Adopted Levels, Gammas

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

Q(β^-)=−107.0 *24*; S(n)=8278.2 *17*; S(p)=6494.6 *13*; Q(α)=−4086.6 *15* 2012Wa38
Note: Current evaluation has used the following Q record −106.9 24 *8278.2 17* 6494.7 *12* −4086.6 *15* 2011AuZZ.
S(2n)=19504 *3*, S(2p)=15405.7 *16* (2011AuZZ).
α: Additional information 1.

^{68}Ga Levels

$\nu g_{9/2}$ coupled to ^{67}Ga $(\pi g_{9/2})(\nu g_{9/2})^2$ (2000Si38).

Cross Reference (XREF) Flags

A	^{68}Ge ε decay	E	^{68}Zn(p,n)	I	^{55}Mn(^{16}O,2pnγ),^{56}Fe(^{15}N,2pnγ)
B	^{65}Cu(α,nγ),^{66}Zn(α,pnγ)	F	^{68}Zn(p,nγ)	J	^{198}Pt(^{76}Ge,Xγ)
C	^{66}Zn(α,d)	G	^{69}Ga(d,t)		
D	^{67}Zn(p,γ)	H	^{70}Ge(d,α)		

E(level)†	Jπ	$T_{1/2}$‡	XREF	Comments
0.0#	1+	67.71 min *8*	AB DEFGHIJ	%ε+%β^+=100 Q=0.0277 *14*; μ=0.01175 *5* Jπ: from log *ft*=5.0 from 0+ in ^{68}Ge ε decay. $T_{1/2}$: weighted average of 67.7 min *3* (1960Gl04), 69.2 min *14* (1961Ra06), 68.33 min *9* (1965Eb01), 68.2 min *1* (1965Bo42), 68.5 min *5* (1971Oo01), 67.80 min *8* (1971Sm02), 67.629 min *24* (1983Iw02) and 68.2 *7* min (2011Ra08). μ: Atomic beam magnetic resonance (2001StZZ,1962Eh02). Q: Atomic beam magnetic resonance and atomic shielding calculations (2001StZZ,1972St38).
175.017# *7*	2+	≤5 ns	B DEFGHIJ	Jπ: 2 from $\gamma(\theta)$ and Hauser-Feshbach analysis; π from M1(+E2) 175γ to 1+ and L(d,t)=1+3.
320.976 *10*	1+		B DEFGH	Jπ: 1 from Hauser-Feshbach analysis; π from M1 146γ to 2+ and L(d,t)=1.
374.581 *12*	2+		B DEFgh	Jπ: 2 from $\gamma(\theta)$ and Hauser-Feshbach analysis; π from M1+E2 374.6γ to 1+.
375.581# *10*	3+	≤5 ns	B DEFghIJ	Jπ: 3 from $\gamma(\theta)$; π from M1+E2 201γ to 2+.
496.092# *15*	4+	≤5 ns	B DEFGHIJ	Jπ: 4 from $\gamma(\theta)$ and Hauser-Feshbach analysis; π from M1(+E2) 121γ to 3+ and L(d,t)=3.
514.301 *15*	1+		B DEFGH	Jπ: 1 from Hauser-Feshbach analysis; π from M1(+E2) 339γ to 2+ and L(d,t)=1.
555.471 *15*	(0,1,2)+		B DEFG	Jπ: M1(+E2) 555γ to 1+. Hauser-Feshbach analysis favors J=0.
564.515 *12*	2+		B DEFGH	E(level): doublet in (d,α) at 562. Jπ: 2 from Hauser-Feshbach analysis; π from M1(+E2) 565γ to 1+ and L(d,t)=1.
583.788 *15*	2−	≤5 ns	B DEFGHI	Jπ: 2 from $\gamma(\theta)$ and Hauser-Feshbach analysis; π from E1(+M2) 584γ to 1+.
676.046 *19*	3+		B EFGH	Jπ: 3 from Hauser-Feshbach analysis; π from M1 501γ to 2+ and L(d,t)=1+3.
806.159 *17*	4+	≤5 ns	B DEFGHI	Jπ: 4 from $\gamma(\theta)$ and Hauser-Feshbach analysis; π from M1(+E2) 310γ to 4+.
825.340 *14*	1+,2+		B EFGH	Jπ: M1(+E2) 825γ to 1+, 449.8γ to 3+, L(d,t)=1.
838.720 *16*	1+,2+		B F	Jπ: M1 518γ to 1+, M1 664γ to 2+.

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Adopted Levels, Gammas (continued)

^{68}Ga Levels (continued)

E(level)[†]	Jπ	$T_{1/2}$[‡]	XREF	Comments
841.189 *18*	3^+		B DEFGH	Jπ: 3 from Hauser-Feshbach analysis; π from M1(+E2) 466.6γ to 3^+ and L(d,t)=1.
876.750 *17*	4^-	≤5 ns	B DEFGHI	Jπ: 4 from γ(θ) and Hauser-Feshbach analysis; π from E1(+M2) 501γ to 3^+.
946.871 *17*	$1^+,2^+,3^+$		B EFgh	Jπ: M1(+E2) 572.3γ to 2^+.
952.43 *15*	$2^+,3^+$		DE gh	Jπ: 456γ to 4^+, 631γ to 1^+.
1055.949 *25*	3^-	≤5 ns	B D F	Jπ: 3 from Hauser Feshbach analysis; π from M1(+E2) 427γ to 2^-.
1064.115 *21*	$1^+,2,3^+$		B EFGH	Jπ: 689γ to 3^+, 1064γ to 1^+.
1101.203 *20*	$^+$		B FGh	XREF: G(1105). Jπ: L(d,t)=1+3.
1103.52 *3*	5^-	≤5 ns	B DEF hIJ	Jπ: 5 from γ(θ) and Hauser-Feshbach analysis; π from E1 607γ to 4^+.
1117.150 *22*	$0^+,1^+,2^+$		F	Jπ: M1(+E2) 603γ to 1^+.
1123.185 *18*	$1^+,2^+,3^+$		B EFGH	Jπ: 747.5γ to 3^+, 1123γ to 1^+; π from L(d,t)=1.
1209.70 *4*			B FGH	
1216.19 *7*	$2^+,3,4^+$		B EF	Jπ: 720γ to 4^+, 1041γ to 2^+.
1223.45 *7*	5^+	≤5 ns	B F I	Jπ: 5 from γ(θ); π from M1+E2 727γ to 4^+.
1225.17 *3*	$1^+,2,3^+$		Fgh	Jπ: 849.6γ to 3^+, 1225γ to 1^+. E(level): doublet in (d,α) at 1226 *3*.
1228.81 *3*			Fgh	E(level): doublet in (d,t) at 1232 *3*.
1229.87 *4*	7^-	62.0 ns *14*	B IJ	Q=0.72 *2*; μ=+0.74 *2* $T_{1/2}$: weighted average of 60 ns *2* from (α,nγ), 64 ns *2* from ^{55}Mn(^{16}O,2pnγ),^{56}Fe(^{15}N,2pnγ), and 62 ns *6* from ^{198}Pt(^{76}Ge,Xγ). Q: TDPAD (2011StZZ,1985Ra33). μ: TDPAD (2011StZZ,1978Fi03). Others: +0.707 *14* (1973BaYF) and +0.72 *2* (1985Ra33). Jπ: 7 from γ(θ); π from E2 126γ to 5^-.
1231.70 *3*	$3^-,4^-$		B F	Jπ: 128γ to 5^-, 648γ to 2^-.
1239.85 *3*			EF	E(level): doublet in (p,n) at 1239 *4*.
1247.56 *3*	5^-	≤5 ns	B GHI	Jπ: 5 from γ(θ); π from M1+E2 371γ to 4^-. π inconsistent with L(d,t)=(3).
1267.21 *3*	$1,2,3^+$		FgH	Jπ: 683γ to 2^-, 703γ to 2^+, and 946γ to 1^+.
1275 *3*			E g	E(level): from (p,n).
1287.00 *5*	$2^+,3,4^+$		B FgH	Jπ: 791γ to 4^+, 1112γ to 2^+. E(level): doublet in (d,t) at 1291 *3*.
1296.39 *4*	$2^-,3,4^-$		B EFg	E(level): doublet in (p,n) at 1297 *3*, doublet in (d,t) at 1291 *3*. Jπ: 420γ to 4^-, 713γ to 2^-.
1317 *3*	$^+$		G	Jπ: L(d,t)=1.
1323.24 *3*	6^-	≤5 ns	BC E HI	XREF: C(1290). Configuration: $((\pi 2p_{3/2})(\nu 1g_{9/2}))_{6-}$ (1994Fi01). E(level): doublet in (d,α) at 1321 *4*. Jπ: 6 from γ(θ); π from M1(+E2) 220γ to 5^-.
1342 *3*			E GH	E(level): weighted average of 1340 *4* in (p,n) and 1344 *5* in (d,α). E(level): doublet in (d,t) at 1336 *3*.
1350.49? *13*			B	
1412 *3*			gH	E(level): doublet in (d,t) at 1419 *4*.
1425 *4*			E g	E(level): doublet in (d,t) at 1419 *4*.
1442.48 *11*	$3^-,4,5^+$		B	Jπ: 339γ to 5^-, 1067γ to 3^+.
1461 *4*			E	
1489.17 *8*			B H	
1493.82 *4*	$(5)^-$	≤5 ns	B E	Jπ: (5,6) from γ(θ); E1(+M2) 998γ to 4^+.
1510 *3*			H	
1523.21 *7*			B E	
1539.44? *10*			B	
1548.25 *10*			B E H	
1570.47 *10*			B E H	
1591 *5*			c E H	XREF: c(1610).

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Adopted Levels, Gammas (continued)

^{68}Ga Levels (continued)

E(level)[†]	Jπ	$T_{1/2}$[‡]	XREF	Comments
				E(level): doublet in (p,n) at 1590 *4*.
1617 *4*			c E	XREF: c(1610).
1646? *5*			H	
1656.61 *8*	2^+,3,4^+		B H	Jπ: 1160γ to 4^+, 1482γ to 2^+.
1687.74 *3*	5^-,6^-		B	Jπ: M1+E2 584γ to 5^-, 458γ to 7^-.
1706? *5*			H	
1721? *5*			H	
1742.38 *7*			B H	XREF: H(1735).
1798.22 *10*			B H	E(level): doublet in (d,α) at 1795 *5*.
1857.29 *6*	5^-,6^-,7^-		B	Jπ: M1(+E2) 534γ to 6^-.
1913 *4*			H	
1946.00 *6*	5^-,6,7^-		B H	E(level): doublet in (d,α) at 1944 *5*. Jπ: 716γ to 7^-, 842γ to 5^-.
1973.18 *23*			B H	
2028 *4*			H	
2039 *5*			H	
2075 *4*			H	
2088.06 *12*	(6)	≤5 ns	B	Jπ: (D+Q) 865γ to 5^+.
2102.98 *6*	(7,8)	≤5 ns	B I	Jπ: from γ(θ) and excitation function.
2141 *5*			H	
2179 *5*			H	
2284.68 *11*	(7,8)	≤5 ns	B I	Jπ: from γ(θ) and excitation function.
2396.78 *11*	$9^{(-)}$	≤5 ns	B I	Jπ: from γ(θ) and excitation function; 1167γ to 7^-.
2611.85 *11*	(8^-)	≤5 ns	B I	Jπ: from γ(θ), γ(θ)(DCO) and excitation function; 1289γ to 6^-.
2896.09[@] *14*	9^+	≤5 ns	BC I	XREF: C(2910). Jπ: strong population in (α,d), assigned from expected configuration of $((\pi 1g_{9/2})(\nu 1g_{9/2}))_{9+}$.
2953.2 *6*	(8,9^-)	≤5 ns	B I	Jπ: from excitation function, 1723γ to 7^-.
3817.58 *14*	(9)	≤5 ns	B I	Jπ: from γ(θ) and excitation function.
3853.1 *10*			I	
3919.0 *6*			I	
3965.01[@] *17*	11^+	≤5 ns	B I	Jπ: from γ(θ) and excitation function.
4646.2 *6*	(11)		I	Jπ: Q 829γ to (9).
5167.1[@] *8*	(13^+)		I	Jπ: Q 1202γ to 11^+.
6591.1[@] *13*	(15^+)		I	Jπ: 1424γ to (13^+).
7725.2[@] *16*	(17^+)		I	Jπ: 1134γ to (15^+).

[†] From a least-squares fit to Eγ for the levels connected by γ's, by evaluator. ΔEγ=1 keV assumed when not given.
[‡] From delayed electronic timing in ^{65}Cu(α,nγ),^{66}Zn(α,pnγ), except where noted otherwise.
[#] Band(A): γ-sequence based on the 1^+ g.s. (2000Si38).
[@] Band(B): Band based on 9^+ 2896 level. Proposed configuration of.

Adopted Levels, Gammas (continued)

γ(^{68}Ga)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	α	Comments
175.017	2$^+$	175.01 *1*	100	0.0	1$^+$	M1		0.01592	α(K)=0.01421 *21*; α(L)=0.001482 *22*; α(M)=0.000217 *4*; α(N+..)=1.160×10^{-5} *17* δ: δ(E2/M1)=+0.0 *2* from γ(θ) in ^{65}Cu(α,nγ),^{66}Zn(α,pnγ) and +0.01 *2* from γ(θ) in ^{68}Zn(p,nγ). Mult.: from α(K)(exp)=0.0148 *13* from 1967Me18 and δ=+0.01 *2* from γ(θ) (1967Me18), mult is assigned M1.
320.976	1$^+$	145.94 *2*	5.5 *4*	175.017	2$^+$	M1(+E2)	<0.16	0.0255	α(K)=0.0228 *4*; α(L)=0.00239 *4*; α(M)=0.000349 *5*; α(N+..)=1.86×10^{-5} *3*
		320.98 *2*	100 *4*	0.0	1$^+$	M1(+E2)	+0.05[@] *5*	0.00353 *7*	α(K)=0.00315 *6*; α(L)=0.000324 *7*; α(M)=4.74×10^{-5} *9*; α(N+..)=2.55×10^{-6} *5* Mult.: D(+Q) from γ(θ) in ^{68}Zn(p,nγ); M1(+E2) from α(K)exp in ^{68}Zn(p,nγ). δ: Other: <0.31 from α(K)exp.
374.581	2$^+$	199.52 *16*	3.01 *18*	175.017	2$^+$				
		374.57 *2*	100 *5*	0.0	1$^+$	M1+E2	−0.07[@] *4*	0.00244 *4*	α(K)=0.00219 *4*; α(L)=0.000224 *4*; α(M)=3.28×10^{-5} *6*; α(N+..)=1.77×10^{-6} *3* Mult.: D(+Q) from γ(θ) in ^{68}Zn(p,nγ); M1+E2 from α(K)exp in ^{68}Zn(p,nγ). δ: Other: <0.66 from α(K)exp.
375.581	3$^+$	200.56 *1*	100 *4*	175.017	2$^+$	M1+E2	+0.25[@] *5*	0.0136 *10*	α(K)=0.0121 *9*; α(L)=0.00128 *10*; α(M)=0.000186 *14*; α(N+..)=9.8×10^{-6} *7* δ: Others: 0.54 *12* from α(K)exp, −0.3 *2* (1976Mo22) and +1.0 *1* (1973HaWI) from γ(θ) in ^{65}Cu(α,nγ),^{66}Zn(α,pnγ).
		375.60 *3*	47.5 *21*	0.0	1$^+$	(E2)[&]		0.00548 *8*	α(K)=0.00489 *7*; α(L)=0.000514 *8*; α(M)=7.49×10^{-5} *11*; α(N+..)=3.87×10^{-6} *6* δ: δ(M3/E2)=−0.2 *2* from γ(θ) in ^{65}Cu(α,nγ),^{66}Zn(α,pnγ).
496.092	4$^+$	120.52 *2*	100 *4*	375.581	3$^+$	M1(+E2)	+0.12[a]	0.047 *24*	α(K)=0.042 *21*; α(L)=0.004 *3*; α(M)=0.0006 *4*; α(N+..)=3.4×10^{-5} *16* δ: Others: <0.21 from α(K)exp and −0.07 *4* from γ(θ) in ^{65}Cu(α,nγ),^{66}Zn(α,pnγ).
		321.05 *7*	4.7 *4*	175.017	2$^+$	(E2)[&]		0.00940 *14*	α(K)=0.00838 *12*; α(L)=0.000887 *13*; α(M)=0.0001292 *19*; α(N+..)=6.60×10^{-6} δ: δ(M3/E2)=−0.2 *2* from γ(θ) in ^{65}Cu(α,nγ),^{66}Zn(α,pnγ).
514.301	1$^+$	139.74 *3*	3.40 *21*	374.581	2$^+$	(M1)		0.0286	α(K)=0.0255 *4*; α(L)=0.00268 *4*; α(M)=0.000392 *6*; α(N+..)=2.09×10^{-5} *3* Mult.: D from α(K)exp; Δπ=no from level scheme.
		193.26 *8*	1.07 *13*	320.976	1$^+$				
		339.28 *2*	100 *4*	175.017	2$^+$	M1(+E2)	<0.28	0.00324 *18*	α(K)=0.00290 *16*; α(L)=0.000298 *17*; α(M)=4.36×10^{-5} *25*; α(N+..)=2.34×10^{-6} *13*

$^{68}_{31}Ga_{37}$-4

Adopted Levels, Gammas (continued)

γ(^{68}Ga) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	α	Comments
514.301	1$^+$	514.31 *10*	20 *4*	0.0	1$^+$				
555.471	(0,1,2)$^+$	234.49 *2*	15.0 *8*	320.976	1$^+$	M1(+E2)	<0.24	0.0082 *6*	α(K)=0.0073 *6*; α(L)=0.00076 *6*; α(M)=0.000111 *9*; α(N+..)=5.9×10^{-6} *4*
		555.47 *2*	100 *5*	0.0	1$^+$	M1(+E2)	<0.52	0.00104 *7*	α(K)=0.00093 *6*; α(L)=9.5×10^{-5} *6*; α(M)=1.39×10^{-5} *9*; α(N+..)=7.5×10^{-7} *5*
564.515	2$^+$	188.91 *8*	1.0 *7*	375.581	3$^+$				
		189.93 *7*	4.8 *4*	374.581	2$^+$				
		243.53 *3*	5.7 *4*	320.976	1$^+$	M1(+E2)	<0.21	0.0073 *4*	α(K)=0.0065 *4*; α(L)=0.00068 *4*; α(M)=9.9×10^{-5} *6*; α(N+..)=5.3×10^{-6} *3*
		389.51 *2*	13.2 *6*	175.017	2$^+$	M1		0.00222 *4*	α(K)=0.00198 *3*; α(L)=0.000203 *3*; α(M)=2.97×10^{-5} *5*; α(N+..)=1.601×10^{-6} *23*
		564.53 *2*	100 *5*	0.0	1$^+$	M1(+E2)	<0.28	0.000966 *24*	α(K)=0.000865 *22*; α(L)=8.80×10^{-5} *23*; α(M)=1.29×10^{-5} *4* α(N+..)=6.96×10^{-7} *17*
583.788	2$^-$	262.91 *9*	0.50 *6*	320.976	1$^+$				
		408.78 *4*	1.17 *15*	175.017	2$^+$				
		583.80 *2*	100 *4*	0.0	1$^+$	E1(+M2)	−0.03 *4*	0.000444 *11*	α(K)=0.000398 *10*; α(L)=4.02×10^{-5} *10*; α(M)=5.86×10^{-6} *15* α(N+..)=3.15×10^{-7} *8* δ: from γ(θ) in ^{65}Cu(α,nγ),^{66}Zn(α,pnγ) (1973HaWi). δ: Others: <0.22 from α(K)exp, 0.0 *2* from γ(θ) in ^{65}Cu(α,nγ),^{66}Zn(α,pnγ) (1976Mo22).
676.046	3$^+$	300.40 *5*	9.3 *5*	375.581	3$^+$	M1(+E2)	<0.34	0.0045 *4*	α(K)=0.0040 *4*; α(L)=0.00042 *4*; α(M)=6.1×10^{-5} *6*; α(N)=3.3×10^{-6} *3*; α(N+..)=3.3×10^{-6} *3*
		501.04 *2*	100 *5*	175.017	2$^+$	M1(+E2)	<0.38	0.001238 *18*	α(K)=0.001108 *16*; α(L)=0.0001128 *16*; α(M)=1.651×10^{-5} *24* α(N)=8.93×10^{-7} *13*
		675.97 *7*	3.5 *10*	0.0	1$^+$	(E2)		0.000888 *13*	α(K)=0.000794 *12*; α(L)=8.14×10^{-5} *12*; α(M)=1.188×10^{-5} *17*; α(N+..)=6.31×10^{-7} Mult.: ΔJ=2,Δπ=no from level scheme.
806.159	4$^+$	310.07 *2*	103 *12*	496.092	4$^+$	M1(+E2)	−0.16[a]	0.0040 *7*	α(K)=0.0036 *6*; α(L)=0.00037 *6*; α(M)=5.4×10^{-5} *9*; α(N)=2.9×10^{-6} *5*; α(N+..)=2.9×10^{-6} *5* δ: Other: <0.38 from α(K)exp.
		430.59 *2*	100 *4*	375.581	3$^+$	M1(+E2)	−0.1[a]	0.00177 *13*	α(K)=0.00158 *12*; α(L)=0.000162 *13*; α(M)=2.37×10^{-5} *18*; α(N)=1.28×10^{-6} *9*; α(N+..)=1.28×10^{-6} *9* δ: Other: <0.95 from α(K)exp.
		631.09 *4*	19 *4*	175.017	2$^+$	(E2)		0.001078 *15*	α(K)=0.000964 *14*; α(L)=9.91×10^{-5} *14*; α(M)=1.446×10^{-5} *21*; α(N+..)=7.67×10^{-7} Mult.: ΔJ=2,Δπ=no from level scheme.
825.340	1$^+$,2$^+$	260.86 *6*	2.4 *3*	564.515	2$^+$				
		449.79 *3*	8.4 *5*	375.581	3$^+$				
		450.88 *16*	4.5 *4*	374.581	2$^+$				

$^{68}_{31}Ga_{37}$-5

Adopted Levels, Gammas (continued)

γ(^{68}Ga) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	α	Comments
825.340	1$^+$,2$^+$	504.33 *3*	11.1 *6*	320.976	1$^+$				
		650.32 *4*	4.9 *3*	175.017	2$^+$				
		825.33 *2*	100 *5*	0.0	1$^+$	M1(+E2)	<0.46	0.000424 *11*	α(K)=0.000380 *10*; α(L)=3.84×10^{-5} *11*; α(M)=5.62×10^{-6} *15* α(N+..)=3.04×10^{-7} *8*
838.720	1$^+$,2$^+$	283.25 *7*	3.6 *3*	555.471	(0,1,2)$^+$				
		464.24 *7*	15.2 *8*	374.581	2$^+$	M1(+E2)	<0.45	0.001474 *21*	α(K)=0.001319 *19*; α(L)=0.0001345 *19*; α(M)=1.97×10^{-5} *3* α(N+..)=1.064×10^{-6}
		517.74 *2*	100 *5*	320.976	1$^+$	M1(+E2)	<0.45	0.001150 *16*	α(K)=0.001029 *15*; α(L)=0.0001047 *15*; α(M)=1.532×10^{-5} *22* α(N+..)=8.29×10^{-7} *12*
		663.67 *4*	24.7 *14*	175.017	2$^+$	M1(+E2)	<1.3	0.000662 *10*	α(K)=0.000593 *9*; α(L)=6.01×10^{-5} *9*; α(M)=8.79×10^{-6} *13*; α(N+..)=4.76×10^{-7} *7*
		838.71 *3*	17.3 *9*	0.0	1$^+$				
841.189	3$^+$	276.67 *4*	16.5 *9*	564.515	2$^+$	M1(+E2)	<0.19	0.00523 *21*	α(K)=0.00467 *18*; α(L)=0.000482 *20*; α(M)=7.1×10^{-5} *3*; α(N+..)=3.78×10^{-6} *14*
		345.11 *4*	13.6 *16*	496.092	4$^+$				
		465.65 *7*	19 *4*	375.581	3$^+$				
		466.60 *2*	100 *5*	374.581	2$^+$	M1(+E2)	<0.38	0.00153 *8*	α(K)=0.00137 *8*; α(L)=0.000140 *8*; α(M)=2.05×10^{-5} *12*; α(N+..)=1.11×10^{-6} *6*
		841.21 *10*	27.4 *15*	0.0	1$^+$	(E2)		0.000495 *7*	α(K)=0.000443 *7*; α(L)=4.51×10^{-5} *7*; α(M)=6.59×10^{-6} *10*; α(N+..)=3.52×10^{-7} *5* I_γ: from ^{68}Zn(p,nγ). Other: ≤16 from ^{65}Cu(α,nγ),^{66}Zn(α,pnγ). Mult.: ΔJ=2, Δπ=no from level scheme.
876.750	4$^-$	292.98 *2*	100 *4*	583.788	2$^-$	E2		0.01297	α(K)=0.01155 *17*; α(L)=0.001230 *18*; α(M)=0.000179 *3*; α(N)=9.08×10^{-6} *13* α(N+..)=9.08×10^{-6} *13* δ: δ(M3/E2)=−0.1 *2* from γ(θ) in ^{65}Cu(α,nγ),^{66}Zn(α,pnγ).
		380.65 *3*	28 *4*	496.092	4$^+$				
		501.15 *3*	60 *6*	375.581	3$^+$	E1(+M2)	<0.35	0.00067 *3*	α(K)=0.00060 *3*; α(L)=6.1×10^{-5} *3*; α(M)=8.8×10^{-6} *4*; α(N+..)=4.73×10^{-7} *22*
946.871	1$^+$,2$^+$,3$^+$	270.75 *10*	1.19 *24*	676.046	3$^+$				
		382.44 *11*	2.3 *10*	564.515	2$^+$				
		432.54 *4*	4.6 *4*	514.301	1$^+$				
		571.42 *15*	7.7 *18*	375.581	3$^+$				
		572.28 *2*	100 *5*	374.581	2$^+$	M1(+E2)	<0.30	0.00094 *3*	α(K)=0.000841 *23*; α(L)=8.55×10^{-5} *24*; α(M)=1.25×10^{-5} *4*; α(N+..)=6.76×10^{-7} *18*

$^{68}_{31}Ga_{37}$-6

Adopted Levels, Gammas (continued)

γ(^{68}Ga) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	α	Comments
946.871	1+,2+,3+	625.92 *3*	13.1 *7*	320.976	1+				
		772.02 *36*	1.1 *4*	175.017	2+				
		946.85 *10*	1.2 *10*	0.0	1+				
952.43	2+,3+	456.38 *17*	100	496.092	4+				E_γ,I_γ: from ^{67}Zn(p,γ).
		631.3 *3*	82 *40*	320.976	1+				E_γ,I_γ: from ^{67}Zn(p,γ).
1055.949	3−	472.16 *2*	100	583.788	2−	M1(+E2)	+0.18[a]	0.00145 *12*	α(K)=0.00130 *10*; α(L)=0.000133 *11*; α(M)=1.94×10^{-5} *16*; α(N+..)=1.05×10^{-6} *8* δ: Other: <0.84 from α(K)exp.
1064.115	1+,2,3+	238.66 *15*	3.6 *6*	825.340	1+,2+				
		688.63 *10*	13.0 *12*	375.581	3+				
		889.09 *2*	100 *5*	175.017	2+				
		1064.14 *25*	3.0 *6*	0.0	1+				
1101.203	+	275.95 *15*	8 *3*	825.340	1+,2+				
		536.77 *16*	3.8 *8*	564.515	2+				
		726.78 *10*	11.0 *11*	374.581	2+				
		926.17 *2*	100 *5*	175.017	2+				
		1101.21 *17*	9.8 *11*	0.0	1+				
1103.52	5−	226.84 *18*	1.40 *9*	876.750	4−				
		297.41 *15*	9.9 *5*	806.159	4+				
		607.42 *3*	100 *8*	496.092	4+	E1(+M2)	0.03[a] *20*	0.00040 *10*	α(K)=0.00036 *9*; α(L)=3.7×10^{-5} *9*; α(M)=5.3×10^{-6} *13*; α(N+..)=2.9×10^{-7} *7* δ: Others: <0.22 from α(K)exp and −0.07 *4* from γ(θ) in ^{65}Cu(α,nγ),^{68}Zn(α,pnγ) (1973HaWI).
		727.99 *12*	3.1 *5*	375.581	3+	(M2+E3)		0.00159 *17*	α(K)=0.00142 *15*; α(L)=0.000149 *17*; α(M)=2.17×10^{-5} *24*; α(N+..)=1.15×10^{-6} *11* Mult.: ΔJ=2,Δπ=yes from level scheme.
1117.150	0+,1+,2+	278.34 *17*	1.9 *5*	838.720	1+,2+				
		602.85 *2*	100 *5*	514.301	1+	M1(+E2)	<0.29	0.000834 *20*	α(K)=0.000747 *18*; α(L)=7.58×10^{-5} *19*; α(M)=1.11×10^{-5} *3* α(N+..)=6.00×10^{-7} *14*
		796.18 *5*	9.9 *8*	320.976	1+				
		941.95 *14*	2.7 *5*	175.017	2+				
1123.185	1+,2+,3+	284.34 *24*	2.2 *13*	838.720	1+,2+				
		297.78 *14*	4.8 *22*	825.340	1+,2+				
		608.90 *3*	56 *3*	514.301	1+				
		747.52 *13*	17.3 *17*	375.581	3+				I_γ: from ^{68}Zn(p,nγ). Other: 37 *8* from ^{65}Cu(α,nγ),^{66}Zn(α,pnγ).
		748.65 *3*	29.4 *17*	374.581	2+				I_γ: from ^{68}Zn(p,nγ). Other: 37 *8* from ^{65}Cu(α,nγ),^{66}Zn(α,pnγ).
		802.13 *10*	18.2 *13*	320.976	1+				

$^{68}_{31}Ga_{37}$-7

Adopted Levels, Gammas (continued)

γ(^{68}Ga) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	α	Comments
1123.185	1+,2+,3+	948.19 *20*	5.2 *9*	175.017	2+				
		1123.12 *3*	100 *5*	0.0	1+				
1209.70		645.83 *10*	18 *3*	564.515	2+				
		835.00 *4*	100 *6*	374.581	2+				
		1035.41 *30*	17.4 *17*	175.017	2+				
1216.19	2+,3,4+	720.17 *13*	61 *12*	496.092	4+				
		840.32 *13*	100 *30*	375.581	3+				
		1041.35 *13*	100 *6*	175.017	2+				
1223.45	5+	417.42 *10*	24.4 *13*	806.159	4+				
		727.15 *12*	100 *10*	496.092	4+	M1+E2	−1.4[a] *2*	0.000664 *16*	α(K)=0.000594 *15*; α(L)=6.06×10^{-5} *15*; α(M)=8.86×10^{-6} *22* α(N+..)=4.74×10^{-7} *1* δ: Others: <1.5 from α(K)exp and +0.9 *3* from γ(θ) in ^{65}Cu(α,nγ),^{68}Zn(α,pnγ) (1973HaWI).
		847.93 *18*	6.9 *9*	375.581	3+	(E2)		0.000485 *7*	α(K)=0.000434 *6*; α(L)=4.42×10^{-5} *7*; α(M)=6.45×10^{-6} *9*; α(N+..)=3.45×10^{-7} *5* Mult.: ΔJ=2,Δπ=no from level scheme.
1225.17	1+,2,3+	660.76 *11*	13.5 *16*	564.515	2+				
		849.61 *20*	10 *6*	375.581	3+				
		850.52 *5*	88 *5*	374.581	2+				
		904.20 *10*	11.9 *16*	320.976	1+				
		1050.16 *5*	100 *6*	175.017	2+				
		1225.21 *6*	30.2 *24*	0.0	1+				
1228.81		673.29 *7*	12.5 *11*	555.471	(0,1,2)+				
		907.81 *6*	18.5 *11*	320.976	1+				
		1053.71 *6*	12.5 *11*	175.017	2+				
		1228.85 *4*	100 *5*	0.0	1+				
1229.87	7−	126.35 *3*	100 *5*	1103.52	5−	E2		0.29 *9*	α(K)=0.26 *8*; α(L)=0.030 *12*; α(M)=0.0044 *18*; α(N+..)=0.00020 *8* B(E2)(W.u.)=16.9 *13* δ: δ(M3/E2)=0.0 *2* from γ(θ) in ^{65}Cu(α,nγ),^{66}Zn(α,pnγ). Other: <0.11 from α(K)exp.
		733.76 *34*	1.6 *5*	496.092	4+	(E3+M4)		0.005 *4*	α(K)=0.004 *3*; α(L)=0.0005 *4*; α(M)=7.E−5 *5*; α(N+..)=3.6×10^{-6} *24* Mult.: ΔJ=3, Δπ=yes from level scheme.
1231.70	3−,4−	128.06 *8*	41 *9*	1103.52	5−				
		354.97 *5*	103 *9*	876.750	4−				
		647.92 *5*	100 *10*	583.788	2−				
		735.60 *7*	83 *11*	496.092	4+				
		856.18 *20*	32 *9*	375.581	3+				E_γ: Doublet transition in (α,nγ); feeds both the 376 and

Adopted Levels, Gammas (continued)

γ(^{68}Ga) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	α	Comments
									1247 levels. I_γ: from ^{68}Zn(p,nγ). Other: ≤32 in ^{65}Cu(α,nγ),^{66}Zn(α,pnγ).
1239.85		725.35 *13*	18.4 *16*	514.301	1^+				
		918.86 *6*	27.14 *16*	320.976	1^+				
		1239.86 *4*	100 *5*	0.0	1^+				
1247.56	5^-	370.77 *3*	100	876.750	4^-	M1+E2	−0.4[a]	0.0029 *5*	α(K)=0.0026 *4*; α(L)=0.00027 *4*; α(M)=4.0×10^{-5} *6*; α(N+..)=2.1×10^{-6} *3* δ: Other: <0.77 from α(K)exp.
1267.21	$1,2,3^+$	441.98 *12*	13 *3*	825.340	$1^+,2^+$				
		683.46 *12*	16 *8*	583.788	2^-				
		702.63 *5*	100 *7*	564.515	2^+				
		752.97 *9*	15 *3*	514.301	1^+				
		892.59 *6*	43 *4*	374.581	2^+				
		946.22 *6*	71 *5*	320.976	1^+				
		1092.23 *6*	28 *4*	175.017	2^+				
		1267.22 *9*	21 *3*	0.0	1^+				
1287.00	$2^+,3,4^+$	790.84 *13*	11.9 *24*	496.092	4^+				
		1111.98 *5*	100 *5*	175.017	2^+				
1296.39	$2^-,3,4^-$	419.72 *6*	100 *8*	876.750	4^-				
		712.57 *7*	52 *7*	583.788	2^-				
		920.63 *10*	34 *4*	375.581	3^+				
1323.24	6^-	75.6 *5*	≤17	1247.56	5^-				
		219.72 *3*	100 *5*	1103.52	5^-	M1(+E2)	−0.02[a]	0.0089 *13*	α(K)=0.0080 *12*; α(L)=0.00083 *13*; α(M)=0.000121 *19*; α(N+..)=6.5×10^{-6} *9* δ: Other: <0.37 from α(K)exp.
		446.52 *5*	8.4 *5*	876.750	4^-	(E2)		0.00310 *5*	α(K)=0.00277 *4*; α(L)=0.000288 *4*; α(M)=4.20×10^{-5} *6*; α(N+..)=2.19×10^{-6} *3* Mult.: ΔJ=2,Δπ=no from level scheme.
1350.49?		246.97[c] *13*	100	1103.52	5^-				
1442.48	$3^-,4,5^+$	339.38 *18*	42 *7*	1103.52	5^-				
		1066.67 *13*	100 *7*	375.581	3^+				
1489.17		425.07 *16*	16.7 *13*	1064.115	$1^+,2,3^+$				
		993.33 *17*	18.0 *17*	496.092	4^+				
		1113.44 *12*	100 *6*	375.581	3^+				
1493.82	$(5)^-$	997.74 *4*	100 *6*	496.092	4^+	E1(+M2)	<0.52	0.000152 *12*	α(K)=0.000136 *11*; α(L)=1.37×10^{-5} *11*; α(M)=2.00×10^{-6} *16* α(N+..)=1.08×10^{-7} *9*
		1118.12 *9*	22.5 *19*	375.581	3^+				
1523.21		419.69 *6*	100	1103.52	5^-				
1539.44?		662.69 *10*	100	876.750	4^-				

$^{68}_{31}Ga_{37}$-9

Adopted Levels, Gammas (continued)

γ(^{68}Ga) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	α	Comments
1548.25		332.05 *10*	74 *12*	1216.19	$2^+,3,4^+$				
		1052.19 *18*	100 *15*	496.092	4^+				
1570.47		274.08 *9*	100	1296.39	$2^-,3,4^-$				
1656.61	$2^+,3,4^+$	1160.18 *18*	40 *4*	496.092	4^+				
		1280.78 *18*	35 *4*	375.581	3^+				
		1481.75 *10*	100 *8*	175.017	2^+				
1687.74	$5^-,6^-$	364.79 *18*	7.6 *17*	1323.24	6^-				
		440.06 *5*	39.4 *24*	1247.56	5^-				
		457.82 *5*	36.3 *21*	1229.87	7^-				
		584.27 *4*	100 *10*	1103.52	5^-	M1(+E2)	<1.15	0.00101 *14*	α(K)=0.00090 *12*; α(L)=9.2×10^{-5} *13*; α(M)=1.35×10^{-5} *19*; α(N+..)=7.2×10^{-7} *10*
		811.11 *8*	18.3 *21*	876.750	4^-				
1742.38		638.73 *23*	15 *6*	1103.52	5^-				
		686.44 *7*	100 *10*	1055.949	3^-				
1798.22		1302.15 *10*	100 *9*	496.092	4^+				
		1422.30 *28*	28 *7*	375.581	3^+				
1857.29	$5^-,6^-,7^-$	534.05 *5*	100	1323.24	6^-	M1(+E2)	<0.45	0.00113 *6*	α(K)=0.00101 *6*; α(L)=0.000103 *6*; α(M)=1.51×10^{-5} *9*; α(N+..)=8.1×10^{-7} *5*
1946.00	$5^-,6,7^-$	716.17 *6*	100 *10*	1229.87	7^-				
		842.21 *14*	98 *11*	1103.52	5^-				
1973.18		649.94 *23*	100	1323.24	6^-				
2088.06	(6)	864.6 *1*	100	1223.45	5^+	(D+Q)[&]	−0.02[a]		
2102.98	(7,8)	779.73 *5*	100	1323.24	6^-				δ: 0.0 *2* for J(2103)=8 or +0.4 *2* for J(2103)=7 from γ(θ) in ^{65}Cu(α,nγ),^{66}Zn(α,pnγ).
2284.68	(7,8)	1054.8 *1*	100	1229.87	7^-				E_γ: slightly contaminated by the 1054γ from ^{67}Ga. δ: +0.12 *2* for J=7 or +1.4 *2* for J=8 from γ(θ) in ^{65}Cu(α,nγ),^{66}Zn(α,pnγ).
2396.78	$9^{(-)}$	1166.9 *1*	100	1229.87	7^-	(E2)[&]		0.00023 *4*	α(K)=0.00020 *4*; α(L)=2.1×10^{-5} *4*; α(M)=3.0×10^{-6} *5*; α(N+..)=4.76×10^{-6} *24* δ: δ(M3/E2)=+0.05 *20* from γ(θ) in ^{65}Cu(α,nγ),^{66}Zn(α,pnγ).
2611.85	(8^-)	1288.6 *1*	100	1323.24	6^-	(E2)[&]		0.0002 *4*	α(K)=0.0002 *4*; α(L)=2.E−5 *4*; α(M)=2.E−6 *6*; α(N+..)=2.6×10^{-5} *19* δ: δ(M3/E2)=0.0 *2* from γ(θ) in ^{65}Cu(α,nγ),^{66}Zn(α,pnγ).
2896.09	9^+	499.3 *1*		2396.78	$9^{(-)}$				
		1666[b] *1*		1229.87	7^-				
2953.2	$(8,9^-)$	1723.0	100	1229.87	7^-				
3817.58	(9)	864[b] *1*		2953.2	$(8,9^-)$				
		921[b] *1*		2896.09	9^+				

Adopted Levels, Gammas (continued)

γ(^{68}Ga) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	α	Comments
3817.58	(9)	1420.8 *1*		2396.78	$9^{(-)}$	(D+Q)[&]	−4.7[a]		
3853.1		957[b] *1*	100	2896.09	9^+				
3919.0		966[b] *1*		2953.2	$(8,9^-)$				
		1022[b] *1*		2896.09	9^+				
		1523[b] *1*		2396.78	$9^{(-)}$				
3965.01	11^+	1068.9 *1*	100	2896.09	9^+	(E2)[&]		0.00028 *6*	α(K)=0.00025 *5*; α(L)=2.5×10^{-5} *5*; α(M)=3.7×10^{-6} *8*; α(N+..)=2.0×10^{-7} *4* δ: δ(M3/E2)=−0.07 *20* from γ(θ) in ^{65}Cu(α,nγ),^{66}Zn(α,pnγ).
4646.2	(11)	681[b] *1*		3965.01	11^+				
		829[b] *1*		3817.58	(9)	Q			Mult.: from γ(θ) (DCO) in ^{55}Mn(^{16}O,2pnγ).
5167.1	(13^+)	521[b] *1*		4646.2	(11)	Q			Mult.: from γ(θ) (DCO) in ^{55}Mn(^{16}O,2pnγ).
		1202[b] *1*		3965.01	11^+	Q			Mult.: from γ(θ) (DCO) in ^{55}Mn(^{16}O,2pnγ).
6591.1	(15^+)	1424[b] *1*	100	5167.1	(13^+)				
7725.2	(17^+)	1134[b] *1*	100	6591.1	(15^+)				

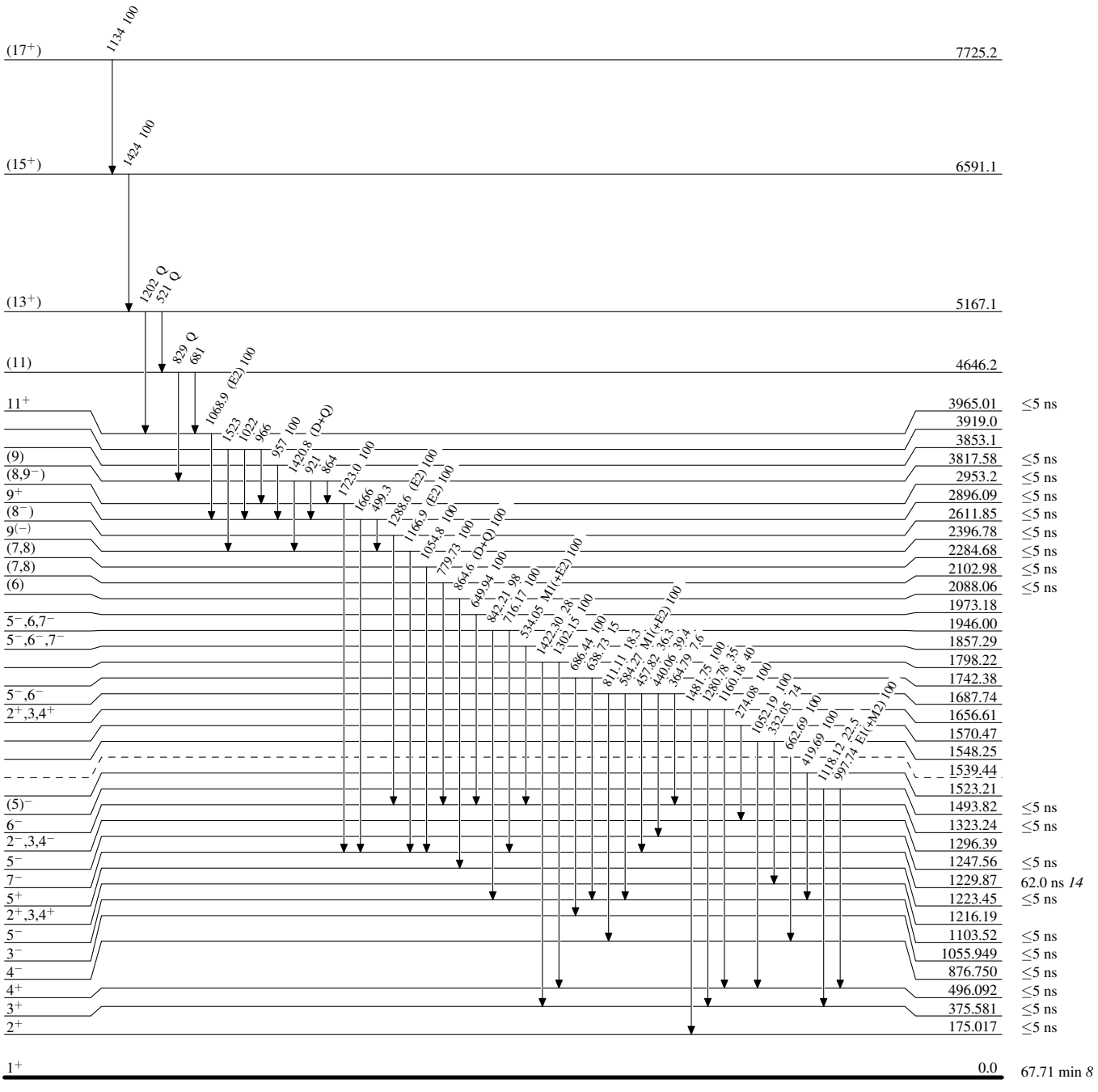
[†] From ^{68}Zn(p,nγ), except where noted.
[‡] Weighted average of ^{68}Zn(p,nγ) and ^{65}Cu(α,nγ),^{66}Zn(α,pnγ), except where noted.
[#] From α(K)exp, except where noted otherwise. α(K)exp are a weighted average of (p,nγ) (1993Ti03) and (α,nγ) (1993Ti04) data, normalized to α(K)exp=0.0144 for 175γ, assumed to be M1.
[@] From γ(θ) in ^{68}Zn(p,nγ) (1968Bi03).
[&] From γ(θ) in ^{65}Cu(α,nγ),^{66}Zn(α,pnγ) and ΔJ^π of initial and final levels.
[a] From γ(θ) in ^{65}Cu(α,nγ),^{66}Zn(α,pnγ) (1976Mo22); uncertainties are ≤0.2.
[b] From ^{55}Mn(^{16}O,2pnγ). ΔE(γ)=1 keV assumed by the evaluator.
[c] Placement of transition in the level scheme is uncertain.

$^{68}_{31}Ga_{37}$-11

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level



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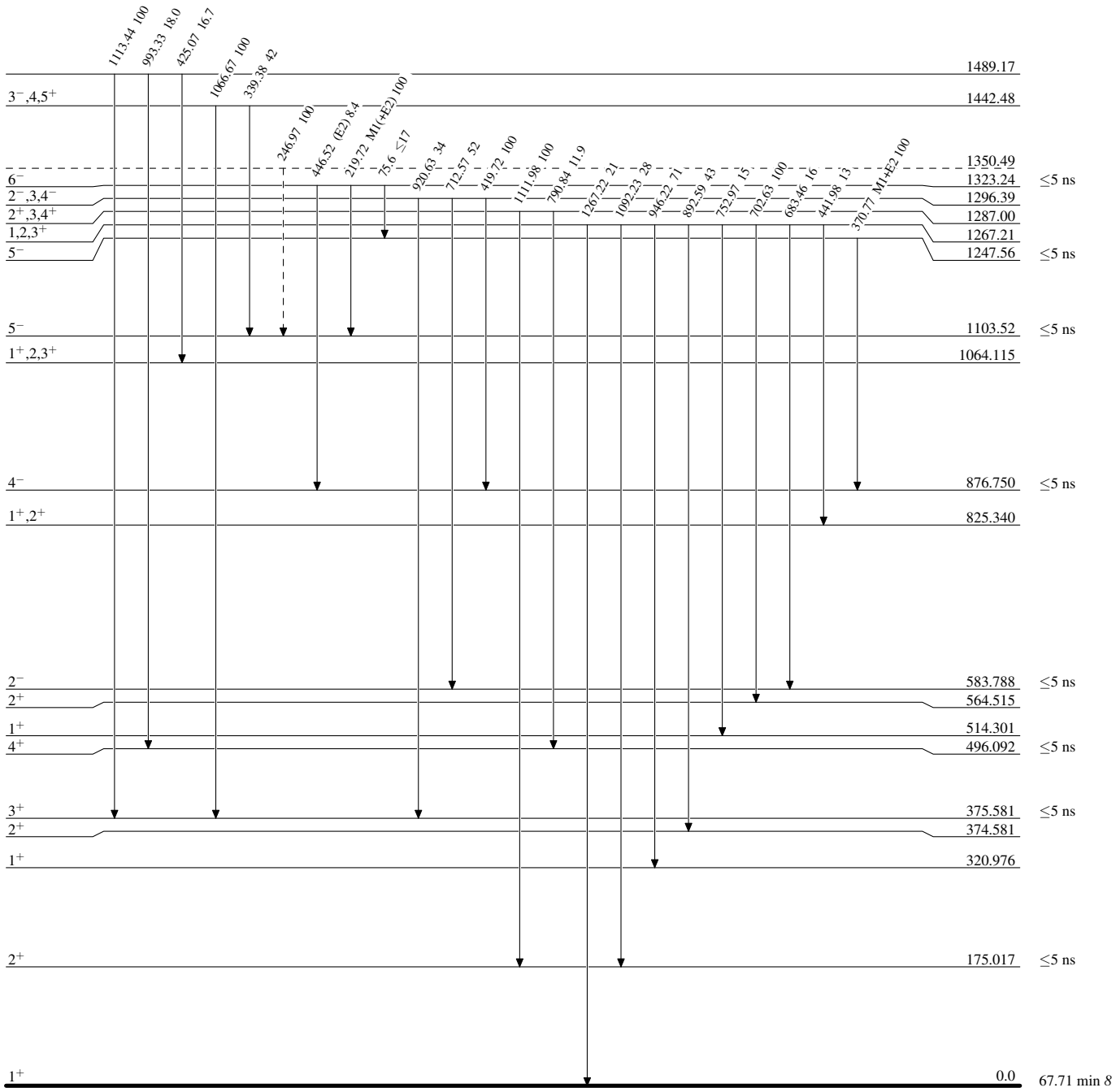
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

γ Decay (Uncertain)

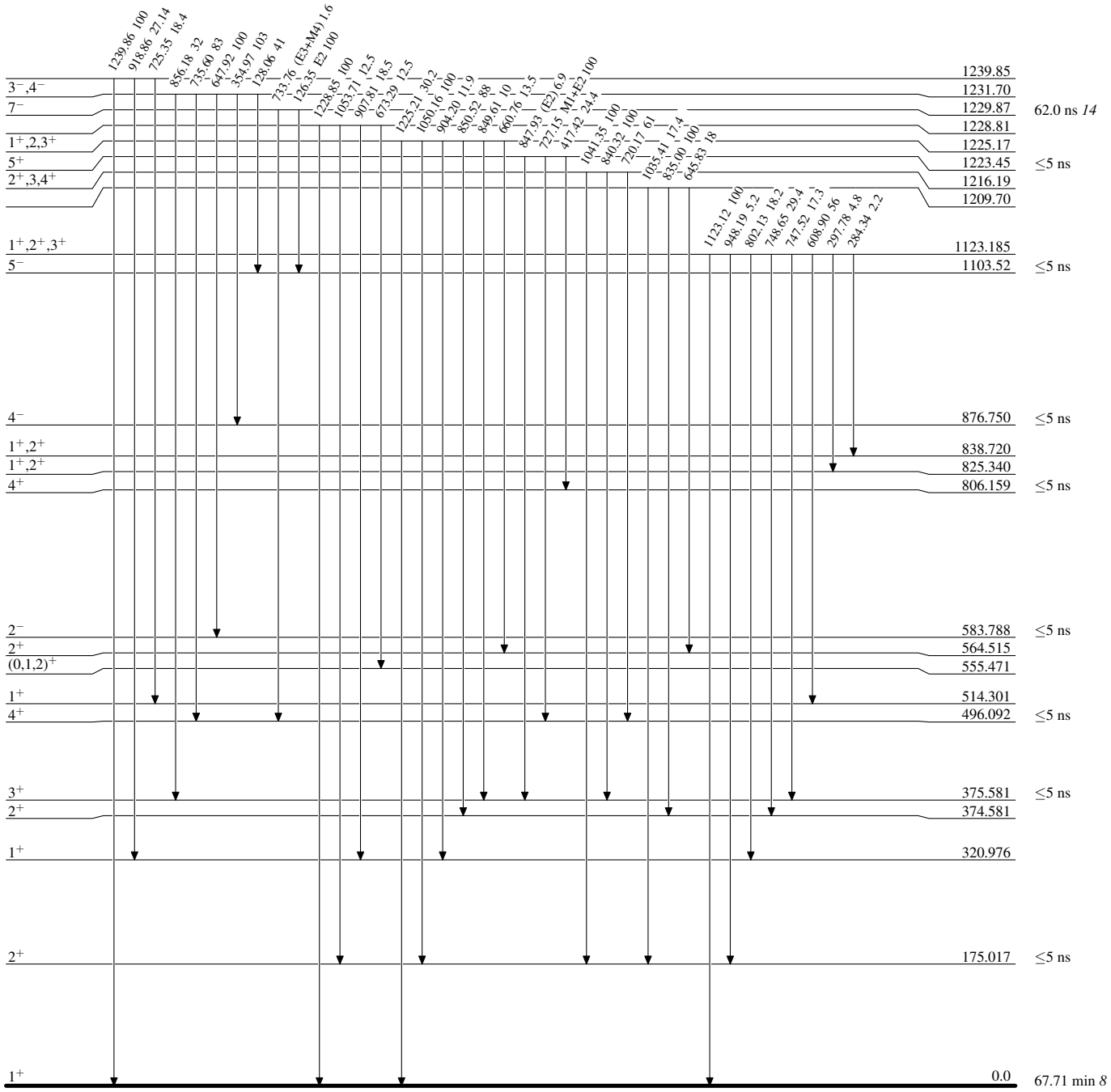


$^{68}_{31}Ga_{37}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

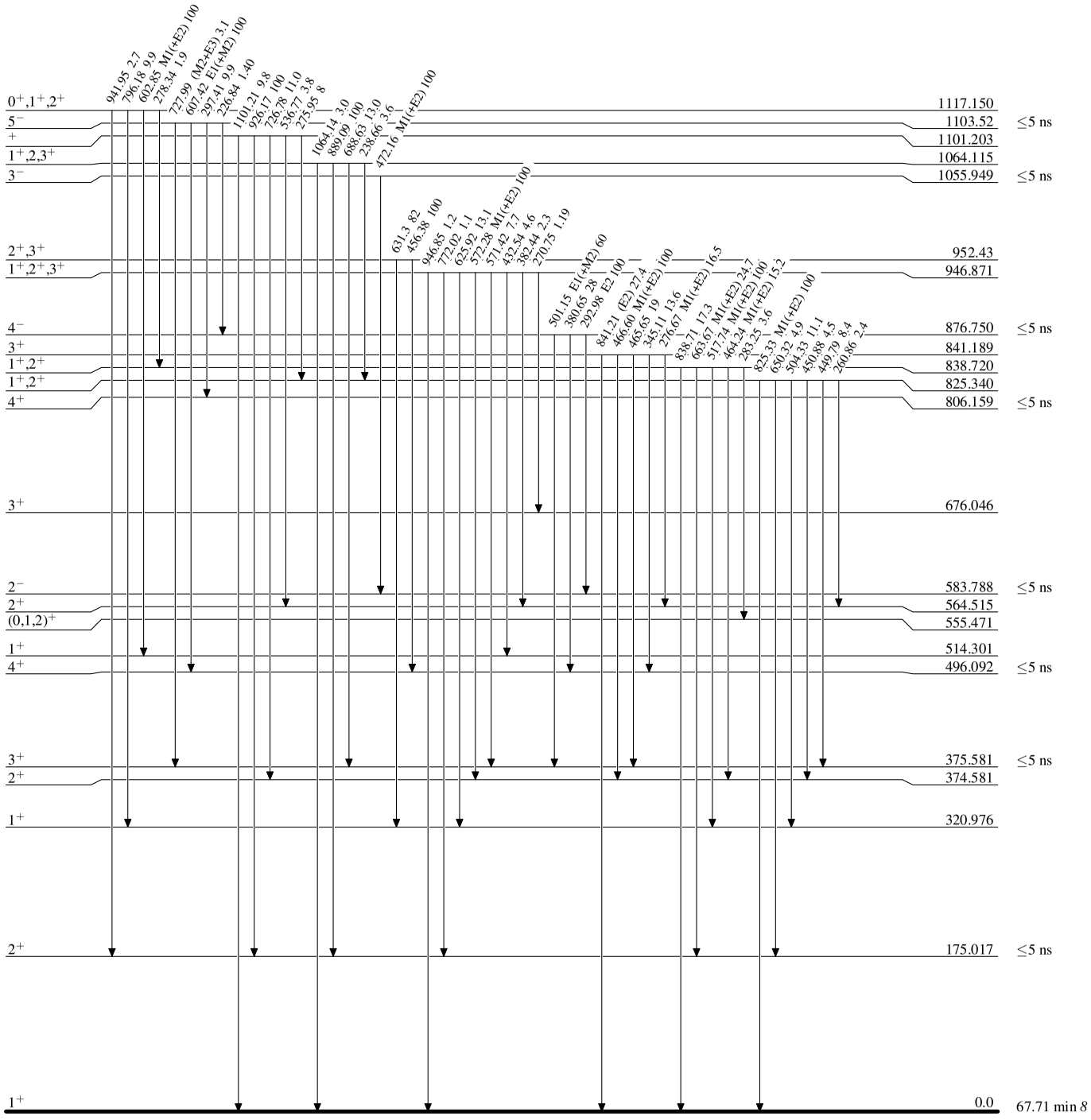


$^{68}_{31}Ga_{37}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

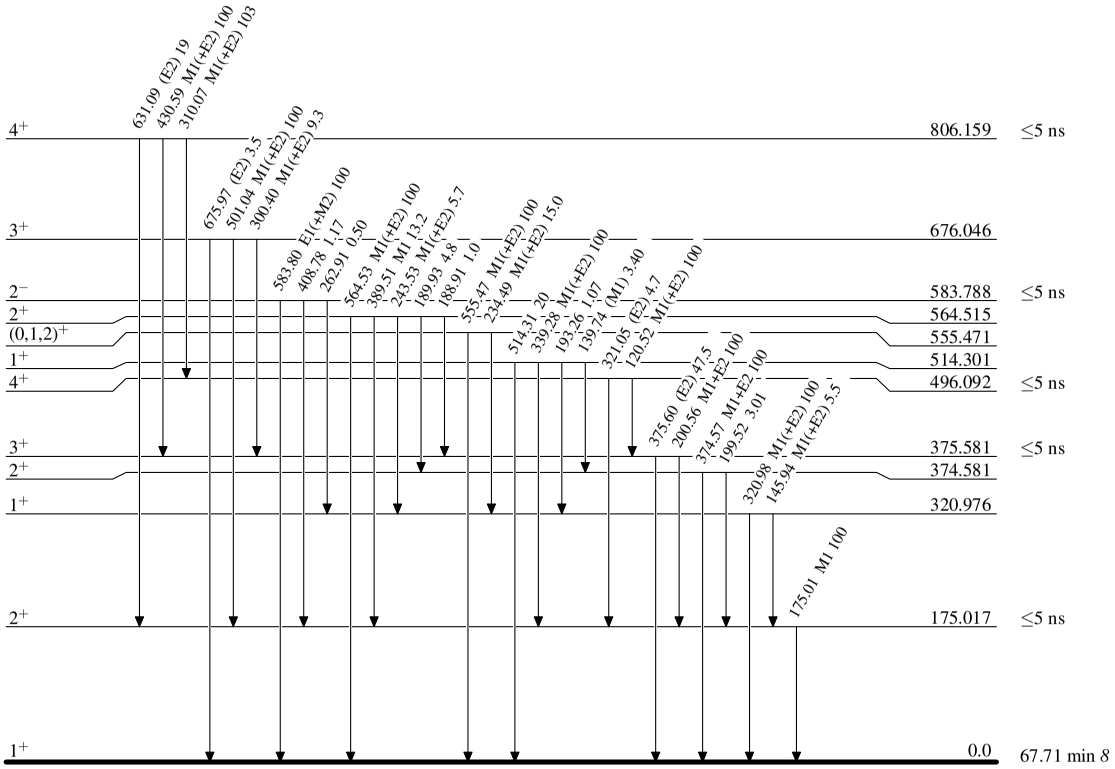


$^{68}_{31}Ga_{37}$

Adopted Levels, Gammas

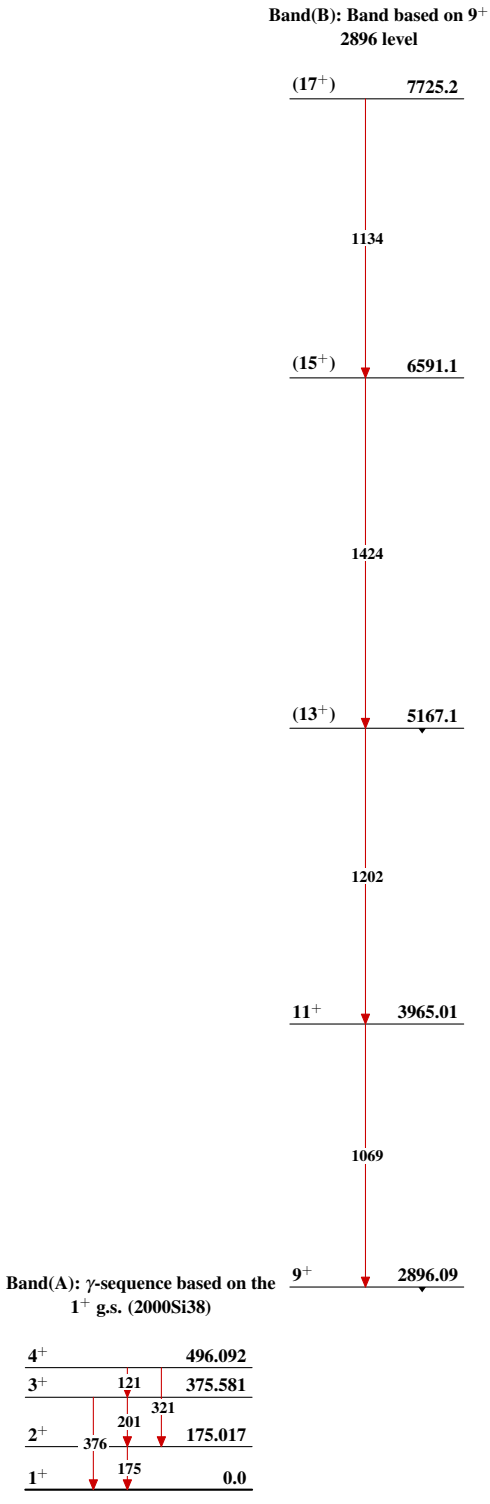
Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{68}_{31}Ga_{37}$

Adopted Levels, Gammas



$^{68}_{31}Ga_{37}$