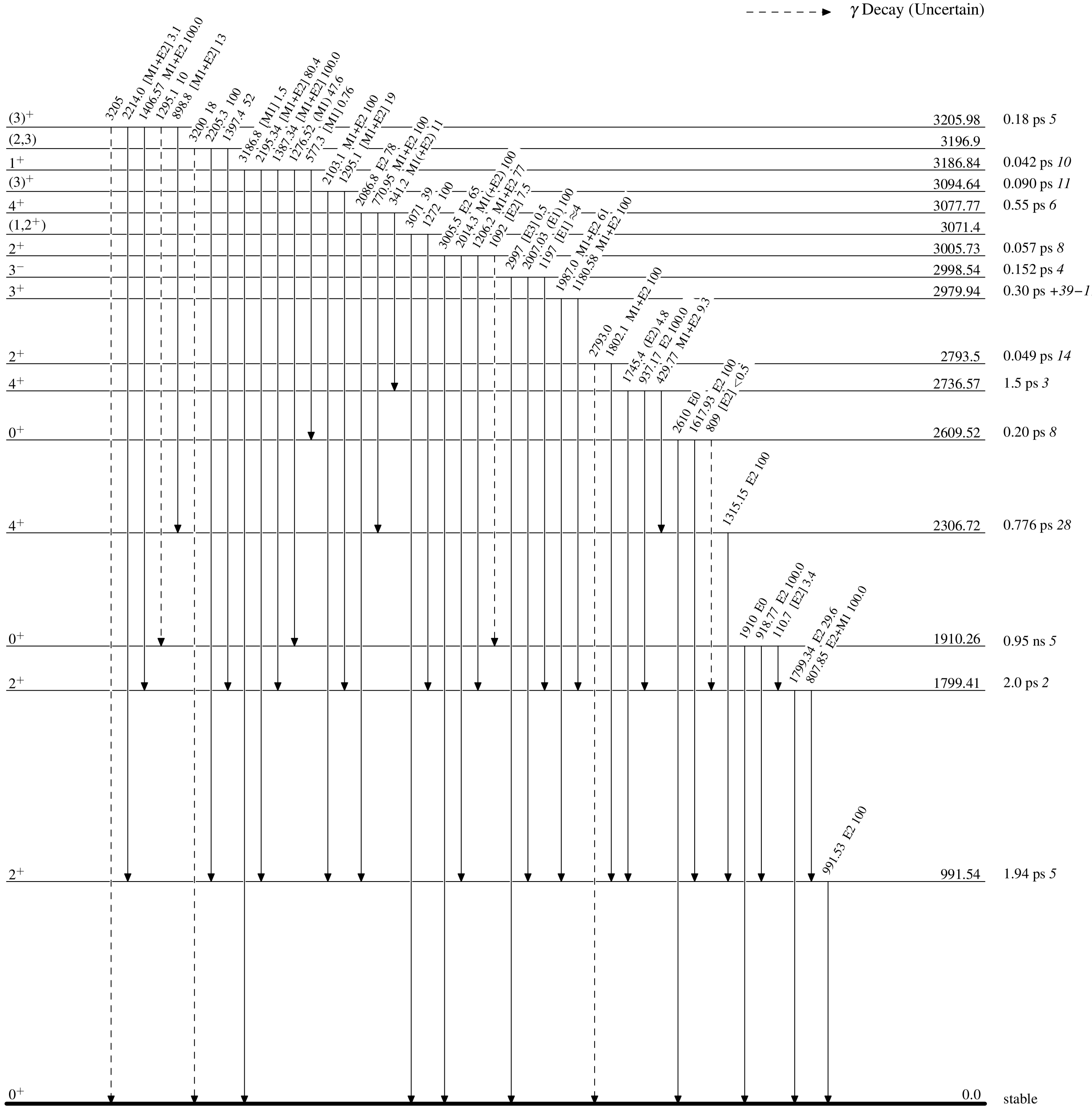
Level Scheme (continued)

Intensities: Relative photon branching from each level

@ Multiply placed: intensity suitably divided

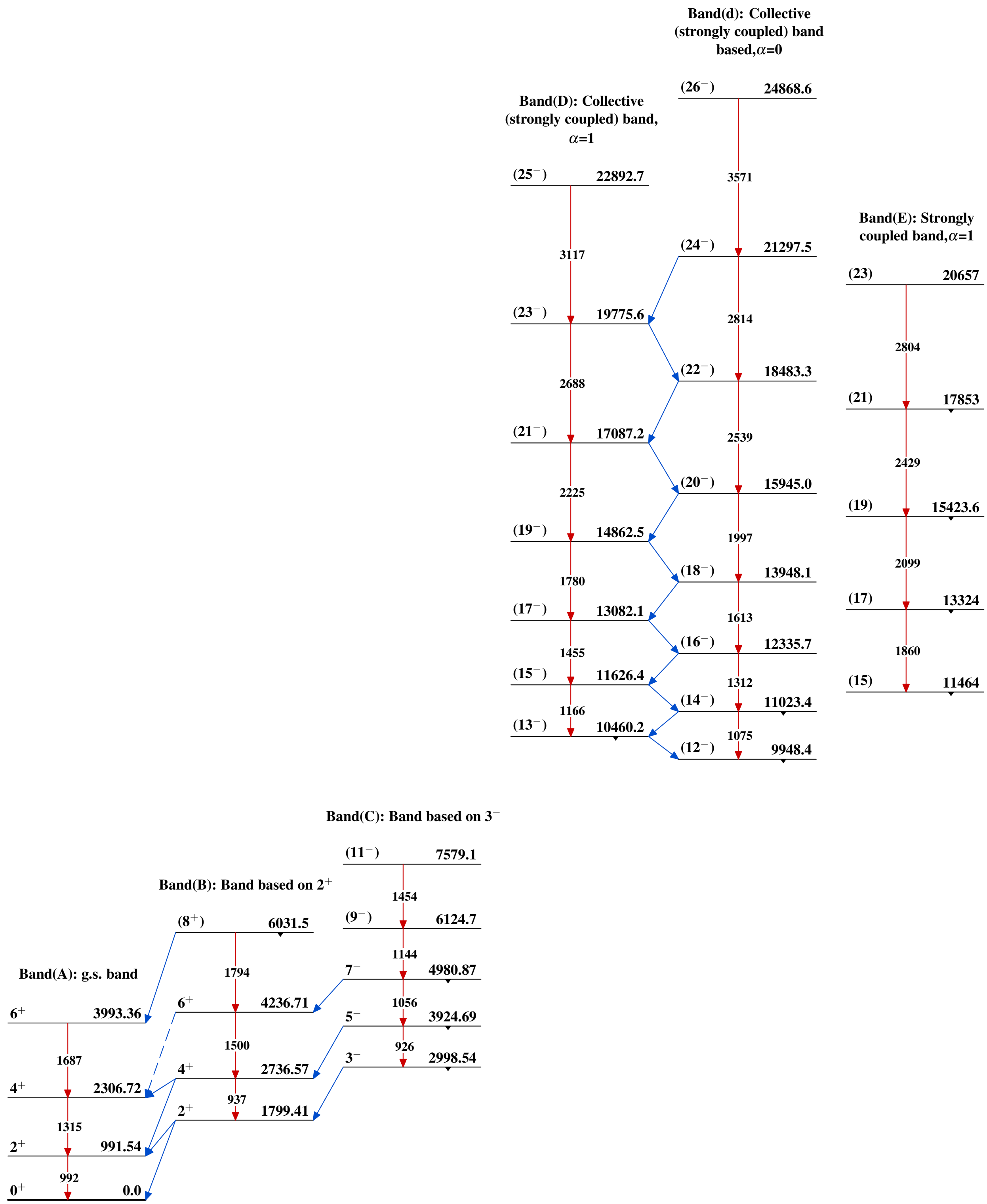
Legend

- - - - - ► γ Decay (Uncertain)



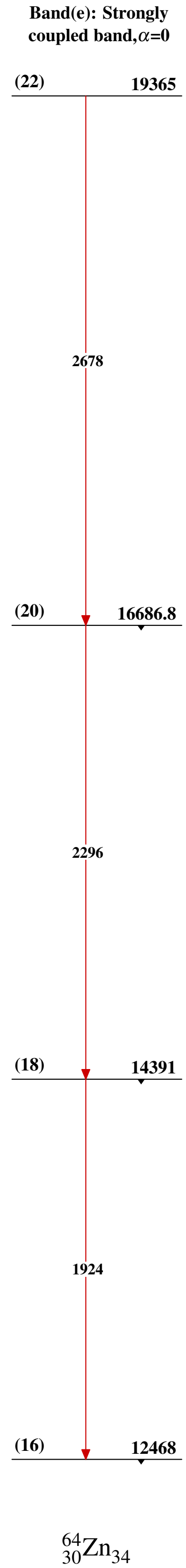
$^{64}_{30}Zn_{34}$

Adopted Levels, Gammas



$^{64}_{30}Zn_{34}$

Adopted Levels, Gammas (continued)



Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	E. Browne, J. K. Tuli	NDS 111,1093 (2010)	3-Mar-2009

Q(β^-)=−5175 *3*; S(n)=11058.6 *10*; S(p)=8924.6 *10*; Q(α)=−4578.1 *8* 2012Wa38
Note: Current evaluation has used the following Q record −5175 3 *11058.9 108924.5 10*−4578.1 *8* 2009AuZZ,2003Au03.
Additional information 1.

^{66}Zn Levels

Configuration: configurations used in DWBA analysis of (α,^{2}He), (^{12}C,^{10}C), and (^{12}C,^{10}Be) data.

Cross Reference (XREF) Flags

A	^{66}Cu β^- decay	K	^{69}Ga(p,α)	U	Coulomb excitation
B	^{66}Ga ε decay	L	^{65}Cu(d,n)	V	^{67}Zn(d,t)
C	^{64}Ni(α,2nγ), ^{55}Mn(^{14}N,2pnγ)	M	^{67}Zn(p,d)	W	^{62}Ni(^{6}Li,d)
D	^{66}Zn(p,p′)	N	^{68}Zn(p,t)	X	^{64}Ni(^{16}O,^{14}C)
E	^{66}Zn(γ,γ′)	O	^{64}Zn(t,p)	Y	^{64}Ni(^{3}He,n)
F	^{66}Zn(p,p′γ)	P	^{65}Cu(^{3}He,d)	Z	^{65}Cu(α,t)
G	^{65}Cu(p,γ)	Q	^{66}Zn(α,α′)	Others:	
H	^{66}Zn(n,n′γ)	R	Inelastic scattering	AA	^{64}Zn(α,^{2}He)
I	^{65}Cu(p,n), (p,nγ) IAR	S	^{66}Zn(e,e′)	AB	^{64}Ni(^{12}C,^{10}Be), ^{64}Zn(^{12}C,^{10}C)
J	^{63}Cu(α,p), (α,pγ)	T	^{66}Zn(α,α′γ), (^{32}S,^{32}S′γ)	AC	^{63}Cu(^{6}He,p2nγ)

E(level)[†]	J$^\pi$[#]	T$_{1/2}$[‡]	XREF	Comments
0.0	0$^+$	stable	ABCDEFGHIJKLMNOPQRSTUVWXYZ	XREF: Others: AA, AB, AC Configuration=(ν f$_{5/2}$0$^+$)
1039.2279 *21*	2$^+$[@]	1.68 ps *3*	BCDEFGH JKLMNOPQRSTUVWX Z	XREF: Others: AA, AB, AC μ=+0.80 *8*; μ=+0.9 *2* (2005St24); Q=+0.24 *8* (2003Ko51) μ=+0.80 *8*, transient field integral perturbed angular correlation (tf) (2002Ke02). μ=+1.06 *10*, transient field integral perturbed angular correlation (tf) (2004An14). μ=+0.9 *2*, perturbed angular correlation after ion implantation (IMPAC) (1979Fa06). Q: from Coulomb excitation (2003Ko51). Other: +0.24 *9* (2020Ro06, from Coul. ex., preliminary value as stated by authors). Comment added March 30, 2021 by B. Singh. T$_{1/2}$: weighted average of 1.73 ps *7* DSAM (2006Le24), 1.68 ps *3* DSAM (2002Ke02), 1.61 ps *10* Coul ex. (2003Ko51), 1.74 ps *11* ^{66}Zn(γ,γ′) (1998Ba02,1981Ca10,1972Ka22,1972ArZD,1967Be39), 1.56 ps *10* Coul ex. (1973Fi15), 1.66 ps *10* ^{66}Zn(e,e′) (1977Ne05). Other measurements: 1.3 ps *8* ^{63}Cu(α,pγ) (1974Iv01), 1.5 ps *7* ^{66}Zn(α,α′γ) (1972Yo01), 1.7 ps *+35−14* ^{64}Ni(α,2nγ), <2 ns ^{66}Cu β^- decay (1953En06). Isotope shift: <r^2>$^{1/2}$=3.9496 *13* (2004An14).
1872.7653 *24*	2$^+$	0.19[a] ps *7*	ABCDEFGH JKLM OPQRSTUVWX	XREF: Others: AB, AC T$_{1/2}$: others: <1.4 ps from (α,α′γ), and 0.83 ps *+35−21* from ^{64}Ni(α,2nγ), 1.7 ps *5* (2003Ko51).

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{66}Zn Levels (continued)

E(level)†	Jπ#	T1/2‡	XREF	Comments
2372.353 *4*	0^+	>0.21 ps	AB DEFGH Kl OP	$T_{1/2}$: from (n,n′γ); other: <60 ps from (p,p′γ).
2451.01 *5*	4^+@	0.34 ps *5*	CD FGH JKlM OPQR TUVW	XREF: Others: AB, AC Jπ: 4 from γ(θ) in ^{64}Ni(α,2nγ); π from E2 γ to 2^+. $T_{1/2}$: weighted average of 0.19 ps *6* (α,pγ), 0.76 ps *14* Coul ex. (2006Le24), and 0.35 ps *2* Coul. ex. (2003Ko51). Others: 0.83 ps *+42−28* from (α,2nγ),0.19 ps *6* from (α,pγ), 0.17 ps *+5−3* from (n,n′γ), and <0.7 ps from (α,α′γ). μ=+2.6 *8*, transient field integral perturbed angular correlation (tf) (2004An14). μ=+2.6 *8*, from γ−factor=+0.65 *20* in Coul. ex. (2006Le24).
2703.6 *4*	(3)		CD FGH K VW	E(level): possible doublet indicated by conflicting parity measurements. Jπ: (1^-,3^-) from proton-capture yield in ^{65}Cu(p,γ); (2^-,3^-) from L=(0) for a level at 2704 in ^{67}Zn(d,t); (3^+) from Hauser-Feshbach analysis in ^{66}Zn(p,p′).
2762.8 *6*	(2)		E	Jπ: from γ(θ) in ^{66}Zn(γ,γ′).
2765.56 *7*	4^+	>7 ps	CD FGH JK mn U	XREF: Others: AC Jπ: 4 from γ(θ) in ^{64}Ni(α,2nγ); π from L(p,p′)=4. $T_{1/2}$: by DSA from ^{64}Ni(α,2nγ). Other: >2.1 ps by DSA from ^{63}Cu(α,pγ).
2780.157 *7*	2^+	0.26 ps *7*	B DEFGH K mnOp V	$T_{1/2}$: weighted average of 0.25 ps *8* from (γ,γ′) and 0.28 ps *14* from (n,n′γ).
2826.69 *5*	3^-@	0.180 ps *7*	BCD FGH JK OpQRSTU WX Z	XREF: Others: AB, AC $T_{1/2}$: From Coul. ex. (2006LeZU). $T_{1/2}$: Others: 0.18 ps *4* from ^{66}Zn(α,α′γ), 0.23 ps *14* from ^{63}Cu(α,pγ), and 0.17 ps *4* from (n,n′γ). Other: 1.0 ps *+6−3* from ^{64}Ni(α,2nγ). μ=+2.1 *9*, transient field integral perturbed angular correlation (tf) (2004An14). μ=+2.1 *9*, from γ−factor=+0.7 *3* in Coul. ex. (2006Le24).
2938.074 *3*	2^+	0.044 ps *16*	B DEFGH JKLM OP V	$T_{1/2}$: unweighted average of 0.06 ps *5* from (α,pγ) and 0.028 ps *3* from (n,n′γ).
3030	(0^+)		W	Jπ: from L(^{6}Li,d)=(0).
3077.73 *23*	4^+	1.04 ps *7*	CD FGH JK M OPQR TUV	XREF: Others: AB, AC Configuration=(π $f_{5/2}4^+$) $T_{1/2}$: Coul. ex. (2006Le24). $T_{1/2}$: 1.7 ps *+10−3* in ^{64}Ni(α,2nγ), 0.5 ps *+3−2* in (α,pγ), 0.13 ps *+56−10* in (α,α′γ), and 0.09 ps *+5−3* in (n,n′γ).
3105.040 *4*	0^+		B DEFGH K O	
3212.582 *8*	2^+	0.083 ps *+21−14*	B DEFGH K m O	$T_{1/2}$: from DSAM in (n,n′γ).
3226.2 *11*			DE K m R	
3228.885 *3*	1^+	0.12 ps *3*	B D FGH K P V	$T_{1/2}$: from DSAM in (n,n′γ). Jπ: from log *ft*=6.14 *4* in ε decay from 0^+ and γ to 0^+; π=+ from M1,E2 to 2^+.
3241.2? *11*			E	
3331.441 *6*	2^+	0.083 ps *+21−14*	B DEFGH KLm O R V	$T_{1/2}$: from DSAM in (n,n′γ).
3380.944 *4*	1^-	20 fs *5*	B DEFGH K p V	$T_{1/2}$: other: 42 fs *+21−14* from DSA in (n,n′γ). Jπ: 1 from γ(θ) in ^{66}Zn(γ,γ′); π from L(p,p′)=(1).

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Adopted Levels, Gammas (continued)

^{66}Zn Levels (continued)

E(level)[†]	J^{π}[#]	$T_{1/2}$[‡]	XREF	Comments
3427.406 *18*	1,2$^-$		B GH p	J^π: log *ft*=8.9 *1* from ε decay from 0$^+$; γ to 2$^+$.
3432.408 *4*	1$^-$	30 fs +*19*−*8*	B DEFGH K R	J^π: 0,1,2$^-$ from log *ft*=7.03 *4* in ε decay from 0$^+$; J=0 ruled out by γ to 0$^+$, J^π=2$^-$ ruled out by $T_{1/2}$; π=(−) from L(p,p′)=(1).
3507.249 *23*	2$^+$		B DEFGH K m V	J^π: L(p,p′)=2.
3523.6 *8*			CD FG K m o	
3531.692 *14*	0$^+$		B DEFG K o	
3576.370 *22*	4$^+$		B DEFGH K R	J^π: L(p,p′)=4.
3670.72 *5*	2$^+$		B D GH K m OP	
3689.01 *16*	1$^+$,2$^+$,3$^+$		D G KLm V	J^π: L(d,t)=L(d,n)=1.
3709.4 *3*	(5)	0.6[a] ps +*6*−*2*	CD G JK	J^π: from $\gamma(\theta)$ in ^{64}Ni(α,2nγ).
3725.3 *5*			D F K	
3731.6 *5*			G	
3738.207 *21*	$^+$	14 fs *2*	B DEFGH K O	Lower J^π member of a J^π=(2$^+$)+(4$^+$) level doublet at 3737 *10* reported in ^{64}Zn(t,p). J^π: J^π=(2$^+$) from L(t,p)=(2) not adopted for this lower J^π member of 3737 *10* doublet since J=1 from $\gamma(\theta)$ and reduced dipole γ rays in ^{66}Zn(γ,γ') reported for a 3739.1 level. $T_{1/2}$: from (γ,γ') with $\Gamma_{\gamma0}/\Gamma$=0.75 *3* from adopted gammas.
3738.24 *4*	(4$^+$)		O	E(level): higher J^π member of a J^π=(2$^+$)+(4$^+$) level doublet reported in ^{64}Zn(t,p).
3747.03 *19*	5$^-$	46 ps *3*	CD GH JK p	XREF: Others: AB, AC Configuration=((π $p_{3/2}$)(π $g_{9/2}$))5$^-$ J^π: 5 from $\gamma(\theta)$ in ^{64}Ni(α,2pnγ); π from E2 to 3$^-$. $T_{1/2}$: by recoil distance in ^{55}Mn(^{14}N,npγ). DSA measurements of 0.8 ps +*11*−*4* from ^{63}Cu(α,pγ) and 6 ps +*14*−*3* from ^{64}Ni(α,2nγ) do not take fully into account strong feeding from the 4252 ($T_{1/2}$=133 ps *11*) and 4076 ($T_{1/2}$=29.8 ps *14*) levels. Other: 0.21 ps +*14*−*7* from (n,n′γ).
3753.01 *4*	4$^+$		B D FGH K p	J^π: L(p,p′)=4.
3770 *30*	(1$^-$)		QR W	J^π: from L(^{6}Li,d)=(1).
3791.123 *3*	1$^+$		B D FGH K m V	J^π: 1$^+$ from log *ft*=5.00 *4* from 0$^+$.
3806.4 *10*			D K m	
3825.0 *3*	0$^+$		B DEF K	J^π: from $\gamma(\theta)$ in (γ,γ').
3874 *5*			D K	
3882.424 *10*	(2)$^+$		B DE G K	J^π: from $\gamma(\theta)$ in ^{66}Zn(γ,γ').
3898.3 *6*	5$^-$		CD G K O q X	
3924.71 *20*			D FGH K q	J^π: 6$^+$ from L(p,p′)=6; γ′s to 0$^+$ and 2$^+$ levels rule it out; level could be a doublet.
3946 *2*	(1$^-$)		D K pqR	J^π: L(p,p′)=(1).
3969 *2*	(4$^+$)		D K m Op	
4005 *10*	4$^+$		D m	J^π: L(p,p′)=4.
4011.7			E m V	E(level): from ^{66}Zn(γ,γ').
4019.2 *15*	2$^+$		D FG K m O	
4075.7 *3*	(6$^-$)	29.8 ps *14*	C E J L	XREF: Others: AC μ=0.9 *2*; Q=−0.081 *13* (2005St24) μ: By recoil into gas and or vacuum (RIGV) (1983Ba69). Q: From electron scattering (Es); recalculated

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Adopted Levels, Gammas (continued)

^{66}Zn Levels (continued)

E(level)†	J$^{\pi}$#	T$_{1/2}$‡	XREF	Comments
				value (1981Ko06). T$_{1/2}$: by recoil distance in ^{55}Mn(^{14}N,2pnγ). Other: >1.4 ps from (α,pγ). J$^{\pi}$: (6) from $\gamma(\theta)$, γ yields and decay systematics in ^{64}Ni(α,2nγ); π from (M1) to 5$^-$.
4081.0 *15*			D F K m	
4085.983 *4*	1$^+$		B D FGH K m V	J$^{\pi}$: log *ft*=5.99 *4* from 0$^+$.
4108.5 *10*			d F m R	π=+ from L(p,d)=1 for a level at 4100 *30*; π=− from L(p,p′)=3 for a level at 4110 *10*, indicating a possible doublet.
4119.0 *5*	(1$^-$)		d G K O q	
4182.7 *5*	(6$^+$)	0.15 ps *6*	CD JK	XREF: Others: AC J$^{\pi}$: (6) from $\gamma(\theta)$ and γ yields in ^{64}Ni(α,2nγ); π from (E2) to 4$^+$. L(p,p′)=4 at 4189 *7*. T$_{1/2}$: unweighted mean of DSA measurements 0.08 ps *+6−4* in ^{63}Cu(α,pγ) and 0.21 ps *+10−3* in ^{64}Ni(α,2nγ).
4186 *7*	(3$^-$)		K O	E(level): weighted average of 4184 *10* in (t,p) and 4188 *10* in (p,α).
4223 *2*	(1$^-$)		D K	XREF: Others: AB J$^{\pi}$: L(p,p′)=(1).
4251.9 *3*	(7$^-$)	133 ps *10*	C J Op	XREF: Others: AA μ=1.0 *2* (2005St24,1989Ra17) Configuration=((ν F$_{5/2}$)(ν G$_{9/2}$)$_{7-}$+(ν P$_{1/2}$)(ν G$_{9/2}$)$_{5-}$) E(level): unresolved doublet in (α,^{2}He) at 4220 *50*; L=7 assigned to the main level at 4220 with a tentative L=5 assigned to the 4400 level visible at some backward angles. μ: From recoil into gas and/or vacuum (RIGV) (1981Ko06). J$^{\pi}$: (7) from $\gamma(\theta)$ and γ yields in ^{64}Ni(α,2nγ); π from (E2) to 5$^-$. T$_{1/2}$: by recoil distance in ^{55}Mn(^{14}N,2pnγ). Other: >0.55 ps in (α,pγ).
4258 *2*			D K p	
4267 *7*	4$^+$		D K p	J$^{\pi}$: L(p,p′)=4.
4295.339 *4*	1$^+$	4.2 fs *+18−9*	B DE K m	J$^{\pi}$: 1$^+$ from log *ft*=5.23 *4* from 0$^+$ in ε decay.
4321.83 *20*			D H K m	
4332 *7*	2$^+$		D K O	J$^{\pi}$: L(t,p)=2.
4393.7 *16*	3$^-$	0.07 ps *+4−2*	D K OPQ T	T$_{1/2}$: from DSA in ^{66}Zn(α,$\alpha'\gamma$).
4424 *6*	1	7.0 fs *12*	DE H m	J$^{\pi}$: 1 from $\gamma(\theta)$ in ^{66}Zn(γ,γ').
4433 *6*	1$^-$		D H m O	
4439 *7*	2$^+$		D m	J$^{\pi}$: L(p,p′)=2.
4454 *5*			D m	
4461.409 *5*	1$^+$	7 fs *+12−3*	B DE H m	J$^{\pi}$: 1$^+$ from log *ft*=5.54 *4* from 0$^+$ in ε decay.
4472 *7*	3$^-$		D m q	J$^{\pi}$: L(p,p′)=3.
4497.6 *5*			D H p	
4511& *5*	0$^+$		D Opq	
4511& *5*	(2$^+$)		D Opq	
4527 *5*			D pq	
4538 *7*	4$^+$		D pq	J$^{\pi}$: L(p,p′)=4.
4565 *2*	3$^-$		D q	J$^{\pi}$: L(p,p′)=3.
4567 *10*	5$^-$		O q	
4609? *2*	(1)	8.4 fs *+33−18*	E p	J$^{\pi}$: from $\gamma(\theta)$ in ^{66}Zn(γ,γ').

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Adopted Levels, Gammas (continued)

^{66}Zn Levels (continued)

E(level)[†]	J^{π}[#]	$T_{1/2}$[‡]	XREF	Comments
4610 *5*	4^+		D p	J^{π}: L(p,p′)=4.
4622 *6*			D H Op	
4635.3 *11*	(2)		DE	XREF: Others: AA J^{π}: (2) from $\gamma(\theta)$ in ^{66}Zn(γ,γ').
4638.24 *14*	1		B	XREF: Others: AA J^{π}: log *ft*=7.96 *11* from 0^+; γ to 0^+.
4645 *10*			D	XREF: Others: AA
4655 *7*	$(3^-,4^+)$		D	XREF: Others: AA J^{π}: L(p,p′)=3+4; probable doublet.
4675.6 *5*	1^+		B l	XREF: Others: AA J^{π}: log *ft*=8.35 *15* from 0^+ rules out 0^+ to 0^+ transition; γ to 2^+.
4680 *50*				XREF: Others: AA
4683 *10*	(1)	7.1 fs *+24−14*	DE l	XREF: Others: AA J^{π}: (1) from $\gamma(\theta)$ in ^{66}Zn(γ,γ').
4694 *7*	4^+		D l	XREF: Others: AA J^{π}: L(p,p′)=4.
4730 *7*	2^+		D l	XREF: Others: AA J^{π}: L(p,p′)=2.
4745 *10*			D l	
4758 *10*			D l q	
4780 *7*	5^-		D q	J^{π}: L(p,p′)=5.
4796 *7*	(1^-)		D q	J^{π}: L(p,p′)=(1).
4806.199 *5*	1^+	3.8 fs *+13−8*	B DE H	J^{π}: 1^+ from log *ft*=4.89 *4* from 0^+ in ε decay.
4814.1 *4*	(7^-)	0.6[a] ps *4*	C J	XREF: Others: AB J^{π}: (7) from $\gamma(\theta)$ and γ yields in ^{64}Ni(α,2nγ); π from (M1) to (6^-).
4832 *10*			D	
4849.93 *3*	1^+		B D	J^{π}: log *ft*=6.62 *6* from 0^+ rules out a 0^+ to 0^+ transition; γ to 2^+.
4866.056 *16*	1^+		B D	J^{π}: log *ft*=6.42 *6* from 0^+; γ to 0^+.
4875 *10*			D	
4885 *10*			D q	
4907 *10*			D q	
4918 *10*			D q	
4945 *10*			D	
4958.2 *4*	1^+		B D l	J^{π}: log *ft*=7.48 *11* from 0^+ rules out a 0^+ to 0^+ transition; γ to 2^+.
4984 *10*			D lm	
5005.8 *3*	1^+		B D lm	J^{π}: log *ft*=7.47 *7* from 0^+; γ to 0^+.
5025 *10*			D lm	
5038 *10*			D	
5059 *10*			D q	
5073 *10*			D q	
5086 *10*			D q	
5097 *10*			D q	
5106 *10*			D q	
5111.9 *4*	(8^-)		CD q	J^{π}: from $\gamma(\theta)$ and γ decay systematics in ^{64}Ni(α,2nγ).
5124 *10*			D q	
5143 *10*			D q	
5159 *10*			D	XREF: Others: AA
5169 *10*			D	XREF: Others: AA
5180 *10*			D	XREF: Others: AA
5198 *10*			D	XREF: Others: AA
5207.3 *5*	(8^+)	>6 ps	C	XREF: Others: AA, AB

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Adopted Levels, Gammas (continued)

^{66}Zn Levels (continued)

E(level)†	J$^{\pi}$#	T$_{1/2}$‡	XREF	Comments
				Configuration=(ν $g_{9/2}8^{+}$) configuration from (^{12}C,^{10}Be), (^{12}C,^{10}C) reaction where this level is seen strongly excited (1990Bo27). This level was seen weakly excited in the (α,^{2}He) reaction (1990Fi07). J$^{\pi}$: (8) from $\gamma(\theta)$, γ yields and decay systematics in ^{64}Ni(α,2nγ); π from (E2) to (6)$^{+}$. T$_{1/2}$: by DSA in ^{64}Ni(α,2nγ).
5222 *10*			D	XREF: Others: AA
5234 *10*			D	XREF: Others: AA
5245 *10*			D	XREF: Others: AA
5263 *10*			D	
5274 *10*			D	
5285 *10*			D	
5305 *10*			D	
5322 *10*			D	
5331 *10*			D q	
5352 *10*			D q	
5364 *10*			D q	
5375 *10*			D q	
5389 *10*			D q	
5403 *10*			D q	XREF: Others: AB
5420 *10*			D	
5431 *10*			D	
5446 *10*			D	
5464.4 *5*	(9^{-})	1.9 ps *8*	C q	J$^{\pi}$: (9) from $\gamma(\theta)$ in ^{64}Ni(α,2nγ); π from (E2) to (7^{-}). T$_{1/2}$: by recoil distance in ^{55}Mn(^{14}N,2npγ). T$_{1/2}$=2.8 ps *+21−14* by DSA in ^{64}Ni(α,2nγ).
5500 *45*			q	
5650 *30*	3^{-}		D q	XREF: Others: AB E(level): from ^{66}Zn(p,p′). J$^{\pi}$: L(p,p′)=3.
5740 *50*			A J q	
6000 *50*				XREF: Others: AB
6292.6 *6*	(10^{+})	1.6 ps *+7−3*	C J	J$^{\pi}$: (10) from $\gamma(\theta)$ in ^{64}Ni(α,2nγ); π from (E2) to (8^{+}). T$_{1/2}$: by DSA in ^{64}Ni(α,2nγ).
6419.0 *8*			C	
6850 *50*	(8^{+})			XREF: Others: AB Configuration=(π $g_{9/2}8^{+}$) J$^{\pi}$: from DWBA analysis of (^{12}C,^{10}Be), (^{12}C,^{10}C) data.
7.17×10^{3} *18*			J	
7367.4 *4*	1	1.47 fs *16*	E	J$^{\pi}$: from $\gamma(\theta)$ in ^{66}Zn(γ,γ′).
7517.3 *10*		1.5 ps *+6−3*	C	T$_{1/2}$: by DSA in ^{64}Ni(α,2nγ).
7550 *50*	(6^{+})			XREF: Others: AB Configuration=((π $g_{9/2}$)(π $d_{5/2}$))6^{+} J$^{\pi}$: from DWBA analysis of (^{12}C,^{10}Be), (^{12}C,^{10}C) data.
7693.3 *3*	1	2.2 fs *4*	E	J$^{\pi}$: 1 from $\gamma(\theta)$ in ^{66}Zn(γ,γ′).
11059.9 *10*	2^{-},3^{-}		I	J$^{\pi}$: from n(θ) in ^{65}Cu(p,n) IAR.
11395 *10*			I	
11411 *10*			I	
11457 *10*			I	

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Adopted Levels, Gammas (continued)

^{66}Zn Levels (continued)

E(level)[†]	J^{π}[#]	XREF	Comments
11514 *10*		I	
11593 *10*		I	
11654 *10*		I	
11698 *10*		I	
11757 *10*		I	
11841 *10*	(2^+)	I	J^{π}: from n(θ) and $\gamma(\theta)$ in ^{65}Cu(p,n),(p,nγ) IAR.
11916 *10*		I	
12194? *10*		I	
12218 *10*		I	
12293 *10*		I	
12324 *10*		I	
12401 *10*		I	
12433? *10*		I	
12552 *10*		I	
12602 *10*		I	
12651 *10*		I	
12688 *10*		I	
12714 *10*		I	

[†] Except as noted, levels with E<10000 are as follows: 1) from a least-squares fit to adopted Eγ data; 2) energies with ΔE=2-10 are from ^{66}Zn(p,p′); 3) energies with ΔE>10 are from ^{66}Zn(α,α'). Levels with E>10000 are from ^{65}Cu(p,n),(p,nγ) IAR.

[‡] Except as noted, $T_{1/2}$ is from measured widths in ^{66}Zn(γ,γ') and adopted γ branchings.

[#] From L-transfer in ^{64}Zn(t,p), except as noted.

[@] Consistent with angular distribution and analyzing-power data in (pol p,p′) (1993Mo15).

[&] Doublet reported in ^{64}Zn(t,p). E=4511 *5* given for one level in ^{66}Zn(p,p′).

[a] By DSA from ^{63}Cu(α,pγ).

Adopted Levels, Gammas (continued)

γ(^{66}Zn)

E_i(level)	J^π_i	E_γ[‡]	I_γ[#]	E_f	J^π_f	Mult.	δ[a]	α[†]	$I_{(\gamma+ce)}$	Comments
1039.2279	2^+	1039.220 *3*	100.0 *3*	0.0	0^+	E2[@]		0.000269 *4*		α(K)=0.000241 *4*; α(L)=2.41×10^{-5} *4*; α(M)=3.46×10^{-6} *5*; α(N+..)=1.384×10^{-7} *20* α(N)=1.384×10^{-7} *20* B(E2)(W.u.)=17.5 *4*
1872.7653	2^+	833.5324 *21*	100.0 *4*	1039.2279	2^+	M1+E2	−1.6 *2*	0.000434 *9*		α(K)=0.000389 *8*; α(L)=3.91×10^{-5} *8*; α(M)=5.60×10^{-6} *11*; α(N+..)=2.24×10^{-7} *5* α(N)=2.24×10^{-7} *5* B(M1)(W.u.)=0.056 *23*; B(E2)(W.u.)=3.3×10^2 *13* Mult.: D+Q from $\gamma(\theta)$ in ^{66}Cu β^- decay; M1+E2 from RUL. δ: From $\gamma\gamma(\theta)$ in ^{66}Ga ε DECAY (2002Ga20). Other value: −1.9 *3*, as given by 1974Kr16 from analysis of 1969Ha46 data.
		1872.740 *6*	0.39 *3*	0.0	0^+	[E2]		0.000328 *5*		α(K)=7.04×10^{-5} *10*; α(L)=6.99×10^{-6} *10*; α(M)=1.001×10^{-6} *14*; α(N+..)=0.000250 *4* α(N)=4.05×10^{-8} *6*; α(IPF)=0.000250 *4* B(E2)(W.u.)=0.032 *12*
2372.353	0^+	499.590 *6*	0.41 *10*	1872.7653	2^+	E2		0.00199 *3*		α(K)=0.001782 *25*; α(L)=0.000182 *3*; α(M)=2.61×10^{-5} *4*; α(N+..)=1.013×10^{-6} *15* α(N)=1.013×10^{-6} *15* B(E2)(W.u.)<22
		1333.112 *5*	100.0 *4*	1039.2279	2^+	E2		0.000190 *3*		B(E2)(W.u.)<40 α(K)=0.0001383 *20*; α(L)=1.379×10^{-5} *20*; α(M)=1.98×10^{-6} *3*; α(N+..)=3.61×10^{-5} *5* α(N)=7.96×10^{-8} *12*; α(IPF)=3.61×10^{-5} *5* Mult.: Q from $\gamma(\theta)$ in ^{66}Zn(p,p′γ); E2 from RUL.
		2372.375[d]		0.0	0^+	E0			6.6×10^{-3} *13*	E_γ: from level energy difference; 2372.2 from (p,p′γ). Mult.: from internal conversion data and absence of γ ray in (p,p′γ). $I_{(\gamma+ce)}$: for 100 transitions of 1333γ from (p,p′γ).
2451.01	4^+	1411.75[b] *5*	100[f]	1039.2279	2^+	E2[@]		0.000194 *3*		α(K)=0.0001227 *18*; α(L)=1.222×10^{-5} *18*; α(M)=1.751×10^{-6} *25* α(N)=7.06×10^{-8} *10*; α(IPF)=5.69×10^{-5} *8* B(E2)(W.u.)=18 *3* δ(M3/E2)=+0.04 *4*.
		2450[d] *2*	2[f]	0.0	0^+					E_γ: not confirmed by any other ^{66}Zn data.
2703.6	(3)	830.7[c] *8*	100[g] *11*	1872.7653	2^+					

$^{66}_{30}Zn_{36}$-8

$\gamma(^{66}Zn)$ (continued)

E_i(level)	J^π_i	E_γ[‡]	I_γ[#]	E_f	J^π_f	Mult.	δ[a]	α[†]	Comments
2703.6	(3)	1664.4[b] 4	7.1[g] 10	1039.2279	2+	(D+Q)	8.5 15		Mult.,δ: from $\gamma(\theta)$ in $^{66}Zn(n,n'\gamma)$.
2762.8	(2)	2762	100	0.0	0+				E_γ: reported only in $^{66}Zn(\gamma,\gamma')$.
2765.56	4+	314.6[b] 1	36[b] 2	2451.01	4+				
		892.7[b] 1	100[b] 3	1872.7653	2+	E2[@]		0.000388 6	B(E2)(W.u.)<4.0 α(K)=0.000348 5; α(L)=3.50×10^{-5} 5; α(M)=5.01×10^{-6} 7; α(N+..)=2.00×10^{-7} 3 α(N)=2.00×10^{-7} 3 δ(M3/E2)=−0.04 6.
		1726.4[b] 2	87[b] 3	1039.2279	2+	E2[@]		0.000274 4	B(E2)(W.u.)<0.13 α(K)=8.21×10^{-5} 12; α(L)=8.16×10^{-6} 12; α(M)=1.169×10^{-6} 17; α(N+..)=0.000183 3 α(N)=4.73×10^{-8} 7; α(IPF)=0.000183 3 δ(M3/E2)=+0.00 3.
2780.157	2+	328.8[b] 5	11[b] 3	2451.01	4+				
		907.394 19	17.7 12	1872.7653	2+				
		1740.904 16	23.1 3	1039.2279	2+	M1+E2	0.33 28	0.000241 8	α(K)=7.74×10^{-5} 13; α(L)=7.67×10^{-6} 13; α(M)=1.100×10^{-6} 19; α(N+..)=0.000155 7 α(N)=4.47×10^{-8} 8; α(IPF)=0.000155 7 B(M1)(W.u.)=0.0022 7; B(E2)(W.u.)=0.13 +20−13
		2780.095 16	100.0 24	0.0	0+	E2		0.000722 11	α(K)=3.51×10^{-5} 5; α(L)=3.47×10^{-6} 5; α(M)=4.98×10^{-7} 7; α(N+..)=0.000683 10 α(N)=2.02×10^{-8} 3; α(IPF)=0.000683 10 B(E2)(W.u.)=0.54 15 Mult.: Q from $\gamma(\theta)$ in $^{66}Zn(n,n'\gamma)$; E2 from RUL.
2826.69	3−	953.93 9	11.3[g] 13	1872.7653	2+				
		1787.44 9	100[g] 9	1039.2279	2+	(E1)[&]		0.000526 8	α(K)=4.21×10^{-5} 6; α(L)=4.16×10^{-6} 6; α(M)=5.95×10^{-7} 9; α(N+..)=0.000479 7 α(N)=2.41×10^{-8} 4; α(IPF)=0.000479 7 B(E1)(W.u.)=0.00036 5 δ(M2/E1)=−0.04 5.
2938.074	2+	1065.305 9	0.60 12	1872.7653	2+				
		1898.823 8	100.0 8	1039.2279	2+	(M1+E2)	0.03 1	0.000288 4	α(K)=6.58×10^{-5} 10; α(L)=6.52×10^{-6} 10; α(M)=9.35×10^{-7} 13; α(N+..)=0.000215 3 α(N)=3.80×10^{-8} 6; α(IPF)=0.000215 3 B(M1)(W.u.)=(0.043 17); B(E2)(W.u.)=(0.017 14) Mult.: D+Q from $\gamma(\theta)$ in $^{66}Zn(n,n'\gamma)$; M1+E2 from ΔJ^π. δ: from $\gamma(\theta)$ in (n,n'γ); sign convention not specified.
		2941[h]	71 24	0.0	0+				Eγ,Iγ: reported only in $^{66}Zn(\gamma,\gamma')$.
3077.73	4+	312.0[c] 8	10[c] 3	2765.56	4+				E_γ: doublet. Eγ is from level energy difference in

$^{66}_{30}Zn_{36}$-9

Adopted Levels, Gammas (continued)

$\gamma(^{66}Zn)$ (continued)

E_i(level)	J^π_i	E_γ[‡]	I_γ[#]	E_f	J^π_f	Mult.	δ[a]	α[†]	$I_{(\gamma+ce)}$	Comments
										$^{64}Ni(\alpha,2n\gamma)$. $E\gamma$=312.8 from level energy difference in $^{65}Cu(p,\gamma)$.
3077.73	4^+	627.6[c] *4*	100[c] *10*	2451.01	4^+	(M1+E2)[&]	−0.25 *12*	0.000688 *23*		α(K)=0.000617 *21*; α(L)=6.19×10^{-5} *21*; α(M)=8.9×10^{-6} *3*; α(N+..)=3.57×10^{-7} *12* α(N)=3.57×10^{-7} *12* B(M1)(W.u.)=(0.056 *9*); B(E2)(W.u.)=(15 *14*)
		1204.2[c] *5*	33[c] *6*	1872.7653	2^+	(E2)[&]		0.000201 *3*		α(K)=0.0001723 *25*; α(L)=1.721×10^{-5} *25*; α(M)=2.47×10^{-6} *4*; α(N+..)=9.43×10^{-6} *1* α(N)=9.91×10^{-8} *14*; α(IPF)=9.33×10^{-6} *15* B(E2)(W.u.)=3.1 *7* δ(M3/E2)=−0.15 *15*.
3105.040	0^+	1232.264 *8*	100 *4*	1872.7653	2^+					
		2065.778 *7*	6.2 *3*	1039.2279	2^+					
		3105.064		0.0	0^+	E0			2.4×10^{-2} *5*	E_γ: from level energy difference; 3107.0 from (p,p′γ). Mult.: from internal conversion data and absence of γ ray in (p,p′γ). $I_{(\gamma+ce)}$: for 100 transitions of 1234γ from (p,p′γ).
3212.582	2^+	2173.319 *15*	100 *6*	1039.2279	2^+					E_γ: placed as depopulating the 3213 level in $^{65}Cu(p,\gamma)$, $^{66}Zn(p,p'\gamma)$, $^{66}Zn(n,n'\gamma)$ and by 1971Ca14, 1994En02 in ^{66}Ga ε decay. Placed as depopulating a proposed level at 4047 by 1970Ph01 in ε decay, which level, however, is not observed by 1994En02.
		3212.499 *19*	2.2 *5*	0.0	0^+					
3228.885	1^+	290.8105 *11*	0.92 *3*	2938.074	2^+					
		448.73 *2*	2.01 *7*	2780.157	2^+	M1+E2	−0.02 *3*	0.001419 *20*		α(K)=0.001272 *18*; α(L)=0.0001283 *19*; α(M)=1.84×10^{-5} *3*; α(N+..)=7.39×10^{-7} α(N)=7.39×10^{-7} *11*
		856.527 *10*	2.09 *12*	2372.353	0^+					
		1356.104 *9*	6.7 *7*	1872.7653	2^+					
		2189.616 *6*	100.0 *5*	1039.2279	2^+	M1+E2	0.12 *2*	0.000398 *6*		α(K)=5.12×10^{-5} *8*; α(L)=5.07×10^{-6} *7*; α(M)=7.26×10^{-7} *11*; α(N+..)=0.000341 *5* α(N)=2.95×10^{-8} *5*; α(IPF)=0.000341 *5* B(M1)(W.u.)=0.012 *3*; B(E2)(W.u.)=0.060 *25* Mult.: from ce measurement in ε decay.
		3228.800 *6*	28.3 *2*	0.0	0^+	M1		0.000812 *12*		α(K)=2.68×10^{-5} *4*; α(L)=2.64×10^{-6} *4*; α(M)=3.79×10^{-7} *6*; α(N+..)=0.000782 *11*

Adopted Levels, Gammas (continued)

$\gamma(^{66}Zn)$ (continued)

E_i(level)	J^π_i	E_γ[‡]	I_γ[#]	E_f	J^π_f	Mult.	δ[a]	α[†]	Comments
									α(K)=2.68×10^{-5} *4*; α(L)=2.64×10^{-6} *4*; α(M)=3.79×10^{-7} *6*; α(N+..)=0.000782 *11* α(N)=1.544×10^{-8} *22*; α(IPF)=0.000782 *11* B(M1)(W.u.)=0.0011 *3*
3331.441	2^+	551.284 *22*	7.2 *7*	2780.157	2^+				
		1458.662 *12*	100.0 *23*	1872.7653	2^+	(M1+E2)	−0.01 *9*	0.0001741 *25*	α(K)=0.0001070 *15*; α(L)=1.062×10^{-5} *15*; α(M)=1.523×10^{-6} *22* α(N)=6.18×10^{-8} *9*; α(IPF)=5.49×10^{-5} *8* B(M1)(W.u.)=(0.058 *+10−15*)
		2292.171 *13*	17.6 *12*	1039.2279	2^+				
		3331.351 *14*	23 *3*	0.0	0^+				
3380.944	1^-	442.873 *14*	1.06 *8*	2938.074	2^+				
		600.788 *21*	0.92 *6*	2780.157	2^+				
		1008.588 *12*	4.0 *5*	2372.353	0^+				
		1508.158 *7*	37.8 *2*	1872.7653	2^+				
		2341.673 *11*	0.22 *5*	1039.2279	2^+				
		3380.850 *6*	100.0 *6*	0.0	0^+				
3427.406	$1,2^-$	1554.62 *3*	100	1872.7653	2^+				
3432.408	1^-	494.336 *1*	32.0 *3*	2938.074	2^+				
		1060.051 *1*	15.4 *4*	2372.353	0^+				
		1559.627 *1*	7.6 *6*	1872.7653	2^+				
		2393.129 *7*	82 *3*	1039.2279	2^+	E1		0.000924 *13*	α(K)=2.73×10^{-5} *4*; α(L)=2.70×10^{-6} *4*; α(M)=3.86×10^{-7} *6*; α(N+..)=0.000894 *13* α(N)=1.569×10^{-8} *22*; α(IPF)=0.000894 *13* B(E1)(W.u.)=0.00035 *+10−23*
		3432.309 *7*	100.0 *13*	0.0	0^+				
3507.249	2^+	680.56 *10*	18 *5*	2826.69	3^-				
		1634.46 *7*	42 *7*	1872.7653	2^+				
		2467.97 *7*	100 *9*	1039.2279	2^+				
3523.6		758.0[c] *8*	100	2765.56	4^+				
3531.692	0^+	2492.42 *3*	100	1039.2279	2^+				
3576.370	4^+	749.68 *10*	25 *8*	2826.69	3^-				
		796.21 *5*	53 *12*	2780.157	2^+				
		1703.59 *5*	100 *4*	1872.7653	2^+				
		2537.09 *5*	93 *20*	1039.2279	2^+				
3670.72	2^+	441.822	100 *9*	3228.885	1^+				E_γ: from level energy difference; 440.5 *1* from (n,n′γ). I_γ: from (n,n′γ).
		1219.1[b] *2*	39[b] *7*	2451.01	4^+				
		1797.94 *9*	18 *5*	1872.7653	2^+				
		2631.44 *9*	28 *11*	1039.2279	2^+				

γ(^{66}Zn) (continued)

E_i(level)	J^π_i	E_γ[‡]	I_γ[#]	E_f	J^π_f	Mult.	δ[a]	α[†]	Comments
3689.01	1+,2+,3+	1815.4[h] *5*	100	1872.7653	2+				E_γ: reported only in ^{65}Cu(p,γ).
3709.4	(5)	943.8[c] *3*	100[c]	2765.56	4+	(D+Q)[&]	−1.5 *+2−1*		
3725.3		293.0[d] *5*	11[f]	3432.408	1−				
		962[d] *1*	100[f]	2765.56	4+				
3731.6		966.0[e] *5*	100[g]	2765.56	4+				E_γ: reported only in ^{65}Cu(p,γ).
3738.207	+	800.13 *5*	7 *4*	2938.074	2+				
		2698.92 *5*	27 *5*	1039.2279	2+				
		3738.10 *5*	100 *6*	0.0	0+				
3747.03	5−	669.5[c] *3*	21[c] *2*	3077.73	4+	(E1)[&]		0.000294 *5*	α(K)=0.000264 *4*; α(L)=2.63×10^{-5} *4*; α(M)=3.77×10^{-6} *6*; α(N+..)=1.511×10^{-7} *22* α(N)=1.511×10^{-7} *22* B(E1)(W.u.)=4.9×10^{-6} *7* δ(M2/E1)=−0.04 *6*.
		919.9[c] *3*	4.9[c] *5*	2826.69	3−	E2[@]		0.000360 *5*	α(K)=0.000323 *5*; α(L)=3.24×10^{-5} *5*; α(M)=4.65×10^{-6} *7*; α(N+..)=1.85×10^{-7} *3* α(N)=1.85×10^{-7} *3* B(E2)(W.u.)=0.045 *7* δ(M3/E2)=−0.00 *6*.
		981.5[c] *5*	<6[c]	2765.56	4+				
		1295.6[c] *4*	100[c] *10*	2451.01	4+	(E1+M2)[&]	−0.04 *2*	0.000193 *3*	α(K)=7.15×10^{-5} *11*; α(L)=7.09×10^{-6} *11*; α(M)=1.015×10^{-6} *16*; α(N+..)=0.0001134 α(N)=4.10×10^{-8} *7*; α(IPF)=0.0001134 *17* B(E1)(W.u.)=(3.2×10^{-6} *5*); B(M2)(W.u.)=(0.014 *+15−14*)
3753.01	4+	2713.73 *5*	100	1039.2279	2+				
3791.123	1+	283.87 *3*	0.016 *4*	3507.249	2+				
		410.178 *12*	0.289 *12*	3380.944	1−				
		459.683 *14*	0.387 *17*	3331.441	2+				
		562.241 *10*	0.029 *3*	3228.885	1+				
		578.540 *19*	0.26 *4*	3212.582	2+				
		686.080 *6*	1.11 *4*	3105.040	0+				
		853.038 *8*	0.334 *9*	2938.074	2+	M1+E2	0.37 *18*	0.000357 *11*	α(K)=0.000321 *10*; α(L)=3.20×10^{-5} *11*; α(M)=4.59×10^{-6} *15*; α(N+..)=1.85×10^{-7} *6* α(N)=1.85×10^{-7} *6*
		1010.957 *19*	0.119 *7*	2780.157	2+				
		1418.754 *5*	2.703 *13*	2372.353	0+				
		1918.329 *5*	8.76 *4*	1872.7653	2+	M1+E2	−0.07 *3*	0.000295 *5*	α(K)=6.47×10^{-5} *9*; α(L)=6.40×10^{-6} *9*; α(M)=9.18×10^{-7} *13*; α(N+..)=0.000223 *4* α(N)=3.73×10^{-8} *6*; α(IPF)=0.000223 *4*

From ENSDF

$^{66}_{30}$Zn$_{36}$-12

$\gamma(^{66}Zn)$ (continued)

E_i(level)	J^π_i	E_γ[‡]	I_γ[#]	E_f	J^π_f	Mult.	δ[a]	α[†]	Comments
3791.123	1^+	2751.835 *5*	100.0 *5*	1039.2279	2^+	(M1+E2)	−0.12 *2*	0.000626 *9*	α(K)=3.48×10^{-5} *5*; α(L)=3.43×10^{-6} *5*; α(M)=4.92×10^{-7} *7*; α(N+..)=0.000588 *9* α(N)=2.00×10^{-8} *3*; α(IPF)=0.000588 *9*
		3791.004 *8*	2.941 *24*	0.0	0^+	M1		0.001017 *15*	α(K)=2.08×10^{-5} *3*; α(L)=2.05×10^{-6} *3*; α(M)=2.95×10^{-7} *5*; α(N+..)=0.000994 *14* α(N)=1.200×10^{-8} *17*; α(IPF)=0.000994 *14*
3825.0	0^+	2785.7 *3*	100	1039.2279	2^+				
3882.424	$(2)^+$	1507[h]		2372.353	0^+				Eγ,Iγ: reported only in ^{66}Zn(γ,γ′).
		2009.628 *16*	100 *21*	1872.7653	2^+				
		2843.130 *16*	54 *11*	1039.2279	2^+				
3898.3	5^-	1071.3[c] *7*	100[c]	2826.69	3^-	(E2(+M3))[&]	−0.04 *20*	0.00025 *4*	α(K)=0.00023 *4*; α(L)=2.3×10^{-5} *4*; α(M)=3.2×10^{-6} *6*; α(N+..)=1.30×10^{-7} *21* α(N)=1.30×10^{-7} *21*
3924.71		1555[d] *1*	100[f]	2372.353	0^+				E_γ: possible doublet. Eγ=1553.0 in ^{65}Cu(p,γ). I_γ: Iγ(1555)/Iγ(2888)<0.6 from ^{65}Cu(p,γ).
		2885.3[b] *2*	33	1039.2279	2^+				I_γ: relative branching from ^{66}Zn(p,p′γ).
4019.2	2^+	1239.0[d] *15*	100[f]	2780.157	2^+				
4075.7	(6^-)	328.6[c] *2*	100[c]	3747.03	5^-	(M1+E2)[@]	+0.10 *2*	0.00299 *5*	α(K)=0.00268 *5*; α(L)=0.000272 *5*; α(M)=3.91×10^{-5} *7*; α(N+..)=1.559×10^{-6} *25* α(N)=1.559×10^{-6} *25* B(M1)(W.u.)=(0.0206 *10*); B(E2)(W.u.)=(3.1 *13*)
4085.983	1^+	347.77 *5*	0.14 *5*	3738.207	$+$				
		554.28 *3*	0.35 *4*	3531.692	0^+				
		653.568 *14*	0.10 *4*	3432.408	1^-				
		658.57 *3*	0.59 *6*	3427.406	$1,2^-$				
		705.031 *15*	0.30 *4*	3380.944	1^-				
		857.093 *9*	1.2 *4*	3228.885	1^+				
		873.392 *21*	1.34 *9*	3212.582	2^+				
		980.934 *13*	3.80 *15*	3105.040	0^+				
		1147.896 *10*	6.15 *21*	2938.074	2^+	M1+E2	−0.18 *5*	0.000192 *3*	α(K)=0.0001708 *25*; α(L)=1.700×10^{-5} *25*; α(M)=2.44×10^{-6} *4*; α(N+..)=2.28×10^{-6} *4* α(N)=9.87×10^{-8} *14*; α(IPF)=2.18×10^{-6} *4*
		1305.807 *21*	0.31 *4*	2780.157	2^+				
		1713.602 *12*	1.92 *9*	2372.353	0^+				
		2213.181 *9*	10.3 *4*	1872.7653	2^+	M1+E2	−0.23 *5*	0.000410 *6*	α(K)=5.03×10^{-5} *7*; α(L)=4.98×10^{-6} *7*; α(M)=7.14×10^{-7} *10*; α(N+..)=0.000354 *6* α(N)=2.90×10^{-8} *4*; α(IPF)=0.000354 *6*
		3046.684 *9*	4.47 *18*	1039.2279	2^+	M1+E2	−0.8 *2*	0.000778 *16*	α(K)=2.97×10^{-5} *5*; α(L)=2.94×10^{-6} *5*;

$^{66}_{30}Zn_{36}$-13

$\gamma(^{66}Zn)$ (continued)

E_i(level)	J^π_i	E_γ[‡]	I_γ[#]	E_f	J^π_f	Mult.	δ[a]	α[†]	Comments
									α(M)=4.21×10^{-7} *6*; α(N+..)=0.000745 *16*
									α(N)=1.712×10^{-8} *25*; α(IPF)=0.000745 *16*
4085.983	1^+	4085.853 *9*	100.0 *6*	0.0	0^+	M1		0.001117 *16*	α(K)=1.86×10^{-5} *3*; α(L)=1.83×10^{-6} *3*; α(M)=2.63×10^{-7} *4*; α(N+..)=0.001096 *16* α(N)=1.070×10^{-8} *15*; α(IPF)=0.001096 *16*
4119.0	(1^-)	3079.7[e] *5*	100[g]	1039.2279	2^+				E_γ: reported only in ^{65}Cu(p,γ).
4182.7	(6^+)	1732.9[c] *5*	100[c]	2451.01	4^+	(E2)[@]		0.000276 *4*	α(K)=8.15×10^{-5} *12*; α(L)=8.10×10^{-6} *12*; α(M)=1.161×10^{-6} *17*; α(N+..)=0.000186 *3* α(N)=4.69×10^{-8} *7*; α(IPF)=0.000186 *3* B(E2)(W.u.)=15 *6* δ(M3/E2)<5.3×10^{-4} from RUL. δ=−0.10 *5* from $\gamma(\theta)$ in (d,2nγ).
4251.9	(7^-)	175.9[c] *3*	87[c] *9*	4075.7	(6^-)	(M1+E2)[@]	+0.09 *2*	0.0144 *4*	α(K)=0.0128 *3*; α(L)=0.00133 *4*; α(M)=0.000190 *5*; α(N+..)=7.48×10^{-6} *17* α(N)=7.48×10^{-6} *17* B(M1)(W.u.)=(0.0139 *21*); B(E2)(W.u.)=(6 *3*)
		504.7[c] *3*	100[c] *10*	3747.03	5^-	(E2)[@]		0.00193 *3*	α(K)=0.001726 *25*; α(L)=0.0001766 *25*; α(M)=2.52×10^{-5} *4*; α(N+..)=9.82×10^{-7} *14* α(N)=9.82×10^{-7} *14* B(E2)(W.u.)=4.4 *7* δ(M3/E2)=−0.00 *2*.
4295.339	1^+	412.916 *16*	0.088 *13*	3882.424	$(2)^+$				
		557.13 *5*	0.161 *17*	3738.207	+	M1+E2		0.0011 *3*	α(K)=0.00103 *25*; α(L)=0.00010 *3*; α(M)=1.5×10^{-5} *4*; α(N+..)=5.9×10^{-7} *14* α(N)=5.9×10^{-7} *14*
		718.97 *5*	0.260 *20*	3576.370	4^+				
		763.64 *3*	0.233 *20*	3531.692	0^+				
		862.926 *13*	0.398 *20*	3432.408	1^-				
		867.93 *3*	0.114 *14*	3427.406	$1,2^-$				
		914.388 *14*	0.71 *4*	3380.944	1^-				
		963.892 *15*	0.38 *3*	3331.441	2^+				
		1066.450 *12*	0.062 *12*	3228.885	1^+				
		1082.75 *2*	0.348 *20*	3212.582	2^+				
		1190.287 *7*	3.35 *19*	3105.040	0^+				
		1357.250 *12*	4.3 *13*	2938.074	2^+	M1+E2	−0.18 *5*	0.0001689 *24*	α(K)=0.0001231 *18*; α(L)=1.223×10^{-5} *18*; α(M)=1.753×10^{-6} *25* α(N)=7.11×10^{-8} *10*; α(IPF)=3.18×10^{-5} *5* B(M1)(W.u.)=0.054 *+20−29*; B(E2)(W.u.)=1.5 *+10−12*
		1515.162 *20*	0.162 *15*	2780.157	2^+				

$^{66}_{30}Zn_{36}$-14

γ(^{66}Zn) (continued)

E_i(level)	J^π_i	E_γ[‡]	I_γ[#]	E_f	J^π_f	Mult.	δ[a]	α[†]	Comments
4295.339	1^+	2422.525 *7*	49.37 *24*	1872.7653	2^+	M1+E2	0.01 *3*	0.000491 *7*	α(K)=4.30×10^{-5} *6*; α(L)=4.25×10^{-6} *6*; α(M)=6.10×10^{-7} *9*; α(N+..)=0.000443 *7* α(N)=2.48×10^{-8} *4*; α(IPF)=0.000443 *7* B(M1)(W.u.)=0.112 *+24−48*; B(E2)(W.u.)=0.003 *+19−3*
		3256.021 *9*	2.47 *10*	1039.2279	2^+	M1+E2	1.5 *2*	0.000889 *14*	α(K)=2.70×10^{-5} *4*; α(L)=2.66×10^{-6} *4*; α(M)=3.81×10^{-7} *6*; α(N+..)=0.000859 *14* α(N)=1.552×10^{-8} *22*; α(IPF)=0.000859 *14* B(M1)(W.u.)=0.00071 *+21−34*; B(E2)(W.u.)=0.24 *+6−11*
		4295.187 *10*	100.0 *8*	0.0	0^+				
4321.83		3282.5[b] *2*	100	1039.2279	2^+				
4393.7	3^-	1565.2 *20*	≈100	2826.69	3^-				E_γ: reported only in ^{66}Zn(α,$\alpha'\gamma$). I_γ: from ^{66}Zn(α,$\alpha'\gamma$).
		3357.0 *25*	≈100	1039.2279	2^+				E_γ: reported only in ^{66}Zn(α,$\alpha'\gamma$). I_γ: from ^{66}Zn(α,$\alpha'\gamma$).
4424	1	4424 *6*	100	0.0	0^+				E_γ: from ^{66}Zn(n,n$'\gamma$). Eγ=4426 in ^{66}Zn(γ,γ'). I_γ: from ^{66}Zn(n,n$'\gamma$).
4433	1^-	4433[h] *6*	100	0.0	0^+				Eγ,Iγ: reported only in ^{66}Zn(n,n$'\gamma$).
4461.409	1^+	375.398 *17*	0.25 *7*	4085.983	1^+				
		670.251 *14*	0.48 *8*	3791.123	1^+				
		708.36 *5*	1.01 *9*	3753.01	4^+				
		723.17 *5*	0.40 *6*	3738.207	$^+$				
		885.00 *5*	0.22 *6*	3576.370	4^+				
		929.68 *3*	0.53 *7*	3531.692	0^+				
		954.12 *7*	0.52 *8*	3507.249	2^+				
		1129.923 *18*	1.59 *9*	3331.441	2^+				
		1232.480 *15*	6.5 *22*	3228.885	1^+				
		1248.779 *22*	0.12 *4*	3212.582	2^+				
		1356.320 *15*	14.3 *22*	3105.040	0^+				
		1523.279 *15*	0.64 *6*	2938.074	2^+				
		2088.985 *13*	1.3 *3*	2372.353	0^+				
		2588.553 *13*	3.07 *18*	1872.7653	2^+	M1+E2	0.35 *27*	0.000568 *16*	α(K)=3.86×10^{-5} *6*; α(L)=3.81×10^{-6} *6*; α(M)=5.47×10^{-7} *9*; α(N+..)=0.000525 *16* α(N)=2.22×10^{-8} *4*; α(IPF)=0.000525 *16* B(M1)(W.u.)=0.0022 *+10−22*; B(E2)(W.u.)=0.06 *+10−6*
		3422.040 *8*	100.0 *7*	1039.2279	2^+	M1+E2	−0.06 *2*	0.000885 *13*	α(K)=2.44×10^{-5} *4*; α(L)=2.41×10^{-6} *4*; α(M)=3.46×10^{-7} *5*; α(N+..)=0.000858 *12* α(N)=1.408×10^{-8} *20*; α(IPF)=0.000858 *12* B(M1)(W.u.)=0.034 *+15−34*; B(E2)(W.u.)=0.017 *+14−17*
		4461.202 *9*	97.7 *13*	0.0	0^+				
4497.6		3458.3[b] *5*	100	1039.2279	2^+				

$^{66}_{30}Zn_{36}$-15

γ(^{66}Zn) (continued)

E_i(level)	J^π_i	E_γ[‡]	I_γ[#]	E_f	J^π_f	Mult.	δ[a]	α[†]	Comments
4609?	(1)	4609[h]	100	0.0	0^+				E_γ,I_γ: reported only in ^{66}Zn(γ,γ').
4622		4622 6	100	0.0	0^+				Eγ,Iγ: reported only in ^{66}Zn(n,n'γ).
4635.3	(2)	2762[h]	100	1872.7653	2^+				Eγ,Iγ: reported only in ^{66}Zn(γ,γ').
4638.24	1	1106.53 24	77 24	3531.692	0^+				
		1409.35 24	1.0×10^2 5	3228.885	1^+				
		2265.84 24	9×10^1 4	2372.353	0^+				
4675.6	1^+	2802.8 5	100	1872.7653	2^+				
4683	(1)	4685[h]	100	0.0	0^+				Eγ,Iγ: reported only in ^{66}Zn(γ,γ').
4806.199	1^+	1015.081 18	0.66 16	3791.123	1^+				
		1135.47 9	0.25 5	3670.72	2^+				
		1274.50 3	0.38 3	3531.692	0^+				
		1298.95 7	0.205 24	3507.249	2^+				
		1425.25 2	0.32 3	3380.944	1^-				
		1577.308 20	0.21 4	3228.885	1^+				
		1868.105 20	1.5 3	2938.074	2^+				
		2026.016 25	0.14 4	2780.157	2^+				
		2433.807 18	0.40 4	2372.353	0^+				
		2933.358 9	11.45 16	1872.7653	2^+	M1+E2	1.6 2	0.000762 12	α(K)=3.19×10^{-5} 5; α(L)=3.15×10^{-6} 5; α(M)=4.52×10^{-7} 7; α(N+..)=0.000727 12 α(N)=1.84×10^{-8} 3; α(IPF)=0.000727 12 B(M1)(W.u.)=0.0060 +17−24; B(E2)(W.u.)=2.9 +7−10
		3766.850 9	8.0 3	1039.2279	2^+	M1+E2	0.11 4	0.001009 15	α(K)=2.11×10^{-5} 3; α(L)=2.08×10^{-6} 3; α(M)=2.98×10^{-7} 5; α(N+..)=0.000986 14 α(N)=1.212×10^{-8} 17; α(IPF)=0.000986 14 B(M1)(W.u.)=0.0069 +15−24; B(E2)(W.u.)=0.010 8
		4806.007 9	100.0 6	0.0	0^+				E_γ: γ-ray, in ^{66}Ga decay, often used for the efficiency calibration of germanium detectors.
4814.1	(7^-)	738.4[c] 3	100[c] 9	4075.7	(6^-)	(M1+E2)[@]	+0.11 2	0.000472 7	α(K)=0.000423 6; α(L)=4.24×10^{-5} 6; α(M)=6.08×10^{-6} 9; α(N+..)=2.45×10^{-7} 4 α(N)=2.45×10^{-7} 4 B(M1)(W.u.)=(0.06 5); B(E2)(W.u.)=(2.2 18)
		915.5[c] 8	45[c] 9	3898.3	5^-				
4849.93	1^+	1468.97 5	6.0 17	3380.944	1^-				
		2977.08 4	100 10	1872.7653	2^+				
		3810.59 5	40 4	1039.2279	2^+				
4866.056	1^+	1195.32 9	2.9 11	3670.72	2^+				
		1433.63 4	5.9 12	3432.408	1^-				
		1534.60 4	19 5	3331.441	2^+				
		1927.96 4	7.2 24	2938.074	2^+				

From ENSDF

$^{66}_{30}Zn_{36}$-16

γ(^{66}Zn) (continued)

E_i(level)	J^π_i	E_γ[‡]	I_γ[#]	E_f	J^π_f	Mult.	δ[a]	α[†]	Comments
4866.056	1^+	2085.86 *4*	7 *5*	2780.157	2^+				
		2993.21 *3*	100 *10*	1872.7653	2^+				
		4865.87 *4*	8.8 *7*	0.0	0^+				
4958.2	1^+	3085.4 *4*	100	1872.7653	2^+				
5005.8	1^+	5005.6 *3*	100	0.0	0^+				
5111.9	(8^-)	860.8[c] *8*	11[c] *3*	4251.9	(7^-)	(M1+E2)[&]	+0.21 *15*	0.000344 *8*	α(K)=0.000308 *7*; α(L)=3.08×10^{-5} *8*; α(M)=4.42×10^{-6} *11*; α(N+..)=1.78×10^{-7} *4* α(N)=1.78×10^{-7} *4*
		1036.0[c] *3*	100[c] *3*	4075.7	(6^-)				
5207.3	(8^+)	954.2[c] *5*	82[c] *16*	4251.9	(7^-)	(E1)[&]		0.0001395 *20*	B(E1)(W.u.)<3.6×10^{-5} α(K)=0.0001252 *18*; α(L)=1.244×10^{-5} *18*; α(M)=1.78×10^{-6} *3* α(N)=7.18×10^{-8} *10* δ(M2/E1)=−0.00 *8*. E_γ: doublet reported in ^{64}Ni(α,2nγ).
		1025.8[c] *5*	100[c] *11*	4182.7	(6^+)	(E2)[@]		0.000277 *4*	α(K)=0.000248 *4*; α(L)=2.49×10^{-5} *4*; α(M)=3.56×10^{-6} *5*; α(N+..)=1.427×10^{-7} *20* α(N)=1.427×10^{-7} *20* B(E2)(W.u.)<2.9 δ(M3/E2)=−0.04 *6*.
5464.4	(9^-)	1212.5[c] *4*	100[c]	4251.9	(7^-)	(E2)[@]		0.000200 *3*	α(K)=0.0001697 *24*; α(L)=1.695×10^{-5} *24*; α(M)=2.43×10^{-6} *4*; α(N+..)=1.073×10^{-5} α(N)=9.76×10^{-8} *14*; α(IPF)=1.063×10^{-5} *17* B(E2)(W.u.)=7 *3* δ(M3/E2)=−0.04 *4*.
6292.6	(10^+)	828[ch] *1*	<22[c]	5464.4	(9^-)				
		1085.3[c] *4*	100[c] *9*	5207.3	(8^+)	(E2)[@]		0.000243 *4*	α(K)=0.000218 *3*; α(L)=2.18×10^{-5} *3*; α(M)=3.12×10^{-6} *5*; α(N+..)=1.252×10^{-7} *18* α(N)=1.252×10^{-7} *18* B(E2)(W.u.)=13 *+4−7* δ(M3/E2)=+0.04 *6*.
6419.0		1307.1[c] *7*	100[c]	5111.9	(8^-)				
7367.4	1	2732	1.9 *12*	4635.3	(2)				
		3071[h]	2.1 *12*	4295.339	1^+				
		3293[h]	≈0.5	4075.7	(6^-)				
		3356[h]	0.4 *2*	4011.7					
		3485	2.1 *7*	3882.424	$(2)^+$				
		3544	1.6 *5*	3825.0	0^+				

$^{66}_{30}$Zn$_{36}$-17

Adopted Levels, Gammas (continued)

$\gamma(^{66}Zn)$ (continued)

E_i(level)	J^π_i	E_γ[‡]	I_γ[#]	E_f	J^π_f	Comments
7367.4	1	3793[h]	≈0.5	3576.370	4^+	
		3835	1.6 *7*	3531.692	0^+	E_γ: rounded-off value from level energy difference; 3840 from (γ,γ').
		4141	1.0 *6*	3226.2		
		4262	8.1 *20*	3105.040	0^+	
		4428	2.1 *6*	2938.074	2^+	
		4587	3.8 *12*	2780.157	2^+	E_γ: rounded off value from level energy difference; 4591 from (γ,γ').
		4995[h]	≤0.4	2372.353	0^+	
		5495	14.3 *7*	1872.7653	2^+	
		6326	≈0.3	1039.2279	2^+	
		7368	100	0.0	0^+	
7517.3		1224.7[c] *7*	100[c]	6292.6	(10^+)	
7693.3	1	4187	8 *2*	3507.249	2^+	
		4263	25 *3*	3432.408	1^-	
		4361	13 *2*	3331.441	2^+	
		4452	7 *2*	3241.2?		
		4480	21 *2*	3212.582	2^+	
		4587	8 *1*	3105.040	0^+	
		4755	24 *2*	2938.074	2^+	
		4930	<2	2762.8	(2)	I_γ: relative branching also reported as 8 in $^{66}Zn(\gamma,\gamma')$.
		5321	<3	2372.353	0^+	
		5819	<2	1872.7653	2^+	
		6654	42 *1*	1039.2279	2^+	
		7693	100 *1*	0.0	0^+	

† Additional information 2.

‡ From ^{66}Ga ε decay, except as noted. Energies of γ's depopulating levels above 7 MeV are from $^{66}Zn(\gamma,\gamma')$.

Relative-photon branching from each level from ^{66}Ga ε decay, except as noted. Branchings for γ's depopulating levels above 7 MeV are from $^{66}Zn(\gamma,\gamma')$.

@ From $\gamma(\theta)$ in $^{64}Ni(\alpha,2n\gamma)$ and RUL.

& From $\gamma(\theta)$ in $^{64}Ni(\alpha,2n\gamma)$ and ΔJ^π.

a From $\gamma(\theta)$ in $^{64}Ni(\alpha,2n\gamma)$, except as noted.

b From $^{66}Zn(n,n'\gamma)$.

c From $^{64}Ni(\alpha,2n\gamma)$.

d From $^{66}Zn(p,p'\gamma)$.

e From level energy differences in $^{65}Cu(p,\gamma)$. Uncertainty not given, but has been chosen by the evaluators to be 0.5 keV (an approximate upper limit).

f From $^{66}Zn(p,p'\gamma)$. Uncertainties not given in the source data but are estimated as ≈2-20%.

g From $^{65}Cu(p,\gamma)$.

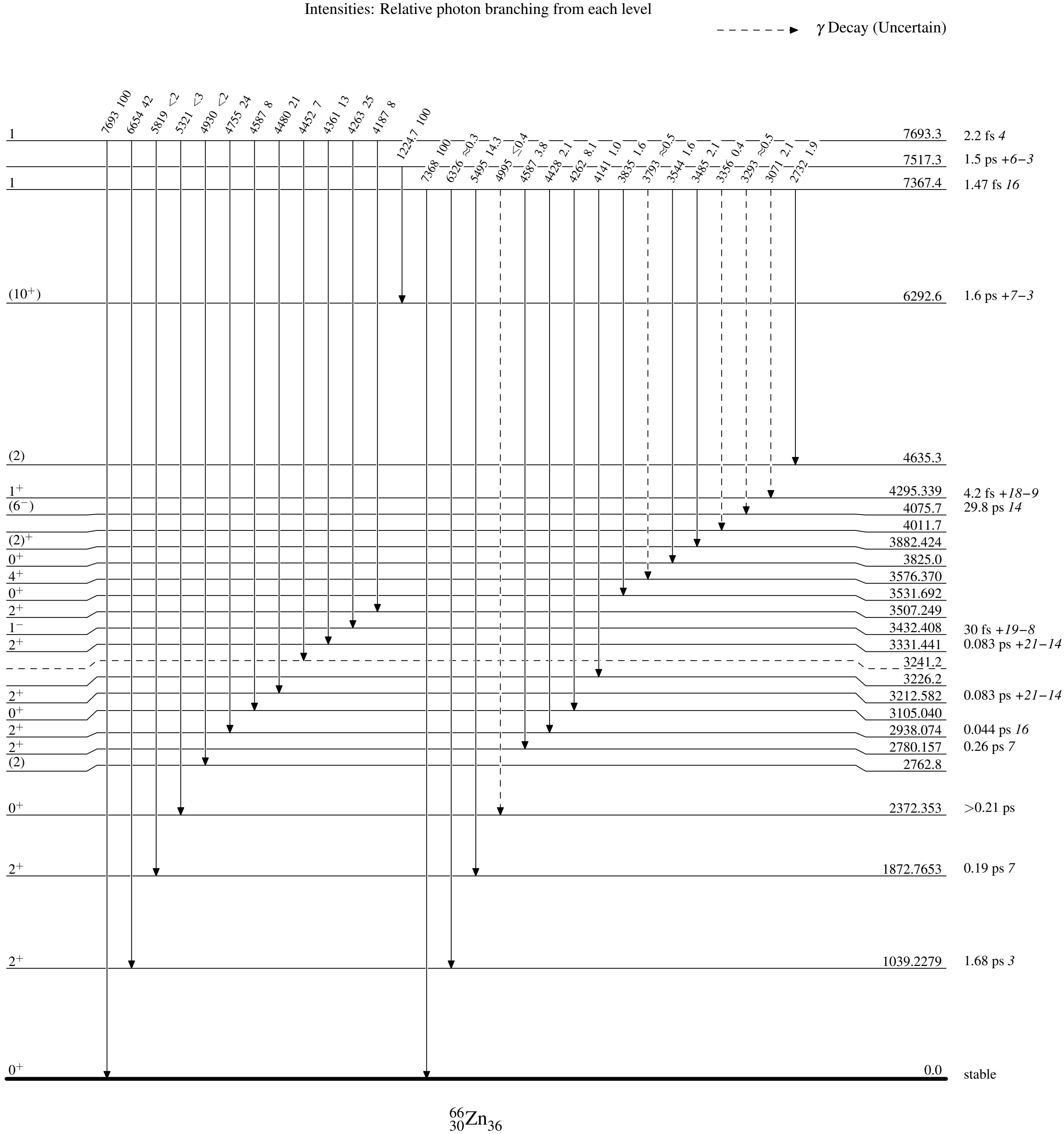
h Placement of transition in the level scheme is uncertain.

$^{66}_{30}Zn_{36}$-18

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level

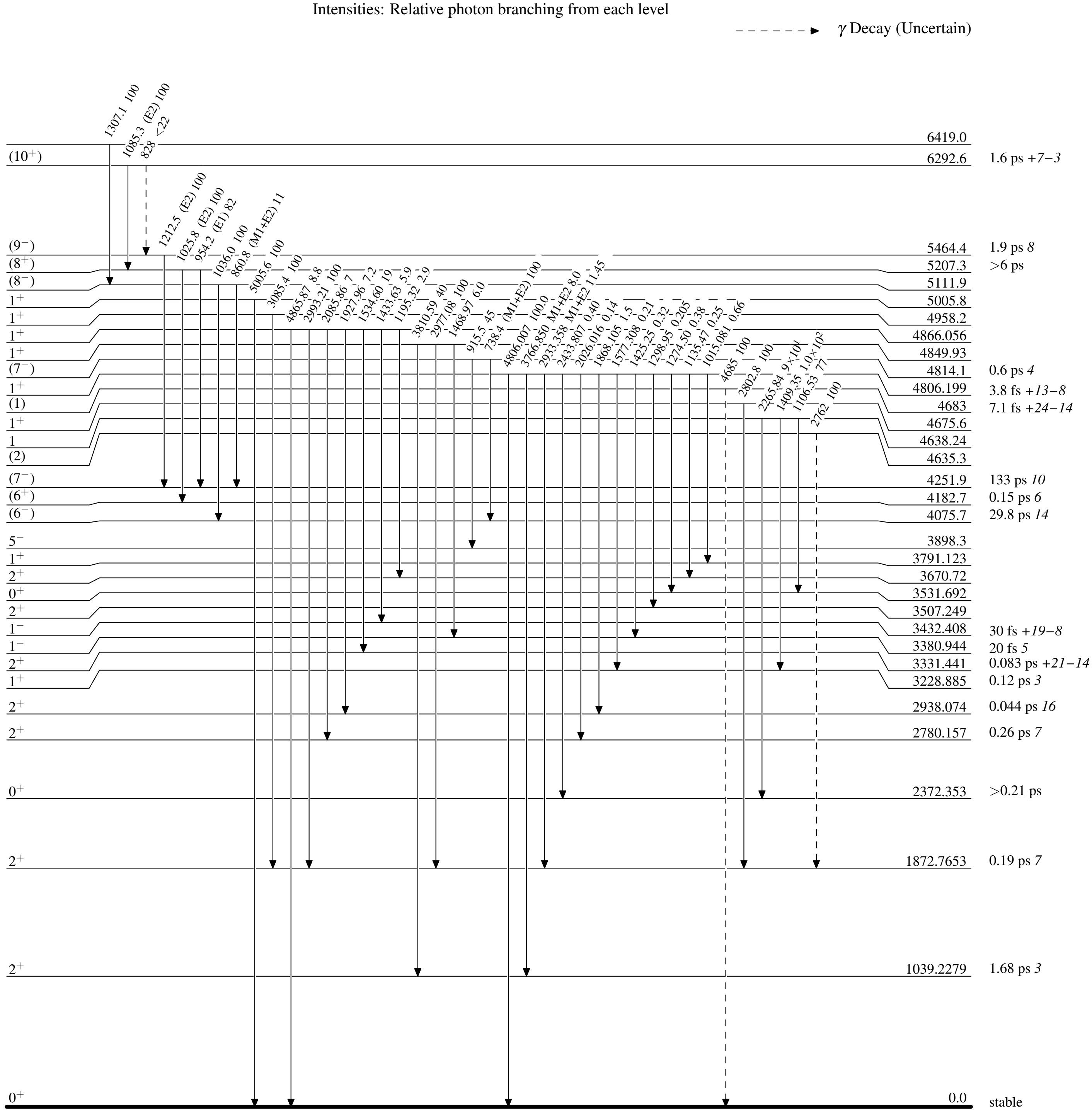


Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intentities: Relative photon branching from each level



$^{66}_{30}Zn_{36}$

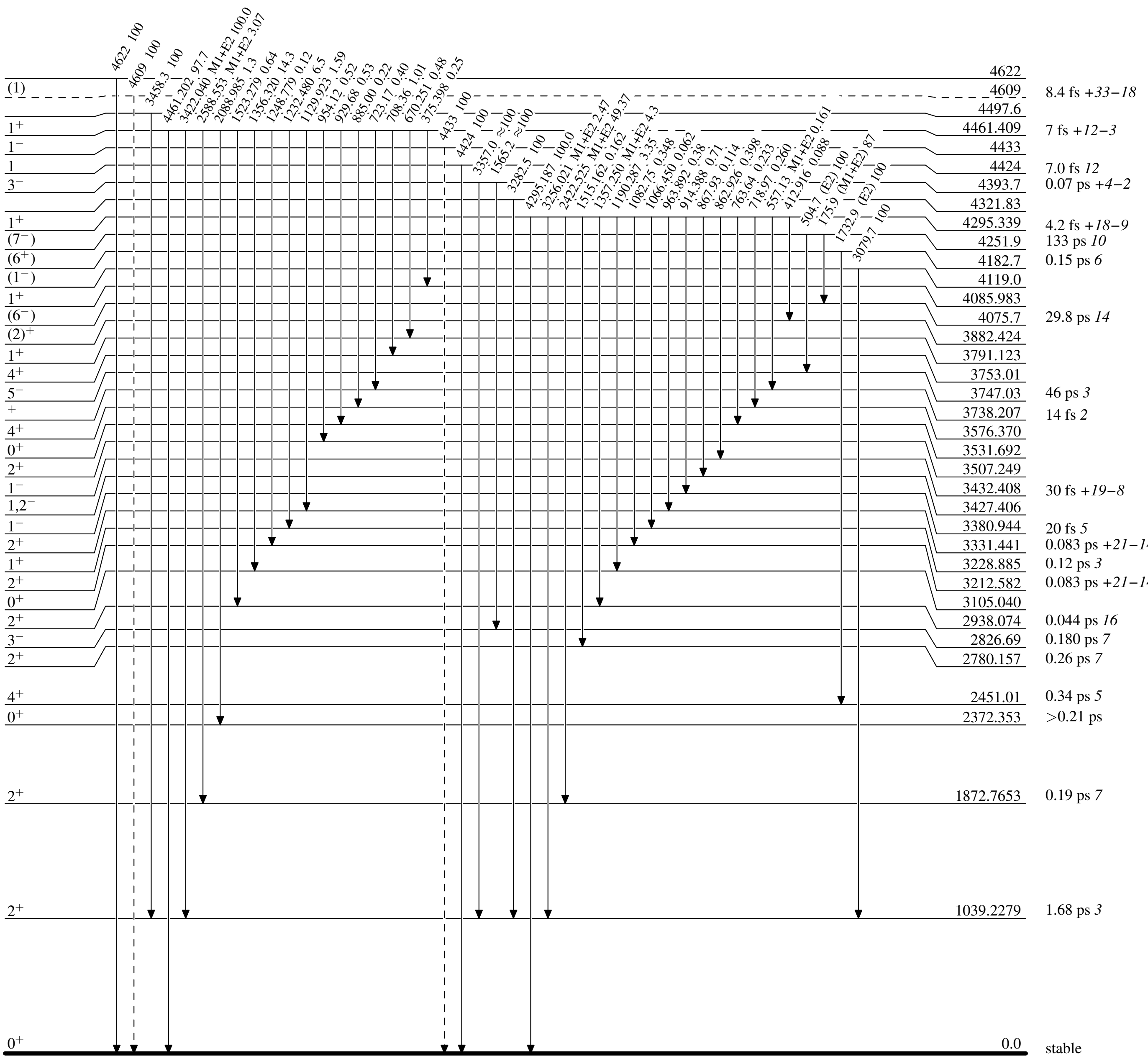
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

Legend

γ Decay (Uncertain)

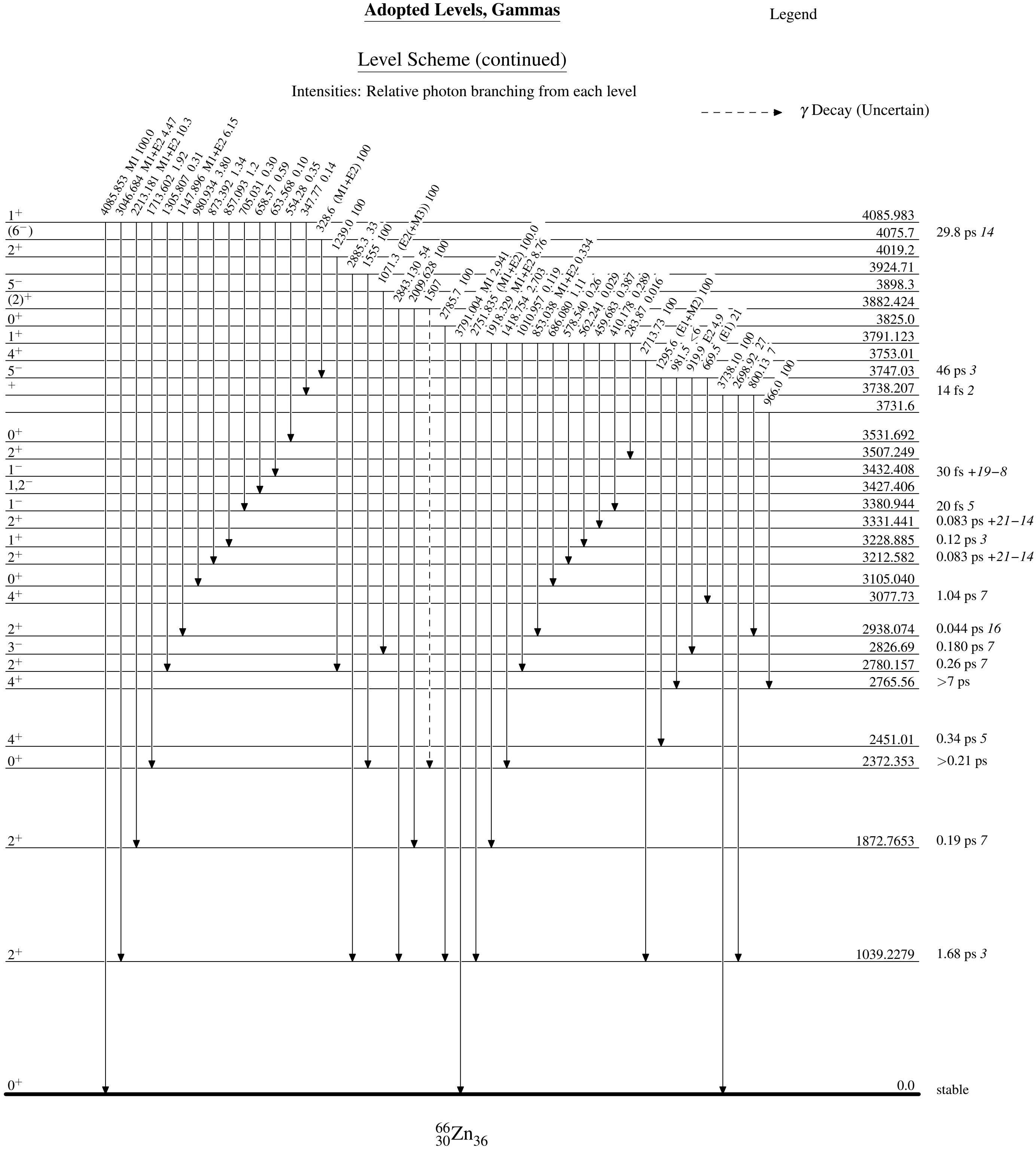


$^{66}_{30}Zn_{36}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



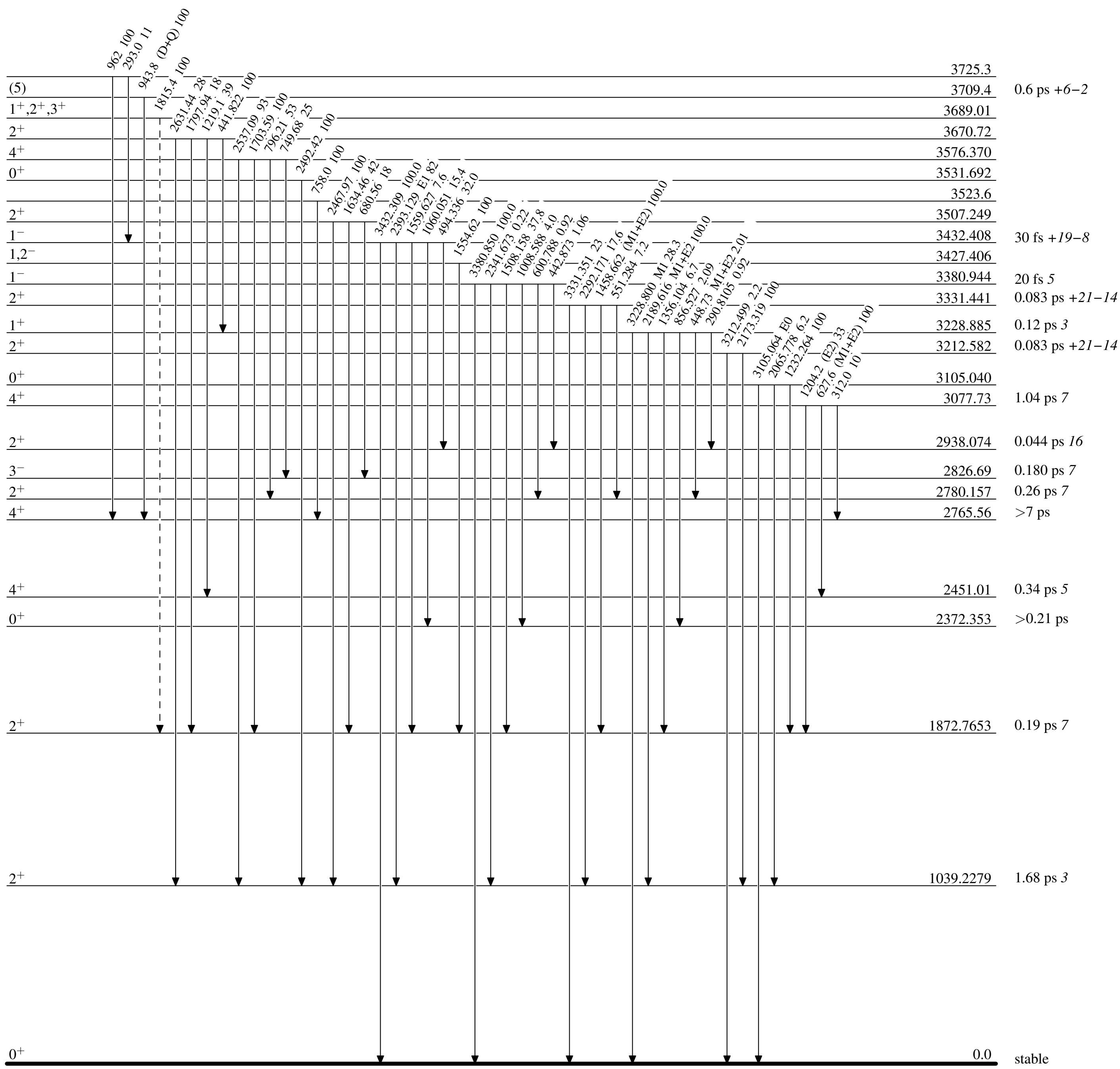
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

Legend

γ Decay (Uncertain)



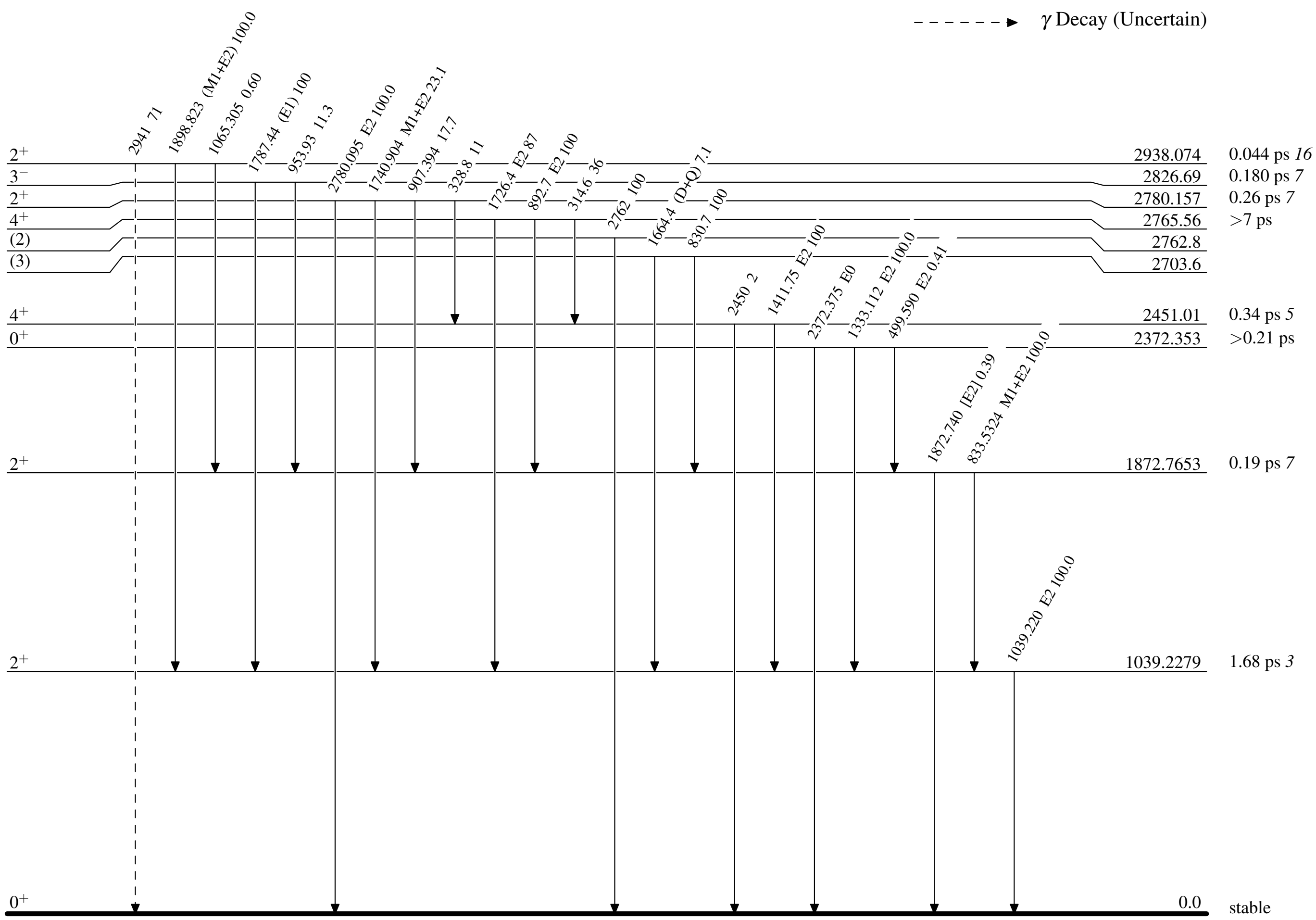
$^{66}_{30}Zn_{36}$

Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{66}_{30}Zn_{36}$

Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	E. A. Mccutchan	NDS 113,1735 (2012)	1-Mar-2012

Q(β^-)=−2921.1 *12*; S(n)=10198.10 *19*; S(p)=9977.0 *16*; Q(α)=−5333.3 *9* 2012Wa38
Note: Current evaluation has used the following Q record −2921.1 1210198.1019 *9977.0* *15* −5333.3 *8* 2011AuZZ.
S(2n)=17250.4 *3*, S(2p)=18578.5 *17* (2011AuZZ).
α: Additional information 1.

^{68}Zn Levels

Cross Reference (XREF) Flags

A	^{68}Cu β^- decay (30.9 s)	I	^{68}Zn(n,n′γ)	Q	^{68}Zn(^{28}Si,^{29}Si),(^{28}Si,^{30}Si)
B	^{68}Cu β^- decay (3.75 min)	J	^{68}Zn(p,p′)	R	^{68}Zn(d,d′),(^{3}He,^{3}He′)
C	^{68}Ga ε decay	K	^{68}Zn(e,e′)	S	^{26}Mg(^{48}Ca,α2nγ)
D	^{65}Cu(α,pγ)	L	Coulomb excitation	T	^{65}Cu(α,p)
E	^{66}Zn(t,p)	M	Coulomb excitation: projectile	U	^{64}Ni(^{6}Li,d)
F	^{67}Zn(n,γ) E=thermal	N	^{70}Zn(p,t)	V	^{66}Zn(α,^{2}He)
G	^{67}Zn(d,p)	O	^{68}Zn(α,α′)	W	^{69}Ga(d,^{3}He)
H	^{68}Zn(γ,γ′)	P	^{68}Zn(p,p′γ)	X	^{208}Pb(^{64}Ni,Xγ)

E(level)[†]	J$^\pi$	T$_{1/2}$	XREF	Comments
0.0[‡]	0$^+$	stable	ABCDEFGHIJKLMNOP R TUVWX	
1077.37[‡] *4*	2$^+$[@]	1.61 ps *2*	ABCDEFGHIJKLMNOPQR TUVWX	Q=−0.106 *16*; μ=+1.08 *6* T$_{1/2}$: weighted average of 1.48 ps *8* from B(E2)↑ in (e,e′), 1.68 ps *11* from Coul. Ex., and 1.62 ps *2* from DSAM in Coul. Ex.:Proj. Others: 1.50 ps *14* from B(E2)↑ in (d,d′), 1.88 ps *16* from (γ,γ′) (1981Ca10) and 0.90 ps *21* from DSAM in Coul. Ex. (1974Iv01). μ: from C-γ(θ,H,t) in Coul. Ex.: Projectile. Others +1.0 *2* from transient field (1978BeZJ) and +0.9 *3* from IMPAC (1979Fa06). Q: from (e,e′) (1981Ko06). Other: +0.09 *3* from GOSIA analysis of multi-step Coul. ex. (2004Ko03).
1655.91 *8*	0$^+$	96 ps *16*	A C EF HIJ MNOP R W	T$_{1/2}$: weighted average of 103 ps *18* from B(E2)↑ in Coul. Ex.:Projectile and 70 ps *35* from centroid-shift measurement in (p,p′γ). J$^\pi$: L(p,t)=L(t,p)=0.
1883.20 *5*	2$^+$	1.01 ps *5*	A CDEFG IJK MNOP R TU W	μ=+1.12 *20* J$^\pi$: L(p,t)=2. T$_{1/2}$: from DSAM in Coul. Ex.:Projectile. Others: 1.6 ps *3* from B(E2)↑ in (e,e′), 1.47 ps 12 from B(E2)↑ in Coul. Ex.:Projectile, >0.11 ps from DSAM in (α,pγ). μ: from C-γ(θ,H,t) in Coul. Ex.: Projectile.
2338.45 *5*	2$^+$[@]	0.31 ps *3*	ABC EFG IJ MNO U W	T$_{1/2}$: from DSAM in Coul. Ex.:Projectile. Others: 0.24 ps *+11−6* from DSAM in (n,n′γ) and 0.043 ps *4* from B(E2)↑ in Coul. Ex.:Projectile.
2370.3 *15*			AB R T V	J$^\pi$: 1293γ to 2$^+$.
2417.40[‡] *6*	4$^+$	0.73 ps *7*	B DEFG IJ MNO U WX	μ=+0.56 *52* J$^\pi$: J from L(p,t)=L(^{6}Li,d)=4. T$_{1/2}$: weighted average of 0.76 ps *6* (2005Le12) and 0.82 ps *6* (2005Le38) from DSAM in Coul. Ex.: Projectile and 0.60 ps *6* (2004Ko03) from B(E2)↑ in Coul. Ex.:Projectile. μ: from C-γ(θ,H,t) in Coul. Ex.: Projectile.

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Adopted Levels, Gammas (continued)

^{68}Zn Levels (continued)

E(level)[†]	J$^\pi$	T$_{1/2}$	XREF	Comments
2510.2 *15*			AB N	XREF: N(?). J$^\pi$: 1433γ to 2$^+$.
2750.76 *8*	3^-[@]	0.257 ps *6*	A EFG IJKLMNO QR UV	μ=1.08 *72* T$_{1/2}$: from DSAM in Coul. Ex.:Projectile. Others: 0.45 ps *+14−8* from DSAM in (n,n′γ) and 0.42 ps *14* from DSAM in Coul. Ex. B(E3)↑: 0.038 *8* from (e,e′) and 0.0220 *17* from (d,d′). μ: from C-γ(θ,H,t) in Coul. Ex.: Projectile.
2821.79 *8*	2^+[@]	0.15[&] ps *3*	ABC EFGHIJ N U W	
2955.9 *22*	[b]		B e g J n w	
2959.49 *13*	(4^+)[b]		eFg I nO U wX	J$^\pi$: proposed by (2000Wi18),(1997Be77) in ^{208}Pb(^{64}Ni,Xγ).
3009.27 *7*	3^+	0.28[&] ps *+14−8*	FG IJ W	J$^\pi$: L(p,p′)=4, J=4 ruled out by γγ(θ) in (n,γ), 1126γ to 2$^+$ rules out J=5.
3102.51 *11*	0^+		EF I P	J$^\pi$: L(t,p)=0.
3153.8? *4*	[c]		e I	
3160.1 *3*	[c]		e I o	
3164.4 *14*			IJ o	J$^\pi$: L(p,p′)=(1) for E=3168 *5* and L(α,α′)=(5) for E=3170 *30* discrepant. E(level): possible multiplet of levels in this region.
3184.18 *13*	$1,2^+$[d]	22[&] fs *6*	Fg I r w	
3186.6 *11*	$(1,2^+)$		A g J r w	J$^\pi$: 1530γ to 0$^+$.
3281.58 *16*	4^+[@]		EF I n r w	
3287.09 *13*	2^+	0.08[&] ps *+2−1*	FG IJ n r w	J$^\pi$: L(p,p′)=2+4 for 3282 and 3287 levels, L=1, j=1/2 transfer in (d,p) gives 2$^+$,3$^+$, 3287γ to 0$^+$.
3334.7?			F	
3346.09 *20*	1^+	6.1[a] fs *16*	HIJ N T W	J$^\pi$: J from γγ(θ) in (γ,γ′); π from L(d,^{3}He). L(p,t)=(0) for 3345 discrepant. T$_{1/2}$: Other: 15 fs *+7−6* from DSAM in (n,n′γ).
3386? *3*			I	
3400.9 *5*	$1,2^+$[e]	45[&] fs *+17−14*	I	
3425.07 *15*	[f]		eFG I W	
3429.46 *15*	$1,2^+$[df]		eF IJ r W	
3451.0 *3*			I no r	
3458.83 *16*	5^-[@]		B DEFG IJ no U X	XREF: J(3465).
3487.7 *15*			A e w	
3496.08 *11*	$3^+,4^+$	62[&] fs *10*	eF IJ w	J$^\pi$: 3$^+$,4$^+$,5$^+$ from L(p,p′)=4; ≠5$^+$ from primary γ from 2$^-$,3$^-$ capture state.
3586.64 *10*	4^+[@]		EFG IJ N R	XREF: J(3595)N(3577).
3610.8 *6*	$(6)^-$	<2.5 ns	B D G O X	J$^\pi$: D transition to 5$^-$ and yield function favor J=6; π from L(d,p)=4. T$_{1/2}$: upper limit from γγ(t) of 152γ in ^{65}Cu(α,pγ).
3622 *5*	3^-		E J	E(level): from (p,p′). Other: 3620 *10* in (t,p). J$^\pi$: L(t,p)=(p,p′)=3.
3624.32 *21*	$(1,2^+)$		I	J$^\pi$: γ to g.s.
3630.32 *11*	(2^+)		F I R	J$^\pi$: 1213γ to 4$^+$, 3630γ to 0$^+$.
3664.7 *3*	$(1,2)^+$		FG IJ W	XREF: J(3658). J$^\pi$: J from γ to 0$^+$; π from L(d,p)=1.
3687.5[‡] *5*	(6^+)		DE I X	J$^\pi$: J=6 from yield function in (α,pγ); π from γ to

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Adopted Levels, Gammas (continued)

^{68}Zn Levels (continued)

E(level)[†]	J^π	$T_{1/2}$	XREF	Comments
				4^+. L(t,p)=(5) for 3682 *10* discrepant. E(level): possible multiplet of levels in this region.
3709.8 *3*	(2^+)		e IJ N	XREF: J(3701)N(3701). J^π: L(p,t)=2 for a level at 3701; however, L(t,p)=0+4 for a level at 3712 *10*. γ's to 2^+ and 0^+ favor J=2.
3717.47 *20*	$1,2^+$[e]	[a]	e HI o	$T_{1/2}$: adopted value of Γ_o/Γ=0.63 *4* gives $T_{1/2}$=22 fs *+8−5* for J=1 and 35 fs *+11−6* for J=2.
3725.79 *17*		33[&] fs *+9−6*	B F IJ o	J^π: 2648γ to 2^+.
3732.4? *10*			B V	
3776.32 *23*	$1,2^+$[d]		FG IJ R U	XREF: G(3769)J(3783).
3814 *4*	$(3)^-$		E G	XREF: E(3806)G(3815). J^π: J from L(t,p)=(3); π from L(d,p)=4. E(level): weighted average of 3806 *10* from (t,p) and 3815 *4* from (d,p).
3814.83 *21*	$1,2^+$[e]	24[&] fs *+8−6*	F I	E(level): γ-decay modes imply this level is distinct from the 3814 *4*, (3^-) level.
3849.30 *22*	4^+	0.16[&] ps *+15−6*	EFG IJ O	XREF: E(3841)J(3840). J^π: L(t,p)=4.
3895.83 *17*	4^+		EF IJ N	XREF: E(3886)J(3888). J^π: L(t,p)=4.
3910.99 *24*	$(3)^-$		FG I r	J^π: 1494γ to 4^+, 2028γ to 2^+; π from L(d,p)=4.
3929? *4*			e I r	
3935.08 *18*	3^+		eF IJ o	J^π: $3^+,4^+,5^+$ from L(p,p′); $\neq 4^+,5$ from γ to 0^+ g.s.
3942.9 *8*	(7^-)	<6 ns	D G o T V X	$T_{1/2}$: upper limit from $\gamma\gamma$(t) of 332γ in ^{65}Cu(α,pγ). J^π: L(α,^{2}He)=(7), L(d,p)=4. This conflicts with yield function and $\gamma(\theta)$ in ^{65}Cu(α,pγ) which suggests J^π=(8^-). Configuration: $(f_{5/2}g_{9/2})_{7-}$ (1990Fi07,1985Ja02).
3970.7? *12*			B J	
3989? *5*			I	
4027.7 *4*	$(1^-,2^+)$		FG I N	XREF: N(4017). J^π: 4028γ to g.s., 1277γ to 3^-, primary γ from $2^-,3^-$ capture state. E(level): doublet in (d,p) with L=(4)+(1).
4061.0 *3*	$(2)^+$	62[&] fs *+21−17*	E G IJ	XREF: E(4049). J^π: J from L(t,p)=(2); π from L(d,p)=1.
4096 *10*			J	
4102? *5*			I	
4110	4^+		N	J^π: L(p,t)=4.
4124 *10*	$(4^-,5^-,6^-)$		J	J^π: L(p,p′)=5.
4139.2 *17*	1^-	33[&] fs *+12−9*	FG I	J^π: 3062γ to 2^+, 4139γ to 0^+, π=− from L(d,p)=2.
4148 *7*	0^+		E J R	XREF: R(4170). E(level): weighted average of 4145 *10* from (t,p) and 4150 *10* from (p,p′). J^π: L(t,p)=0.
4215.4 *6*	$1^+,2^+$		FG IJ	XREF: J(4205). J^π: 3138γ to 2^+, 4216γ to 0^+, π=+ from L(d,p)=1.
4229? *4*			I o	
4234 *4*	$(0,1,2)^-$		IJ o	XREF: J(4240). J^π: L(p,p′)=(1).
4252			e N	

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Adopted Levels, Gammas (continued)

^{68}Zn Levels (continued)

E(level)[†]	J^π	$T_{1/2}$	XREF	Comments
4284.0 *4*	$(2,3)^+$		eFG IJ	XREF: J(4278). J^π: $1^+,2^+,3^+$ from L(p,p′); 1533γ to 3^-.
4325 *6*			G I R	XREF: G(4303).
4339.1 *20*	(1)	12.0[a] fs *+43−25*	HI O	J^π: from γ(θ) in (γ,γ′).
4345 *10*	$3^+,4^+,5^+$		J	J^π: L(p,p′)=4.
4355 *10*			G	J^π: π=− from L(d,p).
4393 *7*	$3^+,4^+$		G J	J^π: 1^+ to 4^+ from L(d,p)=1 and $3^+,4^+,5^+$ from L(p,p′)=4 . E(level): weighted average of 4396 *10* from (d,p) and 4389 *10* from (p,p′).
4396.8[‡] *7*	(8^+)		D V X	J^π: L(α,^{3}He)=(8); E2(+M3) 709γ to the (6^+) 3688 level and the yield function of the 709γ. Configuration: $(g_{9/2})^2$ (1990Fi07,1985Ja02).
4408.4 *4*			F Ij	
4414 *6*	$1^+,2^+$		Ij	J^π: L(p,p′)=2, γ to g.s.
4437 *5*			G Ij	XREF: G(4425). J^π: π=− from L(d,p).
4444 *6*	$(1,2^+)$		Ij	J^π: γ to g.s.
4466.2 *20*	1^-	7.0[a] fs *+29−16*	GHI	XREF: G(4452). J^π: J from γ(θ) in (γ,γ′); π from L(d,p)=2 for 4452 *10*.
4496 *6*	$(1,2^+)$		IJ	J^π: γ to g.s.
4503.2 *20*	(1)	[a]	HI	J^π: from γ(θ) in (γ,γ′). $T_{1/2}$: adopted value of Γ_o/Γ>0.29 gives 1 fs <$T_{1/2}$<12 fs.
4512.2 *3*	(2^+)		F	J^π: 2095γ to 4^+, 4513γ to 0^+, primary γ from $2^-,3^-$ capture state.
4520.6 *4*	$1,2^+$[d]		F IJ	
4535.6 *4*	$1,2^+$[d]		F IJ u	XREF: J(4545).
4578 *6*	$(1,2^+)$		I u	J^π: γ to g.s.
4587 *4*	$(1^+,2^+)$		IJ	J^π: L(p,p′)=2, γ to g.s.
4608 *6*	(1^-)		G IJ	J^π: L(d,p)=2, γ to g.s.
4642 *4*	$1,2^+$[d]		F IJ	
4656 *10*	$2^-,3^-$		G	J^π: L(d,p)=0.
4670 *6*	$(1,2^+)$		I	J^π: γ to g.s.
4680 *6*			IJ	
4724.1 *5*	$1^+,2^+$		F IJ	XREF: I(4718). J^π: L(p,p′)=2, γ to g.s.
4732.8 *11*	$1,2^+$[d]		F	
4743 *5*	$2^-,3^-$		G IJ	J^π: L(d,p)=0.
4792 *6*			IJ	XREF: J(4782).
4851.2 *6*	$2^-,3^-$		FG J	XREF: J(4841). J^π: L(d,p)=0.
4857.9 *6*	$1,2^+$		F I	J^π: γ to 0^+; primary γ from $2^-,3^-$ capture state.
4865.9 *8*	(9^-)		X	J^π: 923γ to (7^-). $J^\pi=(10^-)$ proposed by 2000Wi18,1997Be77 in ^{208}Pb(^{64}Ni,Xγ).
4873 *4*	$2^-,3^-,4^-$		IJ	J^π: L(p,p′)=3.
4910.6 *4*	$1,2^+$[d]		F I	
4951.5 *4*	$1^-,2^-,3^-$		FG I	J^π: π=− from L(d,p)=2; γ to 2^+; primary γ from $2^-,3^-$ capture state.
4963.0 *7*			F	
4982 *6*			I	
4992.0 *10*	$1,2^+$[d]		F I	XREF: I(4998).

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Adopted Levels, Gammas (continued)

^{68}Zn Levels (continued)

E(level)[†]	J^π	$T_{1/2}$	XREF	Comments
5019 *10*	−		G U	J^π: L(d,p)=2. E(level): from ^{67}Zn(d,p). Other 5030 *20* in ^{64}Ni(^{6}Li,d).
5120 *10*	−		G V	J^π: L(d,p)=2.
5146 *5*			I	
5162 *10*			G	
5187.7 *7*			F	
5200 *10*	$2^-,3^-$		G	J^π: L(d,p)=0.
5283.4 *6*			FG	
5298.0 *4*	$1^-,2^+$		F	J^π: 2547γ to 3^- 2751, γ to g.s.
5307.5 *10*	−		FG	XREF: G(5317). J^π: from L(d,p)=2.
5400.4 *5*			F	
5403.2 *5*	$1,2^+$[d]		F I	
5415.3 *8*	$1,2^+$[d]		FG	
5420?			G	
5565.0 *8*			F	
5610?			G	
5635 *10*	$(^-)$		G	J^π: L(d,p)=(2).
5693.8 *6*			F	
5860	−		G	J^π: L(d,p)=2.
5990.7 *9*	(11^-)		X	J^π: 1125γ to (9^-). $J^\pi=(12^-)$ proposed by (2000Wi18),(1997Be77) in ^{208}Pb(^{64}Ni,Xγ).
6760	−		G	J^π: L(d,p)=2.
7110	$2^-,3^-$		G	J^π: L(d,p)=0.
7362.3 *5*	1^-	0.240[a] fs *+14−12*	H	J^π: from γ(θ) and polarization data in (γ,γ′).
x[#]	J		S	J^π: based on observed feeding into known levels, the estimated spin of the lowest level in the super-deformed band is 17 *2* (1999De20).
1506.0+x[#] *10*	J+2		S	
3223.0+x[#] *15*	J+4		S	
5141.1+x[#] *18*	J+6		S	
7262.1+x[#] *20*	J+8		S	
9593.1+x[#] *23*	J+10		S	
12148.2+x[#] *25*	J+12		S	
14943+x[#] *3*	J+14		S	
18016+x?[#]	J+16		S	

[†] From least squares fit to Eγ by evaluator, except where noted.
[‡] Yrast band (2000Wi18,1997Be77).
[#] Super-deformed band (1999De20).
[@] From L transfer in (t,p) and (p,t).
[&] From DSAM in (n,n′γ).
[a] From Γ measurement in (γ,γ′). For the 4339 and 4466 levels, $\Gamma_{\gamma o}/\Gamma_\gamma$ is assumed to be 1. Thus, the deduced half-life may be an upper limit.
[b] L(t,p)=4 for E=2955 *10*, L(p,t)=4, 4+(2) for E=2957, L(d,p)=(1)+(3) for E=2958 *4*.
[c] L(t,p)=0 for possible doublet at 3157 *10*.
[d] γ′s to 0^+ and 2^+; primary γ from $2^-,3^-$ capture state.

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Adopted Levels, Gammas (continued)

^{68}Zn Levels (continued)

[e] D,E2 γ to g.s.
[f] L(t,p)=2 for 3427 *10*, L(d,p)=1 for 3424 *4*.

$\gamma(^{68}Zn)$

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.	δ	α	$I_{(\gamma+ce)}$	Comments
1077.37	2^+	1077.34‡ *5*	100	0.0	0^+	E2		0.000247 *4*		α(K)=0.000221 *4*; α(L)=2.22×10^{-5} *4*; α(M)=3.18×10^{-6} *5*; α(N+..)=1.273×10^{-7} *18* B(E2)(W.u.)=14.69 *19* Mult.: Q from $\gamma\gamma(\theta)$ in (n,γ) and ^{68}Ga ε decay; E2 from comparison to RUL.
1655.91	0^+	578.52‡ *13*	100‡ *5*	1077.37	2^+	E2		0.001272 *18*		α(K)=0.001139 *16*; α(L)=0.0001160 *17*; α(M)=1.659×10^{-5} *24* α(N+..)=6.50×10^{-7} *10* B(E2)(W.u.)=5.5 *10* Mult.: Q from $\gamma\gamma(\theta)$ in (n,γ) and ^{68}Ga ε decay; E2 from comparison to RUL.
		1659‡ *7*		0.0	0^+	E0#			4.2×10^{-2} *10*	$I_{(\gamma+ce)}$: from ce(K)(1659)/Iγ(578γ)=2.2×10^{-4} *4* and and I(γ+ce)(1656)/Ice(K)(1656)=0.55.
1883.20	2^+	227.31‡ *15*	0.049 *16*	1655.91	0^+	(E2)d		0.0300		α(K)=0.0268 *4*; α(L)=0.00286 *4*; α(M)=0.000406 *6*; α(N+..)=1.476×10^{-5} *21* B(E2)(W.u.)=16 *6* I_γ: weighted average of 0.043 *16* from (n,γ), E=thermal and 0.09 *4* from ^{68}Ga ε decay.
		805.83‡ *7*	68.0 *17*	1077.37	2^+	M1+E2@	−1.55 *5*	0.000471 *7*		α(K)=0.000422 *6*; α(L)=4.24×10^{-5} *7*; α(M)=6.08×10^{-6} *9*; α(N+..)=2.43×10^{-7} *4* B(E2)(W.u.)=28.6 *18*; B(M1)(W.u.)=0.0050 *4* I_γ: weighted average of 65 *3* from (n,γ), E=thermal and 68.9 *17* from ^{68}Ga ε decay. δ: from ^{68}Ga ε decay. Others: −1.45 *15* from (n,γ), E=thermal and −1.5 *3* from (n,n′γ).
		1883.16‡ *6*	100.0‡ *19*	0.0	0^+	(E2)d		0.000333 *5*		α(K)=6.97×10^{-5} *10*; α(L)=6.91×10^{-6} *10*; α(M)=9.91×10^{-7} *14*; α(N+..)=0.000255 *4* B(E2)(W.u.)=0.85 *5*
2338.45	2^+	682.57‡ *16*	0.331‡ *21*	1655.91	0^+	(E2)d		0.000789 *11*		α(K)=0.000707 *10*; α(L)=7.16×10^{-5} *10*; α(M)=1.025×10^{-5} *15*; α(N+..)=4.05×10^{-7} B(E2)(W.u.)=2.4 *3*
		1261.08‡ *6*	100.0‡ *21*	1077.37	2^+	M1+E2@	−0.16 *2*	0.0001725 *25*		α(K)=0.0001418 *20*; α(L)=1.410×10^{-5} *20*; α(M)=2.02×10^{-6} *3* α(N+..)=8.20×10^{-8} *12* B(E2)(W.u.)=0.85 *23*; B(M1)(W.u.)=0.034 *4* δ: unweighted av of −0.22 *5* from (n,γ), −0.15 *2* from ^{68}Ga ε decay and −0.15 *2* from (n,n′γ).
		2338.40‡ *8*	1.19‡ *17*	0.0	0^+	(E2)d		0.000529 *8*		α(K)=4.71×10^{-5} *7*; α(L)=4.67×10^{-6} *7*;

$^{68}_{30}Zn_{38}$-7

$\gamma(^{68}Zn)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.	δ	α	Comments
									α(M)=6.69×10^{-7} *10*; α(N+..)=0.000476 *7* B(E2)(W.u.)=0.019 *4*
2370.3		1292.9 *15*	100	1077.37	2$^+$				E_γ,I_γ: from ^{68}Cu $\beta-$ decay (30.9 s + 3.75 min).
2417.40	4$^+$	534.22 *20*	0.56 *16*	1883.20	2$^+$	(E2)[d]		0.001618 *23*	α(K)=0.001448 *21*; α(L)=0.0001478 *21*; α(M)=2.11×10^{-5} *3*; α(N+..)=8.25×10^{-7} B(E2)(W.u.)=6.0 *19*
		1339.96 *5*	100 *3*	1077.37	2$^+$	E2		0.000190 *3*	α(K)=0.0001368 *20*; α(L)=1.364×10^{-5} *20*; α(M)=1.95×10^{-6} *3* α(N+..)=3.77×10^{-5} *7* B(E2)(W.u.)=10.8 *12* Mult.: Q from $\gamma\gamma(\theta)$ in (n,γ), E2 from comparison to RUL. δ: δ(M3/E2)=−0.05 *6* from $\gamma\gamma(\theta)$ in (n,γ),E=thermal and +0.02 *+5−2* from $\gamma(\theta)$ in ^{65}Cu(α,pγ). From RUL, one expects δ<2.4×10^7.
2510.2		1432.8 *15*	100	1077.37	2$^+$				E_γ,I_γ: from ^{68}Cu $\beta-$ decay (30.9 s + 3.75 min).
2750.76	3$^-$	412.41 *12*	7.7 *6*	2338.45	2$^+$	(E1)		0.000964 *14*	α(K)=0.000865 *13*; α(L)=8.65×10^{-5} *13*; α(M)=1.237×10^{-5} *18*; α(N+..)=4.92×10^{-7} B(E1)(W.u.)=0.00161 *17* Mult.: D from RUL; $\Delta\pi$=yes from level scheme.
		1673.29 *10*	100 *7*	1077.37	2$^+$	(E1)		0.000445 *7*	α(K)=4.66×10^{-5} *7*; α(L)=4.61×10^{-6} *7*; α(M)=6.60×10^{-7} *10*; α(N+..)=0.000393 *6* B(E1)(W.u.)=0.00031 *3* Mult.: D,E2 from RUL; $\Delta\pi$=yes from level scheme.
2821.79	2$^+$	483.35[‡] *16*	2.8[‡] *3*	2338.45	2$^+$	M1+E2[@]		0.0017 *5*	α(K)=0.0015 *5*; α(L)=0.00016 *5*; α(M)=2.2×10^{-5} *7*; α(N+..)=9.E−7 *3* δ: −0.12 *6* or +1.7 *9* from $\gamma\gamma(\theta)$ in ^{68}Ga ε decay.
		938.61[‡] *20*	1.86[‡] *17*	1883.20	2$^+$	M1+E2[@]	−0.7 *3*	0.000304 *12*	α(K)=0.000272 *11*; α(L)=2.72×10^{-5} *11*; α(M)=3.90×10^{-6} *16* α(N+..)=1.57×10^{-7} *6* B(E2)(W.u.)=1.8 *11*; B(M1)(W.u.)=0.0020 *8* δ: from $\gamma\gamma(\theta)$ in ^{68}Ga ε decay.
		1165.92[‡] *15*	0.17[‡] *10*	1655.91	0$^+$	E2[d]		0.000211 *3*	α(K)=0.000185 *3*; α(L)=1.85×10^{-5} *3*; α(M)=2.65×10^{-6} *4*; α(N+..)=4.67×10^{-6} *7* B(E2)(W.u.)=0.16 *11*
		1744.42[‡] *13*	100[‡] *5*	1077.37	2$^+$	M1+E2[@]	+0.27 *5*	0.000241 *4*	α(K)=7.70×10^{-5} *11*; α(L)=7.63×10^{-6} *11*; α(M)=1.094×10^{-6} *16*; α(N+..)=0.0001550 B(E2)(W.u.)=0.9 *4*; B(M1)(W.u.)=0.023 *5* δ: from $\gamma\gamma(\theta)$ in ^{68}Ga ε decay. Others: +0.24 *13* from (n,γ) and +0.15 *5* from (n,n′γ).
		2821.73[‡] *14*	4.9[‡] *4*	0.0	0$^+$	(E2)[d]		0.000740 *11*	α(K)=3.43×10^{-5} *5*; α(L)=3.39×10^{-6} *5*; α(M)=4.86×10^{-7} *7*; α(N+..)=0.000702 *10*

$^{68}_{30}Zn_{38}$-8

$\gamma(^{68}Zn)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.	δ	α	Comments
									B(E2)(W.u.)=0.057 *13* I_γ: Other: 10 *3* in (n,γ), E=thermal.
2955.9		585.6 *15*	100	2370.3					E_γ,I_γ: from ^{68}Cu β- decay (3.75 min).
2959.49	(4$^+$)	542.05 *16*	12.0 *20*	2417.40	4$^+$				
		1883.1[&] *5*	100 *27*	1077.37	2$^+$				
3009.27	3$^+$	591.71 *16*	5.7 *6*	2417.40	4$^+$				
		670.89 *17*	4.8 *6*	2338.45	2$^+$				I_γ: Other: 18 *3* in (n,n$'\gamma$).
		1126.07 *6*	100 *5*	1883.20	2$^+$	M1+E2[@]	−0.36 *+20−27*	0.000201 *6*	α(K)=0.000179 *5*; α(L)=1.79×10^{-5} *5*; α(M)=2.56×10^{-6} *7*; α(N+..)=1.39×10^{-6} *10* B(E2)(W.u.)=6 *+7−6*; B(M1)(W.u.)=0.040 *+13−21* δ: from $\gamma\gamma(\theta)$ in (n,γ), E=thermal.
		1932.1 *3*	11.7 *12*	1077.37	2$^+$	(M1+E2)	−0.15 *3*	0.000301 *5*	α(K)=6.39×10^{-5} *9*; α(L)=6.33×10^{-6} *9*; α(M)=9.07×10^{-7} *13*; α(N+..)=0.000230 *4* B(E2)(W.u.)=0.010 *+5−7*; B(M1)(W.u.)=0.0010 *+4−6* Mult.,δ: D+Q from $\gamma(\theta)$ in (n,n$'\gamma$),$\Delta\pi$=no from level scheme. δ: from $\gamma(\theta)$ in (n,n$'\gamma$).
3102.51	0$^+$	1219.3[a] *1*	100[a]	1883.20	2$^+$	[E2]		0.000199 *3*	α(K)=0.0001676 *24*; α(L)=1.674×10^{-5} *24*; α(M)=2.40×10^{-6} *4*; α(N+..)=1.185×10^{-5}
		2025.1[f]	≤3	1077.37	2$^+$				E_γ,I_γ: from (p,p$'\gamma$).
3153.8?		815.7[af] *5*	100[a] *21*	2338.45	2$^+$				
		1270.0[af] *5*	<79[a]	1883.20	2$^+$				I_γ: the 1270γ is a doublet with Iγ=68 *11*.
3160.1		2082.7[a] *3*	100[a]	1077.37	2$^+$				
3164.4		747.0[af] *14*	100[a]	2417.40	4$^+$				
3184.18	1,2$^+$	845.2 *6*	6.5 *15*	2338.45	2$^+$				
		1300.87 *20*	25.5 *20*	1883.20	2$^+$				
		2106.83 *18*	100 *15*	1077.37	2$^+$				
		3184.3 *6*	32 *4*	0.0	0$^+$				
3186.6	(1,2$^+$)	1529.7 *15*	56 *17*	1655.91	0$^+$				E_γ,I_γ: from ^{68}Cu β- decay (30.9 s).
		2110.1 *15*	100 *28*	1077.37	2$^+$				E_γ,I_γ: from ^{68}Cu β- decay (30.9 s).
3281.58	4$^+$	864.17 *14*	100[a] *9*	2417.40	4$^+$				I_γ: weighted average of (n,γ) and (n,n$'\gamma$).
		1397.0[af] *6*	18[a] *3*	1883.20	2$^+$				I_γ: weighted average of (n,γ) and (n,n$'\gamma$).
3287.09	2$^+$	465.20[f] *18*	1.6 *3*	2821.79	2$^+$				
		1403.7 *3*	4.3 *14*	1883.20	2$^+$				
		1630.9 *3*	14.5 *14*	1655.91	0$^+$				I_γ: Other: 38 *15* in (n,n$'\gamma$).
		2209.75 *16*	100 *12*	1077.37	2$^+$	(M1+E2)[@]		0.00044 *4*	α(K)=5.12×10^{-5} *12*; α(L)=5.07×10^{-6} *12*; α(M)=7.27×10^{-7} *16*; α(N+..)=0.00038 *4* δ: −0.07 *10* for J^π(3287)=1$^+$ and +0.63 *+22−37* for J^π=2$^+$ from (n,γ) E=thermal.

$^{68}_{30}Zn_{38}$-9

$\gamma(^{68}Zn)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.	δ	α	Comments
3287.09	2^+	3287.2 *3*	48 *5*	0.0	0^+				I_γ: Other: 5 *4* in (n,n′γ).
3334.7?		996.2[f] *5*	52 *14*	2338.45	2^+				
		1451.8[f] *6*	62 *14*	1883.20	2^+				
		2257.2[f] *7*	100 *19*	1077.37	2^+				
3346.09	1^+	1462.0[af] *23*	27[a] *10*	1883.20	2^+				
		2270[a] *3*	34[a] *11*	1077.37	2^+				
		3346.0[a] *2*	100[a] *17*	0.0	0^+	(M1)		0.000856 *12*	α(K)=2.53×10^{-5} *4*; α(L)=2.50×10^{-6} *4*; α(M)=3.58×10^{-7} *5*; α(N+..)=0.000828 *12* B(M1)(W.u.)=0.060 *21* Mult.: D,E2 from comparison to RUL, from level scheme transition is 1^+ to 0^+.
3386?		2310[af] *3*	100[a] *50*	1077.37	2^+				
		3383[af] *5*	30[a] *17*	0.0	0^+				
3400.9	$1,2^+$	1517.7[a] *5*	89[a] *22*	1883.20	2^+				
		2322[af] *3*	100[a] *45*	1077.37	2^+				
		3402[a] *5*	24[a] *12*	0.0	0^+				
3425.07		1542.0 *2*	53 *5*	1883.20	2^+				
		2347.5 *2*	100 *15*	1077.37	2^+				
3429.46	$1,2^+$	1091.04[f] *18*	28 *2*	2338.45	2^+				
		1546.13 *16*	100 *8*	1883.20	2^+				
		2352.4 *3*	50 *10*	1077.37	2^+				
		3430.2 *11*	12 *4*	0.0	0^+				
3451.0		630.0[a] *13*	46[a] *19*	2821.79	2^+				
		1114.0[af] *18*	95[a] *40*	2338.45	2^+				
		2373.5[af] *3*	100[a] *26*	1077.37	2^+				
3458.83	5^-	499.9[&f] *5*		2959.49	(4^+)				E_γ: observed only in 208Pb(^{64}Ni,Xγ) as sole depopulating transition from a 3459 level.
		1041.26 *16*		2417.40	4^+	(E1+M2)	+0.07 *5*	0.000120 *4*	α(K)=0.000108 *4*; α(L)=1.07×10^{-5} *4*; α(M)=1.53×10^{-6} *6*; α(N+..)=6.17×10^{-8} *22* Mult.: D+Q from γ(θ) in ^{65}Cu(α,pγ), Δπ=yes from level scheme. δ: from γ(θ) in ^{65}Cu(α,pγ).
3487.7		736.9 *15*	100	2750.76	3^-				E_γ,I_γ: from ^{68}Cu β- decay (30.9 s).
3496.08	$3^+,4^+$	744.8 *6*	3.1 *15*	2750.76	3^-				
		1612.2 *6*	5.4 *15*	1883.20	2^+				
		2418.7 *1*	100 *12*	1077.37	2^+				
3586.64	4^+	835.87[a] *6*	100[a] *19*	2750.76	3^-				
		2508[a] *4*	46[a] *13*	1077.37	2^+				

$^{68}_{30}Zn_{38}$-10

Adopted Levels, Gammas (continued)

$\gamma(^{68}Zn)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.	δ	α	Comments
3610.8	(6)$^-$	152.0 *5*	100	3458.83	5$^-$	M1(+E2)	−0.05 +*8*−*6*	0.0205 *12*	α(K)=0.0183 *10*; α(L)=0.00190 *12*; α(M)=0.000272 *16*; α(N+..)=1.07×10^{-5} *6* B(M1)(W.u.)>0.0024 E_γ: from ^{65}Cu(α,pγ). Mult.: D+Q from $\gamma(\theta)$ in ^{65}Cu(α,pγ), $\Delta\pi$=no from level scheme. δ: from $\gamma(\theta)$ in ^{65}Cu(α,pγ).
3624.32	(1,2$^+$)	2546.9[a] *2*	100[a] *25*	1077.37	2$^+$				
		3626[a] *5*	26[a] *12*	0.0	0$^+$				
3630.32	(2$^+$)	348.7[f] *3*	3.5 *7*	3281.58	4$^+$				
		621.06 *14*	42 *4*	3009.27	3$^+$				
		879.59 *15*	100 *13*	2750.76	3$^-$				
		1212.7 *3*	23 *3*	2417.40	4$^+$				
		3630.2 *6*	68 *9*	0.0	0$^+$				
3664.7	(1,2)$^+$	1781.5 *3*	100 *10*	1883.20	2$^+$				
		2587.2 *7*	65 *19*	1077.37	2$^+$				
		3664.8 *10*	36 *9*	0.0	0$^+$				
3687.5	(6$^+$)	1270.1 *5*	100	2417.40	4$^+$	(E2+M3)	+0.14 *5*	0.000201 *8*	α(K)=0.000161 *7*; α(L)=1.61×10^{-5} *7*; α(M)=2.30×10^{-6} *10*; α(N+..)=2.13×10^{-5} *5* E_γ: from ^{65}Cu(α,pγ). Mult.: Q+O from $\gamma(\theta)$ in ^{65}Cu(α,pγ), $\Delta\pi$=no from level scheme. δ: from $\gamma(\theta)$ in ^{65}Cu(α,pγ).
3709.8	(2$^+$)	1371.6[a] *3*	100[a] *19*	2338.45	2$^+$				
		3708.2[a] *8*	71[a] *10*	0.0	0$^+$				
3717.47	1,2$^+$	2061.5[a] *2*	58[a] *9*	1655.91	0$^+$				
		3717.5[a] *5*	100[a] *10*	0.0	0$^+$				
3725.79		904.6 *4*	11 *3*	2821.79	2$^+$				
		975.4[f] *4*	13 *3*	2750.76	3$^-$				E_γ: Other: 978.0 *17* in (n,n′γ). I_γ: Other: 30 *17* in (n,n′γ).
		1387.21 *19*	63 *5*	2338.45	2$^+$				
		2648.1 *6*	100 *30*	1077.37	2$^+$				
3732.4?		1222.2[f] *15*	100	2510.2					E_γ,I_γ: from ^{68}Cu β^- decay (3.75 min).
3776.32	1,2$^+$	1437.76 *24*	62 *5*	2338.45	2$^+$				
		2699.5 *10*	35 *11*	1077.37	2$^+$				
		3777.0[f] *9*	100 *18*	0.0	0$^+$				
3814.83	1,2$^+$	2737.4[a] *2*	100 *27*	1077.37	2$^+$				
		3817[a] *5*	37 *6*	0.0	0$^+$				
3849.30	4$^+$	1431.86 *22*	100 *9*	2417.40	4$^+$				

$^{68}_{30}Zn_{38}$-11

Adopted Levels, Gammas (continued)

$\gamma(^{68}Zn)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.	α	Comments
3849.30	4^+	1511.1 7	13 6	2338.45	2^+	[E2]	0.000210 3	α(K)=0.0001068 15; α(L)=1.063×10^{-5} 15; α(M)=1.523×10^{-6} 22 α(N)=6.15×10^{-8} 9 B(E2)(W.u.)=3.1 +19−31
3895.83	4^+	936.7 3	22 5	2959.49	(4^+)			
		1478.31 18	100 8	2417.40	4^+			
		1557.1 6	8 4	2338.45	2^+			I_γ: Other: 47 20 in (n,n′γ).
3910.99	$(3)^-$	629.3[f] 3	29 7	3281.58	4^+			
		1493.5 3	95 12	2417.40	4^+			
		1572.5 9	22 7	2338.45	2^+			
		2027.9 4	100 15	1883.20	2^+			
3929?		2852[a][f] 4	100[a]	1077.37	2^+			
3935.08	3^+	1113.34 20	9.6 12	2821.79	2^+			
		1184.5[f] 3	12 3	2750.76	3^-			
		1596.3 5	7.6 20	2338.45	2^+			I_γ: Other: 29 14 in (n,n′γ).
		2857.6 4	100 28	1077.37	2^+			
		3935.1 13	6 3	0.0	0^+			
3942.9	(7^-)	332.1 5	100	3610.8	$(6)^-$		0.00771 12	E_γ,I_γ: from ^{65}Cu(α,pγ).
3970.7?		1014.5[f] 15	100 45	2955.9				E_γ,I_γ: from ^{68}Cu β^- decay (3.75 min).
		1149.4[f] 20	32 13	2821.79	2^+			E_γ,I_γ: from ^{68}Cu β^- decay (3.75 min).
3989?		3989[a][f] 5	100[a]	0.0	0^+			
4027.7	$(1^-,2^+)$	1018.3 4	16 5	3009.27	3^+			
		1276.9 6	27 11	2750.76	3^-			
		4028.3 8	100 14	0.0	0^+			
4061.0	$(2)^+$	1724[a] 3	65[a] 20	2338.45	2^+			
		2983.5[a] 3	100[a] 15	1077.37	2^+			
4102?		4102[a][f] 5	100[a]	0.0	0^+			
4139.2	1^-	3062.4[f] 5	100 10	1077.37	2^+			
		4139.1 17	19 9	0.0	0^+			
4215.4	$1^+,2^+$	3137.8 6	100 16	1077.37	2^+			
		4215.9 15	27 12	0.0	0^+			
4229?		3152[a][f] 4	100[a]	1077.37	2^+			
4234	$(0,1,2)^-$	3157[a][f] 4	100[a]	1077.37	2^+			
4284.0	$(2,3)^+$	1274.8 8	20 8	3009.27	3^+			
		1533.2 4	39 8	2750.76	3^-			
		3206.4 9	100 14	1077.37	2^+			
4325		4325[a] 6	100[a]	0.0	0^+			
4339.1	(1)	4339[b] 2	100[b]	0.0	0^+			

$^{68}_{30}Zn_{38}$-12

$\gamma(^{68}Zn)$ (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.	δ	α	Comments
4396.8	(8^+)	709.3 *5*	100	3687.5	(6^+)	E2(+M3)	+0.05 *+2−8*	0.000716 *12*	α(K)=0.000642 *11*; α(L)=6.49×10^{-5} *11*; α(M)=9.30×10^{-6} *16* α(N+..)=3.67×10^{-7} *7* E_γ,I_γ: from ^{65}Cu(α,pγ). Mult.: Q+O from $\gamma(\theta)$ in ^{65}Cu(α,pγ), $\Delta\pi$=no from level scheme. δ: from $\gamma(\theta)$ in ^{65}Cu(α,pγ).
4408.4		1448.8 *5*	13 *3*	2959.49	(4^+)				
		3331.0 *4*	100 *10*	1077.37	2^+				
4414	$1^+,2^+$	4414[a] *6*	100[a]	0.0	0^+				
4437		3360[af] *5*	100[a] *17*	1077.37	2^+				
		4440[a] *6*	<164[a]	0.0	0^+				
4444	$(1,2^+)$	4444[a] *6*	100[a]	0.0	0^+				
4466.2	1^-	4466[b] *2*	100[b]	0.0	0^+	[E1]		0.00186 *3*	α(K)=1.208×10^{-5} *17*; α(L)=1.188×10^{-6} *17*; α(M)=1.702×10^{-7} *24*; α(N+..)=0.00184 *3* B(E1)(W.u.)=0.00065 *+15−27*
4496	$(1,2^+)$	4496[a] *6*	100[a]	0.0	0^+				
4503.2	(1)	3427[af] *5*	≤150[a]	1077.37	2^+				
		4503[b] *2*	100[a] *40*	0.0	0^+				
4512.2	(2^+)	2094.6 *3*	100 *12*	2417.40	4^+				
		3434.9 *8*	78 *16*	1077.37	2^+				
		4513.3 *8*	80 *14*	0.0	0^+				
4520.6	$1,2^+$	1698.0[f] *8*	25 *7*	2821.79	2^+				I_γ: Other: 200 *120* in (n,n′γ), relative to Iγ(4521γ)=100 *65*.
		2181.7 *5*	46 *8*	2338.45	2^+				I_γ: Other: 300 *130* in (n,n′γ), relative to Iγ(4521γ)=100 *65*.
		4521.0 *6*	100 *9*	0.0	0^+				
4535.6	$1,2^+$	3458.1 *4*	100 *12*	1077.37	2^+				
		4535.5 *9*	30 *6*	0.0	0^+				
4578	$(1,2^+)$	4578[a] *6*	100[a]	0.0	0^+				
4587	$(1^+,2^+)$	3511[a] *5*	100[a] *16*	1077.37	2^+				
		4585[a] *6*	28[a] *9*	0.0	0^+				
4608	(1^-)	4608[a] *6*	100[a]	0.0	0^+				
4642	$1,2^+$	2300[af] *3*	37[a] *30*	2338.45	2^+				
		3567[a] *5*	100[a] *18*	1077.37	2^+				
		4639[a] *6*	42[a] *18*	0.0	0^+				
4670	$(1,2^+)$	3592[af] *5*	100[a] *56*	1077.37	2^+				
		4670[a] *6*	62[a] *41*	0.0	0^+				

$^{68}_{30}Zn_{38}$-13

Adopted Levels, Gammas (continued)

$\gamma(^{68}$Zn) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f
4680		4680[a] *6*	100[a]	0.0	0^+
4724.1	$1^+,2^+$	1902.2 *5*	61 *16*	2821.79	2^+
		4724.3 *8*	100 *14*	0.0	0^+
4732.8	$1,2^+$	1723.5[f] *5*	42 *9*	3009.27	3^+
		3077.2[f] *8*	100 *20*	1655.91	0^+
		3655.2 *16*	44 *22*	1077.37	2^+
		4732.8 *14*	38 *11*	0.0	0^+
4743	$2^-,3^-$	3666[af] *5*	100[a]	1077.37	2^+
4792		4792[a] *6*	100[a]	0.0	0^+
4851.2	$2^-,3^-$	916.1[f] *4*	9 *4*	3935.08	3^+
		1186.9[f] *6*	16 *5*	3664.7	$(1,2)^+$
		2512.7 *6*	100 *30*	2338.45	2^+
4857.9	$1,2^+$	3201.1 *9*	88 *21*	1655.91	0^+
		4858.4 *8*	100 *18*	0.0	0^+
4865.9	(9^-)	923.0[&] *5*	100[&]	3942.9	(7^-)
4873	$2^-,3^-,4^-$	2122[af] *3*	100[a] *58*	2750.76	3^-
		2990[a] *4*	≤344[a]	1883.20	2^+
4910.6	$1,2^+$	3027.7[f] *14*	11 *6*	1883.20	2^+
		3254.4 *10*	13 *6*	1655.91	0^+
		3833.1 *4*	100 *12*	1077.37	2^+
4951.5	$1^-,2^-,3^-$	1767.2 *4*	30 *6*	3184.18	$1,2^+$
		3068.8 *8*	37 *9*	1883.20	2^+
		3874.1 *8*	100 *23*	1077.37	2^+
4963.0		3885.5 *7*	100	1077.37	2^+
4982		4982[a] *6*	100[a]	0.0	0^+
4992.0	$1,2^+$	3107.5[f] *15*	85 *41*	1883.20	2^+
		3913.9 *18*	100 *29*	1077.37	2^+
		4992.0 *11*	76 *18*	0.0	0^+
5146		2732[af] *4*	100 *47*	2417.40	4^+
		4069[af] *5*	<6	1077.37	2^+
5187.7		2770.4 *7*	100 *30*	2417.40	4^+
		4109.8 *13*	31 *14*	1077.37	2^+
5283.4		2866.1 *7*	100 *30*	2417.40	4^+
		2944.5[f] *9*	52 *15*	2338.45	2^+
		3399.8 *11*	52 *17*	1883.20	2^+
5298.0	$1^-,2^+$	2547.0 *4*	100 *30*	2750.76	3^-
		2959.7[f] *8*	43 *13*	2338.45	2^+
		3415.6 *9*	91 *26*	1883.20	2^+

Adopted Levels, Gammas (continued)

$\gamma(^{68}Zn)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.	Comments
5298.0	$1^-,2^+$	4221.7 *17*	29 *15*	1077.37	2^+		
		5297.3 *11*	30 *7*	0.0	0^+		
5307.5	$^-$	3651.5 *10*	100	1655.91	0^+		
5400.4		2391.2 *6*	50 *11*	3009.27	3^+		
		2982.9 *6*	100 *30*	2417.40	4^+		
5403.2	$1,2^+$	3519.4 *6*	100 *22*	1883.20	2^+		
		5403.9 *8*	76 *10*	0.0	0^+		
5415.3	$1,2^+$	4337.3 *15*	100 *37*	1077.37	2^+		
		5415.3 *9*	57 *12*	0.0	0^+		
5565.0		2814.4 *11*	58 *18*	2750.76	3^-		
		3147.3 *11*	52 *16*	2417.40	4^+		
		3226.4[f] *7*	100 *14*	2338.45	2^+		
5693.8		3276.3 *6*	100	2417.40	4^+		
5990.7	(11^-)	1124.7[&] *5*	100[&]	4865.9	(9^-)		
7362.3	1^-	4540[b]		2821.79	2^+		
		5706[b]		1655.91	0^+		
		6285[b]		1077.37	2^+		
		7362[b]		0.0	0^+	E1	Γ_0/Γ=0.85 from (γ,γ'). Mult.: from $\gamma(\theta)$ (lin pol) in (γ,γ').
1506.0+x	J+2	1506[c]		x	J	Q[e]	
3223.0+x	J+4	1717[c]		1506.0+x	J+2	Q[e]	
5141.1+x	J+6	1918[c]		3223.0+x	J+4	Q[e]	
7262.1+x	J+8	2121[c]		5141.1+x	J+6	Q[e]	
9593.1+x	J+10	2331[c]		7262.1+x	J+8	Q[e]	
12148.2+x	J+12	2555[c]		9593.1+x	J+10	Q[e]	
14943+x	J+14	2795[c]		12148.2+x	J+12		
18016+x?	J+16	3073[cf]		14943+x	J+14		

† From (n,γ) E=thermal, except where noted.
‡ From ^{68}Ga ε decay.
# From ce data in $(p,p'\gamma)$ or ^{68}Ga ε decay.
@ D+Q from $\gamma\gamma(\theta)$, M1+E2 from comparison to RUL.
& From $^{208}Pb(^{64}Ni,X\gamma)$. $\Delta E\gamma$=0.5 keV assumed by evaluator.
a From $(n,n'\gamma)$.
b From (γ,γ').
c From $^{26}Mg(^{48}Ca,\alpha 2n\gamma)$. $\Delta E\gamma$=1 keV assumed by evaluator.

From ENSDF

Adopted Levels, Gammas (continued)

$\gamma(^{68}\mathrm{Zn})$ (continued)

[d] D,E2 from RUL; ΔJ^{π}=2,no from level scheme.
[e] From $\gamma(\theta)$ in $^{26}\mathrm{Mg}(^{48}\mathrm{Ca},\alpha 2n\gamma)$.
[f] Placement of transition in the level scheme is uncertain.

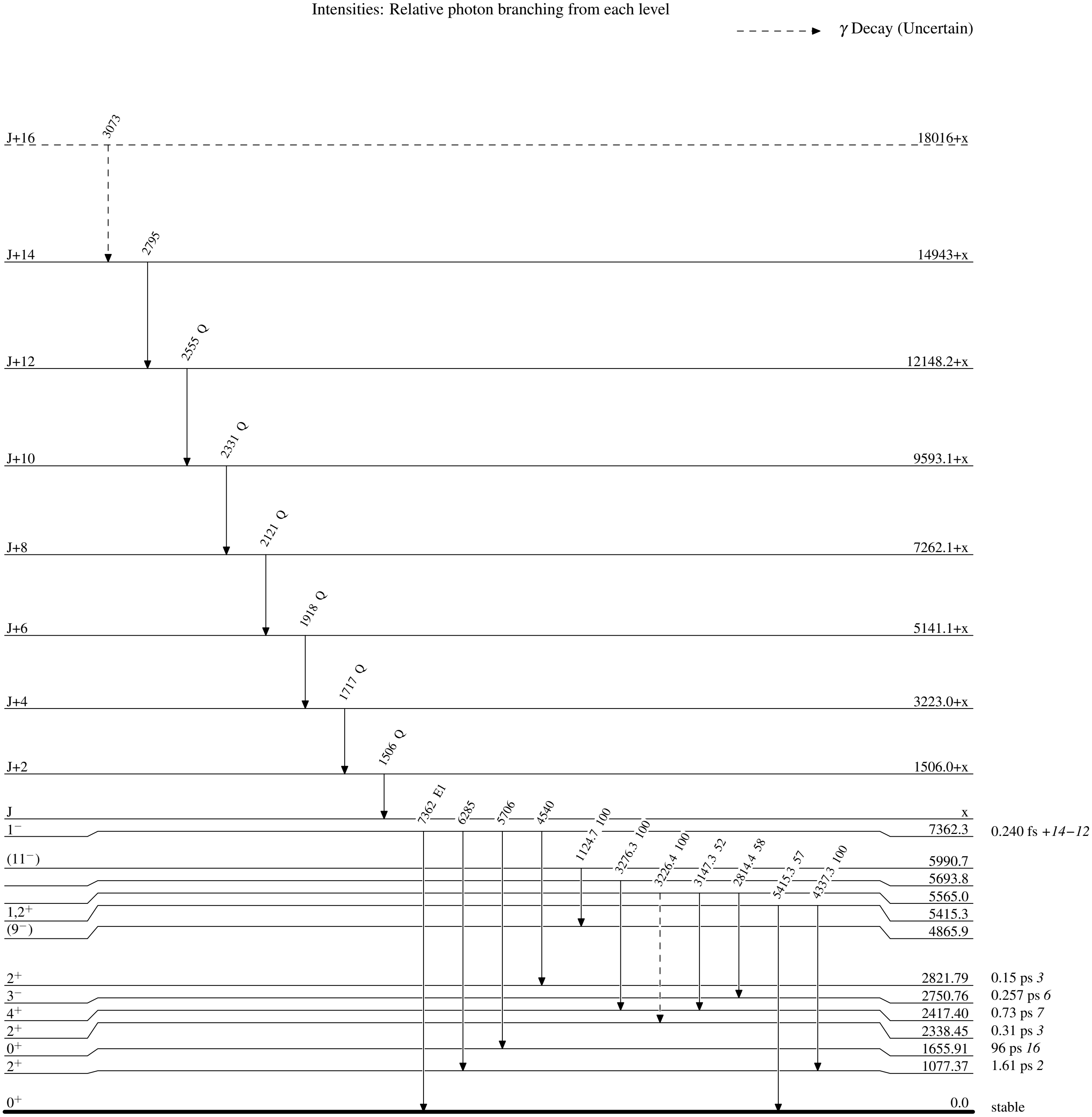
$^{68}_{30}\mathrm{Zn}_{38}$-16

Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level



$^{68}_{30}Zn_{38}$

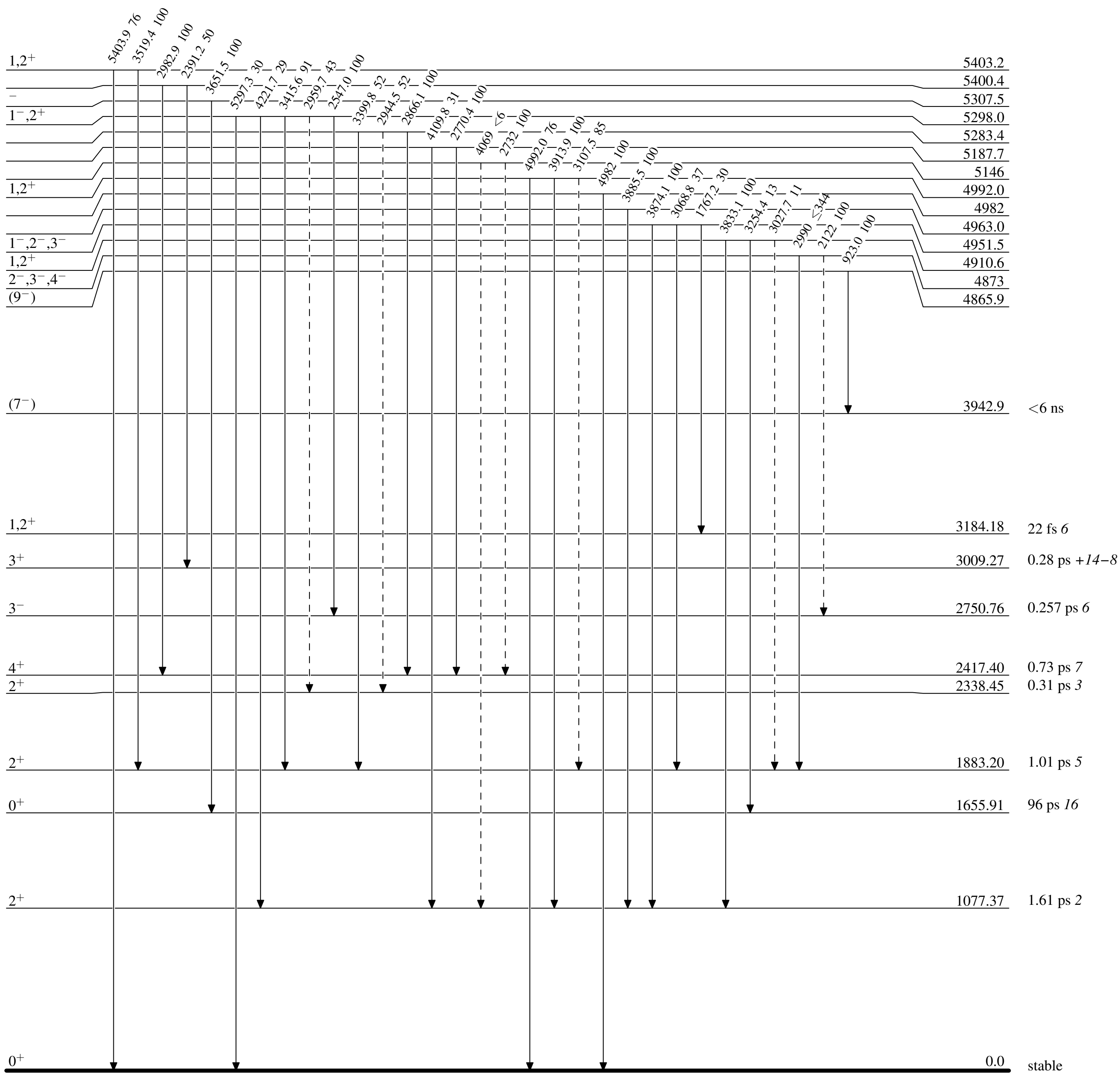
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

γ Decay (Uncertain)

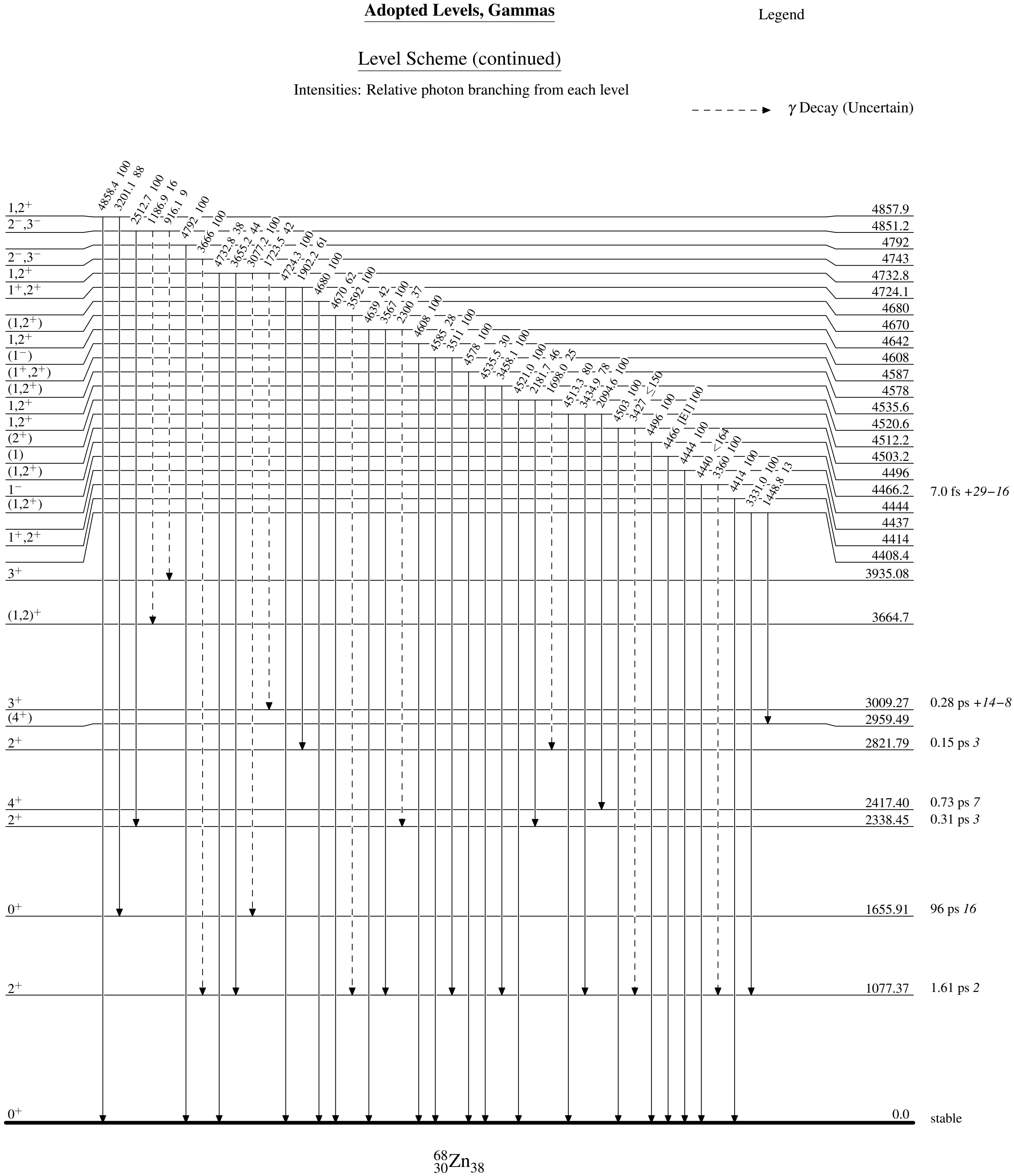


$^{68}_{30}Zn_{38}$

Adopted Levels, Gammas

Level Scheme (continued)

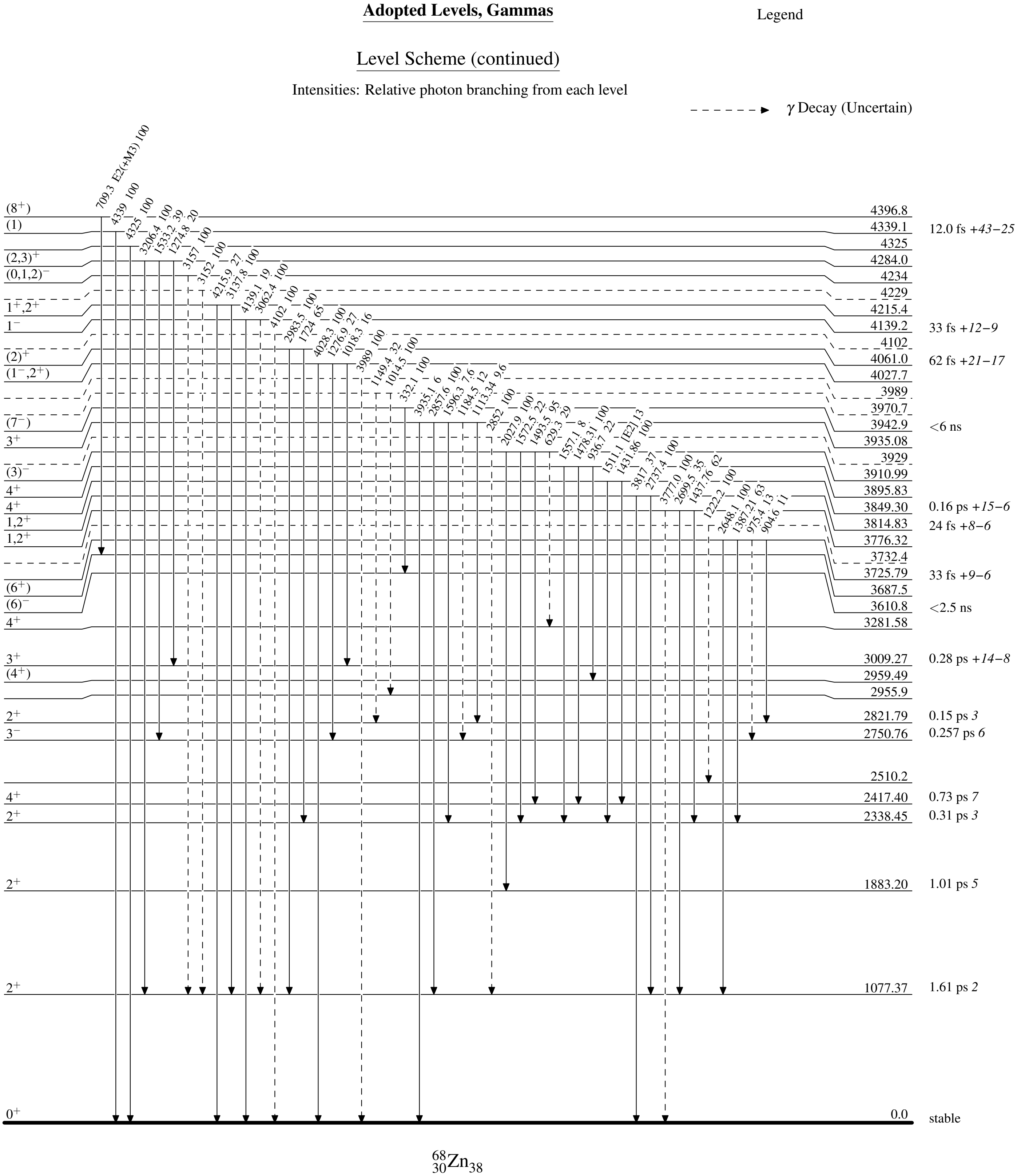
Intensities: Relative photon branching from each level



Adopted Levels, Gammas

Level Scheme (continued)

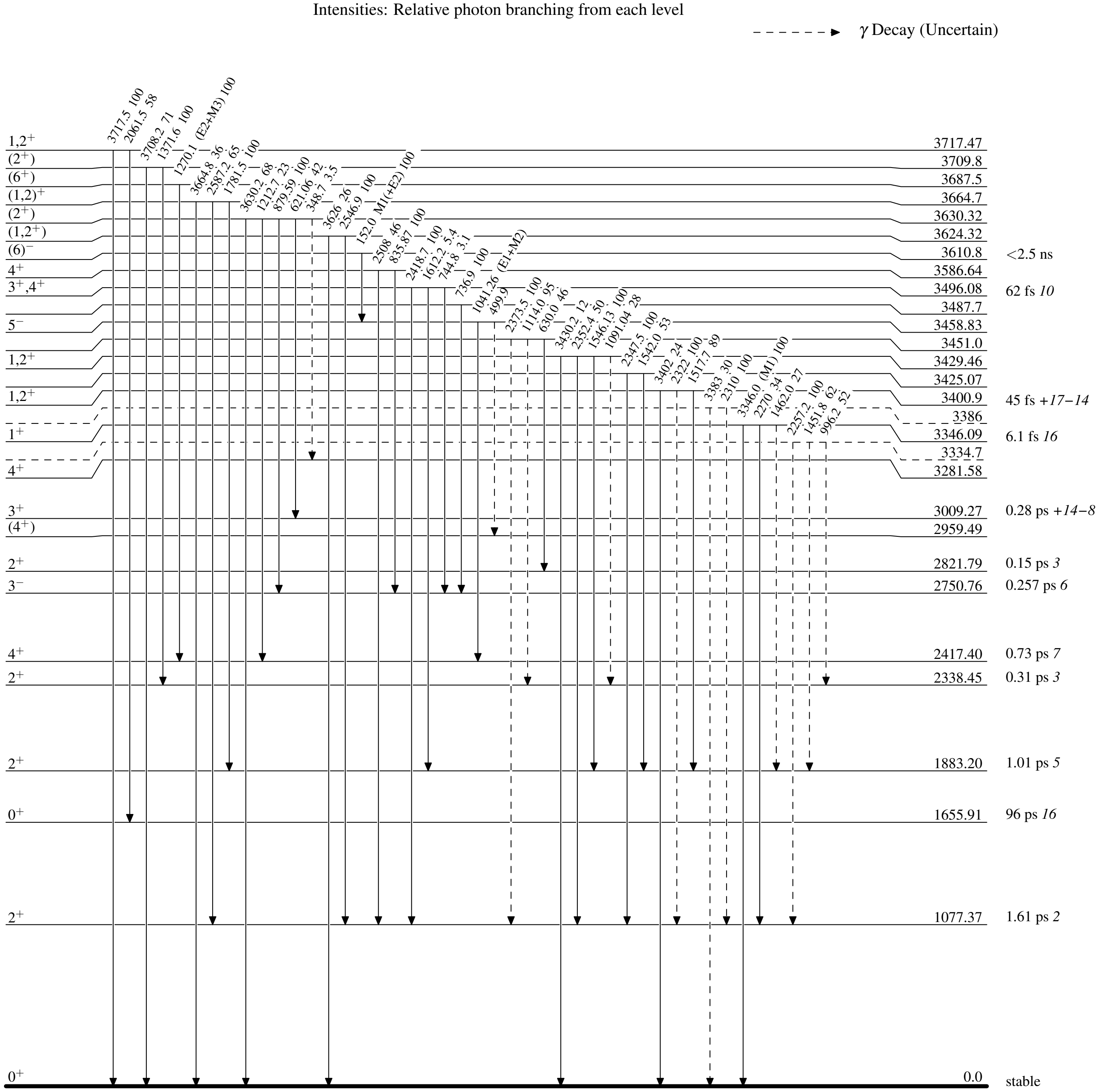
Intensities: Relative photon branching from each level



Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



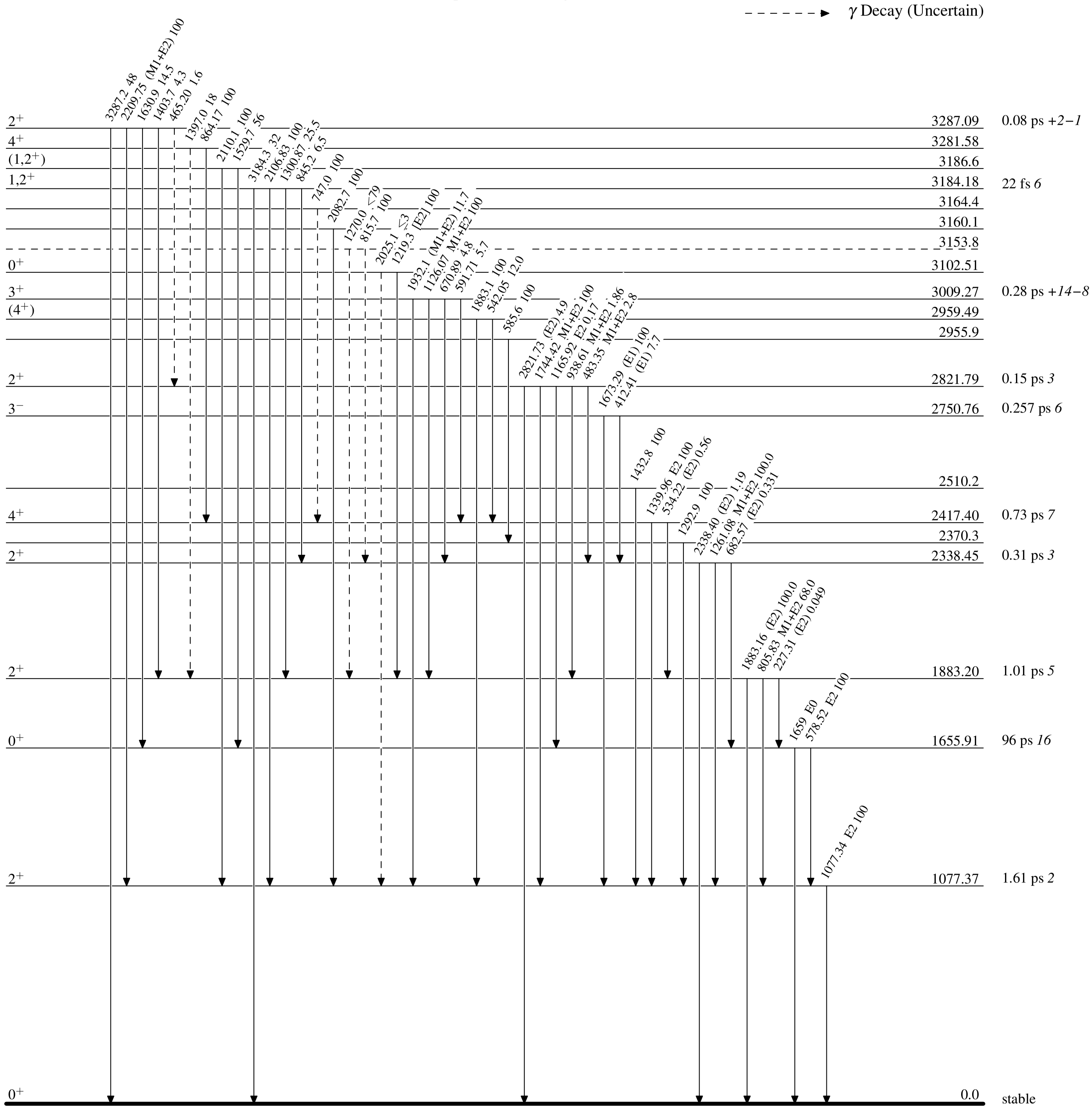
$^{68}_{30}Zn_{38}$

Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{68}_{30}Zn_{38}$

Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	G. Gürdal, E. A. Mccutchan	NDS 136, 1 (2016)	1-Jul-2016

Q(β^-)=−654.6 *16*; S(n)=9218.4 *21*; S(p)=11117.5 *24*; Q(α)=−5983.3 *24* 2012Wa38
S(2n)=15700.5 *21*; S(2p)=20679 *4* (2012Wa38).
α: Additional information 1.

^{70}Zn Levels

Cross Reference (XREF) Flags

A	^{70}Cu β^- decay (44.5 s)	G	^{70}Zn(p,p′γ)	M	^{208}Pb(^{64}Ni,Xγ)
B	^{70}Cu β^- decay (33 s)	H	^{70}Zn(α,α′)	N	^{238}U(^{76}Ge,Xγ)
C	^{70}Cu β^- decay (6.6 s)	I	^{70}Zn(n,n′γ)	O	^{70}Zn(d,d′)
D	^{70}Ga ε decay	J	^{70}Zn(e,e′)	P	^{70}Zn(^{3}He,^{3}He′)
E	^{68}Zn(t,p)	K	Coulomb excitation	Q	^{73}Ge(n,α)
F	^{70}Zn(p,p′),(pol p,p′)	L	^{71}Ga(d,^{3}He)		

E(level)[†]	J$^\pi$	T$_{1/2}$	XREF	Comments
0.0[‡]	0$^+$	≥3.8×10^{18} y	ABCDEFGHIJKLMNOPQ	%2β^-=? T$_{1/2}$: from 2011Be39 for 2ν2β^- decay; also determined T$_{1/2}$≥3.2×10^{19} for 0ν2β^- decay. Others: ≥2.3×10^{17} for 2ν2β^- decay and ≥1.8×10^{19} for 0ν2β^- decay (2010Be41, 2010BeZO, 2009Be27, earlier results by same group as 2011Be39), ≥2.2×10^{17} (2007Bl15, 2006Zu02), ≥1.3×10^{16} for 2ν2β^- decay and ≥0.7×10^{18} for 0ν2β^- decay (2005Da47), ≥1.3×10^{16} (2003Ki08), >4.8×10^{14} y (1952Fr23).
884.92[‡] *8*	2$^+$	3.65 ps *21*	ABC EFGHIJKLMNOPQ	Q=−0.233 *22* (1976Ne06); μ=+0.76 *4* (2009Mu06) β_2=0.20 (1993Mo15) μ: from transient field technique in Coulomb Excitation. Others: +0.76 *8* (2002Ke02), 0.82 *20* (1979BrZP), 0.60 *18* (1977HaZW), all from transient field technique in Coulomb Excitation, and 0.60 *14* (1979Fa06) from IMPAC. T$_{1/2}$: weighted average of 3.67 ps *21* from DSAM and 3.60 ps *35* from RDDS, both in Coulomb Excitation. Others: 3.7 ps *12* from RDDS in ^{238}U(^{76}Ge,Xγ), 2.5 ps *2* from B(E2)=0.205 *19* in (e,e′), 3.3 ps *3* from B(E2)=0.160 *14* in Coulomb Excitation. J$^\pi$: L(t,p)=2. Q: from (e,e′); extracted using anharmonic-vibrator model and is model dependent. β_2: from (pol p,p′). Other: 0.220 from (α,α′).
1070.76 *9*	0$^+$	3.90 ns *20*	C E G I KL	T$_{1/2}$: from (p,p′γ). J$^\pi$: L(t,p)=0.
1554[@] *5*			F H	
1759.16 *10*	2$^+$	1.32 ps *21*	BC EF HIJKL	μ=+0.94 *44* (2009Mu06) XREF: E(1767)F(1764). J$^\pi$: L(p,p′)=2, L(d,^{3}He)=1(+3), strong population in Coulomb excitation. T$_{1/2}$: from DSAM in Coulomb Excitation. Others: 1.4 ps *4* from B(E2)=0.0050 *13* from (e,e′), 0.24 ps *+24−12* from DSAM in (n,n′γ). μ: from transient field technique in Coulomb excitation. Other: +0.84 *38* from reanalysis of transient field data (2010Mo14).
1786.75[‡] *10*	4$^+$	2.9 ps *8*	AB EF I KLMN	μ=+1.48 *56* (2009Mu06)

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{70}Zn Levels (continued)

E(level)†	J^π	$T_{1/2}$	XREF	Comments
				J^π: L(t,p)=4. $T_{1/2}$: weighted average of 2.0 ps *+9−11* from RDDS in ^{238}U(^{76}Ge,Xγ) and 3.4 ps *8* from RDDS in Coulomb Excitation. Other: 1.32 ps *14* from DSAM in Coulomb Excitation (2009Mu06). μ: from transient field technique in Coulomb excitation. Other: +0.84 *52* from reanalysis of transient field data (2010Mo14).
1957.28 *12*	2^+		C EF HI KL Q	XREF: H(1945). J^π: L(t,p)=2.
2140.64 *17*	0^+		C EF I L	XREF: F(2150)L(2126). J^π: L(t,p)=0.
2375@ *5*	$(2,1,3)^+$		F H Q	XREF: Q(2300?). J^π: L(p,p′)=2.
2538.31 *11*	2^+	0.21 ps *+28−8*	B F I KL	$T_{1/2}$: from DSAM in (n,n′γ). J^π: from L(d,^{3}He)=1+3 and J=2 from $\gamma(\theta)$ in (n,n′γ). 2004Va08 in ^{70}Cu β^- decay (33 s) assign (3^+) to this level, however, this is unlikely given its direct population in Coulomb excitation. L(p,p′)=(0) is discrepant.
2665@ *5*	2^+		EF L	J^π: L(t,p)=2.
2693.40 *11*	4^+	0.28 ps *+35−14*	AB EF I K	$T_{1/2}$: from DSAM in (n,n′γ). J^π: L(p,p′)=4.
2805@ *5*			F	
2859.49 *11*	3^-	0.201 ps *14*	B EF HI K	β_3=0.20 (1993Mo15) J^π: L(t,p)=3; analyzing power consistent with 3^- in (pol p,p′). β_3: from (pol p,p′). $T_{1/2}$: from DSAM in Coulomb Excitation.
2895.10‡ *13*	(6^+)		A K MN	J^π: 1108γ to 4^+, band assignment.
2949.67 *18*	$1^+,2^+,3^+$	0.042 ps *+21−14*	I KL	XREF: L(?). J^π: M1+E2 2064γ to 2^+. $T_{1/2}$: from DSAM in (n,n′γ).
2954@ *5*			F	E(level): possibly the same as 2949.2-keV level, although L(p,p′)=(1) is discrepant with Adopted J^π.
2978.26 *23*	4^+		B EF K	J^π: L(t,p)=4.
3022# *10*			L	E(level): possibly the same as 3037.6-keV level, although L(d,^{3}He)=(1) is discrepant with Adopted J^π.
3038.15 *11*	5^-	1.04 ps *7*	AB EF HI K MN	J^π: L(p,p′)=5, L(t,p)=(5), population in Coulomb Excitation makes $J^\pi=4^-$ or 6^- unlikely. $J^\pi=4^-$ proposed in (n,n′γ) based on population strength and $J^\pi=4^+$ proposed in ^{208}Pb(^{64}Ni,Xγ). $T_{1/2}$: from DSAM in Coulomb Excitation. Configuration=((π 2p$_{3/2}$)^2(ν 2p$_{1/2}$)$^{-1}$(ν 1g$_{9/2}$)) (2004Va08).
3222.08 *10*	1		I	J^π: from $\gamma(\theta)$ in (n,n′γ).
3235 *5*	$3^+,4^+,5^+$		EF	E(level): from (p,p′). J^π: from L(p,p′)=4.
3246.71 *11*	$(3^-,4^+)$		B	J^π: strong β feeding from $J^\pi=3^-$ parent, 209γ to 5^-, 708γ to 2^+. E(level): possibily the same as the 3235-keV level.
3328@ *5*	(0^+)		EF	J^π: L(t,p)=(0).
3342.0 *3*	3^-		A E H	J^π: L(α,α')=3.
3419@ *5*	$(3)^-$		EF	J^π: L(t,p)=(3), L(p,p′)=3.

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Adopted Levels, Gammas (continued)

^{70}Zn Levels (continued)

E(level)†	J$^{\pi}$	XREF	Comments
3464@ *5*	4^{+}	EF H	J$^{\pi}$: L(t,p)=4.
3476.68 *14*		A M	
3506@ *5*	5^{-}	EF H L	J$^{\pi}$: L(t,p)=5, L(p,p′)=5; L=1 in (d,^{3}He) is discrepant.
3598.98 *14*		A M	
3634.99 *22*	2^{+}	C EF L	J$^{\pi}$: L(t,p)=2.
3680@ *5*	0^{+}	EF H L	J$^{\pi}$: L(t,p)=0; L=1(+3) in (d,^{3}He) is discrepant.
3710.7 *6*	2^{+}	EF I	J$^{\pi}$: L(t,p)=2.
3750@ *5*	(0^{-},1^{-},2^{-})	EF	J$^{\pi}$: L(p,p′)=(1).
3755.4‡ *10*	(8^{+})	MN	J$^{\pi}$: 860γ to (6^{+}), band assignment.
3788.16 *22*		A M	
3813@ *5*		EF	E(level): possible doublet; L(p,p′)=(1)+4.
3844@ *5*	1^{-}	EF h	J$^{\pi}$: L(t,p)=1.
3848.4 *6*	(5,6^{+})	A	J$^{\pi}$: direct β^{-} feeding from J^{π}=6^{-} parent, 2062γ to 4^{+}.
3888@ *5*	(4)$^{+}$	EF h	J$^{\pi}$: L(p,p′)=4.
3904.0 *4*	(5,6^{+})	A	J$^{\pi}$: direct β^{-} feeding from J^{π}=6^{-} parent, 2117γ to 4^{+}.
3914 *10*		E	
3948@ *5*	1^{-}	EF	J$^{\pi}$: L(t,p)=1.
3999 *10*	2^{+}	E H	J$^{\pi}$: L(t,p)=2. E(level): from (t,p).
4001.46 *15*	(5,6,7^{-})	A	J$^{\pi}$: direct β^{-} feeding from J^{π}=6^{-} parent, 963γ to 5^{-}.
4016 *10*	3^{+},4^{+},5^{+}	EF	E(level): doublet in (t,p). J$^{\pi}$: L(p,p′)=4.
4061.40 *16*	(5,6,7^{-})	A	J$^{\pi}$: direct β^{-} feeding from J^{π}=6^{-} parent, 1023γ to 5^{-}.
4066@ *10*	4^{+}	EF	J$^{\pi}$: L(t,p)=4.
4136@ *10*	2^{+},1^{+},3^{+}	EF	J$^{\pi}$: L(p,p′)=2.
4146.1 *3*		I	J$^{\pi}$: proposed as 3^{-} in (n,n′γ) based on population strength.
4172@ *10*	5^{-}	F H	XREF: H(4200). J$^{\pi}$: L(p,p′)=5, L(α,α′)=5.
4264.5 *7*	(5,6,7^{-})	A	J$^{\pi}$: direct β^{-} feeding from J^{π}=6^{-} parent, 1226γ to 5^{-}.
4291 *10*	2^{+}	EF	E(level): weighted average of 4297 *10* from (t,p) and 4284 *10* from (p,p′). J$^{\pi}$: L(t,p)=L(p,p′)=2.
4308.99 *18*	(5,6,7^{-})	A F	J$^{\pi}$: direct β^{-} feeding from J^{π}=6^{-} parent, 1271γ to 5^{-}.
4367 *10*	3^{+},4^{+},5^{+}	F	J$^{\pi}$: L(p,p′)=4.
4444 *10*	3^{+},4^{+},5^{+}	F	J$^{\pi}$: L(p,p′)=4.
4464.77 *17*	(5,6,7^{-})	A	J$^{\pi}$: direct β^{-} feeding from J^{π}=6^{-} parent, 1426.5γ to 5^{-}.
4514.27 *23*	(5,6,7^{-})	A	J$^{\pi}$: direct β^{-} feeding from J^{π}=6^{-} parent, 1476γ to 5^{-}.
4558.2 *3*	(5,6^{+})	A	J$^{\pi}$: direct β^{-} feeding from J^{π}=6^{-} parent, 2771γ to 4^{+}.
4588.8 *3*	(5,6,7^{-})	A	J$^{\pi}$: direct β^{-} feeding from J^{π}=6^{-} parent, 1551γ to 5^{-}.
4710.1 *5*	(5,6,7)	A	J$^{\pi}$: direct β^{-} feeding from J^{π}=6^{-} parent.
4791.7 *10*	(5,6,7)	A	J$^{\pi}$: direct β^{-} feeding from J^{π}=6^{-} parent.
4849.2 *3*	(5,6^{+})	A	J$^{\pi}$: direct β^{-} feeding from J^{π}=6^{-} parent, 3062γ to 4^{+}.
4935.9‡ *14*	(10^{+})	MN	J$^{\pi}$: 1180.5γ to (8^{+}), band assignment.
5061.3 *5*	(5,6,7)	A	J$^{\pi}$: direct β^{-} feeding from J^{π}=6^{-} parent.
6116.2‡ *17*	(12^{+})	MN	J$^{\pi}$: 1180.3γ to (10^{+}), band assignment.

† From a least-squares fit to Eγ, by evaluators, for levels connected by γ rays. For levels from transfer reactions, corresponding dataset is indicated.
‡ Band(A): yrast band.
# From (d,^{3}He).
@ From (p,p′),(pol p,p′).

$\gamma(^{70}Zn)$

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[‡]	δ[#]	α	$I_{(\gamma+ce)}$	Comments
884.92	2^+	884.88 *9*	100	0.0	0^+	E2		3.97×10^{-4}		α(K)=0.000356 *5*; α(L)=3.58×10^{-5} *5*; α(M)=5.12×10^{-6} *8*; α(N)=2.04×10^{-7} *3* B(E2)(W.u.)=16.7 *10* Mult.: from Coulomb Excitation from 0^+ ground state.
1070.76	0^+	185.85[@] *3*	100	884.92	2^+	[E2]		0.0634		α(K)=0.0563 *8*; α(L)=0.00613 *9*; α(M)=0.000871 *13*; α(N)=3.07×10^{-5} *5* B(E2)(W.u.)=37.3 *19* E_γ: other: 184.4 *2* in (n,n′γ).
		1067		0.0	0^+	E0			<0.3	$I_{(\gamma+ce)}$: for 100 transitions of 185.9γ as measured in (p,p′γ). Mult.: from internal conversion data in (p,p′γ). E_γ: from (p,p′γ).
1759.16	2^+	874.33[@] *8*	100[@] *9*	884.92	2^+	M1+E2	+0.75 *15*	3.58×10^{-4} *9*		α(K)=0.000321 *9*; α(L)=3.21×10^{-5} *9*; α(M)=4.61×10^{-6} *12*; α(N)=1.85×10^{-7} *5* B(E2)(W.u.)=10 *4*; B(M1)(W.u.)=0.0095 *23* Mult.: D+Q from $\gamma(\theta)$ in (n,n′γ), $\Delta\pi$=no from level scheme.
		1759.6[@] *2*	68[@] *7*	0.0	0^+	[E2]		2.86×10^{-4}		α(K)=7.92×10^{-5} *11*; α(L)=7.86×10^{-6} *11*; α(M)=1.127×10^{-6} *16*; α(N)=4.56×10^{-8} *7* B(E2)(W.u.)=0.60 *12*
1786.75	4^+	901.7 *1*	100	884.92	2^+	[E2]		3.78×10^{-4}		α(K)=0.000339 *5*; α(L)=3.41×10^{-5} *5*; α(M)=4.88×10^{-6} *7*; α(N)=1.95×10^{-7} *3* B(E2)(W.u.)=19 *6*
1957.28	2^+	1072.2[@] *1*	100	884.92	2^+					
2140.64	0^+	1255.6[a] *2*	100	884.92	2^+					
2538.31	2^+	751.5[a] *2*	≈18[a]	1786.75	4^+	[E2]		6.06×10^{-4}		α(K)=0.000543 *8*; α(L)=5.49×10^{-5} *8*; α(M)=7.86×10^{-6} *11*; α(N)=3.11×10^{-7} *5* B(E2)(W.u.)=73 *44*
		779.1[@] *2*	40[@] *4*	1759.16	2^+					I_γ: other: 58 in (n,n′γ).
		1653.9[@] *2*	100[@] *7*	884.92	2^+	M1+E2	−1.5 *3*	2.39×10^{-4} *5*		α(K)=8.78×10^{-5} *14*; α(L)=8.72×10^{-6} *14*; α(M)=1.250×10^{-6} *19*; α(N)=5.06×10^{-8} *8* B(E2)(W.u.)=4.9 *+49−21*; B(M1)(W.u.)=0.0040 *+40−20* Mult.: D+Q from $\gamma(\theta)$ in (n,n′γ), $\Delta\pi$=no from level scheme.
		2537.9[a] *3*	20[a]	0.0	0^+	[E2]		6.18×10^{-4}		α(K)=4.09×10^{-5} *6*; α(L)=4.05×10^{-6} *6*; α(M)=5.81×10^{-7} *9*; α(N)=2.36×10^{-8} *4* B(E2)(W.u.)=0.17 *10*
2693.40	4^+	735.5[a] *2*	11[a]	1957.28	2^+	[E2]		6.43×10^{-4}		α(K)=0.000576 *8*; α(L)=5.82×10^{-5} *9*; α(M)=8.33×10^{-6} *12*; α(N)=3.30×10^{-7} *5* B(E2)(W.u.)=26 *+26−14*
		906.5 *1*	92 *12*	1786.75	4^+					

γ(^{70}Zn) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[‡]	δ[#]	α	Comments
2693.40	4^+	934.9[a] *3*	30[a]	1759.16	2^+	[E2]		3.46×10^{-4}	α(K)=0.000310 *5*; α(L)=3.12×10^{-5} *5*; α(M)=4.46×10^{-6} *7*; α(N)=1.782×10^{-7} *25* B(E2)(W.u.)=21 *+21−12*
		1809.2[a] *3*	100[a] *16*	884.92	2^+	[E2]		3.04×10^{-4}	α(K)=7.51×10^{-5} *11*; α(L)=7.46×10^{-6} *11*; α(M)=1.069×10^{-6} *15*; α(N)=4.32×10^{-8} *6* B(E2)(W.u.)=2.6 *+26−15*
2859.49	3^-	902		1957.28	2^+				E_γ: observed only in Coulomb Excitation.
		1072.2[&] *1*	100[&] *13*	1786.75	4^+	[E1]		1.12×10^{-4}	α(K)=0.0001001 *14*; α(L)=9.94×10^{-6} *14*; α(M)=1.423×10^{-6} *20*; α(N)=5.74×10^{-8} *8* B(E1)(W.u.)=0.00068 *11*
		1100.5[&] *2*	45[&] *5*	1759.16	2^+	[E1]		1.15×10^{-4}	α(K)=9.54×10^{-5} *14*; α(L)=9.47×10^{-6} *14*; α(M)=1.356×10^{-6} *19*; α(N)=5.47×10^{-8} *8* B(E1)(W.u.)=0.00028 *5*
		1975.0[&] *4*	93[&] *7*	884.92	2^+	[E1]		6.56×10^{-4}	α(K)=3.61×10^{-5} *5*; α(L)=3.57×10^{-6} *5*; α(M)=5.11×10^{-7} *8*; α(N)=2.07×10^{-8} *3* B(E1)(W.u.)=0.000100 *13*
2895.10	(6^+)	1108.4 *1*	100	1786.75	4^+				
2949.67	$1^+,2^+,3^+$	1191.9[a] *3*	72[a]	1759.16	2^+				
		2064.1[a] *2*	100[a]	884.92	2^+	M1+E2	+3.8 *5*	4.04×10^{-4}	α(K)=5.87×10^{-5} *9*; α(L)=5.82×10^{-6} *9*; α(M)=8.34×10^{-7} *12*; α(N)=3.38×10^{-8} *5* B(E2)(W.u.)=11 *+4−6*; B(M1)(W.u.)=0.0022 *+10−13* Mult.: D+Q from $\gamma(\theta)$ in (n,n′γ), E1+M2 excluded by comparison to RUL.
2978.26	4^+	1191.5[&] *2*	100	1786.75	4^+				
3038.15	5^-	1251.7 *1*	100	1786.75	4^+	[E1]		1.68×10^{-4}	α(K)=7.56×10^{-5} *11*; α(L)=7.49×10^{-6} *11*; α(M)=1.073×10^{-6} *15*; α(N)=4.34×10^{-8} *6* B(E1)(W.u.)=0.000195 *14*
3222.08	1	2155.0[ac] *1*	≈33[a]	1070.76	0^+				E_γ: level energy difference gives $E\gamma$=2151.3, transition not included in least-squares fitting.
		3222.0[a] *1*	≈100[a]	0.0	0^+				
3246.71	$(3^-,4^+)$	208.75[&] *7*	55[&] *4*	3038.15	5^-				
		387.10[&] *5*	54[&] *4*	2859.49	3^-				
		553.2[&] *1*	28[&] *4*	2693.40	4^+				
		708.42[&] *7*	100[&] *5*	2538.31	2^+				
		1460.4[&] *2*	20[&] *4*	1786.75	4^+				
3342.0	3^-	1555.2 *3*	100	1786.75	4^+				
3476.68		438.2 *2*	22.2 *10*	3038.15	5^-				
		783.1 *2*	7.8 *10*	2693.40	4^+				
		1690.3 *2*	100.0 *16*	1786.75	4^+				
3598.98		560.82 *8*	100	3038.15	5^-				

$^{70}_{30}$Zn$_{40}$-5

Adopted Levels, Gammas (continued)

γ(^{70}Zn) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f
3634.99	2^+	1875.8[@] *2*	100	1759.16	2^+
3710.7	2^+	1951.5[a] *6*	100	1759.16	2^+
3755.4	(8^+)	860.3[b]	100	2895.10	(6^+)
3788.16		750.0 *2*	63 *4*	3038.15	5^-
		893.1 *6*	100 *5*	2895.10	(6^+)
3848.4	$(5,6^+)$	2061.6 *6*	100	1786.75	4^+
3904.0	$(5,6^+)$	2117.2 *4*	100	1786.75	4^+
4001.46	$(5,6,7^-)$	963.3 *1*	100	3038.15	5^-
4061.40	$(5,6,7^-)$	584.7 *1*	100 *8*	3476.68	
		1023.3 *2*	70 *7*	3038.15	5^-
4146.1		1107.9[a] *3*	100	3038.15	5^-
4264.5	$(5,6,7^-)$	1226.3 *7*	100	3038.15	5^-
4308.99	$(5,6,7^-)$	1270.8 *2*	100 *5*	3038.15	5^-
		1413.9 *2*	43 *4*	2895.10	(6^+)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f
4464.77	$(5,6,7^-)$	988.0 *3*	28 *3*	3476.68	
		1426.5 *2*	100 *4*	3038.15	5^-
		1569.8 *2*	32 *3*	2895.10	(6^+)
4514.27	$(5,6,7^-)$	1476.1 *2*	100	3038.15	5^-
4558.2	$(5,6^+)$	1520.1 *3*	67 *5*	3038.15	5^-
		2771.2 *6*	100 *4*	1786.75	4^+
4588.8	$(5,6,7^-)$	1550.6 *3*	100	3038.15	5^-
4710.1	(5,6,7)	1815.0 *5*	100	2895.10	(6^+)
4791.7	(5,6,7)	1315 *1*	100	3476.68	
4849.2	$(5,6^+)$	1954.2 *3*	100 *4*	2895.10	(6^+)
		3062.1 *6*	85 *4*	1786.75	4^+
4935.9	(10^+)	1180.5[b]	100	3755.4	(8^+)
5061.3	(5,6,7)	2166.2 *5*	100	2895.10	(6^+)
6116.2	(12^+)	1180.3[b]	100	4935.9	(10^+)

† From ^{70}Cu β^- decay (44.5 s), except where noted.

‡ From $\gamma(\theta)$ in (n,n′γ), except where noted.

\# From $\gamma(\theta)$ in (n,n′γ).

@ From ^{70}Cu β^- decay (6.6 s).

& From ^{70}Cu β^- decay (33 s).

a From (n,n′γ).

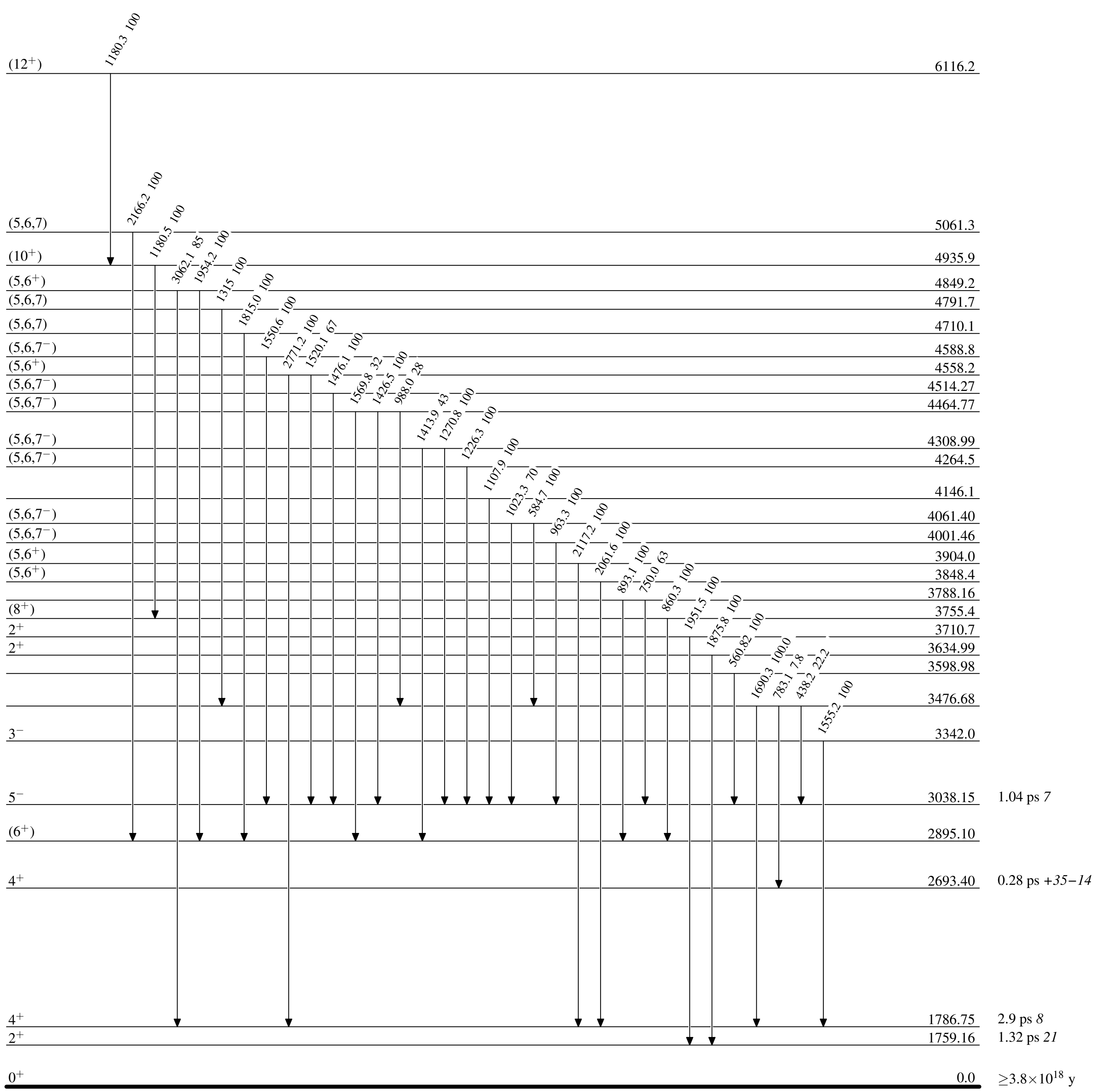
b From ^{208}Pb(^{64}Ni,Xγ).

c Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level



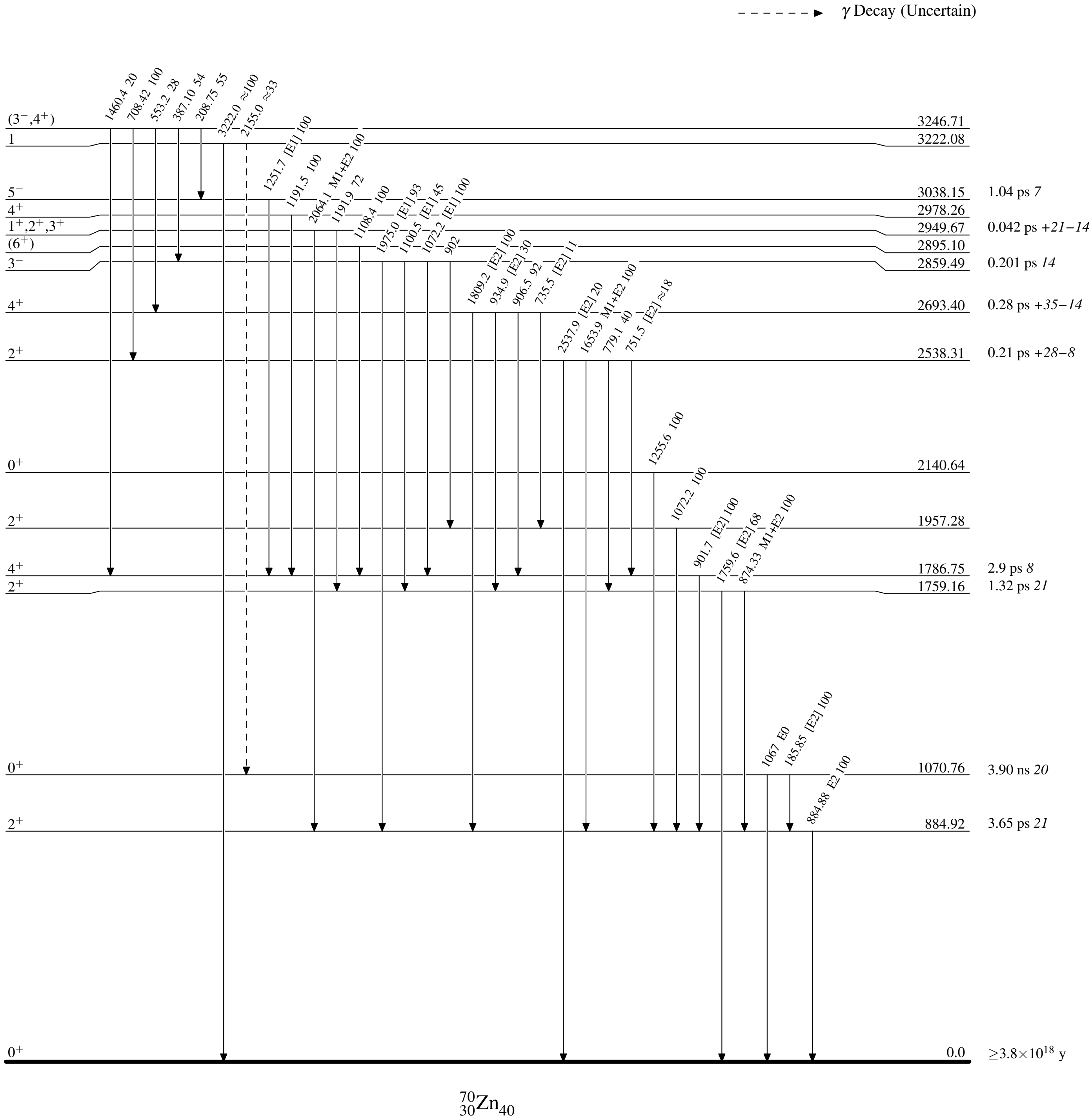
$^{70}_{30}Zn_{40}$

Adopted Levels, Gammas

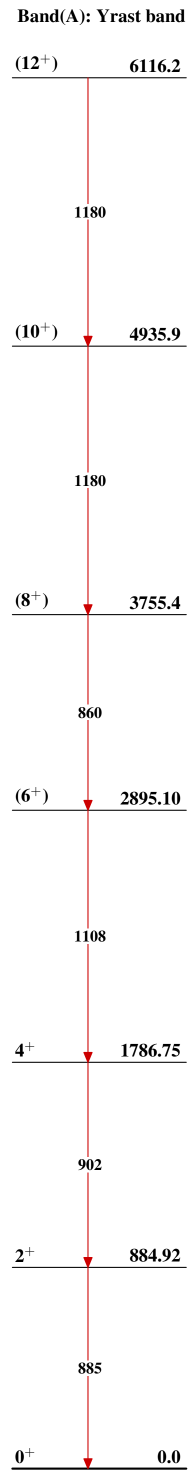
Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level



Adopted Levels, Gammas



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