

Adopted Levels, Gammas

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	S. K. Basu, E. A. Mccutchan		NDS 165, 1 (2020)	1-Mar-2020

$Q(\beta^-)=2278.5$ 16; $S(n)=6857.03$ 10; $S(p)=7574.0$ 16; $Q(\alpha)=-6172.0$ 16 [2017Wa10](#)
 $S(2n)=18338.8$ 22; $S(2p)=18463.0$ 16 ([2017Wa10](#)).

α : [Additional information 1](#).

 ^{90}Y LevelsCross Reference (XREF) Flags

A	$^{89}\text{Y}(n,\gamma)$ E=thermal	F	^{90}Y IT decay (3.19 h)	K	$^{92}\text{Zr}(d,\alpha)$
B	$^{89}\text{Y}(\text{pol } d,p)$	G	$^{90}\text{Sr } \beta^-$ decay (28.91 y)	L	$^{91}\text{Zr}(t,\alpha)$
C	$^{89}\text{Y}(d,p\gamma)$	H	$^{89}\text{Y}(\alpha,^3\text{He})$	M	$^{82}\text{Se}(^{11}\text{B},3n\gamma)$
D	$^{74}\text{Ge}(^{18}\text{O},np\gamma), ^{76}\text{Ge}(^{18}\text{O},3np\gamma)$	I	$^{88}\text{Sr}(^3\text{He},p)$	N	$^{89}\text{Y}(n,n')$
E	$^{87}\text{Rb}(\alpha,n\gamma)$	J	$^{91}\text{Zr}(d,^3\text{He})$		

E(level) [†]	J ^π [‡]	T _{1/2}	XREF	Comments
0.0	2 ⁻	64.05 h 5	ABCDEF GHIJKL	$\% \beta^- = 100$ $Q = -0.125$ 11; $\mu = -1.630$ 8 J ^π : J from atomic beam (1978Fu06); π from L=2 in (d,p) and ($\alpha,^3\text{He}$); L=1 in (t, α) and (d, ^3He). T _{1/2} : weighted average (using the limitation of relative statistical weights method (1988WoZO)) of 64.053 h 20 (2004Ko18), 63.46 h 13 (1969Gr38), 64.6 h 8 (1967Bi02), 64.21 h 8 (1968La10), 64.06 h 11 (1966Ri01), 63.74 h 10 (1963Vo02), 64.8 h 2 (1956He77), and 64.24 h 30 (1955Vo03). μ : from atomic beam measurement (1962Pe01). Q: from 2016St14 evaluation based on 2008Py02 and 1998Bi20 . Other: -0.155 3 (1962Pe01).
202.496 12	3 ⁻	250 ps 7	ABCDEF H JKLM	$\mu = -0.85$ 7 J ^π : L=2 in (d,p) and ($\alpha,^3\text{He}$); L=1 in (t, α) and (d, ^3He). $\gamma\gamma(\theta)$ in ^{90}Y IT decay (3.19 h). T _{1/2} : from delayed coin in ^{90}Y IT decay (3.19 h). μ : from integral perturbed angular correlations (IPAC) (1974Kl06).
682.01 ^b 5	7 ⁺	3.19 h 6	A CDEF JKLM	$\% \text{IT} = 99.9982$ 2; $\% \beta^- = 0.0018$ 2 $Q = -0.65$ 8; $\mu = +5.28$ 3 J ^π : L=4 in (t, α) and (d, ^3He); 479 γ E5 to 2 ⁻ . T _{1/2} : weighted average (using the limitation of relative statistical weights method) of: 3.244 h 5 (1992An19), 3.19 h 1 (1967Gr02), 3.15 h 5 (1962Ab03), 3.2 h 1 (1961Ca12), 3.14 h 10 (1961He09), and 3.19 h 6 (1961Ha17). The uncertainty has been increased to include the most precise value of 3.244 h 5 (1992An19). μ : from Colinear Laser Spectroscopy (CLS) (2007Ch07); other: +5.1 5 from low temperature nuclear orientation of 480 keV transition (1988Be46). Q: from Colinear Laser Spectroscopy (CLS) (2007Ch07 , 2016St14). $\% \beta^-$: from measured I(2319 γ)/I(480 γ); see $^{90}\text{Y } \beta^-$ decay (3.19 h).
776.593 15	2 ⁺		A C E JKL	J ^π : L=4 in (t, α) and (d, ^3He); circular polarization of primary γ ray to this level in (n, γ); 776 γ E1+M2 to 2 ⁻ .
953.512 17	2 ⁺ , 3 ⁺		A C E JKL	J ^π : L=4 in (t, α) and (d, ^3He); 177 γ to 2 ⁺ , 953 γ to 2 ⁻ , 751 γ to 3 ⁻ .
1047.22 12	(5 ⁺)		A C E JKL	J ^π : tentative assignment from (n, γ); supported by L=4 transfer in (t, α) and (d, ^3He) reaction; 365.2 γ to 7 ⁺ .
1189.68 8			A C E J L	
1211.578 17	0 ⁻		ABC E H KL	J ^π : L=0 in (d,p). S-factor(1211)/S-factor(1371)=2.9 1 agrees with 3.0

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

⁹⁰Y Levels (continued)

E(level) [†]	J ^π [‡]	XREF	Comments
1298.0 4	(5,6,7) ⁺	C E J L	(theory) for J ^π (1211)=0 ⁻ and J ^π (1371)=1 ⁻ .
1371.133 15	1 ⁻	ABC E H KL	J ^π : L=4 in (t,α) and (d, ³ He); 616γ to 7 ⁺ , 250.8γ to (5 ⁺).
1416.581 16	(2 ⁻),3 ^{-@}	ABC E JKL	J ^π : L=0 in (d,p); see arguments for 1211.6 level.
1561.9@ 5	3 ⁻ ,4 ^{-@}	B L	
1571.614 17	2 ⁻ ,(3) ^{-@}	ABC H JK	
1640.914 16	1 ^{-@}	ABC J	
1647 5	(4 ⁻)	H KL	J ^π : as proposed in (t,α) based on L=3.
1760.977 18	2 ^{-@}	ABC H JKL	
1811.02 4	(2 ⁻),3 ⁻	ABC J L	
1815.152 22	1 ⁺	A HI K	J ^π : L=0+2 in (³ He,p).
1962.1@ 2	5 ⁺ ,6 ⁺ @	BC H L	
2021.4?@ 4		B JKL	XREF: J(2030)K(2030)L(2030).
2088.8@ 8	5 ⁺ ,6 ⁺ @	BC H L	
2133.502 23	1,2 ^{-@}	AB	J ^π : 922γ to 0 ⁻ , 1357γ to 2 ⁺ , 2133γ to 2 ⁻ is consistent with J ^π from (pol d,p).
2179.4@ 7	(2 ⁻ ,3 ⁻)@	B	
2196.120 21	(1 ⁻ ,2) [#]	AB	J ^π : 1993γ to 3 ⁻ , 380.8γ to 1 ⁺ , 825.2γ to 1 ⁻ .
2216.66 ^b 7	8 ⁺	D M	J ^π : from γ(θ) and lin pol in ⁷⁴ Ge(¹⁸ O,npγ), ⁷⁶ Ge(¹⁸ O,3npγ); 1534γ M1+E2 to 7 ⁺ .
2240.6 8	5 ⁺ ,6 ⁺ @	BC	
2244.30 3	(1,2 ⁻)	A H	J ^π : 1032.6γ to 0 ⁻ .
2313 10	1 ⁺	I L	J ^π : L=0+2 in (³ He,p). E(level): from ⁸⁸ Sr(³ He,p).
2327.4@ 4		B	
2365.964 21	1 ^{-@}	ABC L	
2454.84? 6	9 ⁺	D	J ^π : γ(θ) and lin pol in (¹⁸ O,npγ) and (¹⁸ O,3npγ); 238γ M1+E2 to 8 ⁺ . E(level): the ordering of 239γ and 642γ may be reversed, which would result in a level at 2859.0.
2475.92 3	2 ⁻	ABC H	J ^π : L=2 in (d,p). S-factor(2476)/S-factor(2624)=1.96 10 agrees with 1.67 (theory) for J ^π (2475)=2 ⁻ and J ^π (2624)=1 ⁻ .
2495.48 3	(2,1 ⁻) [#]	A	J ^π : 2292.9γ to 3 ⁻ , 680.4γ to 1 ⁺ . Primary γ from J ^π =1 ⁻ .
2504.613 23	2 ^{-@}	ABC	
2520.9@ 5	5 ⁺ ,6 ⁺ @	B H	
2558.4@ 3	3 ^{-@}	B	
2590.2@ 5	3 ⁻ ,4 ^{-@}	B	
2623.99 4	1 ⁻	ABC H L	J ^π : L=2 in (d,p); see argument for 2475 level.
2631.93 4	(1 ⁻ ,2,3 ⁻) [#]	A	J ^π : 2429γ to 3 ⁻ , primary γ from J ^π =1 ⁻ .
2663.28 4	(1 ⁻ ,2 ⁻)	AB	J ^π : 2461γ to 3 ⁻ , 1452γ to 0 ⁻ .
2678.1@ 4	3 ^{-@}	B	
2702.6@ 5		B	
2719.35 3	(1,2 ⁻)	A	J ^π : 1509γ to 0 ⁻ .
2745.9@ 5		B	
2749.240 19	(1 ⁻ ,2,3 ⁻) [#]	A C H L	J ^π : 2547γ to 3 ⁻ , primary γ from J ^π =1 ⁻ .
2755.4@ 3	3 ^{-@}	B	
2758.078 20	(1 ⁻ ,2 ⁻)	A	J ^π : 1546.5γ to 0 ⁻ , 2555.6γ to 3 ⁻ .
2784.6@ 3		B	
2819.7@ 3	1 ^{-@}	B L	
2838.32 3	1,2	A C H L	J ^π : 2838γ to 2 ⁻ , primary γ from J ^π =1 ⁻ .
2847.42 4	1 ^{-@}	ABC	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

⁹⁰Y Levels (continued)

E(level) [†]	J ^{π‡}	XREF		Comments
2858.86 ^b 18	(9 ⁺)	D	M	J ^π : (M1+E2) 642γ to 8 ⁺ .
2859.35 3	2 ⁻	AB		J ^π : L(pol d,p)=2, 1648γ to 0 ⁻ .
2870.4 [@] 2	3 ⁻ ,4 ⁻ [@]	B	H	
2905 15	(2,3)		L	E(level),J ^π : from (t,α).
2932.8 [@] 2	3 ⁻ ,4 ⁻ [@]	BC	H L	
2937.5 5		C	H	E(level): from ⁸⁹ Y(d,py).
2986.10 3	(1 ⁻ ,2) [#]	A		J ^π : 2784γ to 3 ⁻ , 1171γ to 1 ⁺ , primary γ from J ^π =1 ⁻ .
2992.35 4	(1 ⁻),2 ⁻ [@]	ABC	L	
3002.3 [@] 2	3 ⁻	BC	H L	J ^π : L=4 in (d,p); 2226γ to 2 ⁺ . Primary γ from J ^π =1 ⁻ .
3002.69 4	(1 ⁻ ,2) [#]	A		J ^π : 2800γ to 3 ⁻ , 1188γ to 1 ⁺ .
3043.50 4	(1 ⁻ ,2,3 ⁻)	A		J ^π : 1403γ to 1 ⁻ , 2841γ to 3 ⁻ .
3048.2 [@] 2	3 ⁻ ,4 ⁻ [@]	BC	H L	
3097.06 ^b 20	(10 ⁺)	D	M	J ^π : M1(+E2) 238γ to (9 ⁺).
3119.5? [@] 4		B	L	
3137.1 [@] 2	3 ⁻ ,4 ⁻ [@]	BC	L	
3143.84 3	(1 ⁻ ,2,3 ⁻) [#]	A		J ^π : 2941γ to 3 ⁻ . Primary γ from J ^π =1 ⁻ .
3160.211 24	1 ⁻ [@]	ABC	H	
3203.9 [@] 4	3 ⁻ ,4 ⁻ [@]	B		
3270.0 [@] 4		B		
3309.5 ^{@&} 3	3 ⁻ [@]	B		
3312.408 25	(2,1 ⁻)	A		J ^π : 1497γ to 1 ⁺ , 1671γ to 1 ⁻ , 3110γ to 3 ⁻ .
3342.3 ^{@&} 3		B	H	
3354.3 ^{&} 3		B		
3404.83 5	(1 ⁻ ,2,3 ⁻)	AB		J ^π : 3202.6γ to 3 ⁻ , primary γ from J ^π =1 ⁻ .
3413.4 [@] 8		B		
3438.8 [@] 8	1 ⁺	B	I	J ^π : L=0(+2) in (³ He,p).
3469.14 4	(1 ⁻ ,2,3 ⁻) [#]	A		J ^π : 3266γ to 3 ⁻ , primary γ from J ^π =1 ⁻ .
3476.06 3	(1,2 ⁻)	A		J ^π : 2264γ to 0 ⁻ .
3490 5	1 ⁺		I	J ^π : L=0(+2) in (³ He,p).
3496.8 [@] 4	(3 ⁻) [@]	B		
3522.6 [@] 4	5 ⁺ ,6 ⁺ [@]	B	H	
3534.4 [@] 5	(5 ⁺ ,6 ⁺) [@]	B		
3555.727 19	(1 ⁻ ,2,3 ⁻)	AB		J ^π : 1915γ to 1 ⁻ , 3353γ to 3 ⁻ .
3574.501 23	1 ⁻ [@]	AB		
3584.5? [@] 5		B	H	
3592.9 [@] 6	5 ⁺ ,6 ⁺ [@]	B		
3602.07 3	1 ⁻ [@]	AB		
3625 6	1 ⁺		I	E(level): from ⁸⁸ Sr(³ He,p). J ^π : L=0+2 in (³ He,p).
3627.647 25	1 ⁻ [@]	AB		
3644.2 [@] 5	5 ⁺ ,6 ⁺ [@]	B		
3667.3? [@] 8		B		
3685.23 4	(1,2 ⁻)	A		J ^π : 2474γ to 0 ⁻ .
3692.29 3	1 ⁻ [@]	AB		
3736.1? [@] 3		B		
3757.8 [@] 3		B		
3792.1 [@] 3	3 ⁻ [@]	B		

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued) ${}^{90}\text{Y}$ Levels (continued)

E(level) [†]	J^{π} [‡]	XREF	Comments
3801.3@ 4	(1 ⁻)@	B	
3833.6@ 4		B	
3858.7@ 3	3 ⁻ @	B	
3881.4@ 3	3 ⁻ @	B	
3907.2@ 4	(1 ⁻)@	B	
3934.47 3	1 ⁻ @	AB	J^{π} : L=0 in (pol d, p).
3942.5?@ 2		B	
3953.54 4	(1 ⁻ ,2 ⁻)	AB	J^{π} : 3751 γ to 3 ⁻ , 2742 γ to 0 ⁻ .
3972.3@ 7		B	
3980.4@ 3	(3 ⁻)@	B	
3996.4@ 7		B	
4015.5@ 4	(5 ⁺ ,6 ⁺)@	B	
4024.2@ 3	(3 ⁻)@	B	
4037.54 3	(1,2 ⁻)@	A	J^{π} : 2826 γ to 0 ⁻ .
4038.0@ 3	(3 ⁻)@	B	
4065.0@& 3		B H	
4080.3?@ 4		B	
4100.49 4	(1 ⁻ ,2 ⁻)	AB	J^{π} : 2889 γ to 0 ⁻ , 1098 γ to 3 ⁻ .
4127.5@ 3	1 ⁻ @	B	
4140.0 8		B	
4161.28 4	(0,1,2)	AB	XREF: B(4158.8). J^{π} : 1795 γ to 1 ⁻ , 2345.9 γ to 1 ⁺ .
4166.8@& 3		B	
4197.7@ 3	(2 ⁻ ,3 ⁻)@	B	
4210.81 4	(0 ⁻ ,1,2,3 ⁻)	A	J^{π} : 1588 γ to 1 ⁻ , 4210.8 γ to 2 ⁻ .
4212.50 ^b 21	(11 ⁺)	D M	J^{π} : M1(+E2) 1115 γ (10 ⁺), Q 1354 γ to (9 ⁺).
4219.7@ 3	(2 ⁻)@	B	
4267.38 3	(1,2)	A	J^{π} : 693 γ to 1 ⁻ , 2452 γ to 1 ⁺ , 3491 γ to 2 ⁺ , 4267 γ to 2 ⁻ .
4288.6@ 4		B	
4302.3@& 3		B	
4325.06 5	1 ⁻ ,2 ⁻ @	AB	
4341.2@ 3	5 ⁺ ,6 ⁺ @	B	
4352.8@ 4		B	
4377.9@ 3	1 ⁻ @	B	
4411.3@ 4	(5 ⁺ ,6 ⁺)@	B	
4425.7@ 3	(5 ⁺ ,6 ⁺)@	B	
4451.576 24	(1,2 ⁻)	A	J^{π} : 3240 γ to 0 ⁻ .
4482.1@ 3	(5 ⁺ ,6 ⁺)@	B	
4504.7@ 3	5 ⁺ ,6 ⁺ @	B	
4515.93 3	(1,2 ⁻)	AB	XREF: B(4518.8). J^{π} : 4210.8 γ to 0 ⁻ .
4518.5 ^b 3	(12 ⁺)	D M	J^{π} : M1(+E2) 306 γ to (11 ⁺), (E2) 1421 γ to (10 ⁺).
4529.65 4	(0 ⁻ ,1,2,3 ⁻)#	A	J^{π} : primary γ from $J^{\pi}=1-$.
4533.14 4	(1 ⁻),2 ⁻ @	AB	
4543.6 3	(11 ⁺)	M	J^{π} : D+Q 1447 γ to (10 ⁺).
4548.0?@ 4		B	
4558.5@ 5	(0 ⁻ ,1 ⁻)@	B	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued) ${}^{90}\text{Y}$ Levels (continued)

E(level) [†]	J ^π [‡]	T _{1/2}	XREF	Comments
4572.0 [@] 4	2 ⁻ ,1 ⁻ [@]		B	
4587.3? [@] 5			B	
4619.5? [@] 5			B	
4636.8 [@] 5	(5 ⁺ ,6 ⁺) [@]		B	
4645.4? [@] 11			B	
4656.1 [@] 7	(5 ⁺ ,6 ⁺) [@]		B	
4662.8 [@] 6	3 ⁻ [@]		B	
4672.6 [@] 7	3 ⁻ [@]		B	
4685.8 [@] 7	1 ⁻ [@]		B	
4694.2 ^{@&} 7			B	
4713.0 [@] 7	5 ⁺ ,6 ⁺ [@]		B	
4725.4? [@] 18			B	
4735.2? [@] 8			B	
4749.4? [@] 8			B	
4777.1? [@] 10			B	
4784.7 [@] 9	3 ⁻ ,4 ⁻ [@]		B	
4802.9? [@] 10			B	
4814.7? [@] 11			B	
4822.7? [@] 11			B	
4835.05 4	(1,2 ⁻)		AB	J ^π : 3623.14γ to 0 ⁻ .
4865.9 [@] 12	5 ⁺ ,6 ⁺ [@]		B	
4881.4 [@] 12			B	
4895.4 [@] 13	(2 ⁻) [@]		B	
4914.8 [@] 13	(1 ⁻ ,2 ⁻) [@]		B	
4927.3? [@] 15			B	
4940.1 [@] 14	(3 ⁻) [@]		B	
4953.2 [@] 15	(1 ⁻) [@]		B	
4971.2 [@] 16	5 ⁺ ,6 ⁺ [@]		B	
4986.0 [@] 16	(0 ⁻ ,1 ⁻) [@]		B	
4997.9 [@] 25	2 ⁻ ,3 ⁻ [@]		B	
5068.39 20			M	
5102.6 3	(12)		M	J ^π : D 1728.4γ from 13 ⁽⁺⁾ , D 890.2γ to (11 ⁺).
5111.46 ^b 24	(13 ⁺)		M	J ^π : Q 898.8γ to (11 ⁺); assignment to γ-ray sequence.
5359.7 ^b 3	(14 ⁺)		M	J ^π : D 248.2γ to (13 ⁺); assignment to γ-ray sequence.
5525.6 4	(12 ⁺)		M	J ^π : D 539.4γ from (13 ⁻); 2428.4γ to (10 ⁺).
5541.1 4	(12 ⁺)		M	J ^π : D 523.9γ from (13 ⁻); 2444.3γ to (10 ⁺).
5674.2 4	(12 ⁺)		M	J ^π : D 390.9γ from (13); 2577.4γ to (10 ⁺).
6065.0 3	(13 ⁻)		M	J ^π : D+Q 962.5γ to 12 ⁻ , D 1546.0γ to (12 ⁺), 2968.3γ to (10 ⁺).
6234.7 ^c 4	(13 ⁻)		M	J ^π : D 1716.1γ to (12 ⁺), E2 663.3γ from (15 ⁻).
6822.52 22	(13 ⁺)		M	J ^π : 2303.9γ to (12 ⁺), 2279.4γ to (11 ⁺).
6831.13 23	13 ⁽⁺⁾		M	J ^π : D 524.4γ from (14 ⁺), D 1728.4γ to (12), 2287.5γ to 11 ⁽⁺⁾ .
6856.992 12	1 ⁻		A	
6898.1 ^c 3	(15 ⁻)		M	J ^π : E2 833.1γ to 13 ⁻ , 2379.6γ to (12 ⁺); assignment to γ-ray sequence.
7355.53 ^a 23	(14 ⁺)		M	J ^π : D 533.0γ to (13 ⁺).
7882.7? ^a 3	(15 ⁺)	0.111 ps 28	M	E(level): since the reversed ordering of the 538.7-527.2 cascade is not ruled out, this level is either at 7882.9 or 7894.4.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued) ${}^{90}\text{Y}$ Levels (continued)

<u>E(level)[†]</u>	<u>J^π[‡]</u>	<u>$T_{1/2}$</u>	<u>XREF</u>	<u>Comments</u>
7994.0 ^c 4	16 ⁽⁻⁾		M	$T_{1/2}$: from DSA measurement in ${}^{82}\text{Se}({}^{11}\text{B}, 3n\gamma)$. J^π : D 527.2 γ to (14 ⁺); band assignment.
8421.4 ^a 3	(16 ⁺)	0.57 ps 8	M	J^π : D 1095.9 γ to 15 ⁻ , assignment to γ -ray sequence.
9005.9 ^a 4	(17 ⁺)	0.37 ps 6	M	$T_{1/2}$: from DSA measurement in ${}^{82}\text{Se}({}^{11}\text{B}, 3n\gamma)$. J^π : D 538.7 γ to (15 ⁺), 1065.8 γ to (14 ⁺); band assignment.
9317.1 5			M	$T_{1/2}$: from DSA measurement in ${}^{82}\text{Se}({}^{11}\text{B}, 3n\gamma)$. J^π : D 584.5 γ to (16 ⁺), band assignment.
9635.1 ^a 5	(18 ⁺)	0.38 ps 6	M	$T_{1/2}$: from DSA measurement in ${}^{82}\text{Se}({}^{11}\text{B}, 3n\gamma)$. J^π : 629.2 γ to 17 ⁽⁺⁾ , band assignment.

[†] From a least-squares fit to $E\gamma$, by evaluators, except where noted.

[‡] From (pol d,p) based on measured values of L-transfers and analyzing powers, except where noted. The spin and parity of states populated by mixed L-transfers may be unambiguously determined because of the high sensitivity of the analyzing power to the two possible couplings of the transferred orbital angular momenta.

Spin and parity assignments from (n, γ) assume capture and secondary γ rays to be E1, M1, or E2, and that the neutron-capture state has $J^\pi=1^-$.

@ From ${}^{89}\text{Y}$ (pol d,p) (1993Mi04).

& Multiplet.

^a Band(A): Band based on 14⁽⁺⁾.

^b Seq.(B): γ cascade based on 7⁺.

^c Seq.(C): Cascade based on 13⁻.

Adopted Levels, Gammas (continued)

$\gamma(^{90}\text{Y})$									
$E_i(\text{level})$	J_i^π	E_γ^\dagger	I_γ^\dagger	E_f	J_f^π	Mult. [†]	δ^\dagger	α	Comments
202.496	3 ⁻	202.53 3	100	0.0	2 ⁻	M1(+E2)	-0.04 4	0.0273 5	$\alpha(\text{K})=0.0240$ 4; $\alpha(\text{L})=0.00272$ 5; $\alpha(\text{M})=0.000465$ 9; $\alpha(\text{N})=6.25 \times 10^{-5}$ 11; $\alpha(\text{O})=4.30 \times 10^{-6}$ 7 B(M1)(W.u.)=0.01030 +27-31; B(E2)(W.u.)<1.9
682.01	7 ⁺	479.51 5	100.00 3	202.496	3 ⁻	M4(+E5)	<0.1	0.0965	$E_\gamma, I_\gamma, \text{Mult.}, \delta$: from ^{90}Y IT decay (3.19 h). $\alpha(\text{K})=0.0825$ 12; $\alpha(\text{L})=0.01162$ 17; $\alpha(\text{M})=0.00202$ 3; $\alpha(\text{N})=0.000267$ 4; $\alpha(\text{O})=1.642 \times 10^{-5}$ 23 B(M4)(W.u.)=1.540 +37-43
		681.8 6	0.35 3	0.0	2 ⁻	E5		0.0226	$E_\gamma, I_\gamma, \text{Mult.}, \delta$: from ^{90}Y IT decay (3.19 h). $\alpha(\text{K})=0.0191$ 3; $\alpha(\text{L})=0.00293$ 5; $\alpha(\text{M})=0.000507$ 8; $\alpha(\text{N})=6.50 \times 10^{-5}$ 10; $\alpha(\text{O})=3.38 \times 10^{-6}$ 5 B(E5)(W.u.)=1.66 15
776.593	2 ⁺	574.10 3	27 5	202.496	3 ⁻				$E_\gamma, I_\gamma, \text{Mult.}$: from ^{90}Y IT decay (3.19 h).
		776.64 3	100 2	0.0	2 ⁻	E1+M2	-0.066 9	4.56×10^{-4}	$\alpha(\text{K})=0.000403$ 7; $\alpha(\text{L})=4.37 \times 10^{-5}$ 7; $\alpha(\text{M})=7.45 \times 10^{-6}$ 12; $\alpha(\text{N})=1.002 \times 10^{-6}$ 16; $\alpha(\text{O})=6.98 \times 10^{-8}$ 11
953.512	2 ⁺ ,3 ⁺	176.91 3	61 12	776.593	2 ⁺				
		751.32 13	6.9 16	202.496	3 ⁻				
		953.54 3	100 20	0.0	2 ⁻				
1047.22	(5 ⁺)	365.21 11	100	682.01	7 ⁺				
1189.68		142.47 ^b 13	13 3	1047.22	(5 ⁺)				I_γ : from ($\alpha, n\gamma$). Others: 13 7 in (n, γ), E=thermal, 23.5 in (d, $p\gamma$). I_γ : from ($\alpha, n\gamma$).
		236.17 7	100 6	953.512	2 ⁺ ,3 ⁺				
1211.578	0 ⁻	1211.56 3	100	0.0	2 ⁻				
1298.0	(5,6,7) ⁺	250.8 [@] 5	5.0 [@] 23	1047.22	(5 ⁺)				
		616.1 [@] 5	100 [@] 5	682.01	7 ⁺				
1371.133	1 ⁻	159.50 13	0.6 3	1211.578	0 ⁻				
		1168.62 4	12 3	202.496	3 ⁻				
		1371.13 3	100 19	0.0	2 ⁻				
1416.581	(2 ⁻),3 ⁻	1214.05 3	47 9	202.496	3 ⁻				
		1416.55 3	100 21	0.0	2 ⁻				
1571.614	2 ⁻ ,(3) ⁻	618.58 18	1.9 5	953.512	2 ⁺ ,3 ⁺				
		1369.10 3	81 16	202.496	3 ⁻				
		1571.62 3	100 20	0.0	2 ⁻				
1640.914	1 ⁻	269.79 11	6.1 13	1371.133	1 ⁻				
		429.27 6	14 3	1211.578	0 ⁻				
		864.28 5	23 4	776.593	2 ⁺				
		1640.93 3	100 20	0.0	2 ⁻				
1760.977	2 ⁻	1558.45 3	100 20	202.496	3 ⁻				
		1760.92 4	49 10	0.0	2 ⁻				
1811.02	(2 ⁻),3 ⁻	1608.52 9	93 25	202.496	3 ⁻				

Adopted Levels, Gammas (continued)

$\gamma(^{90}\text{Y})$ (continued)

$E_i(\text{level})$	J_i^π	E_γ^\dagger	I_γ^\dagger	E_f	J_f^π	Mult. [†]	δ^\dagger	α	Comments
1811.02	(2 ⁻),3 ⁻	1810.82 9	100 20	0.0	2 ⁻				
1815.152	1 ⁺	603.37 20	1.8 5	1211.578	0 ⁻				
		1038.1 ^b 5	2.8 9	776.593	2 ⁺				
		1815.02 4	100 20	0.0	2 ⁻				
1962.1	5 ⁺ ,6 ⁺	664 [#]	85 [#]	1298.0	(5,6,7) ⁺				
		772 [#]	100 [#]	1189.68					
		914 [#]	100 [#]	1047.22	(5 ⁺)				
2088.8	5 ⁺ ,6 ⁺	791 [#]	100 [#]	1298.0	(5,6,7) ⁺				
		899 [#]	80 [#]	1189.68					
2133.502	1,2 ⁻	718.0 ^a 4	6.3 ^a 25	1416.581	(2 ⁻),3 ⁻				
		762.39 4	94 19	1371.133	1 ⁻				
		921.7 4	6.9 25	1211.578	0 ⁻				
		1356.91 4	100 20	776.593	2 ⁺				
		2133.30 17	21 3	0.0	2 ⁻				
2196.120	(1 ⁻ ,2)	380.81 14	10 3	1815.152	1 ⁺				
		825.15 14	4.2 10	1371.133	1 ⁻				
		1242.56 4	35 7	953.512	2 ⁺ ,3 ⁺				
		1419.48 4	16 3	776.593	2 ⁺				
		1993.47 ^b 19	18 3	202.496	3 ⁻				
		2196.00 5	100 10	0.0	2 ⁻				
2216.66	8 ⁺	1534.64 ^{&} 4	100 ^{&}	682.01	7 ⁺	M1+E2	-0.73 14	3.39×10 ⁻⁴	$\alpha(\text{K})=0.000224$ 4; $\alpha(\text{L})=2.42\times 10^{-5}$ 4; $\alpha(\text{M})=4.13\times 10^{-6}$ 6; $\alpha(\text{N})=5.57\times 10^{-7}$ 8; $\alpha(\text{O})=3.94\times 10^{-8}$ 6 Mult., δ : from $\gamma(\theta)$ and lin pol in ⁷⁴ Ge(¹⁸ O,np γ), ⁷⁶ Ge(¹⁸ O,3np γ). Other: $\delta=-0.68$ 5 in (¹¹ B,3n γ).
2240.6	5 ⁺ ,6 ⁺	943 [#]	100 [#]	1298.0	(5,6,7) ⁺				
		1193 [#]	82 [#]	1047.22	(5 ⁺)				
2244.30	(1,2 ⁻)	1032.60 6	16 3	1211.578	0 ⁻				
		1290.83 10	14 3	953.512	2 ⁺ ,3 ⁺				
		1467.63 7	48 10	776.593	2 ⁺				
		2244.28 6	100 10	0.0	2 ⁻				
2365.964	1 ⁻	605.00 3	100 19	1760.977	2 ⁻				
		724.98 7	12.1 25	1640.914	1 ⁻				
		794.38 4	60 12	1571.614	2 ⁻ ,(3) ⁻				
		994.76 8	11.4 23	1371.133	1 ⁻				
		2163.35 12	13.2 16	202.496	3 ⁻				
		2365.92 6	19.1 19	0.0	2 ⁻				
2454.84?	9 ⁺	238.50 ^{&b} 3	100 ^{&}	2216.66	8 ⁺	M1(+E2)	+0.03 8	0.0178 4	$\alpha(\text{K})=0.0157$ 4; $\alpha(\text{L})=0.00177$ 5; $\alpha(\text{M})=0.000303$ 8; $\alpha(\text{N})=4.07\times 10^{-5}$ 10;

∞

Adopted Levels, Gammas (continued)

$\gamma(^{90}\text{Y})$ (continued)

<u>E_i(level)</u>	<u>J_i^{π}</u>	<u>E_{γ}^{\dagger}</u>	<u>I_{γ}^{\dagger}</u>	<u>E_f</u>	<u>J_f^{π}</u>	<u>Comments</u>
						$\alpha(\text{O})=2.81 \times 10^{-6}$ Mult., δ : from $\gamma(\theta)$ and lin pol in ⁷⁴ Ge(¹⁸ O,np γ), ⁷⁶ Ge(¹⁸ O,3np γ).
2475.92	2 ⁻	715.5 ^a 5 835.43 20 904.7 ^a 4 1059.09 15 1104.72 13 1264.25 6 2273.39 6 2475.98 8	1.1 ^a 4 4.3 12 1.8 ^a 9 5.0 12 5.0 11 10.7 22 100 11 23.0 25	1760.977 1640.914 1571.614 1416.581 1371.133 1211.578 202.496 0.0	2 ⁻ 1 ⁻ 2 ⁻ , (3) ⁻ (2 ⁻), 3 ⁻ 1 ⁻ 0 ⁻ 3 ⁻ 2 ⁻	
2495.48	(2,1 ⁻)	680.39 15 923.66 ^a 42 1079.02 11 1542.3 3 2292.87 6 2495.38 5	15 3 8 ^a 3 19 4 24 10 100 10 68 7	1815.152 1571.614 1416.581 953.512 202.496 0.0	1 ⁺ 2 ⁻ , (3) ⁻ (2 ⁻), 3 ⁻ 2 ⁺ , 3 ⁺ 3 ⁻ 2 ⁻	
2504.613	2 ⁻	689.45 ^a 8 693.80 17 743.21 ^a 21 1087.94 4 1133.62 12 1293.07 17 1551.18 ^a 10 2302.05 6 2504.61 5	3.9 ^a 8 4.5 13 1.3 ^a 4 15 3 4.3 10 2.2 6 4.4 ^a 10 22.2 24 100 10	1815.152 1811.02 1760.977 1416.581 1371.133 1211.578 953.512 202.496 0.0	1 ⁺ (2 ⁻), 3 ⁻ 2 ⁻ (2 ⁻), 3 ⁻ 1 ⁻ 0 ⁻ 2 ⁺ , 3 ⁺ 3 ⁻ 2 ⁻	
2623.99	1 ⁻	862.3 ^a 3 1847.99 21 2623.95 5	7.9 ^a 21 4.8 12 100 10	1760.977 776.593 0.0	2 ⁻ 2 ⁺ 2 ⁻	
2631.93	(1 ⁻ , 2, 3 ⁻)	871.01 14 1060.8 ^a 3 1855.07 18 2429.48 5	17 5 13 ^a 4 20 5 100 10	1760.977 1571.614 776.593 202.496	2 ⁻ 2 ⁻ , (3) ⁻ 2 ⁺ 3 ⁻	
2663.28	(1 ⁻ , 2 ⁻)	1452.05 21 2461.06 17 2663.27 5	12 3 32 8 100 10	1211.578 202.496 0.0	0 ⁻ 3 ⁻ 2 ⁻	
2719.35	(1, 2 ⁻)	904.7 ^a 4 1302.57 ^a 24 1347.96 22 1507.7 2 1942.73 5 2719.29 8	9 ^a 5 13 ^a 3 13 3 53 20 100 20 25 3	1815.152 1416.581 1371.133 1211.578 776.593 0.0	1 ⁺ (2 ⁻), 3 ⁻ 1 ⁻ 0 ⁻ 2 ⁺ 2 ⁻	
2749.240	(1 ⁻ , 2, 3 ⁻)	937.75 ^b 14	2.9 6	1811.02	(2 ⁻), 3 ⁻	

Adopted Levels, Gammas (continued)

$\gamma(^{90}\text{Y})$ (continued)										
$E_i(\text{level})$	J_i^π	E_γ †	I_γ †	E_f	J_f^π	Mult. †	α	Comments		
2749.240	(1 ⁻ ,2,3 ⁻)	988.37 14	2.0 5	1760.977	2 ⁻					
		1177.54 6	2.7 6	1571.614	2 ⁻ ,(3) ⁻					
		1332.68 3	12.3 25	1416.581	(2 ⁻),3 ⁻					
		1378.08 3	9.7 19	1371.133	1 ⁻					
		1972.3 ^b 3	4.5 12	776.593	2 ⁺					
		2546.71 5	89 9	202.496	3 ⁻					
		2749.24 5	100 10	0.0	2 ⁻					
		2758.078	(1 ⁻ ,2 ⁻)	997.02 5	39 8	1760.977	2 ⁻			
		1117.06 7		15 3	1640.914	1 ⁻				
		1186.47 4		85 16	1571.614	2 ⁻ ,(3) ⁻				
1341.0 3	9 3	1416.581		(2 ⁻),3 ⁻						
1386.97 9	13 3	1371.133	1 ⁻							
1546.51 5	59 13	1211.578	0 ⁻							
2555.62 5	47 5	202.496	3 ⁻							
2758.04 6	100 10	0.0	2 ⁻							
2838.32	1,2	705.0 3	6.7 22	2133.502	1,2 ⁻					
		1023.07 5	65 13	1815.152	1 ⁺					
		1884.78 5	84 17	953.512	2 ⁺ ,3 ⁺					
		2838.42 5	100 10	0.0	2 ⁻					
2847.42	1 ⁻	1086.19 ^b 22	10 3	1760.977	2 ⁻					
		1206.30 12	40 13	1640.914	1 ⁻					
		1635.32 ^b 19	25 6	1211.578	0 ⁻					
		2070.94 18	10.9 21	776.593	2 ⁺					
		2847.39 5	100 9	0.0	2 ⁻					
2858.86	(9 ⁺)	642.2 [‡] 3	100 [‡]	2216.66	8 ⁺	(M1+E2)	0.00177 15	$\alpha(\text{K})=0.00156$ 13; $\alpha(\text{L})=0.000174$ 17; $\alpha(\text{M})=3.0\times 10^{-5}$ 3; $\alpha(\text{N})=4.0\times 10^{-6}$ 4; $\alpha(\text{O})=2.73\times 10^{-7}$ 19 Mult.: from $\gamma(\theta)$ and lin pol in $^{74}\text{Ge}(^{18}\text{O},\text{npy}),^{76}\text{Ge}(^{18}\text{O},3\text{npy})$;		
2859.35	2 ⁻	1098.1 ^a 3	16 ^a 5	1760.977	2 ⁻					
		1648.01 18	15 4	1211.578	0 ⁻					
		1904.9 ^b 5	26 14	953.512	2 ⁺ ,3 ⁺					
		2656.75 5	100 10	202.496	3 ⁻					
		2859.36 5	89 9	0.0	2 ⁻					
2937.5		1125 [#]	70 [#]	1811.02	(2 ⁻),3 ⁻					
		1178 [#]	60 [#]	1760.977	2 ⁻					
		1520 [#]	60 [#]	1416.581	(2 ⁻),3 ⁻					
		1985 [#]	100 [#]	953.512	2 ⁺ ,3 ⁺					
2986.10	(1 ⁻ ,2)	789.91 12	51 11	2196.120	(1 ⁻ ,2)					
		1170.89 13	28 7	1815.152	1 ⁺					
		1345.28 9	45 10	1640.914	1 ⁻					
		1615.04 9	31 7	1371.133	1 ⁻					
		2032.34 10	100 11	953.512	2 ⁺ ,3 ⁺					

Adopted Levels, Gammas (continued)

E _i (level)	J ^π _i	<u>γ(⁹⁰Y) (continued)</u>							Comments
		E _γ [†]	I _γ [†]	E _f	J ^π _f	Mult. [†]	δ [†]	α	
2986.10	(1 ⁻ ,2)	2783.74 10	50 7	202.496	3 ⁻				
		2986.18 9	83 11	0.0	2 ⁻				
2992.35	(1 ⁻),2 ⁻	748.0 3	4.4 13	2244.30	(1,2 ⁻)				
		1181.42 ^a 22	3.3 ^a 11	1811.02	(2 ⁻),3 ⁻				
		1231.30 8	11.6 24	1760.977	2 ⁻				
		1780.61 ^b 11	100 20	1211.578	0 ⁻				
		2789.93 7	26 3	202.496	3 ⁻				
		2992.13 9	6.0 7	0.0	2 ⁻				
3002.3	3 ⁻	2226 [#]	40 [#]	776.593	2 ⁺				
		3003 [#]	100 [#]	0.0	2 ⁻				
3002.69	(1 ⁻ ,2)	758.26 23	43 13	2244.30	(1,2 ⁻)				
		1188.1 3	37 12	1815.152	1 ⁺				
		1430.59 ^a 19	31 ^a 7	1571.614	2 ⁻ , (3) ⁻				
		2049.31 10	81 9	953.512	2 ⁺ ,3 ⁺				
		2800.24 12	47 6	202.496	3 ⁻				
		3002.47 10	100 6	0.0	2 ⁻				
3043.50	(1 ⁻ ,2,3 ⁻)	1402.67 11	34 7	1640.914	1 ⁻				
		1471.88 11	36 8	1571.614	2 ⁻ , (3) ⁻				
		1626.82 12	60 13	1416.581	(2 ⁻),3 ⁻				
		2090.6 4	27 10	953.512	2 ⁺ ,3 ⁺				
		2840.95 6	100 11	202.496	3 ⁻				
		3043.42 7	70 4	0.0	2 ⁻				
3048.2	3 ⁻ ,4 ⁻	3047 ^{#b}	100 [#]	0.0	2 ⁻				
3097.06	(10 ⁺)	238.2 [‡] 1	100 [‡]	2858.86	(9 ⁺)	M1(+E2)	+0.03 8	0.0179 4	α(K)=0.0158 4; α(L)=0.00178 5; α(M)=0.000304 8; α(N)=4.08×10 ⁻⁵ 10; α(O)=2.82×10 ⁻⁶ 6 Mult.,δ: from γ(θ) and lin pol in ⁷⁴ Ge(¹⁸ O,npγ), ⁷⁶ Ge(¹⁸ O,3npγ);
3143.84	(1 ⁻ ,2,3 ⁻)	1727.22 4	100 21	1416.581	(2 ⁻),3 ⁻				
		2190.33 5	59 6	953.512	2 ⁺ ,3 ⁺				
		2941.30 5	53 5	202.496	3 ⁻				
		3143.0 3	5.3 15	0.0	2 ⁻				
3160.211	1 ⁻	915.78 7	8.8 18	2244.30	(1,2 ⁻)				
		1399.24 4	19 4	1760.977	2 ⁻				
		1519.31 4	26 5	1640.914	1 ⁻				
		3160.18 6	100 5	0.0	2 ⁻				
3312.408	(2,1 ⁻)	648.87 ^a 16	5.2 ^a 12	2663.28	(1 ⁻ ,2 ⁻)				
		837.2 ^a 3	4.8 ^a 17	2475.92	2 ⁻				
		1497.25 6	18 4	1815.152	1 ⁺				
		1551.18 ^a 10	13 ^a 3	1760.977	2 ⁻				
		1671.41 ^a 22	5.0 ^a 12	1640.914	1 ⁻				
		1895.81 4	100 19	1416.581	(2 ⁻),3 ⁻				

Adopted Levels, Gammas (continued)

$\gamma(^{90}\text{Y})$ (continued)

$E_i(\text{level})$	J_i^π	E_γ^\dagger	I_γ^\dagger	E_f	J_f^π	$E_i(\text{level})$	J_i^π	E_γ^\dagger	I_γ^\dagger	E_f	J_f^π
3312.408	(2,1 ⁻)	3109.87 6	32.6 17	202.496	3 ⁻	3574.501	1 ⁻	943.24 24	11 3	2631.93	(1 ⁻ ,2,3 ⁻)
		3312.36 8	11.0 7	0.0	2 ⁻			1069.75 5	25 5	2504.613	2 ⁻
3404.83	(1 ⁻ ,2,3 ⁻)	909.26 11	51 12	2495.48	(2,1 ⁻)			1330.01 ^a 24	4.2 ^a 13	2244.30	(1,2 ⁻)
		1988.53 13	100 21	1416.581	(2 ⁻),3 ⁻			1441.10 ^a 20	6.0 ^a 16	2133.502	1,2 ⁻
		2628.37 20	35 7	776.593	2 ⁺			1933.47 5	42 9	1640.914	1 ⁻
		3202.55 10	46 4	202.496	3 ⁻			2002.98 6	22.1 24	1571.614	2 ⁻ ,(3) ⁻
		3404.62 24	63 9	0.0	2 ⁻			2362.93 5	100 10	1211.578	0 ⁻
3469.14	(1 ⁻ ,2,3 ⁻)	630.4 ^a 3	12 ^a 4	2838.32	1,2			2797.95 12	7.8 10	776.593	2 ⁺
		749.9 3	25 8	2719.35	(1,2 ⁻)			3574.55 8	15.3 8	0.0	2 ⁻
		837.2 ^a 3	14 ^a 5	2631.93	(1 ⁻ ,2,3 ⁻)	3602.07	1 ⁻	743.21 ^a 21	7.1 ^a 22	2859.35	2 ⁻
		845.5 ^a 5	19 ^a 8	2623.99	1 ⁻			754.21 16	11 3	2847.42	1 ⁻
		2515.60 5	100 10	953.512	2 ⁺ ,3 ⁺			843.69 ^a 19	16 ^a 4	2758.078	(1 ⁻ ,2 ⁻)
		3266.30 11	27.1 21	202.496	3 ⁻			881.5 ^a 5	8 ^a 4		
		3469.24 15	9.7 7	0.0	2 ⁻			882.8 3	8 4	2719.35	(1,2 ⁻)
3476.06	(1,2 ⁻)	628.78 24	8.2 25	2847.42	1 ⁻			970.8 3	16 7	2631.93	(1 ⁻ ,2,3 ⁻)
		637.85 12	10.7 25	2838.32	1,2			977.96 9	26 5	2623.99	1 ⁻
		756.71 7	36 8	2719.35	(1,2 ⁻)			1790.24 ^b 22	42 10	1811.02	(2 ⁻),3 ⁻
		843.69 ^a 19	13 ^a 3	2631.93	(1 ⁻ ,2,3 ⁻)			1961.9 3	11 3	1640.914	1 ⁻
		972.1 3	14 5	2504.613	2 ⁻			2030.5 ^b 5	44 18	1571.614	2 ⁻ ,(3) ⁻
		980.95 22	7.5 18	2495.48	(2,1 ⁻)			2230.88 7	47 5	1371.133	1 ⁻
		1835.4 ^b 5	43 14	1640.914	1 ⁻			2648.56 6	52 5	953.512	2 ⁺ ,3 ⁺
		2104.87 5	100 10	1371.133	1 ⁻			3399.55 9	38 3	202.496	3 ⁻
		2264.53 7	78 8	1211.578	0 ⁻			3602.03 7	100 5	0.0	2 ⁻
		2699.45 15	13.6 21	776.593	2 ⁺	3627.647	1 ⁻	964.38 6	56 12	2663.28	(1 ⁻ ,2 ⁻)
		3475.96 7	46.4 25	0.0	2 ⁻			1132.03 9	32 7	2495.48	(2,1 ⁻)
3555.727	(1 ⁻ ,2,3 ⁻)	696.38 7	10.5 22	2859.35	2 ⁻			1151.54 9	21 4	2475.92	2 ⁻
		718.0 ^a 4	1.7 ^a 7	2838.32	1,2			1383.16 7	22 5	2244.30	(1,2 ⁻)
		923.7 ^a 4	2.2 ^a 9	2631.93	(1 ⁻ ,2,3 ⁻)			1494.48 20	7.8 22	2133.502	1,2 ⁻
		1190.6 ^a 3	2.5 ^a 9	2365.964	1 ⁻			1812.35 11	52 11	1815.152	1 ⁺
		1359.55 4	35 7	2196.120	(1 ⁻ ,2)			1867.01 18	9.5 22	1760.977	2 ⁻
		1422.33 5	9.7 20	2133.502	1,2 ⁻			1986.6 4	9 3	1640.914	1 ⁻
		1744.58 11	5.9 14	1811.02	(2 ⁻),3 ⁻			2256.51 6	100 10	1371.133	1 ⁻
		1795.08 ^a 25	5.8 ^a 19	1760.977	2 ⁻			2416.11 6	27 3	1211.578	0 ⁻
		1914.76 5	25 5	1640.914	1 ⁻			3627.71 8	26.3 13	0.0	2 ⁻
		2138.97 6	100 10	1416.581	(2 ⁻),3 ⁻	3685.23	(1,2 ⁻)	692.64 ^a 19	28 ^a 9	2992.35	(1 ⁻),2 ⁻
		2184.65 5	52 5	1371.133	1 ⁻			699.01 14	15 3	2986.10	(1 ⁻ ,2)
		2779.15 8	6.6 7	776.593	2 ⁺			845.5 ^a 5	15 ^a 6	2838.32	1,2
		3353.07 8	8.1 5	202.496	3 ⁻			965.92 12	35 8	2719.35	(1,2 ⁻)
		3555.61 7	57 3	0.0	2 ⁻			1319.26 13	18 4	2365.964	1 ⁻
3574.501	1 ⁻	715.5 ^a 5	2.1 ^a 8	2859.35	2 ⁻			1441.10 ^a 20	13 ^a 3	2244.30	(1,2 ⁻)
		816.45 6	18 4	2758.078	(1 ⁻ ,2 ⁻)			1488.92 8	23 5	2196.120	(1 ⁻ ,2)
		855.30 20	4.4 13	2719.35	(1,2 ⁻)			1869.98 ^a 10	26 ^a 5	1815.152	1 ⁺

Adopted Levels, Gammas (continued)

$\gamma(^{90}\text{Y})$ (continued)

$E_i(\text{level})$	J_i^π	E_γ^\dagger	I_γ^\dagger	E_f	J_f^π
3685.23	(1,2 ⁻)	2043.7 3	13.1 23	1640.914	1 ⁻
		2268.81 14	13.1 17	1416.581	(2 ⁻),3 ⁻
		2314.57 23	9.7 23	1371.133	1 ⁻
		2473.97 16	100 11	1211.578	0 ⁻
		2731.9 3	9.1 23	953.512	2 ⁺ ,3 ⁺
		2908.80 9	20.5 23	776.593	2 ⁺
3692.29	1 ⁻	648.87 ^a 16	14 ^a 3	3043.50	(1 ⁻ ,2,3 ⁻)
		689.45 ^a 8	30 ^a 6	3002.69	(1 ⁻ ,2)
		833.33 21	16 4	2859.35	2 ⁻
		2320.97 7	90 9	1371.133	1 ⁻
		2915.76 5	100 10	776.593	2 ⁺
		3692.19 7	17.3 12	0.0	2 ⁻
		890.8 3	11 4	3043.50	(1 ⁻ ,2,3 ⁻)
3934.47	1 ⁻	948.73 15	22 7	2986.10	(1 ⁻ ,2)
		1438.97 11	41 9	2495.48	(2,1 ⁻)
		1568.45 5	100 21	2365.964	1 ⁻
		2563.81 19	33 7	1371.133	1 ⁻
		2722.72 6	66 7	1211.578	0 ⁻
		3731.98 8	39.6 19	202.496	3 ⁻
		3934.41 8	84 5	0.0	2 ⁻
		793.14 10	100 23	3160.211	1 ⁻
		1321.93 ^a 23	32 ^a 8	2631.93	(1 ⁻ ,2,3 ⁻)
3953.54	(1 ⁻ ,2 ⁻)	1330.01 ^a 24	19 ^a 6	2623.99	1 ⁻
		1587.6 ^a 4	23 ^a 11	2365.964	1 ⁻
		1757.25 9	55 12	2196.120	(1 ⁻ ,2)
		2142.55 8	82 10	1811.02	(2 ⁻),3 ⁻
		2312.65 13	39 6	1640.914	1 ⁻
		2381.9 ^a 3	14 ^a 4	1571.614	2 ⁻ ,(3 ⁻)
		2742.35 21	14 4	1211.578	0 ⁻
		3751.03 14	16.7 12	202.496	3 ⁻
		3953.55 9	41.7 24	0.0	2 ⁻
		893.56 12	40 9	3143.84	(1 ⁻ ,2,3 ⁻)
		1190.6 ^a 3	16 ^a 6	2847.42	1 ⁻
		1279.31 10	65 14	2758.078	(1 ⁻ ,2 ⁻)
		1288.25 13	35 9	2749.240	(1 ⁻ ,2,3 ⁻)
4037.54	(1,2 ⁻)	1533.21 15	27 7	2504.613	2 ⁻
		1561.76 9	48 11	2475.92	2 ⁻
		1671.41 ^a 22	23 ^a 6	2365.964	1 ⁻
		1842.0 ^a 3	12 ^a 3	2196.120	(1 ⁻ ,2)
		2396.70 7	66 7	1640.914	1 ⁻
		2465.64 19	13.2 22	1571.614	2 ⁻ ,(3 ⁻)
		2825.90 6	90 9	1211.578	0 ⁻

Adopted Levels, Gammas (continued)

$\gamma(^{90}\text{Y})$ (continued)

$E_i(\text{level})$	J_i^π	E_γ^\dagger	I_γ^\dagger	E_f	J_f^π	Mult. [†]	δ^\dagger	α	Comments
4037.54	(1,2 ⁻)	3260.94 8	100 6	776.593	2 ⁺				
4100.49	(1 ⁻ ,2 ⁻)	630.4 ^a 3	11 ^a 4	3469.14	(1 ⁻ ,2,3 ⁻)				
		1098.1 ^a 3	12 ^a 4	3002.3	3 ⁻				
		1476.24 9	26 5	2623.99	1 ⁻				
		1604.86 9	33 7	2495.48	(2,1 ⁻)				
		1624.33 19	37 9	2475.92	2 ⁻				
		1966.84 ^a 16	26 ^a 6	2133.502	1,2 ⁻				
		2285.37 ^a 8	70 ^a 7	1815.152	1 ⁺				
		2459.92 20	32 10	1640.914	1 ⁻				
		2889.06 7	100 10	1211.578	0 ⁻				
		3324.30 22	23 5	776.593	2 ⁺				
4161.28	(0,1,2)	1158.7 3	9 3	3002.69	(1 ⁻ ,2)				
		1302.57 ^a 24	13 ^a 3	2859.35	2 ⁻				
		1323.8 4	10 3	2838.32	1,2				
		1795.08 ^a 25	23 ^a 8	2365.964	1 ⁻				
		1964.7 ^b 6	42 16	2196.120	(1 ⁻ ,2)				
		2345.94 10	35 4	1815.152	1 ⁺				
		2520.15 8	52 5	1640.914	1 ⁻				
		4161.30 10	100 5	0.0	2 ⁻				
4210.81	(0 ⁻ ,1,2,3 ⁻)	1050.71 10	42 8	3160.211	1 ⁻				
		1208.29 11	54 12	3002.69	(1 ⁻ ,2)				
		1461.96 20	19 5	2749.240	(1 ⁻ ,2,3 ⁻)				
		1587.6 ^a 4	23 ^a 11	2623.99	1 ⁻				
		1966.84 ^a 16	49 ^a 11	2244.30	(1,2 ⁻)				
		2077.06 11	74 10	2133.502	1,2 ⁻				
		2399.66 ^a 6	95 ^a 10	1811.02	(2 ⁻),3 ⁻				
		2639.07 14	27 4	1571.614	2 ⁻ , (3) ⁻				
		4210.79 9	100 5	0.0	2 ⁻				
4212.50	(11 ⁺)	1115.4 [‡] 1	100.0 [‡] 5	3097.06	(10 ⁺)	M1(+E2)	0.00 5	4.89×10 ⁻⁴	$\alpha(\text{K})=0.000432$ 6; $\alpha(\text{L})=4.68\times 10^{-5}$ 7; $\alpha(\text{M})=7.99\times 10^{-6}$ 12; $\alpha(\text{N})=1.078\times 10^{-6}$ 15; $\alpha(\text{O})=7.62\times 10^{-8}$ 11 Mult., δ : from $\gamma(\theta)$ and lin pol in ⁷⁴ Ge(¹⁸ O,np γ), ⁷⁶ Ge(¹⁸ O,3np γ);
		1353.7 [‡] 3	37.8 [‡] 5	2858.86	(9 ⁺)	E2		3.61×10 ⁻⁴	$\alpha(\text{K})=0.000285$ 4; $\alpha(\text{L})=3.10\times 10^{-5}$ 5; $\alpha(\text{M})=5.28\times 10^{-6}$ 8; $\alpha(\text{N})=7.11\times 10^{-7}$ 10; $\alpha(\text{O})=4.97\times 10^{-8}$ 7 Mult.: Q from $\gamma\gamma(\theta)$ (DCO) in ⁸² Se(¹¹ B,3n γ), $\Delta J^\pi=\text{no}$ from level scheme.
4267.38	(1,2)	692.64 ^a 19	21 ^a 7	3574.501	1 ⁻				
		862.3 ^a 3	11 ^a 3	3404.83	(1 ⁻ ,2,3 ⁻)				
		1107.45 16	27 7	3160.211	1 ⁻				
		1281.32 ^a 10	32 ^a 7	2986.10	(1 ⁻ ,2)				
		1428.79 23	7.4 21	2838.32	1,2				

Adopted Levels, Gammas (continued)

$\gamma(^{90}\text{Y})$ (continued)

$E_i(\text{level})$	J_i^π	E_γ^\dagger	I_γ^\dagger	E_f	J_f^π	Mult. ‡	δ^\ddagger	α	Comments		
4267.38	(1,2)	1643.46 6	34 7	2623.99	1 ⁻						
		1772.08 12	63 13	2495.48	(2,1 ⁻)						
		2452.34 24	6.2 12	1815.152	1 ⁺						
		2896.05 15	6.2 8	1371.133	1 ⁻						
		3490.64 10	9.9 8	776.593	2 ⁺						
		4267.35 8	100 5	0.0	2 ⁻						
4325.06	1 ⁻ ,2 ⁻	723.03 12	48 10	3602.07	1 ⁻						
		1181.42 ^a 22	19 ^a 7	3143.84	(1 ⁻ ,2,3 ⁻)						
		1281.32 ^a 10	100 ^a 21	3043.50	(1 ⁻ ,2,3 ⁻)						
		1321.93 ^a 23	35 ^a 9	3002.69	(1 ⁻ ,2)						
		1829.0 3	17 5	2495.48	(2,1 ⁻)						
		2129.32 23	25 5	2196.120	(1 ⁻ ,2)						
		2509.98 11	34 4	1815.152	1 ⁺						
		4122.69 17	22.1 13	202.496	3 ⁻						
		4451.576	(1,2 ⁻)	895.74 6	51 11	3555.727	(1 ⁻ ,2,3 ⁻)				
976.2 3	9 3			3476.06	(1,2 ⁻)						
1448.88 4	73 15			3002.69	(1 ⁻ ,2)						
1732.24 11	58 13			2719.35	(1,2 ⁻)						
2086.01 20	12.4 24			2365.964	1 ⁻						
2636.33 5	69 7			1815.152	1 ⁺						
2690.64 22	5.9 12			1760.977	2 ⁻						
2810.75 7	25 3			1640.914	1 ⁻						
3239.67 16	8.3 12			1211.578	0 ⁻						
3498.02 8	100 7			953.512	2 ⁺ ,3 ⁺						
3674.98 11	20.1 12			776.593	2 ⁺						
4515.93	(1,2 ⁻)			959.9 3	11 6	3555.727	(1 ⁻ ,2,3 ⁻)				
				1039.75 10	48 10	3476.06	(1,2 ⁻)				
		1796.66 13	80 18	2719.35	(1,2 ⁻)						
		2381.9 ^a 3	14 ^a 3	2133.502	1,2 ⁻						
		2875.08 6	100 10	1640.914	1 ⁻						
		2944.42 9	51 6	1571.614	2 ⁻ ,(3) ⁻						
		3144.59 10	86 7	1371.133	1 ⁻						
		4313.17 11	28.7 11	202.496	3 ⁻						
4518.5	(12 ⁺)	306.10 ^{‡b} 10	65.2 [‡] 4	4212.50	(11 ⁺)	M1(+E2)	-0.03 6	0.00950 15	$\alpha(\text{K})=0.00838$ 14; $\alpha(\text{L})=0.000937$ 16; $\alpha(\text{M})=0.000160$ 3; $\alpha(\text{N})=2.15\times 10^{-5}$ 4; $\alpha(\text{O})=1.495\times 10^{-6}$ 23 Mult., δ : from $\gamma(\theta)$ and lin pol in $^{74}\text{Ge}(^{18}\text{O},\text{npy}), ^{76}\text{Ge}(^{18}\text{O},3\text{npy})$. I_γ : other: 68 5 in $^{74}\text{Ge}(^{18}\text{O},\text{npy}), ^{76}\text{Ge}(^{18}\text{O},3\text{npy})$.		
		1421.30 ^{‡b} 20	100.0 [‡] 18	3097.06	(10 ⁺)	(E2)		3.49×10^{-4}	$\alpha(\text{K})=0.000258$ 4; $\alpha(\text{L})=2.80\times 10^{-5}$ 4; $\alpha(\text{M})=4.77\times 10^{-6}$ 7; $\alpha(\text{N})=6.42\times 10^{-7}$ 9;		

Adopted Levels, Gammas (continued)

E _i (level)	J _i ^π	<u>γ(⁹⁰Y) (continued)</u>						Comments
		E _γ [†]	I _γ [†]	E _f	J _f ^π	Mult. [†]	α	
								α(O)=4.50×10 ⁻⁸ 7 Mult.: from γ(θ) and lin pol in ⁷⁴ Ge(¹⁸ O,npγ), ⁷⁶ Ge(¹⁸ O,3npγ);
4529.65	(0 ⁻ ,1,2,3 ⁻)	1060.8 ^a 3	18 ^a 6	3469.14	(1 ⁻ ,2,3 ⁻)			
		1125.04 9	35 7	3404.83	(1 ⁻ ,2,3 ⁻)			
		1217.08 8	44 9	3312.408	(2,1 ⁻)			
		1543.60 12	100 25	2986.10	(1 ⁻ ,2)			
		1691.6 ^a 3	11 ^a 4	2838.32	1,2			
		2034.7 3	48 7	2495.48	(2,1 ⁻)			
		2285.37 ^a 8	98 ^a 10	2244.30	(1,2 ⁻)			
		4529.48 10	46 3	0.0	2 ⁻			
4533.14	(1 ⁻),2 ⁻	930.82 17	11 3	3602.07	1 ⁻			
		1128.87 23	8.4 24	3404.83	(1 ⁻ ,2,3 ⁻)			
		1673.66 10	29 6	2859.35	2 ⁻			
		1869.98 ^a 10	27 ^a 5	2663.28	(1 ⁻ ,2 ⁻)			
		2057.9 4	7.8 24	2475.92	2 ⁻			
		2336.64 18	17 3	2196.120	(1 ⁻ ,2)			
		2399.66 ^a 6	48 ^a 5	2133.502	1,2 ⁻			
		3579.54 10	16.2 12	953.512	2 ⁺ ,3 ⁺			
		4532.91 9	100 5	0.0	2 ⁻			
4543.6	(11 ⁺)	1446.6 [‡] 2	100 [‡]	3097.06	(10 ⁺)	D+Q	3.43×10 ⁻⁴ 6	α(K)=0.000251 5; α(L)=2.72×10 ⁻⁵ 5; α(M)=4.64×10 ⁻⁶ 8; α(N)=6.25×10 ⁻⁷ 11; α(O)=4.41×10 ⁻⁸ 9 Mult.: D+Q from γγ(θ)(DCO) in ⁸² Se(¹¹ B,3nγ).
4835.05	(1,2 ⁻)	673.6 3	24 8	4161.28	(0,1,2)			
		881.5 ^a 5	25 ^a 13	3953.54	(1 ⁻ ,2 ⁻)			
		1143.38 25	22 6	3692.29	1 ⁻			
		1430.59 ^a 19	31 ^a 8	3404.83	(1 ⁻ ,2,3 ⁻)			
		1691.6 ^a 3	18 ^a 6	3143.84	(1 ⁻ ,2,3 ⁻)			
		1842.0 ^a 3	16 ^a 5	2992.35	(1 ⁻),2 ⁻			
		2203.14 8	100 10	2631.93	(1 ⁻ ,2,3 ⁻)			
		2469.53 24	18 3	2365.964	1 ⁻			
		2701.23 10	91 12	2133.502	1,2 ⁻			
		3073.84 17	19.4 15	1760.977	2 ⁻			
		3193.96 10	46 3	1640.914	1 ⁻			
		3263.29 20	37 5	1571.614	2 ⁻ ,(3) ⁻			
		3623.14 12	26.9 15	1211.578	0 ⁻			
		3882.9 8	6 3	953.512	2 ⁺ ,3 ⁺			
		4058.39 9	57 3	776.593	2 ⁺			
		4834.84 17	37 3	0.0	2 ⁻			
5068.39		1971.3 [‡] 9	7.0 [‡] 14	3097.06	(10 ⁺)			
		2209.5 [‡] 1	100 [‡] 4	2858.86	(9 ⁺)			

Adopted Levels, Gammas (continued)

							<u>$\gamma(^{90}\text{Y})$ (continued)</u>	
$E_i(\text{level})$	J_i^π	E_γ^\dagger	I_γ^\dagger	E_f	J_f^π	Mult. [†]	α	Comments
5102.6	(12)	890.2 [‡] 6	100 [‡]	4212.50	(11 ⁺)	D	3.37×10 ⁻⁴	$\alpha(\text{K})=0.000298$ 5; $\alpha(\text{L})=3.22\times 10^{-5}$ 5; $\alpha(\text{M})=5.49\times 10^{-6}$ 8; $\alpha(\text{N})=7.38\times 10^{-7}$ 11; $\alpha(\text{O})=5.16\times 10^{-8}$ 8 Mult.: from $\gamma\gamma(\theta)$ in $^{82}\text{Se}(^{11}\text{B},3n\gamma)$.
5111.46	(13 ⁺)	593.0 [‡] 2 898.8 [‡] 2	70 [‡] 4 100 [‡] 2	4518.5 (12 ⁺) 4212.50 (11 ⁺)		E2	8.02×10 ⁻⁴	$\alpha(\text{K})=0.000709$ 10; $\alpha(\text{L})=7.84\times 10^{-5}$ 11; $\alpha(\text{M})=1.338\times 10^{-5}$ 19; $\alpha(\text{N})=1.79\times 10^{-6}$ 3 $\alpha(\text{O})=1.232\times 10^{-7}$ 18 Mult.: Q from $\gamma\gamma(\theta)$ in $^{82}\text{Se}(^{11}\text{B},3n\gamma)$, assumed E2 from assignment to γ -ray sequence.
5359.7	(14 ⁺)	248.2 [‡] 2	100 [‡]	5111.46 (13 ⁺)		(M1)	0.01610	$\alpha(\text{K})=0.01419$ 20; $\alpha(\text{L})=0.001595$ 23; $\alpha(\text{M})=0.000273$ 4; $\alpha(\text{N})=3.67\times 10^{-5}$ 6; $\alpha(\text{O})=2.54\times 10^{-6}$ 4 Mult.: D from $\gamma\gamma(\theta)$ in $^{82}\text{Se}(^{11}\text{B},3n\gamma)$, $\Delta\pi$ =no from level scheme.
5525.6	(12 ⁺)	2428.4 [‡] 7	100 [‡]	3097.06 (10 ⁺)				
5541.1	(12 ⁺)	2444.3 [‡] 7	100 [‡]	3097.06 (10 ⁺)				
5674.2	(12 ⁺)	2577.4 [‡] 4	100 [‡]	3097.06 (10 ⁺)				
6065.0	(13 ⁻)	390.9 [‡] 3	6.0 [‡] 12	5674.2 (12 ⁺)		(E1)	0.00225	$\alpha(\text{K})=0.00199$ 3; $\alpha(\text{L})=0.000217$ 3; $\alpha(\text{M})=3.70\times 10^{-5}$ 6; $\alpha(\text{N})=4.95\times 10^{-6}$ 7; $\alpha(\text{O})=3.39\times 10^{-7}$ 5 Mult.: D from $\gamma\gamma(\theta)$ in $^{82}\text{Se}(^{11}\text{B},3n\gamma)$, $\Delta\pi$ =yes from level scheme.
		523.9 [‡] 2	11.9 [‡] 12	5541.1 (12 ⁺)		(E1)	1.08×10 ⁻³	$\alpha(\text{K})=0.000956$ 14; $\alpha(\text{L})=0.0001041$ 15; $\alpha(\text{M})=1.773\times 10^{-5}$ 25; $\alpha(\text{N})=2.38\times 10^{-6}$ 4 $\alpha(\text{O})=1.643\times 10^{-7}$ 23 Mult.: D from $\gamma\gamma(\theta)$ in $^{82}\text{Se}(^{11}\text{B},3n\gamma)$, $\Delta\pi$ =yes from level scheme.
		539.4 [‡] 3	11.9 [‡] 12	5525.6 (12 ⁺)		(E1)	1.01×10 ⁻³	$\alpha(\text{K})=0.000892$ 13; $\alpha(\text{L})=9.70\times 10^{-5}$ 14; $\alpha(\text{M})=1.653\times 10^{-5}$ 24; $\alpha(\text{N})=2.22\times 10^{-6}$ 4 $\alpha(\text{O})=1.534\times 10^{-7}$ 22 Mult.: D from $\gamma\gamma(\theta)$ in $^{82}\text{Se}(^{11}\text{B},3n\gamma)$, $\Delta\pi$ =yes from level scheme.
		962.5 [‡] 2	100.0 [‡] 24	5102.6 (12)		(M1+E2)	6.74×10 ⁻⁴ 13	$\alpha(\text{K})=0.000596$ 11; $\alpha(\text{L})=6.53\times 10^{-5}$ 15; $\alpha(\text{M})=1.11\times 10^{-5}$ 3; $\alpha(\text{N})=1.50\times 10^{-6}$ 3; $\alpha(\text{O})=1.045\times 10^{-7}$ 15 Mult.: D+Q from $\gamma\gamma(\theta)$ in $^{82}\text{Se}(^{11}\text{B},3n\gamma)$, $\Delta\pi$ =no from level scheme.
		1546.0 [‡] 3	91.7 [‡] 12	4518.5 (12 ⁺)		(E1)	4.05×10 ⁻⁴	$\alpha(\text{K})=0.0001097$ 16; $\alpha(\text{L})=1.174\times 10^{-5}$ 17; $\alpha(\text{M})=2.00\times 10^{-6}$ 3; $\alpha(\text{N})=2.70\times 10^{-7}$ 4; $\alpha(\text{O})=1.90\times 10^{-8}$ 3 Mult.: D from $\gamma\gamma(\theta)$ in $^{82}\text{Se}(^{11}\text{B},3n\gamma)$, $\Delta\pi$ =yes from level scheme.
		2968.3 [‡] 9	11.9 [‡] 12	3097.06 (10 ⁺)		[E3]	6.41×10 ⁻⁴	$\alpha(\text{K})=0.0001016$ 15; $\alpha(\text{L})=1.095\times 10^{-5}$ 16; $\alpha(\text{M})=1.87\times 10^{-6}$ 3; $\alpha(\text{N})=2.52\times 10^{-7}$ 4 $\alpha(\text{O})=1.784\times 10^{-8}$ 25
6234.7	(13 ⁻)	1716.1 [‡] 5	100 [‡]	4518.5 (12 ⁺)		(E1)	5.19×10 ⁻⁴	$\alpha(\text{K})=9.27\times 10^{-5}$ 13; $\alpha(\text{L})=9.91\times 10^{-6}$ 14; $\alpha(\text{M})=1.688\times 10^{-6}$ 24; $\alpha(\text{N})=2.28\times 10^{-7}$ 4; $\alpha(\text{O})=1.608\times 10^{-8}$ 23 Mult.: D from $\gamma\gamma(\theta)$ in $^{82}\text{Se}(^{11}\text{B},3n\gamma)$, $\Delta\pi$ =yes from level scheme.

Adopted Levels, Gammas (continued)

$\gamma(^{90}\text{Y})$ (continued)

$E_i(\text{level})$	J_i^π	E_γ^\dagger	I_γ^\dagger	E_f	J_f^π	Mult. [†]	α	Comments
6822.52	(13 ⁺)	1711.0 [‡] 6	84 [‡] 6	5111.46	(13 ⁺)	(E1)	5.21×10 ⁻⁴	$\alpha(\text{K})=9.24\times 10^{-5}$ 13; $\alpha(\text{L})=9.87\times 10^{-6}$ 14; $\alpha(\text{M})=1.682\times 10^{-6}$ 24; $\alpha(\text{N})=2.27\times 10^{-7}$ 4; $\alpha(\text{O})=1.602\times 10^{-8}$ 23 Mult.: D from $\gamma\gamma(\theta)$ in $^{82}\text{Se}(^{11}\text{B},3n\gamma)$, $\Delta\pi=\text{yes}$ from level scheme.
		1719.9 [‡] 4	21.6 [‡] 20	5102.6	(12)			
		1754.1 [‡] 1	100 [‡] 14	5068.39				
		2279.4 [‡] 6	18 [‡] 4	4543.6	(11 ⁺)			
6831.13	13 ⁽⁺⁾	2303.9 [‡] 3	15.7 [‡] 20	4518.5	(12 ⁺)	(M1)	3.54×10 ⁻⁴	$\alpha(\text{K})=0.000181$ 3; $\alpha(\text{L})=1.95\times 10^{-5}$ 3; $\alpha(\text{M})=3.32\times 10^{-6}$ 5; $\alpha(\text{N})=4.48\times 10^{-7}$ 7; $\alpha(\text{O})=3.18\times 10^{-8}$ 5 Mult.: D from $\gamma\gamma(\theta)$ in $^{82}\text{Se}(^{11}\text{B},3n\gamma)$, $\Delta\pi=\text{no}$ from level scheme.
		1719.6 [‡] 2	85 [‡] 4	5111.46	(13 ⁺)			
		1728.4 [‡] 3	35 [‡] 4	5102.6	(12)			
6856.992	1 ⁻	1760.7 ^{‡b} 5	54 [‡] 15	5068.39		(E1)	5.27×10 ⁻⁴	$\alpha(\text{K})=9.17\times 10^{-5}$ 13; $\alpha(\text{L})=9.79\times 10^{-6}$ 14; $\alpha(\text{M})=1.669\times 10^{-6}$ 24; $\alpha(\text{N})=2.25\times 10^{-7}$ 4; $\alpha(\text{O})=1.590\times 10^{-8}$ 23 Mult.: D from $\gamma\gamma(\theta)$ in $^{82}\text{Se}(^{11}\text{B},3n\gamma)$, $\Delta\pi=\text{yes}$ from level scheme. E_γ : poor fit. Level-energy difference=1762.6.
		2287.5 [‡] 4	100 [‡] 4	4543.6	(11 ⁺)			
		2313.1 [‡] 4	31 [‡] 4	4518.5	(12 ⁺)			
		2021.84 5	0.39 4	4835.05	(1,2 ⁻)			
		2323.83 6	0.35 3	4533.14	(1 ⁻),2 ⁻			
		2327.37 5	1.05 11	4529.65	(0 ⁻ ,1,2,3 ⁻)			
		2341.05 5	0.54 5	4515.93	(1,2 ⁻)			
		2405.39 5	0.97 10	4451.576	(1,2 ⁻)			
		2531.86 7	0.154 16	4325.06	1 ⁻ ,2 ⁻			
		2589.68 5	1.21 13	4267.38	(1,2)			
		2646.19 5	0.63 6	4210.81	(0 ⁻ ,1,2,3 ⁻)			
		2695.64 5	0.62 6	4161.28	(0,1,2)			
		2756.46 5	0.97 10	4100.49	(1 ⁻ ,2 ⁻)			
		2819.56 7	0.84 8	4037.54	(1,2 ⁻)			
		2903.45 5	0.51 5	3953.54	(1 ⁻ ,2 ⁻)			
		2922.47 5	0.79 8	3934.47	1 ⁻			
		3164.59 6	1.05 5	3692.29	1 ⁻			
		3171.75 6	0.66 3	3685.23	(1,2 ⁻)			
		3229.25 6	1.02 5	3627.647	1 ⁻			
		3254.87 6	1.05 5	3602.07	1 ⁻			
		3282.48 6	1.68 8	3574.501	1 ⁻			
		3301.30 6	2.43 13	3555.727	(1 ⁻ ,2,3 ⁻)			
		3380.94 6	1.40 6	3476.06	(1,2 ⁻)			
3387.77 7	0.149 8	3469.14	(1 ⁻ ,2,3 ⁻)					
3452.07 8	0.194 10	3404.83	(1 ⁻ ,2,3 ⁻)					
3544.55 7	1.43 8	3312.408	(2,1 ⁻)					
3696.73 7	1.21 6	3160.211	1 ⁻					

Adopted Levels, Gammas (continued)

$\gamma(^{90}\text{Y})$ (continued)

$E_i(\text{level})$	J_i^π	E_γ^\dagger	I_γ^\dagger	E_f	J_f^π	Mult. [†]	α	Comments		
6856.992	1 ⁻	3713.07 7	0.69 3	3143.84	(1 ⁻ ,2,3 ⁻)					
		3813.53 8	0.121 6	3043.50	(1 ⁻ ,2,3 ⁻)					
		3854.38 13	0.063 6	3002.69	(1 ⁻ ,2)					
		3864.60 8	0.100 5	2992.35	(1 ⁻),2 ⁻					
		3870.84 7	0.79 4	2986.10	(1 ⁻ ,2)					
		3997.40 11	0.098 5	2859.35	2 ⁻					
		4009.56 9	0.79 5	2847.42	1 ⁻					
		4018.68 8	0.421 21	2838.32	1,2					
		4098.92 8	0.95 5	2758.078	(1 ⁻ ,2 ⁻)					
		4107.74 8	7.4 4	2749.240	(1 ⁻ ,2,3 ⁻)					
		4137.35 9	0.186 10	2719.35	(1,2 ⁻)					
		4193.73 8	0.214 11	2663.28	(1 ⁻ ,2 ⁻)					
		4225.11 11	0.0365 16	2631.93	(1 ⁻ ,2,3 ⁻)					
		4233.17 18	0.035 3	2623.99	1 ⁻					
		4352.27 8	1.83 10	2504.613	2 ⁻					
		4361.16 12	0.049 3	2495.48	(2,1 ⁻)					
		4380.90 9	0.75 4	2475.92	2 ⁻					
		4490.90 9	0.83 5	2365.964	1 ⁻					
		4612.60 9	0.332 17	2244.30	(1,2 ⁻)					
		4660.68 9	0.77 4	2196.120	(1 ⁻ ,2)					
		4723.38 12	0.083 5	2133.502	1,2 ⁻					
		5041.62 10	0.49 3	1815.152	1 ⁺					
		5095.74 10	0.51 3	1760.977	2 ⁻					
		5215.74 20	0.027 3	1640.914	1 ⁻					
		5285.08 11	0.254 13	1571.614	2 ⁻ , (3) ⁻					
		5485.56 12	0.370 19	1371.133	1 ⁻					
		5645.15 13	2.65 13	1211.578	0 ⁻					
		6080.05 14	100 5	776.593	2 ⁺					
		6654.07 21	0.314 16	202.496	3 ⁻					
		6856.55 3	0.246 13	0.0	2 ⁻					
		6898.1	(15 ⁻)	663.3 [‡] 3	9 [‡] 4	6234.7	(13 ⁻)	E2	1.75×10 ⁻³	$\alpha(\text{K})=0.001541$ 22; $\alpha(\text{L})=0.0001735$ 25; $\alpha(\text{M})=2.96\times 10^{-5}$ 5; $\alpha(\text{N})=3.96\times 10^{-6}$ 6; $\alpha(\text{O})=2.66\times 10^{-7}$ 4 Mult.: Q from $\gamma\gamma(\theta)$ in $^{82}\text{Se}(^{11}\text{B},3n\gamma)$, assumed E2.
				833.1 [‡] 3	100 [‡] 4	6065.0	(13 ⁻)	E2	9.66×10 ⁻⁴	$\alpha(\text{K})=0.000853$ 12; $\alpha(\text{L})=9.48\times 10^{-5}$ 14; $\alpha(\text{M})=1.617\times 10^{-5}$ 23; $\alpha(\text{N})=2.17\times 10^{-6}$ 3 $\alpha(\text{O})=1.481\times 10^{-7}$ 21 Mult.: Q from $\gamma\gamma(\theta)$ in $^{82}\text{Se}(^{11}\text{B},3n\gamma)$, assumed E2.
				1538.4 [‡] 1	45.0 [‡] 14	5359.7	(14 ⁺)	E1	4.00×10 ⁻⁴	$\alpha(\text{K})=0.0001106$ 16; $\alpha(\text{L})=1.184\times 10^{-5}$ 17; $\alpha(\text{M})=2.02\times 10^{-6}$ 3; $\alpha(\text{N})=2.72\times 10^{-7}$ 4; $\alpha(\text{O})=1.92\times 10^{-8}$ 3 Mult.: D from $\gamma\gamma(\theta)$ in $^{82}\text{Se}(^{11}\text{B},3n\gamma)$, $\Delta\pi=\text{yes}$ from level scheme.
2379.6 [‡] 3	10.0 [‡] 7			4518.5	(12 ⁺)	[E3]	4.83×10 ⁻⁴	$\alpha(\text{K})=0.0001560$ 22; $\alpha(\text{L})=1.692\times 10^{-5}$ 24; $\alpha(\text{M})=2.89\times 10^{-6}$ 4; $\alpha(\text{N})=3.89\times 10^{-7}$ 6; $\alpha(\text{O})=2.74\times 10^{-8}$ 4		

Adopted Levels, Gammas (continued)

$\gamma(^{90}\text{Y})$ (continued)

$E_i(\text{level})$	J_i^π	E_γ^\dagger	I_γ^\dagger	E_f	J_f^π	Mult. †	α	Comments
7355.53	(14 ⁺)	524.4 [‡] 1	100 [‡] 4	6831.13	13 ⁽⁺⁾	(M1)	0.00259	$\alpha(\text{K})=0.00229$ 4; $\alpha(\text{L})=0.000252$ 4; $\alpha(\text{M})=4.31\times 10^{-5}$ 6; $\alpha(\text{N})=5.80\times 10^{-6}$ 9; $\alpha(\text{O})=4.06\times 10^{-7}$ 6 Mult.: D from $\gamma\gamma(\theta)$ in $^{82}\text{Se}(^{11}\text{B},3n\gamma)$, M1 from assignment to band structure.
		533.0 [‡] 1	75.0 [‡] 18	6822.52	(13 ⁺)	(M1)	0.00250	$\alpha(\text{K})=0.00221$ 3; $\alpha(\text{L})=0.000243$ 4; $\alpha(\text{M})=4.15\times 10^{-5}$ 6; $\alpha(\text{N})=5.59\times 10^{-6}$ 8; $\alpha(\text{O})=3.91\times 10^{-7}$ 6 Mult.: D from $\gamma\gamma(\theta)$ in $^{82}\text{Se}(^{11}\text{B},3n\gamma)$, M1 from assignment to band structure.
7882.7?	(15 ⁺)	527.2 [‡] 2	100 [‡]	7355.53	(14 ⁺)	(M1)	0.00256	$\alpha(\text{K})=0.00226$ 4; $\alpha(\text{L})=0.000249$ 4; $\alpha(\text{M})=4.26\times 10^{-5}$ 6; $\alpha(\text{N})=5.73\times 10^{-6}$ 8; $\alpha(\text{O})=4.01\times 10^{-7}$ 6 B(M1)(W.u.)=1.35 +46-28 Mult.: D from $\gamma\gamma(\theta)$ in $^{82}\text{Se}(^{11}\text{B},3n\gamma)$, M1 from assignment to band structure.
7994.0	16 ⁽⁻⁾	1095.9 [‡] 2	100 [‡]	6898.1	(15 ⁻)	(M1)	5.06×10^{-4}	$\alpha(\text{K})=0.000448$ 7; $\alpha(\text{L})=4.86\times 10^{-5}$ 7; $\alpha(\text{M})=8.29\times 10^{-6}$ 12; $\alpha(\text{N})=1.119\times 10^{-6}$ 16; $\alpha(\text{O})=7.91\times 10^{-8}$ 11 Mult.: D from $\gamma\gamma(\theta)$ in $^{82}\text{Se}(^{11}\text{B},3n\gamma)$, M1 from assignment to γ sequence.
8421.4	(16 ⁺)	538.7 [‡] 1	100 [‡] 3	7882.7?	(15 ⁺)	(M1)	0.00243	$\alpha(\text{K})=0.00215$ 3; $\alpha(\text{L})=0.000237$ 4; $\alpha(\text{M})=4.05\times 10^{-5}$ 6; $\alpha(\text{N})=5.45\times 10^{-6}$ 8; $\alpha(\text{O})=3.82\times 10^{-7}$ 6 B(M1)(W.u.)=0.181 +29-23 Mult.: D from $\gamma\gamma(\theta)$ in $^{82}\text{Se}(^{11}\text{B},3n\gamma)$, M1 from assignment to band structure.
		1065.8 [‡] 7	36 [‡] 3	7355.53	(14 ⁺)	[E2]	5.39×10^{-4}	$\alpha(\text{K})=0.000477$ 7; $\alpha(\text{L})=5.23\times 10^{-5}$ 8; $\alpha(\text{M})=8.93\times 10^{-6}$ 13; $\alpha(\text{N})=1.199\times 10^{-6}$ 17; $\alpha(\text{O})=8.31\times 10^{-8}$ 12 B(E2)(W.u.)=8.0 +14-11
9005.9	(17 ⁺)	584.5 [‡] 1	100 [‡]	8421.4	(16 ⁺)	(M1)	0.00202	$\alpha(\text{K})=0.001782$ 25; $\alpha(\text{L})=0.000196$ 3; $\alpha(\text{M})=3.34\times 10^{-5}$ 5; $\alpha(\text{N})=4.50\times 10^{-6}$ 7; $\alpha(\text{O})=3.16\times 10^{-7}$ 5 B(M1)(W.u.)=0.30 +6-4 Mult.: D from $\gamma\gamma(\theta)$ in $^{82}\text{Se}(^{11}\text{B},3n\gamma)$, M1 from assignment to band structure.
9317.1		1323.1 [‡] 3	100 [‡]	7994.0	16 ⁽⁻⁾			
9635.1	(18 ⁺)	629.2 [‡] 3	100 [‡]	9005.9	(17 ⁺)			

† From (n, γ), E=thermal, except where noted.

‡ From $^{82}\text{Se}(^{11}\text{B},3n\gamma)$.

From (d,p γ).

@ From (α ,n γ).

Adopted Levels, Gammas (continued) $\gamma({}^{90}\text{Y})$ (continued)

& From ${}^{74}\text{Ge}({}^{18}\text{O},\text{n}\gamma)$, ${}^{76}\text{Ge}({}^{18}\text{O},3\text{n}\gamma)$.

^a Multiply placed with undivided intensity.

^b Placement of transition in the level scheme is uncertain.

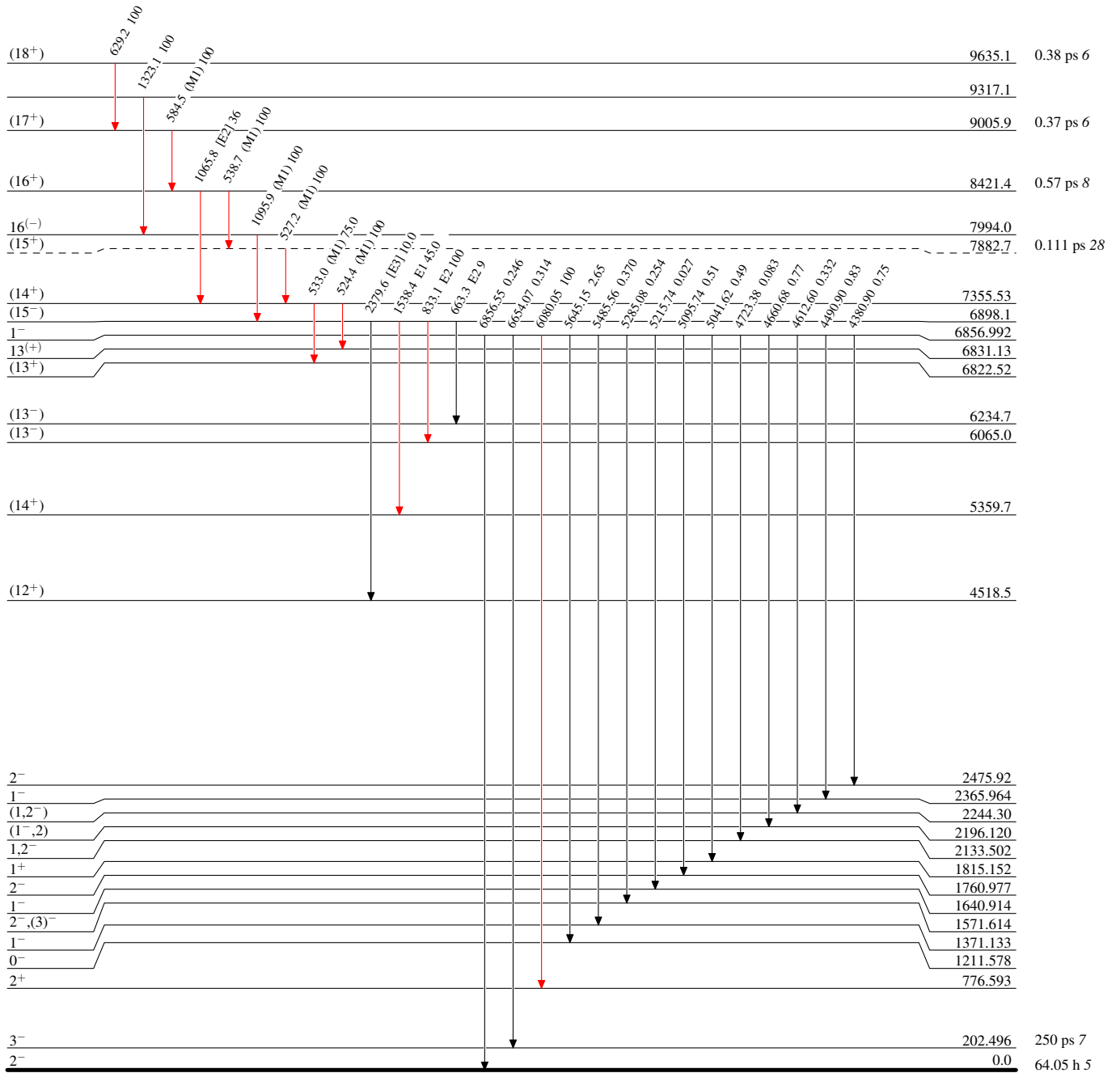
Adopted Levels, Gammas

Level Scheme

Intensities: Type not specified

Legend

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



$^{90}_{39}\text{Y}_{51}$

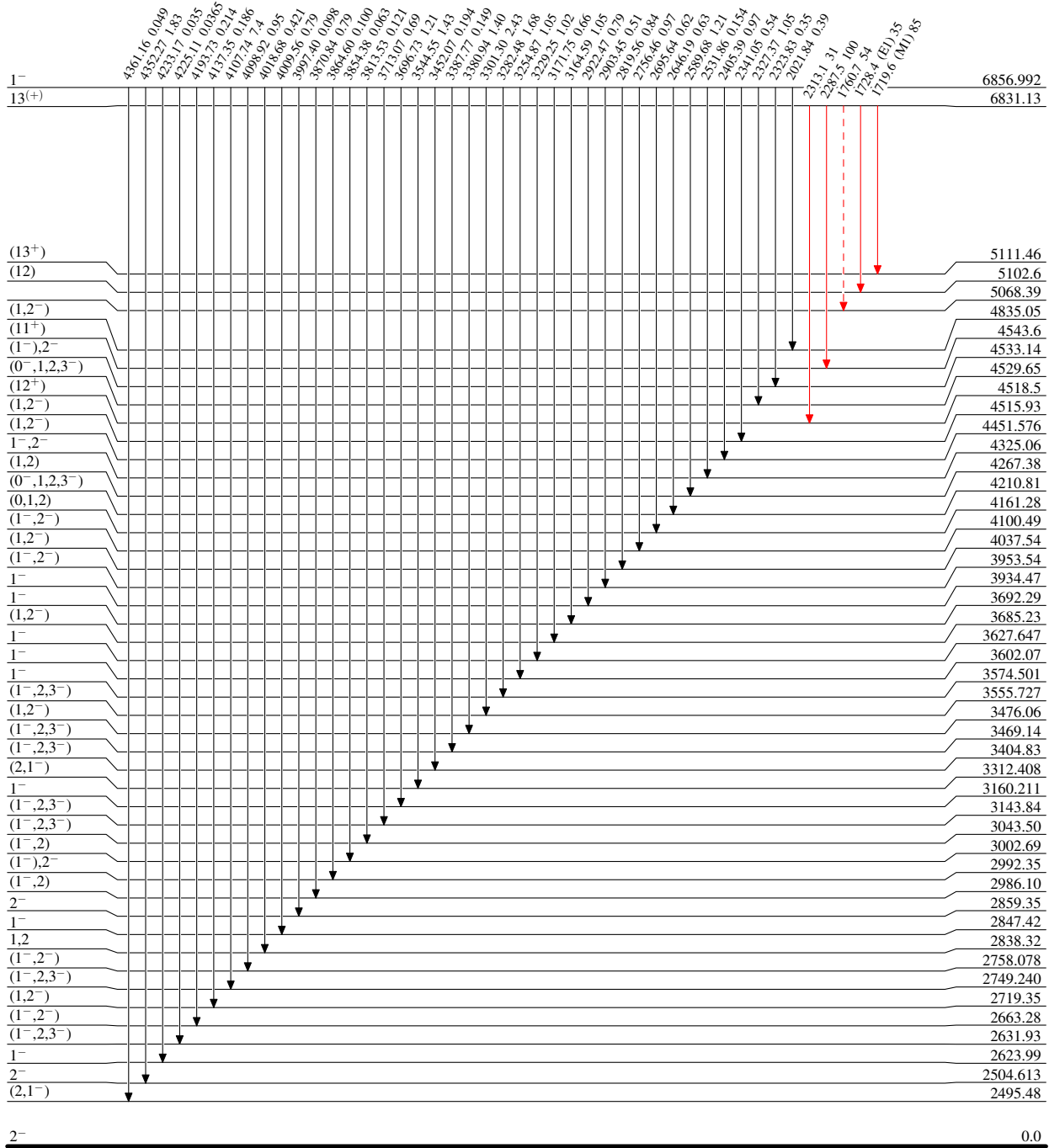
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Type not specified

- ▶ I_γ < 2% × I_γ^{max}
- ▶ I_γ < 10% × I_γ^{max}
- ▶ I_γ > 10% × I_γ^{max}
- - - -▶ γ Decay (Uncertain)



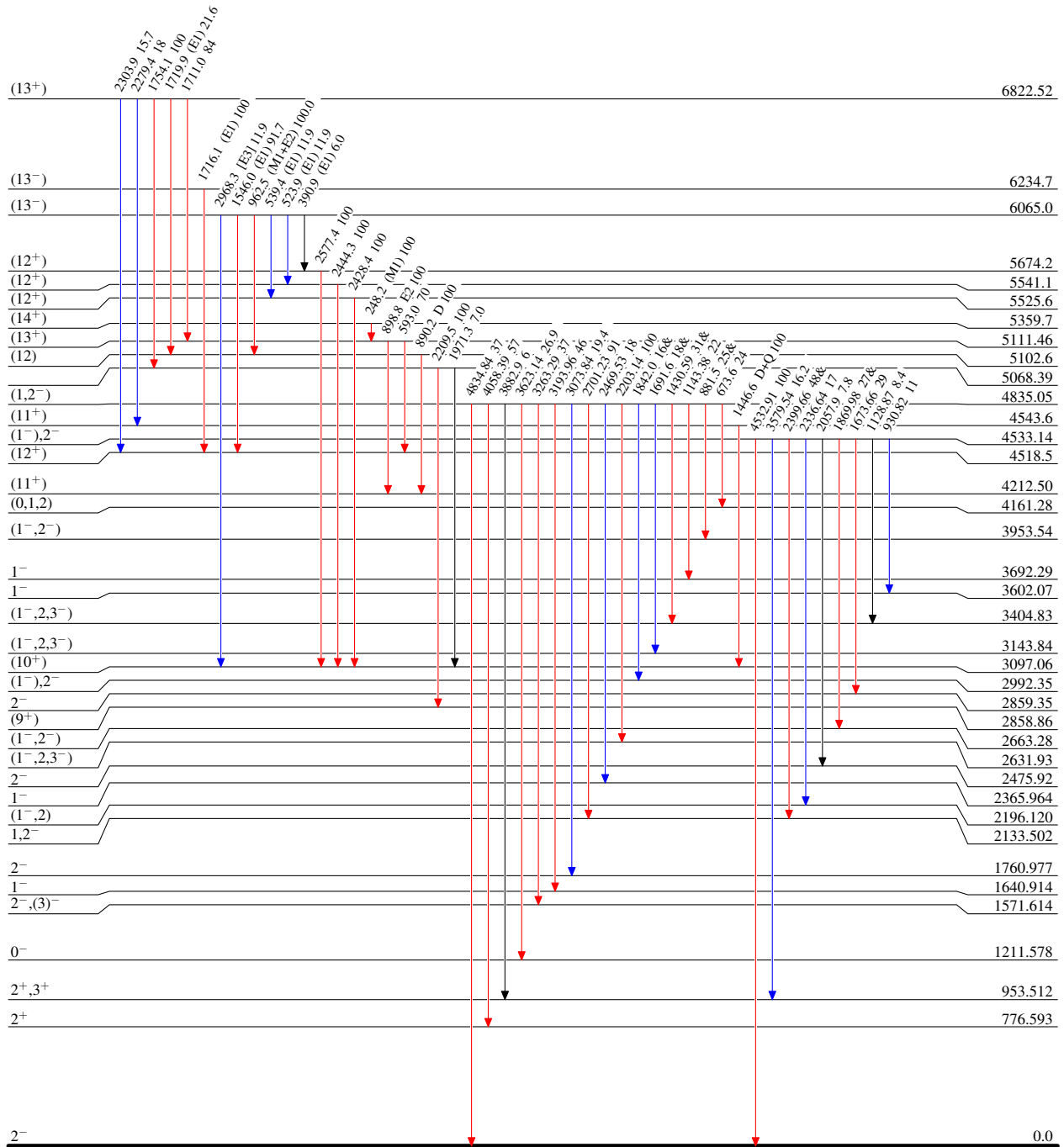
Adopted Levels, Gammas

Level Scheme (continued)

Legend

Intensities: Type not specified
& Multiplied placed: undivided intensity given

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



⁹⁰Y₅₁

64.05 h 5

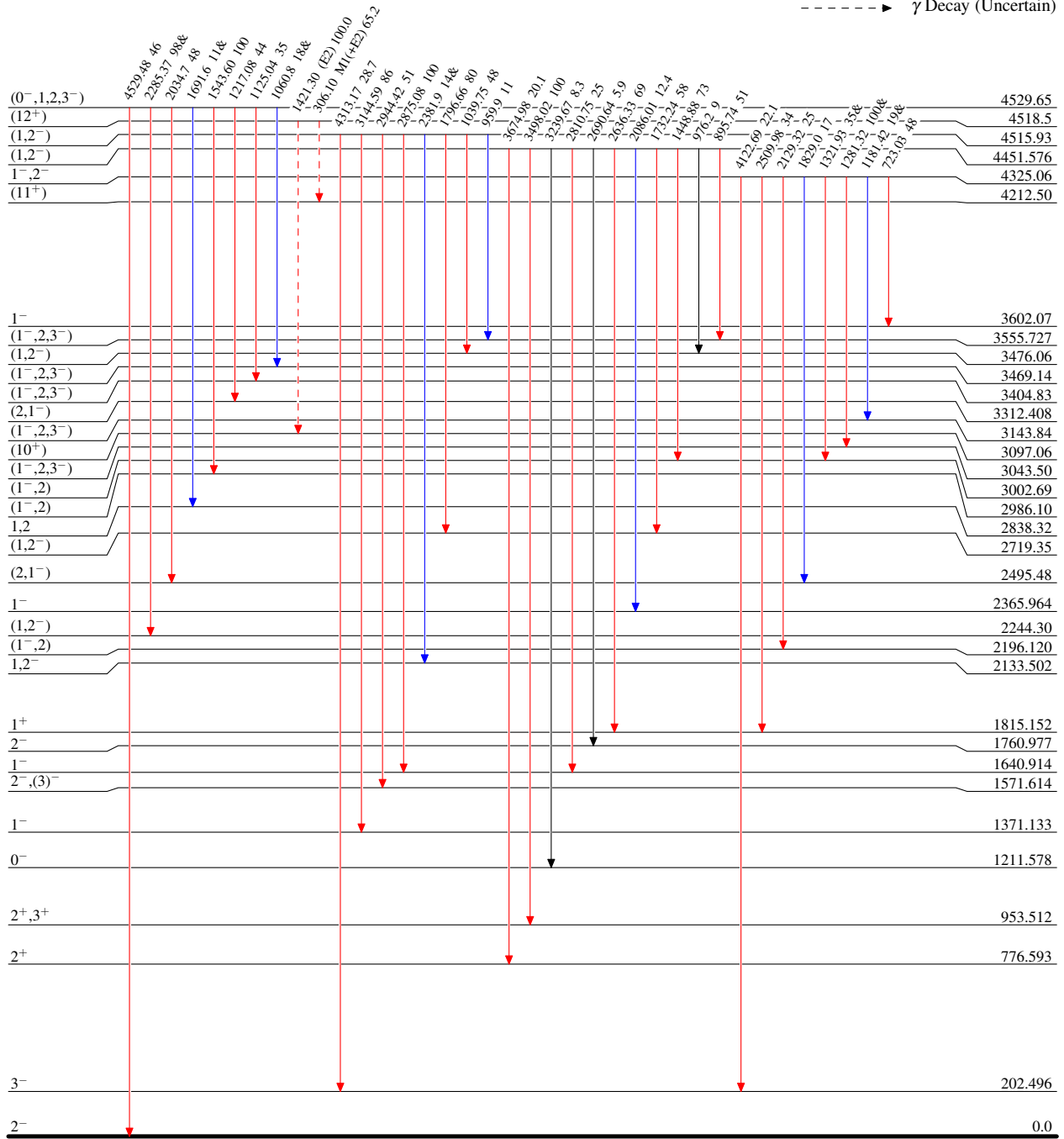
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified
& Multiply placed: undivided intensity given

Legend

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



$^{90}_{39}\text{Y}_{51}$

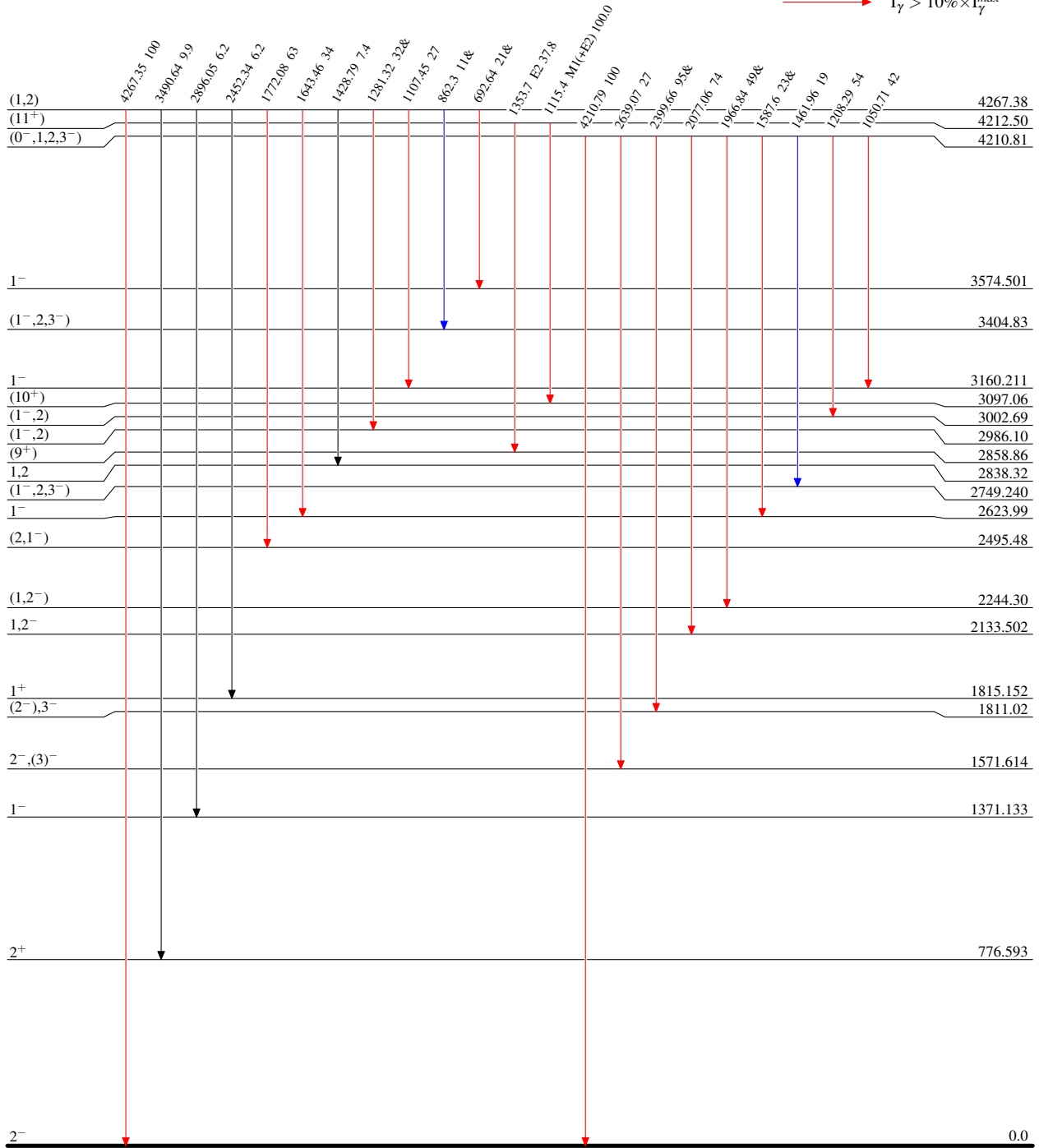
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified
& Multiply placed: undivided intensity given

Legend

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



$^{90}_{39}\text{Y}_{51}$

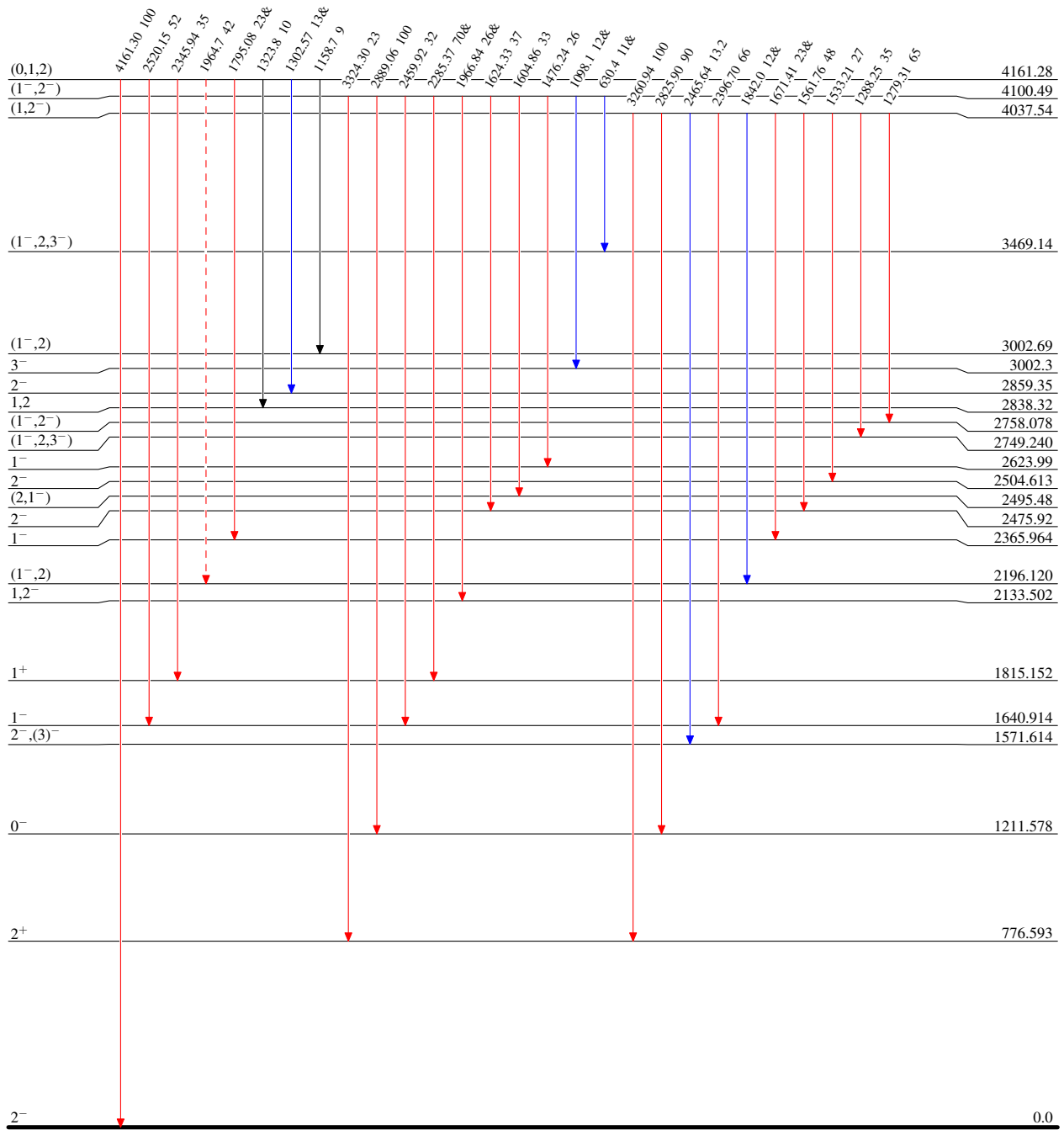
64.05 h 5

Adopted Levels, Gammas

Legend

Level Scheme (continued)
Intensities: Type not specified
& Multiply placed: undivided intensity given

- ▶ I_γ < 2% × I_γ^{max}
- ▶ I_γ < 10% × I_γ^{max}
- ▶ I_γ > 10% × I_γ^{max}
- - - - -▶ γ Decay (Uncertain)



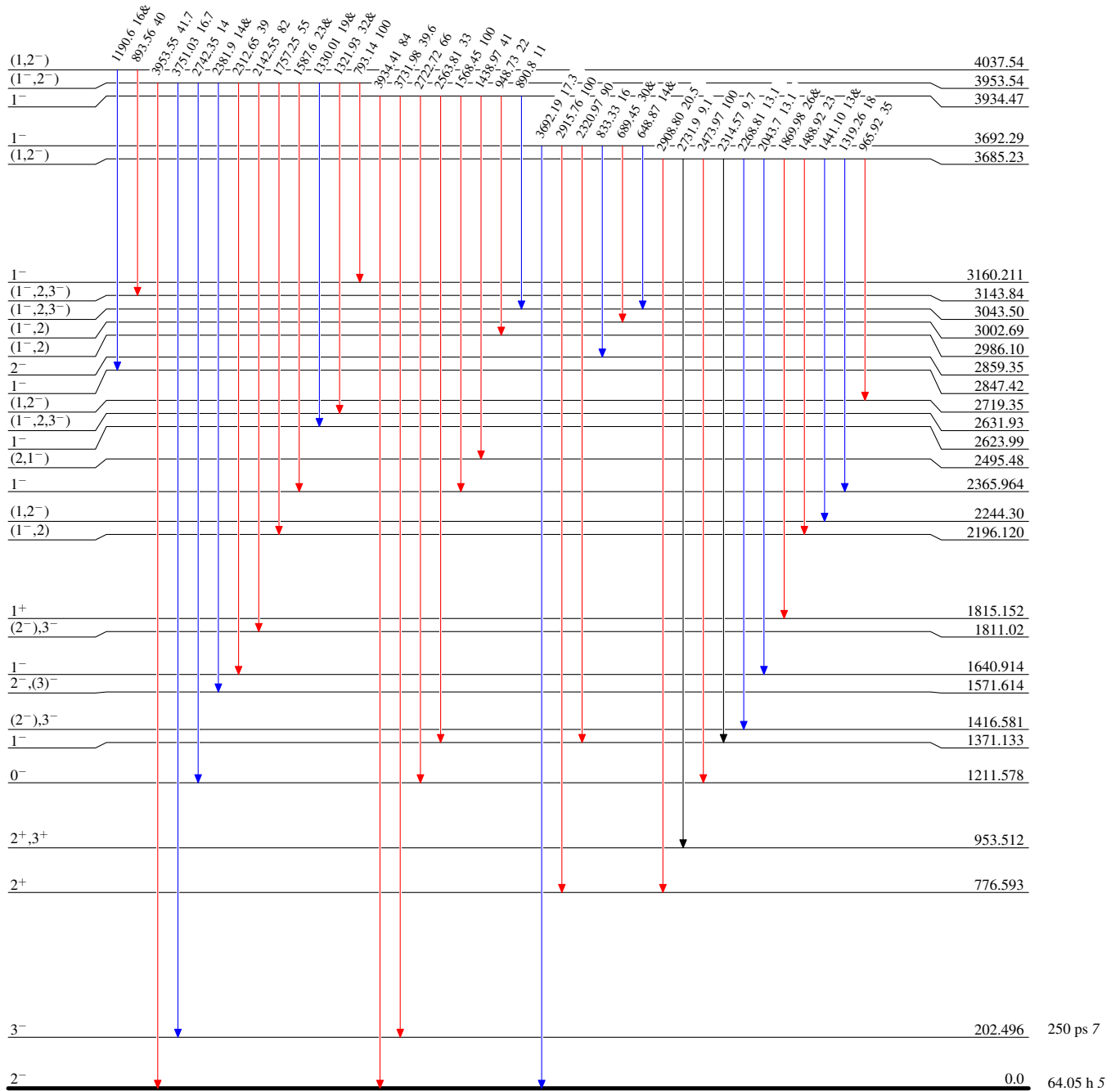
Adopted Levels, Gammas

Level Scheme (continued)

Legend

Intensities: Type not specified
& Multiplied placed: undivided intensity given

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



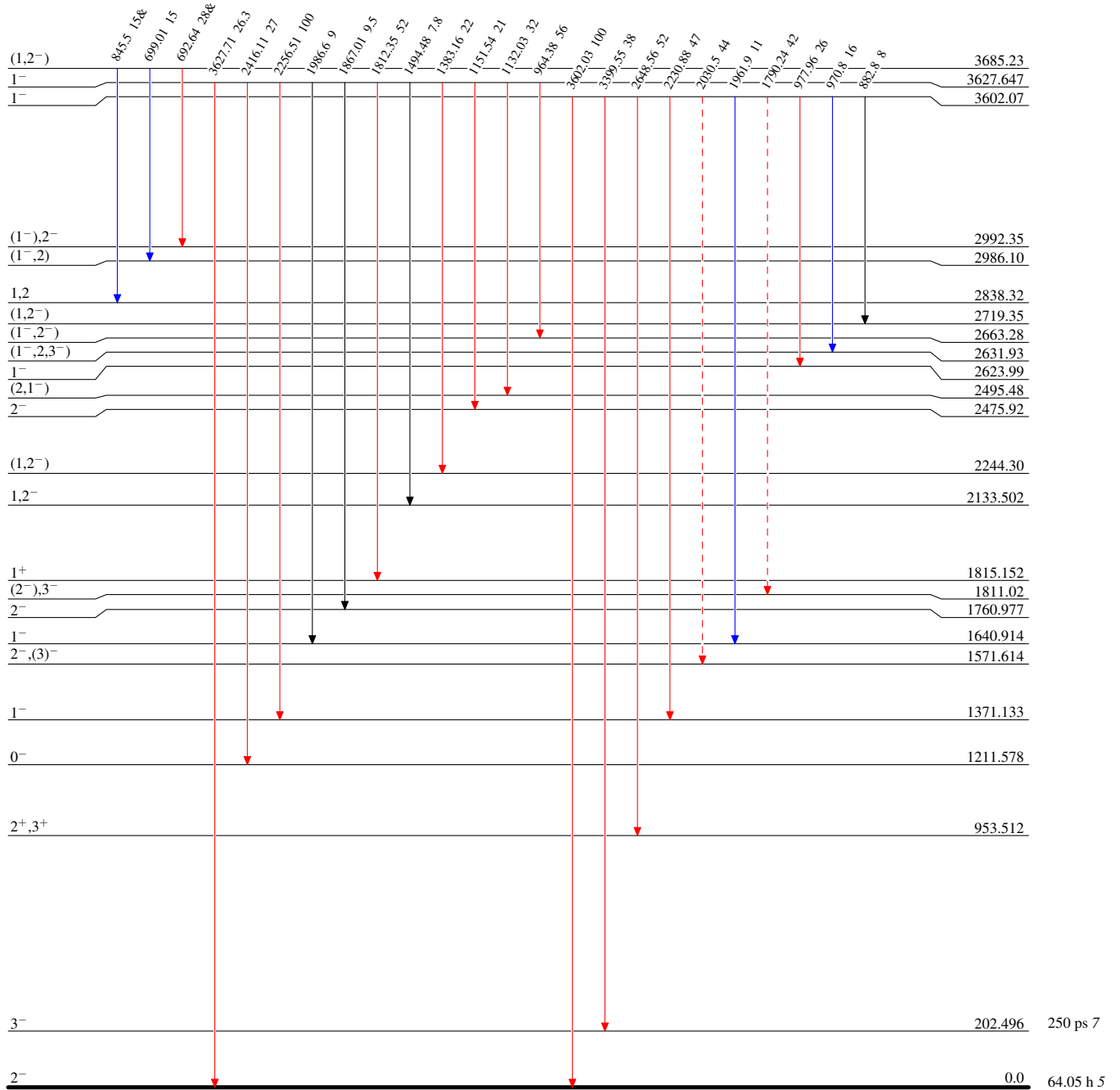
$^{90}_{39}\text{Y}_{51}$

Adopted Levels, Gammas

Legend

Level Scheme (continued)
Intensities: Type not specified
& Multiply placed: undivided intensity given

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



$^{90}_{39}\text{Y}_{51}$

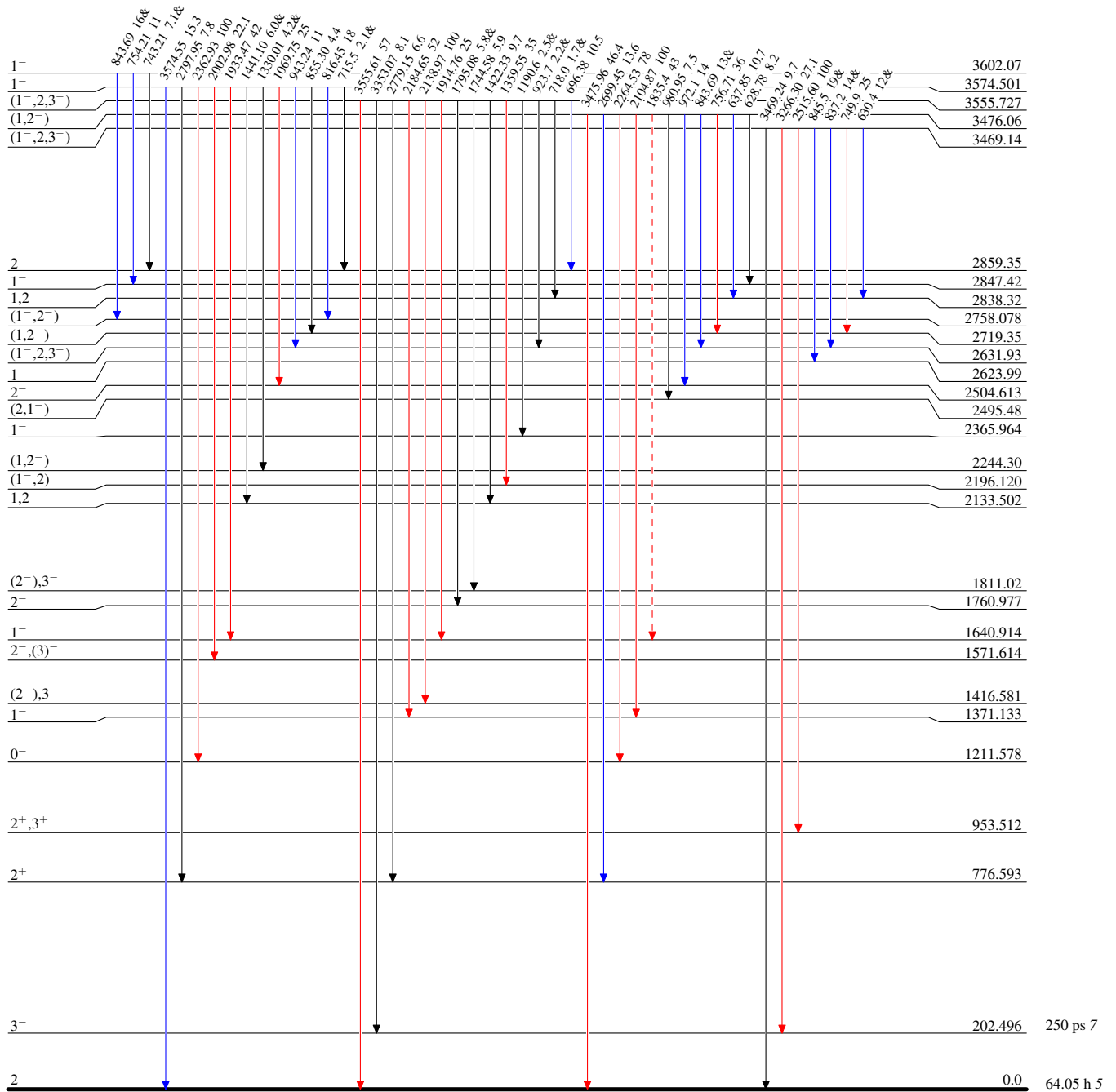
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified
& Multiply placed: undivided intensity given

Legend

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



$^{90}_{39}\text{Y}_{51}$

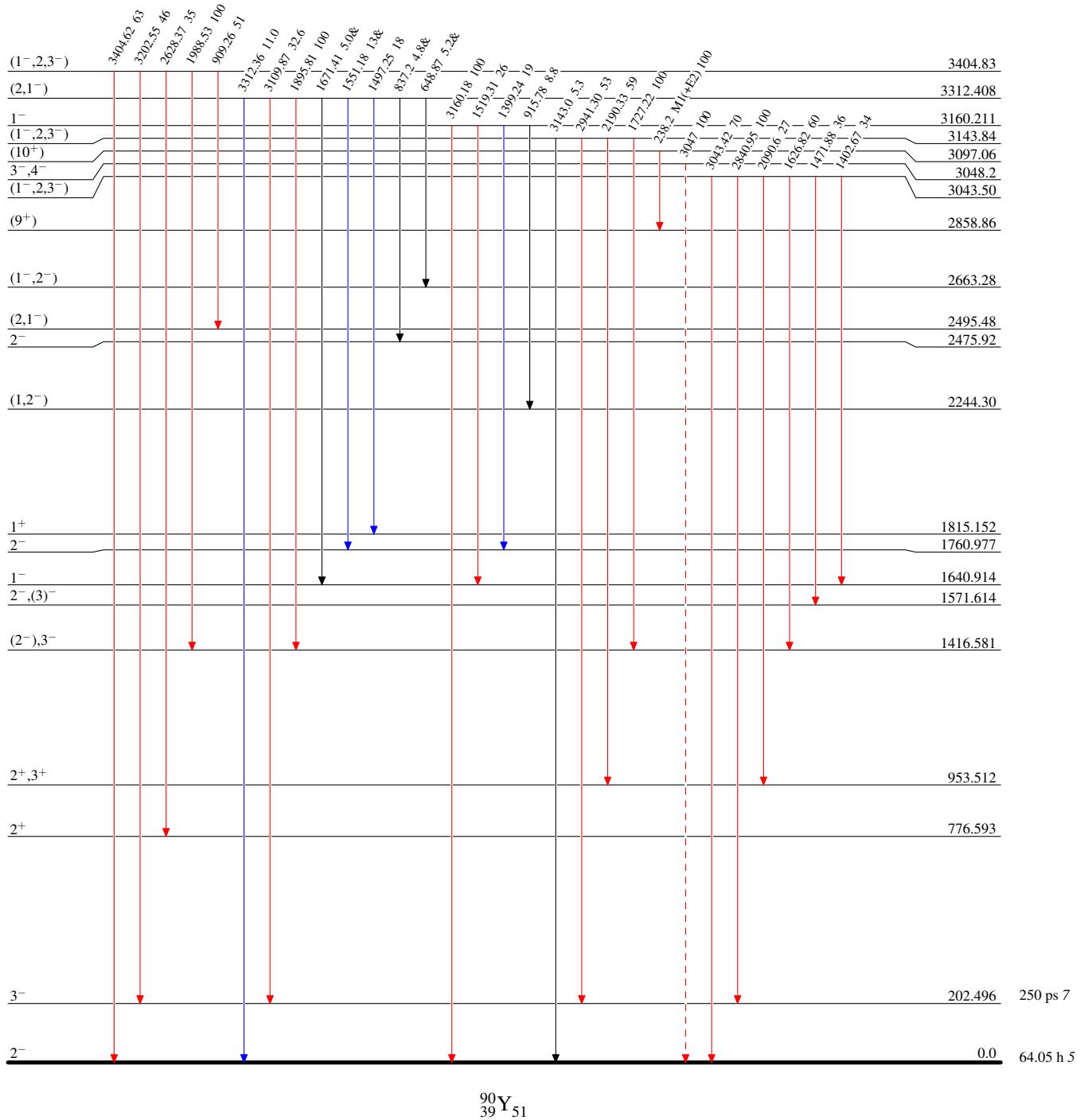
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified
& Multiply placed: undivided intensity given

Legend

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



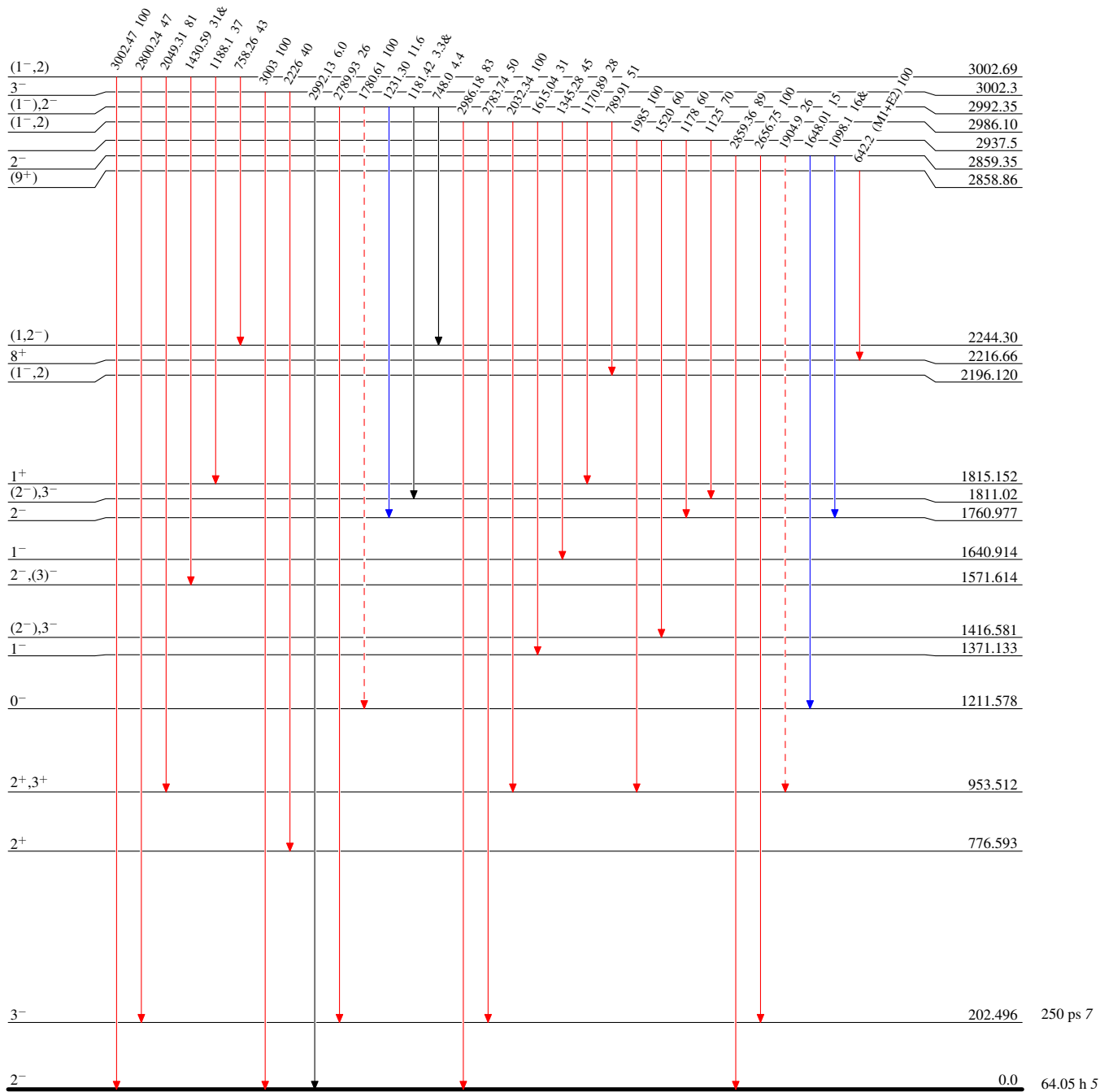
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified
& Multiply placed: undivided intensity given

Legend

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



$^{90}_{39}\text{Y}_{51}$

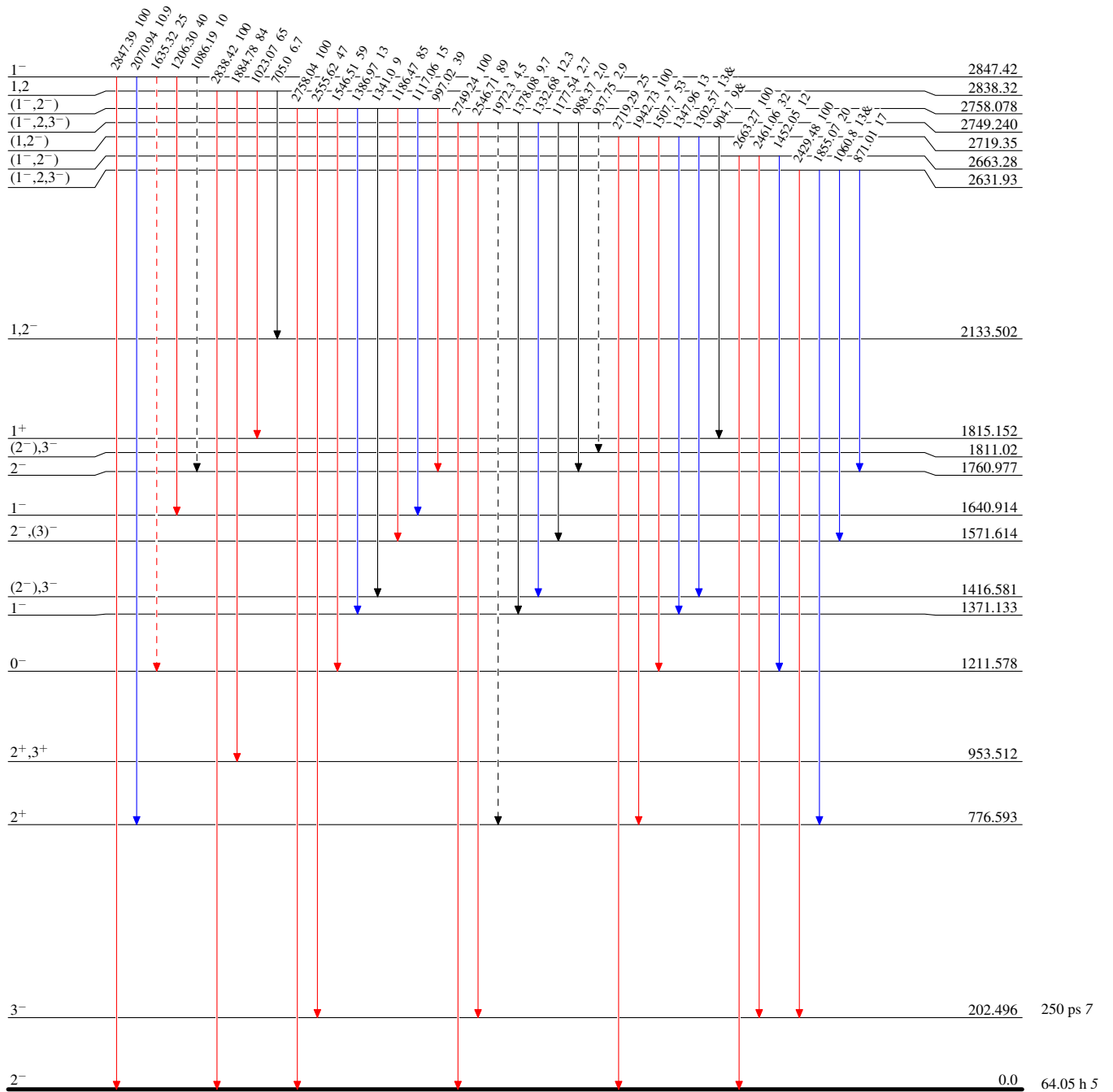
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified
& Multiply placed: undivided intensity given

Legend

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



$^{90}_{39}\text{Y}_{51}$

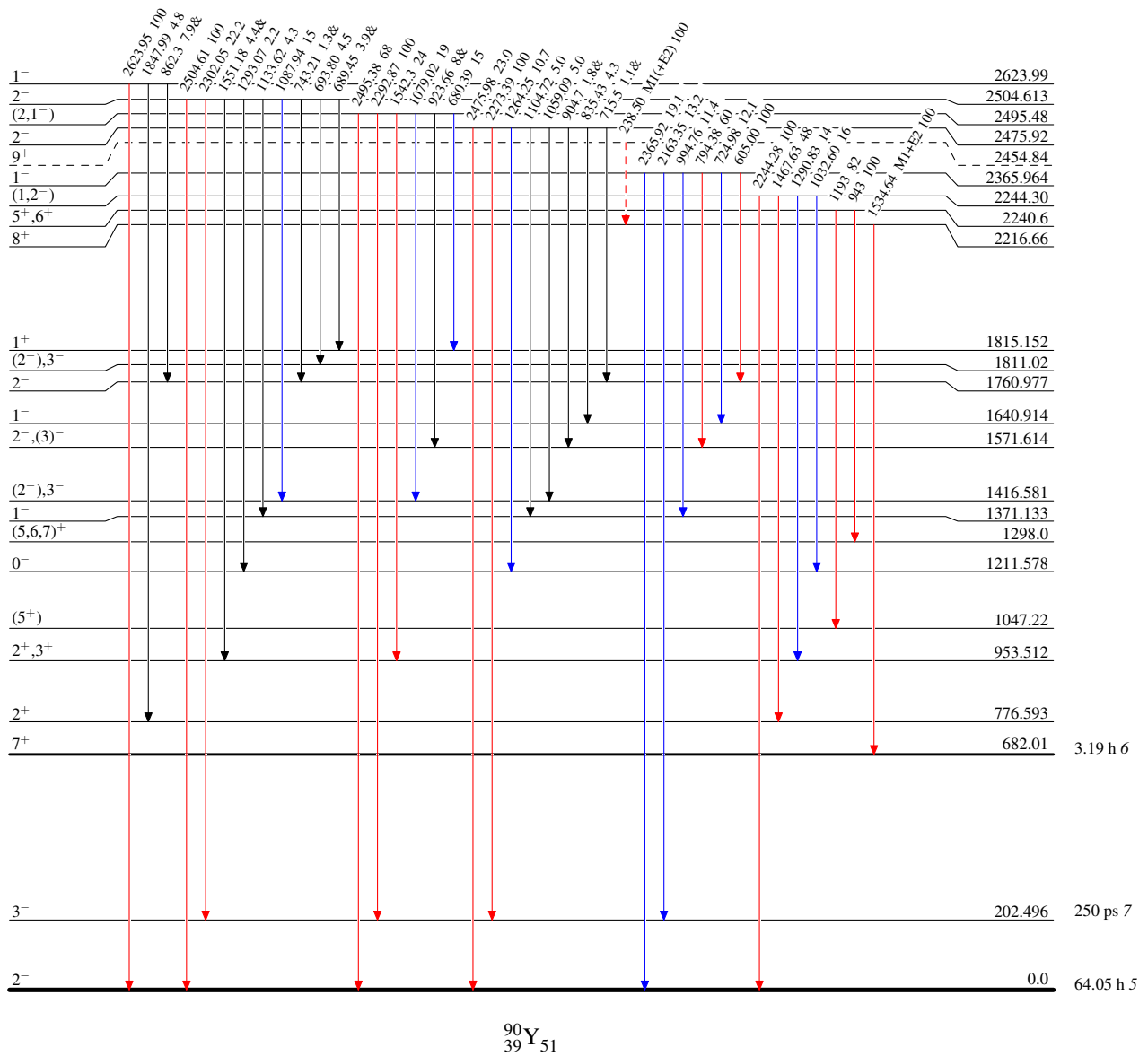
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified
& Multiply placed: undivided intensity given

Legend

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



$^{90}_{39}\text{Y}_{51}$

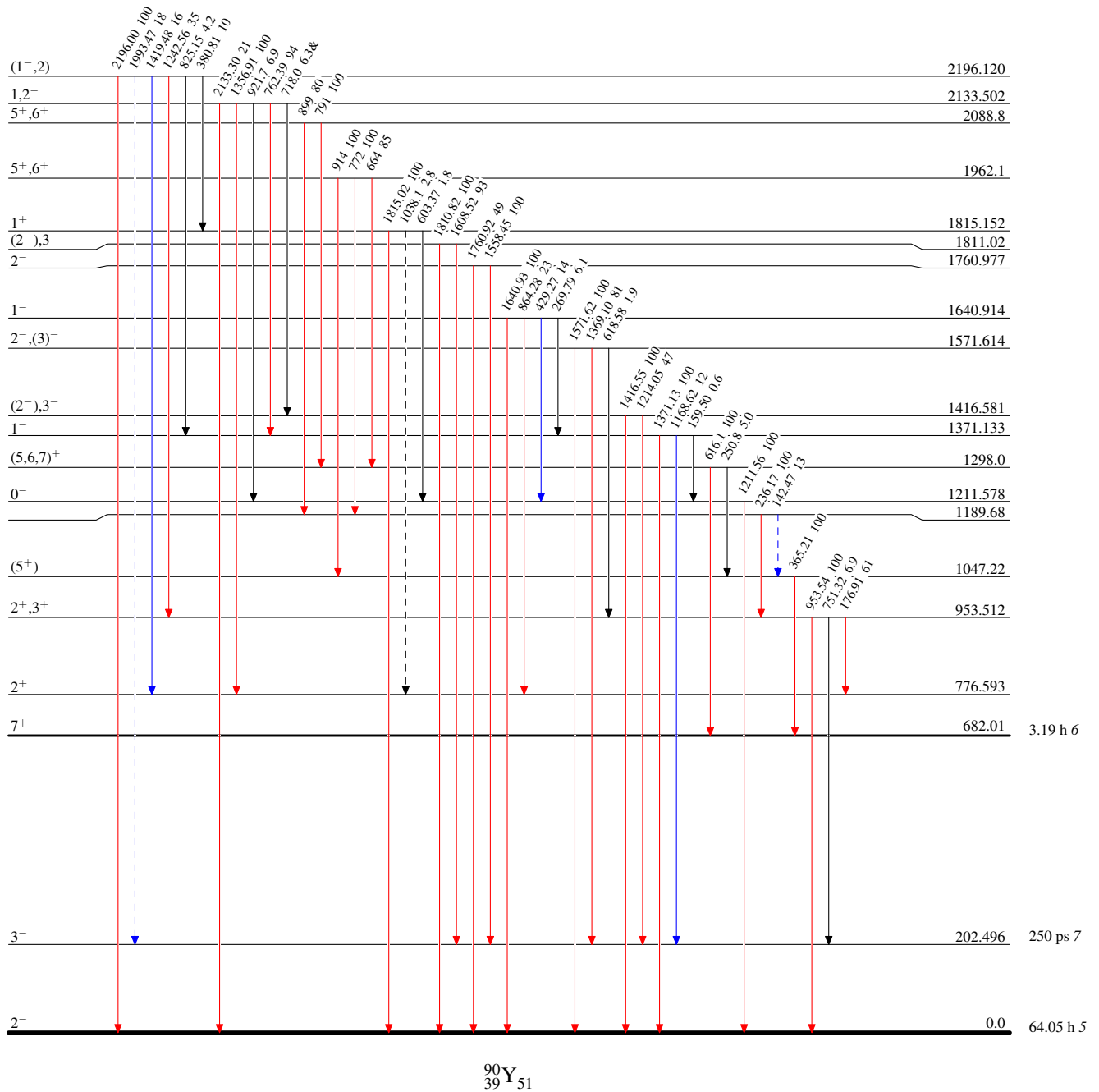
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified
& Multiply placed: undivided intensity given

Legend

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



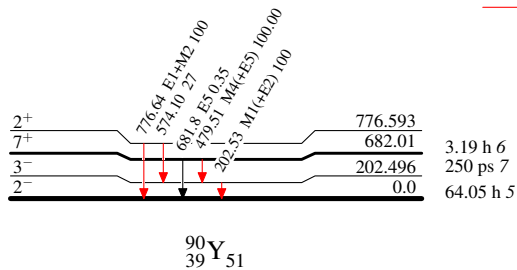
Adopted Levels, Gammas

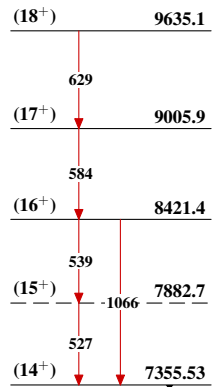
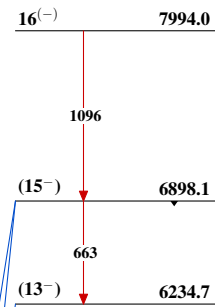
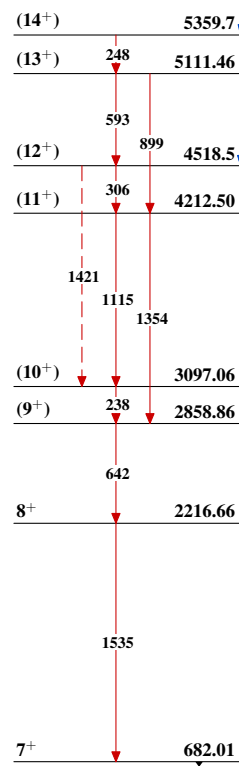
Level Scheme (continued)

Intensities: Type not specified
& Multiplied placed: undivided intensity given

Legend

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



Adopted Levels, GammasBand(A): Band based on $14^{(+)}$ Seq.(C): Cascade based on 13^- Seq.(B): γ cascade based on 7^+  $^{90}_{39}\text{Y}_{51}$