Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Jun Chen, Balraj Singh	NDS 164, 1 (2020)	15-Feb-2020

Q(β^-)=8992 *12*; S(n)=4245 *10*; S(p)=11002 *9*; Q(α)=−6157 *8* 2017Wa10
S(2n)=10102 *10*, S(2p)=25518 *9*, Q(β^-n)=2577 *8* (2017Wa10).
No new experimental references for ^{98}Y found in the NSR databases, as of Feb 11, 2021.
Mass measurement: 2007Ha32.
2006Ca38: measured resonance fluorescence spectra. Collinear laser spectroscopy.
Additional information 1.
Theory references: consult the NSR database (www.nndc.bnl.gov/nsr/) for four primary references, one dealing with nuclear structure calculations and 3 with decay modes and half-lives.

^{98}Y Levels

Cross Reference (XREF) Flags

A	^{98}Sr β^- decay (0.653 s)	D	^{235}U(n,Fγ),^{241}Pu(n,Fγ)
B	^{99}Sr β^-n decay (0.269 s)	E	^{235}U(n,Fγ):delayed γ
C	^{248}Cm,^{252}Cf SF decay	F	^{238}U(P,Fγ)

E(level)†	J$^\pi$‡	$T_{1/2}$	XREF	Comments
0.0	0$^-$	0.548 s *2*	ABCDEF	%β^-=100; %β^-n=0.33 *3* Evaluated rms charge radius=4.371 fm *13* (2013An02). Evaluated δ<r^2>(^{89}Y,^{98}Y)=+1.110 fm^2 *1* (2013An02). J$^\pi$: single peak seen in hyperfine structure using collinear laser spectroscopy at IGISOL facility, JYFL (2010Ba31,2007Ch07). J=0 is also also consistent with (428γ)(119γ)(θ) in ^{98}Sr β^- decay (1989BeZG,1988MaYY); and $\gamma\gamma$(θ) data in SF decay (2017Ur03). Parity is from E1-M1 cascade of 428γ-119γ from 1$^+$. Calculations (1989Br31) based on IBFFM model suggest configuration=$\pi p_{1/2}\otimes\nu s_{1/2}$. $T_{1/2}$: weighted average of 0.550 s *30* (1987PfZX, earlier value of 0.655 s *50* in 1982Ga24); 0.548 s *1* (1986ReZU, earlier values of 0.548 s *2* in 1986Wa17, and 0.51 s *1* in 1983Re10); and 0.65 s *6* (1977Si05, earlier value of 0.60 s *5* in 1975Kh05). Uncertainty inflated by evaluators from 0.001 s to 0.002 s. Others: 0.6 s (1978St02), <0.3 s (1971Tr02). %β^-n: weighted averaged of 0.35 *2* (1993Ru01), 0.3 *1* (1987PfZX,1982Ga24), and 0.23 *5* (1986ReZU, earlier values of 0.24 *1* in 1986Wa17 and 0.21 *4* in 1983Re10). δ<r^2>(relative to ^{89}Y)=+1.088 fm^2 (collinear laser spectroscopy, 2007Ch07). Additional information 2.
119.353 *3*	1$^-$	0.14 ns *5*	A CDEF	J$^\pi$: 113.4γ M1 to 0$^-$; spin=1 also from $\gamma\gamma$(θ) in SF decay (2017Ur03). Calculations (1989Br31) based on IBFFM model suggest configuration=$\pi p_{1/2}\otimes\nu s_{1/2}$. log *ft*=5.2 from 0$^+$ is inconsistent (see comments in ^{98}Sr β^- decay). $T_{1/2}$: from γ(t) in ^{98}Sr β^- decay (1987Oh05). Other: ≈11 ns (1979ScZV) ($\beta\gamma$(t) in ^{98}Sr β^- decay).
170.78 *5*	2$^-$	0.63 μs *2*	A CDEF	%IT=100 J$^\pi$: 170.8γ E2 to 0$^-$, 51.5γ M1+E2 to 1$^-$. $T_{1/2}$: from (171γ)γ(t); weighted average of 0.64 μs *2* (2017Ur03 in ^{235}U(n,Fγ):delayed γ); 0.61 μs *1* (2013RuZX, ^{235}U(n,Fγ), ^{241}Pu(n,Fγ); uncertainty of 0.02 μs used in averaging); and 0.62 μs *8* (1972GrYM and 1970Gr38 in ^{235}U(n,Fγ)). Others: 0.62 μs (1979ScZV in ^{98}Sr decay), 0.62 μs (1970Jo20 in ^{235}U(n,Fγ)).
358.13 *6*	(1,2$^-$)		A	J$^\pi$: 357.9γ to 0$^-$.
374.97 *9*	4$^-$	35.2 ns *5*	A CDEF	J$^\pi$: 204.3γ E2 to 2$^-$; (121γ)(204γ)(θ) in SF decay (2017Ur03) supports J=4 for

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Adopted Levels, Gammas (continued)

^{98}Y Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$	XREF	Comments
				375 level.
				$T_{1/2}$: from γγ(t). Weighted average of 35.0 ns *5* (2017Ur03 in SF decay), and 35.8 ns *8* (2002PfZZ,2004Br14 in ^{235}U,^{241}Pu(n,Fγ)).
446.07 *10*	$(3)^+$	<0.7 ns	CDEF	J^π: 49.9γ E1 from 496, $(4)^-$ level, 275.2γ to 2^-.
				$T_{1/2}$: γγ(t) (2002PfZZ,2004Br14 in ^{235}U(n,Fγ),^{241}Pu(n,Fγ)).
465.7 *7*	$(7^+,6^+)$	2.32 s *8*		%β^-=90 *10*; %IT<20; %β^-n=3.44 *95* (1981En05)
				E(level): from mass measurement (2017Ur03).
				J^π: evidence of β^- feeding with log *ft*=6.4 to 4^+ and 5^- levels, and no β^- feeding to 2^+ levels (see ^{98}Y β^- (2.32 s)). 1994St31 suggest $J^\pi=5^+$ with configuration=$\pi g_{9/2}\otimes\nu s_{1/2}$, but 4^- is suggested (1995HaZT) with configuration=$\pi 2p_{1/2}\otimes\nu 1g_{7/2}$. 2007Ch07 observed hyperfine structure with a minimum of four peaks in the spectrum, but could not assign a definite spin from these data. 2017Ur03 propose 7^+ or 6^+ with a preference for the former, based on decay pattern and shell-model considerations, and possible contribution from 9/2[404] neutron extruder orbital in its configuration.
				$T_{1/2}$: weighted average of 2.36 s *6* (2017Ur03), 2.1 s *3* (1981En05), and 2.0 s *2* (1977Si05).
				No IT decay has been observed: %IT/%β^-<0.25 (1977Si05) suggests %IT<20%. Other: 1991AyZZ.
				%β^-n evaluations: 3.1 *28* (1984Ma39), 3.6 *22* (1975Iz03).
				μ=+2.98 *2* for J=4, +3.11 *2* for J=5 (collinear laser spectroscopy, 2007Ch07, 2014StZZ); values are relative to those of ^{89}Y.
				Q=+1.73 *19* for J=4, +1.80 *20* for J=5 (collinear laser spectroscopy, 2007Ch07, 2016St14); values are relative to those of ^{89}Y.
				Additional information 3.
				δ<r^2>(relative to ^{89}Y)=+0.863 fm^2 for J=4, +0.860 fm^2 for J=5 (collinear laser spectroscopy,2007Ch07); deduced (2007Ch07) β_2=+0.33 *3* for J=4, +0.31 *3* for J=5.
496.10[@] *11*	$(4)^-$	6.90 μs *5*	A CDEF	%IT=100
				XREF: A(?).
				J^π: 121.2γ M1+E2 to 4^-, 325.2γ to 2^-; possible bandhead with configuration=$\pi 1/2[303]\otimes\nu 9/2[404]$ (1987Ma58).
				$T_{1/2}$: from γ(t). Weighted average of 6.95 μs *6* (2017Ur03 in ^{235}U(n,Fγ):delayed γ), and 6.87 μs *5* (2013RuZX in ^{235}U,^{241}Pu(n,Fγ)). Others from ^{235}U,^{241}Pu(n,Fγ): 7.2 μs *1* (1999Ge01), 8.0 μs *2* (1972GrYM,1970Gr38).
547.86 *5*	1^+		A C	J^π: log *ft*=4.9 (allowed β transition) from 0^+; 428.6γ E1 to 1^-, 547.9γ to 0^-. Possible configuration=$\pi g_{9/2}\otimes\nu g_{7/2}$ (1989Br31).
563.999 *19*	$(1^-,2^-)$	2.4 ns *12*	A C	J^π: 36.2γ E1 from 1^+, 564.0γ to 0^-; γγ(θ) in SF decay (2017Ur03).
				$T_{1/2}$: βγ(t) in ^{98}Sr β^- decay (2004Br14). Other: ≈4 ns (1979ScZV in ^{98}Sr β^-).
564.0+x[&]	$(3^-,4^-)$	180 ns *7*	A C	XREF: A(?).
				Additional information 4.
				$T_{1/2}$: from decay curve for prompt lines above the 564+x level gated at 444.7-keV line below the isomer in SF data (2017Ur03). Other: 160 ns *40* from SF data (2017Ur03).
				Interpreted by 2017Ur03 as deformed state with a band built on it, as shown in authors′ level-scheme Fig. 2.
595.78 *8*	$(1,2^-)$		A	J^π: possible (weak) β^- feeding (log *ft*=5.8) from 0^+.
596.73[@] *14*	$(5)^-$	175 ps *25*	CDEF	J^π: 100.6γ M1(+E2) to $(4)^-$; possible band member.
				$T_{1/2}$: from 2017Is03 in ^{235}U,^{241}Pu(n,Fγ), presumably from fast-timing γγ(t) method.
600.30 *4*	1^+	7.5 ns *7*	A C	J^π: log *ft*=4.4 (allowed β transition) from 0^+.
				$T_{1/2}$: βγ(t) in ^{98}Sr β^- (2004Br14). Other: 9 ns (1979ScZV, γγ(t) in ^{98}Sr β^-).
601.92 *8*	(0,1,2)		A	J^π: 482.7γ to 1^-; 384.5γ from 1^+.

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Adopted Levels, Gammas (continued)

^{98}Y Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$	XREF	Comments
603.57 *14*	(5⁻,6⁻)		C E	Jπ: (204γ)(229γ)(θ) in SF decay supports J=5,6 for 604 level.
615.17 *12*	(2⁻,3⁺)		A C	Jπ: 51.1γ from (1⁺); 240.2γ to 4⁻.
658.27 *17*	(6⁻,7⁻)		C E	Jπ: 54.7γ M1+E2 to (5⁻,6⁻), 313.9γ from (8⁺).
665.10+x[&] *10*			C	
666.28 *7*	(1⁺)		A C	Jπ: log *ft*=5.5 (allowed β transition) from 0⁺.
713.03 *10*	(0⁻,1,2⁻)[#]		A	Jπ: 165.3γ to 1⁺.
726.48[@] *14*	(6⁻)	51 ps *10*	CDEF	Jπ: 129.7γ to (5)⁻, 230.4γ to 4⁻; possible band member. $T_{1/2}$: from 2017Is03 in ^{235}U,^{241}Pu(n,Fγ), presumably from fast-timing γγ(t) method.
798.80+x[&] *15*			C	
824.40 *6*	(0⁻,1,2⁻)[#]		A	Jπ: 224.1γ to 1⁺.
869.47 *24*			C	
884.49[@] *15*	(7⁻)	45 ps *15*	CDEF	Jπ: 158.0γ to (6⁻), 287.8γ to (5)⁻; possible band member. $T_{1/2}$: from 2017Is03 in ^{235}U,^{241}Pu(n,Fγ), presumably from fast-timing γγ(t) method.
908.41 *15*	(0⁻,1,2⁻)[#]		A	Jπ: 308.3γ to 1⁺.
964.30+x[&] *18*			C	
972.17 *20*	(8⁺)	0.45 μs *15*	C E	%IT=100 Jπ: Interpreted by 2017Ur03 as a spherical state with configuration=$\nu g_{7/2}\otimes\pi g_{9/2}$. $T_{1/2}$: from decay curve for summed gates on 228.6-54.7-313.9 cascade (2017Ur03) in ^{235}U(n,Fγ):delayed γ.
986.39 *6*	1⁺		A	Jπ: log *ft*=5.1 from 0⁺.
1053.07 *24*	(6⁻,7⁻)		C	Jπ: proposed by 2017Ur03 in SF decay.
1070.70[@] *15*	(8⁻)	<15 ps	CDEF	Jπ: 186.2γ to (7⁻), 344.2γ to (6⁻); possible band member. $T_{1/2}$: from 2017Is03 in ^{235}U,^{241}Pu(n,Fγ), presumably from fast-timing γγ(t) method.
1163.30+x[&] *20*			C	
1181.50[a] *18*	(10⁻)	0.78 μs *3*	CDEF	%IT=100 Jπ: 110.8γ E2 to (8⁻), band member. $T_{1/2}$: from γ(t). Unweighted average of 0.72 μs *2* (2017Ur03 in ^{235}U(n,Fγ):delayed γ), 0.80 μs *2* (2013RuZX) and 0.83 μs *10* (1972GrYM,1970Gr38) in ^{235}U,^{241}Pu(n,Fγ)).
1199.70 *9*	(1⁺)		A	Jπ: log *ft*=5.6 (allowed β transition) from 0⁺; 599.2γ and 651.9γ to 1⁺, 1080.3γ to 1⁻;
1291.76[@] *16*	(9⁻)		C F	Jπ: 221.0γ to (8⁻), 407.3γ to (7⁻); probable band member.
1348.50 *11*	(0⁻,1,2⁻)[#]		A	
1386.8+x[&] *3*			C	
1464.45 *15*	(0⁻,1,2⁻)[#]		A	
1532.68[@] *17*	(10⁻)		C F	Jπ: 240.9γ to (9⁻) and 462.0γ to (8⁻); probable band member.
1631.5+x[&] *4*			C	
1679.2 *4*			C	
1680.07 *15*	(0⁻,1,2⁻)[#]		A	
1842.93[@] *21*	(11⁻)		C F	Jπ: 310.3γ to (10⁻), 551.1γ to (9⁻); probable band member.
1896.8+x[&] *4*			C	
1898.57 *17*	(0⁻,1,2⁻)[#]		A	
1945.1 *4*			C	
2100.65[@] *23*	(12⁻)		C F	Jπ: 257.7γ to (11⁻), 568.0γ to (10⁻); probable band member.
2178.0+x[&] *5*			C	

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Adopted Levels, Gammas (continued)

^{98}Y Levels (continued)

E(level)[†]	XREF
2366.0[a] 3	C
3165.0[a] 4	C

[†] From least-squares fit to Eγ data, unless noted otherwise. Reduced χ^2=1.4 is below the critical χ^2 at 95% confidence level, with no significant deviations of experimental γ-energies with the fitted values.

[‡] For high-spin datasets such as SF decays, (n,Fγ), etc., ascending spins are assumed due to yrast pattern of population of levels.

[#] 0^-,1,2^- from possible β feeding (allowed, first-forbidden or first-forbidden unique) from 0^+ parent. Additional supporting comments from γ decays are given for some of the levels.

[@] Band(A): $\pi g_{9/2}\otimes\nu h_{11/2}$, $K^\pi=4^-$, prolate. Proposed configuration=π5/2[422]⊗ν3/2[541] for 4^- to 10^- states, and dominant π5/2[422]⊗ν1/2[550] for 11^- and 12^- states (2016Ra07).

[&] Band(B): $\pi g_{9/2}\otimes\nu h_{11/2}$, deformed. Band assignment from SF decay (2017Ur03).

[a] Band(C): $\pi g_{9/2}\otimes\nu h_{11/2}$, spherical. Intensity of this band is about 1/3 of that of the band based on 496.1 level. Band assignment from SF decay (2017Ur03).

Adopted Levels, Gammas (continued)

$\gamma(^{98}Y)$

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[‡]	δ[#]	α[@]	Comments
119.353	1^-	119.353 *3*	100	0.0	0^-	M1		0.1115	B(M1)(W.u.)=0.083 *+47−22* α(K)=0.0980 *14*; α(L)=0.01126 *16*; α(M)=0.00193 *3* α(N)=0.000258 *4*; α(O)=1.763×10^{-5} *25* E_γ: from ^{98}Sr β^- decay. Values from other reactions and decays are in agreement but much less precise. Mult.: also supported by δ(Q/D)=0.0 *2* from $\gamma\gamma(\theta)$ in SF decay (2017Ur03).
170.78	2^-	51.5 *1*	17.1 *9*	119.353	1^-	M1+E2	0.26 *+7−8*	1.9 *4*	B(M1)(W.u.)=2.49×10^{-5} *+35−32*; B(E2)(W.u.)=0.61 *+44−34* α(K)=1.5 *3*; α(L)=0.28 *9*; α(M)=0.048 *15* α(N)=0.0059 *18*; α(O)=0.00025 *4* I_γ: from ^{235}U(n,Fγ):delayed γ. Other values are in agreement but less precise.
		170.8 *1*	100 *3*	0.0	0^-	E2		0.1507	B(E2)(W.u.)=0.140 *9* α(K)=0.1296 *19*; α(L)=0.0177 *3*; α(M)=0.00302 *5* α(N)=0.000388 *6*; α(O)=2.05×10^{-5} *3* I_γ: from ^{235}U(n,Fγ):delayed γ. Other values are in agreement but less precise.
358.13	$(1,2^-)$	187.1 *2*	100 *25*	170.78	2^-	[D,E2]		0.06 *4*	
		238.8 *1*	75 *15*	119.353	1^-				
		357.9 *2*	12.5 *25*	0.0	0^-				
374.97	4^-	204.3 *1*	100	170.78	2^-	E2		0.0789	B(E2)(W.u.)=1.560 *+28−27* α(K)=0.0683 *10*; α(L)=0.00890 *13*; α(M)=0.001522 *22* α(N)=0.000197 *3*; α(O)=1.100×10^{-5} *16* Mult.: α(K)exp in ^{235}U,^{241}Pu(n,Fγ) with δ(E2/M1)>2.0 (2004Br14).
446.07	$(3)^+$	71.3 *2*	4.9 *20*	374.97	4^-	(E1)		0.289 *5*	α(K)=0.255 *5*; α(L)=0.0289 *5*; α(M)=0.00490 *8* α(N)=0.000639 *11*; α(O)=3.89×10^{-5} *7* I_γ: unweighted average of 6.9 *17* in ^{235}U,^{241}Pu(n,Fγ) and 2.9 *12* in ^{235}U(n,Fγ):delayed γ. Mult.: α(K)exp in 2004Br14 gives M1+E2 with δ=0.7 *4* to 374, 4^- level but it contradicts to 49.9γ E1 from 495, 4^- level; E1+M2 with δ=0.5 *2*, but it would require an unreasonably large B(M2)(W.u.) exceeding RUL=1. So it is most probable that 71.3γ is pure E1, by combining all considerations. Note that 71.3γ is very weak (the weakest transition in 2004Br14 and 2017Ur03 also states that this transition is too weak to determine its conversion in their data including ^{235}U(n,fγ), ^{248}Cm,^{248}Cf SF decay, and ^{98}Sr β^- decay.
		275.2 *1*	100 *6*	170.78	2^-	[E1]		0.0058	
496.10	$(4)^-$	49.9 *2*	4.5 *6*	446.07	$(3)^+$	E1		0.811 *15*	B(E1)(W.u.)=1.21×10^{-8} *+23−21* α(K)=0.712 *13*; α(L)=0.0830 *16*; α(M)=0.0140 *3* α(N)=0.00181 *4*; α(O)=0.0001042 *19*

Adopted Levels, Gammas (continued)

γ(^{98}Y) (continued)

E_i(level)	J_i^π	E_γ †	I_γ †	E_f	J_f^π	Mult. ‡	δ #	α @	Comments
									I_γ: weighted average of 3.8 *9* in ^{235}U,^{241}Pu(n,Fγ) and 4.9 *7* in ^{235}U(n,Fγ):delayed γ.
496.10	(4)$^-$	121.2 *1*	100 *3*	374.97	4$^-$	M1+E2	−0.8 *2*	0.27 *6*	B(M1)(W.u.)=7.9×10^{-7} *+19−16*; B(E2)(W.u.)=0.033 *11* α(K)=0.23 *5*; α(L)=0.033 *8*; α(M)=0.0057 *13* α(N)=0.00073 *16*; α(O)=3.7×10^{-5} *7* Mult.,δ: from γγ(θ) in SF decay (2017Ur03), and RUL; (M1) from α(K)exp in ^{235}U,^{241}Pu(n,Fγ) (2004Br14).
		325.2 *2*	2.8 *10*	170.78	2$^-$	[E2]		0.01555	α(K)=0.01360 *20*; α(L)=0.001637 *24*; α(M)=0.000280 *4* α(N)=3.68×10^{-5} *6*; α(O)=2.27×10^{-6} *4* B(E2)(W.u.)=1.7×10^{-5} *7*
547.86	1$^+$	189.7 *1*	1.01 *14*	358.13	(1,2$^-$)	[D,E2]		0.06 *4*	
		428.6 *1*	100 *4*	119.353	1$^-$	E1			Mult.: α(K)exp in β$^-$ decay (2002PfZZ,1988MaYY).
		547.9 *1*	7.9 *3*	0.0	0$^-$	[E1]			
563.999	(1$^-$,2$^-$)	393.3 *1*	3.0 *8*	170.78	2$^-$				
		444.628 *20*	100 *4*	119.353	1$^-$	M1(+E2)	<0.9		Mult.,δ: from α(K)exp in β$^-$ decay (2002PfZZ,1988MaYY). Other: δ(Q/D)=−0.04 *6*, +0.2 *2*, +0.04 *2*, +0.4 *2* from γγ(θ) in SF decay (2017Ur03).
		564.0 *1*	22.2 *10*	0.0	0$^-$	M1,E2			Mult.: α(K)exp in β$^-$ decay (2002PfZZ,1988MaYY).
564.0+x	(3$^-$,4$^-$)	x		563.999	(1$^-$,2$^-$)				2017Ur03 discuss a 26.3-keV γ line seen in the decay of ^{98}Sr in connection with the decay of the 564.0+x level, but did not conclude anything due to spin mismatches.
595.78	(1,2$^-$)	237.7 *2*	53 *27*	358.13	(1,2$^-$)				
		476.7 *1*	100 *5*	119.353	1$^-$				
596.73	(5)$^-$	100.6 *1*	100	496.10	(4)$^-$	M1(+E2)	<0.15	0.188 *10*	α(K)=0.165 *9*; α(L)=0.0195 *15*; α(M)=0.00334 *25* α(N)=0.00044 *3*; α(O)=2.93×10^{-5} *12* B(M1)(W.u.)=0.102 *+20−13*
600.30	1$^+$	36.2 *1*	100 *21*	563.999	(1$^-$,2$^-$)	E1		2.02 *4*	B(E1)(W.u.)=1.64×10^{-4} *+45−39* α(K)=1.76 *3*; α(L)=0.213 *4*; α(M)=0.0359 *6* α(N)=0.00457 *8*; α(O)=0.000247 *4* Mult.: α(K)exp and α(total)exp in β$^-$ decay (2017Ur03,2002PfZZ,1987Ma58).
		52.4 *1*	36 *4*	547.86	1$^+$	M1+E2	0.43 *10*	2.7 *7*	B(M1)(W.u.)=0.0011 *+6−4*; B(E2)(W.u.)=8×10^{1} *+7−4* α(K)=2.1 *5*; α(L)=0.47 *15*; α(M)=0.081 *25* α(N)=0.010 *3*; α(O)=0.00032 *6* Mult.,δ: α(total)exp in β$^-$ decay (2017Ur03). Other: δ(E2/M1)>0.22 from α(K)exp and α(total)exp in β$^-$ (2002PfZZ,1987Ma58).
		429.6 *1*	18 *3*	170.78	2$^-$	[E1]		0.0018	B(E1)(W.u.)=1.8×10^{-8} *+10−6*
		481.1 *1*	71 *7*	119.353	1$^-$	E1			B(E1)(W.u.)=5.0×10^{-8} *+21−14* Mult.: α(K)exp in β$^-$ decay (2002PfZZ,1988MaYY).
		600.2 *1*	20 *3*	0.0	0$^-$	[E1]			B(E1)(W.u.)=7.2×10^{-9} *+37−24*
601.92	(0,1,2)	243.7 *2*	100 *50*	358.13	(1,2$^-$)				
		482.7 *2*	100 *50*	119.353	1$^-$				

$^{98}_{39}Y_{59}$-6

Adopted Levels, Gammas (continued)

γ(^{98}Y) (continued)

E_i(level)	J_i^π	E_γ [†]	I_γ [†]	E_f	J_f^π	Mult.[‡]	δ[#]	α[@]	Comments
603.57	(5⁻,6⁻)	228.6 *1*	100	374.97	4⁻				δ(Q/D)=+0.31 *5*, +2.5 *3*, 0.0 from γγ(θ) in SF decay (2017Ur03).
615.17	(2⁻,3⁺)	240.2 *1*	100	374.97	4⁻				
658.27	(6⁻,7⁻)	54.7 *1*	100	603.57	(5⁻,6⁻)	M1+E2	0.25 *+5−6*	1.50 *21*	α(K)=1.24 *15*; α(L)=0.21 *5*; α(M)=0.037 *8* α(N)=0.0046 *10*; α(O)=0.000206 *20* Mult.,δ: α(total)exp in SF decay (2017Ur03).
665.10+x		101.1 *1*	100	564.0+x	(3⁻,4⁻)				
666.28	(1⁺)	51.1 *2*	37 *19*	615.17	(2⁻,3⁺)				
		66.0 *1*	100 *8*	600.30	1⁺	D		0.5 *1*	Mult.,δ: α(total)exp=0.3 *1* in β⁻ decay (2017Ur03). Other: δ(E2/M1)=0.53 *16* from α(total)exp=1.5 *7* in 2002PfZZ.
		102.3 *1*	10.0 *19*	563.999	(1⁻,2⁻)	[E1]		0.1006	α(K)=0.0887 *13*; α(L)=0.00992 *15*; α(M)=0.001682 *24* α(N)=0.000222 *4*; α(O)=1.402×10⁻⁵ *20*
713.03	(0⁻,1,2⁻)	165.3 *1*	100	547.86	1⁺	[D,E2]		0.10 *8*	
726.48	(6⁻)	129.7 *1*	100.0 *18*	596.73	(5)⁻	[M1]		0.0889	α(K)=0.0782 *11*; α(L)=0.00896 *13*; α(M)=0.001535 *22* α(N)=0.000206 *3*; α(O)=1.406×10⁻⁵ *20* B(M1)(W.u.)=0.170 *+43−29*
		230.4 *1*	7.2 *4*	496.10	(4)⁻	[E2]		0.0514	α(K)=0.0446 *7*; α(L)=0.00567 *8*; α(M)=0.000970 *14* α(N)=0.0001260 *18*; α(O)=7.27×10⁻⁶ *11* B(E2)(W.u.)=39 *+13−9*
798.80+x		133.7 *1*	100	665.10+x					
824.40	(0⁻,1,2⁻)	158.5[&] *3*	6.4 *36*	666.28	(1⁺)				
		222.5 *1*	29 *7*	601.92	(0,1,2)				
		224.1 *1*	26 *4*	600.30	1⁺				
		228.9 *1*	36 *7*	595.78	(1,2⁻)				
		260.3 *1*	100 *7*	563.999	(1⁻,2⁻)				
869.47		265.9 *2*	100	603.57	(5⁻,6⁻)				
884.49	(7⁻)	158.0 *1*	100.0 *7*	726.48	(6⁻)	[M1]		0.0523	α(K)=0.0460 *7*; α(L)=0.00525 *8*; α(M)=0.000898 *13* α(N)=0.0001204 *17*; α(O)=8.26×10⁻⁶ *12* B(M1)(W.u.)=0.095 *+49−25*
		287.8 *1*	24.6 *10*	596.73	(5)⁻	[E2]		0.0236	α(K)=0.0206 *3*; α(L)=0.00252 *4*; α(M)=0.000431 *6* α(N)=5.64×10⁻⁵ *8*; α(O)=3.41×10⁻⁶ *5* B(E2)(W.u.)=45 *+25−13*
908.41	(0⁻,1,2⁻)	306.3 *2*	31 *16*	601.92	(0,1,2)				
		308.3 *2*	100 *19*	600.30	1⁺				
		343.8[&] *2*	36 *14*	563.999	(1⁻,2⁻)				
964.30+x		165.5 *1*	100 *10*	798.80+x					
		299[&]		665.10+x					
972.17	(8⁺)	313.9 *1*	100	658.27	(6⁻,7⁻)				
986.39	1⁺	162.2 *1*	33 *5*	824.40	(0⁻,1,2⁻)	[D,E2]		0.11 *8*	
		320.1 *1*	49 *5*	666.28	(1⁺)				
		384.5 *1*	13 *5*	601.92	(0,1,2)				
		386.0 *1*	100 *5*	600.30	1⁺				

$^{98}_{39}Y_{59}$-7

Adopted Levels, Gammas (continued)

γ(^{98}Y) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[‡]	α[@]	Comments
986.39	1+	422.3 *1*	17.9 *13*	563.999	(1−,2−)			
		986.1 *2*	17.9 *21*	0.0	0−			
1053.07	(6−,7−)	449.5 *2*	100	603.57	(5−,6−)			
1070.70	(8−)	186.2 *1*	100.0 *13*	884.49	(7−)	[M1+E2]	0.07 *4*	α(K)=0.06 *4*; α(L)=0.008 *5*; α(M)=0.0014 *8* α(N)=0.00018 *10*; α(O)=1.0×10^{-5} *5*
		344.2 *1*	28.8 *5*	726.48	(6−)	[E2]	0.01286	α(K)=0.01125 *16*; α(L)=0.001345 *19*; α(M)=0.000230 *4* α(N)=3.03×10^{-5} *5*; α(O)=1.89×10^{-6} *3*
1163.30+x		199.0 *1*	100 *16*	964.30+x				
		364[&]		798.80+x				
1181.50	(10−)	110.8 *1*	100	1070.70	(8−)	E2	0.732	B(E2)(W.u.)=0.935 *+48−44* α(K)=0.614 *9*; α(L)=0.0985 *15*; α(M)=0.01692 *25* α(N)=0.00211 *3*; α(O)=9.25×10^{-5} *14*
1199.70	(1+)	599.2 *2*	15 *4*	600.30	1+			
		651.9 *1*	51 *4*	547.86	1+			
		1080.3 *2*	100 *8*	119.353	1−			
1291.76	(9−)	221.0 *1*	100 *9*	1070.70	(8−)			
		407.3 *1*	62 *6*	884.49	(7−)			
1348.50	(0−,1,2−)	635.6 *1*	100 *11*	713.03	(0−,1,2−)			
		800.3 *2*	70 *14*	547.86	1+			
		990.2 *2*	34 *7*	358.13	(1,2−)			
1386.8+x		223.5 *2*	100 *14*	1163.30+x				
		422.6[&] *2*	23 *9*	964.30+x				
1464.45	(0−,1,2−)	798.3 *2*	96 *16*	666.28	(1+)			
		864.0 *2*	100 *20*	600.30	1+			
1532.68	(10−)	240.9 *1*	100 *9*	1291.76	(9−)			
		462.0 *1*	53 *6*	1070.70	(8−)			
1631.5+x		244.7 *2*	100	1386.8+x				
1679.2		707.0 *3*	100	972.17	(8+)			
1680.07	(0−,1,2−)	1132.4 *2*	62 *18*	547.86	1+			
		1560.5 *2*	100 *15*	119.353	1−			
1842.93	(11−)	310.3 *2*	89 *17*	1532.68	(10−)			
		551.1 *2*	100 *17*	1291.76	(9−)			
1896.8+x		265.3 *2*	100	1631.5+x				
1898.57	(0−,1,2−)	1298.5 *2*	67 *22*	600.30	1+			
		1334.0 *3*	100 *19*	563.999	(1−,2−)			
1945.1		763.6 *3*	100	1181.50	(10−)			
2100.65	(12−)	257.7 *2*	67 *13*	1842.93	(11−)			
		568.0 *2*	100 *20*	1532.68	(10−)			
2178.0+x		281.2 *3*	100	1896.8+x				
2366.0		1184.5 *2*	100	1181.50	(10−)			
3165.0		799.0 *3*	100	2366.0				

Adopted Levels, Gammas (continued)

$\gamma(^{98}Y)$ (continued)

† For low-spin (J<3), values are from ^{98}Sr β^- decay (2017Ur03). For levels of J≥3, values with uncertainties are available from three datasets: ^{248}Cm SF decay,^{252}Cf SF decay (2017Ur03); $^{235}U(n,F\gamma)$,$^{241}Pu(n,F\gamma)$ (2004Br14); and $^{235}U(n,F\gamma)$:delayed γ (2017Ur03). Most of the values are from 2017Ur03, as these are the most precise values available. Exceptions are noted.

‡ From α(total)exp or α(K)exp data (2004Br14) in ^{235}U,$^{241}Pu(n,F\gamma)$ and/or α(total)exp data in $^{235}U(n,F\gamma)$:delayed γ, unless otherwise noted.

If multipolarity is based on α(total)exp or α(K)exp data, value is generally deduced by evaluators from BrIccMixing code, unless otherwise noted.

@ Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

& Placement of transition in the level scheme is uncertain.

$^{98}_{39}Y_{59}$-9

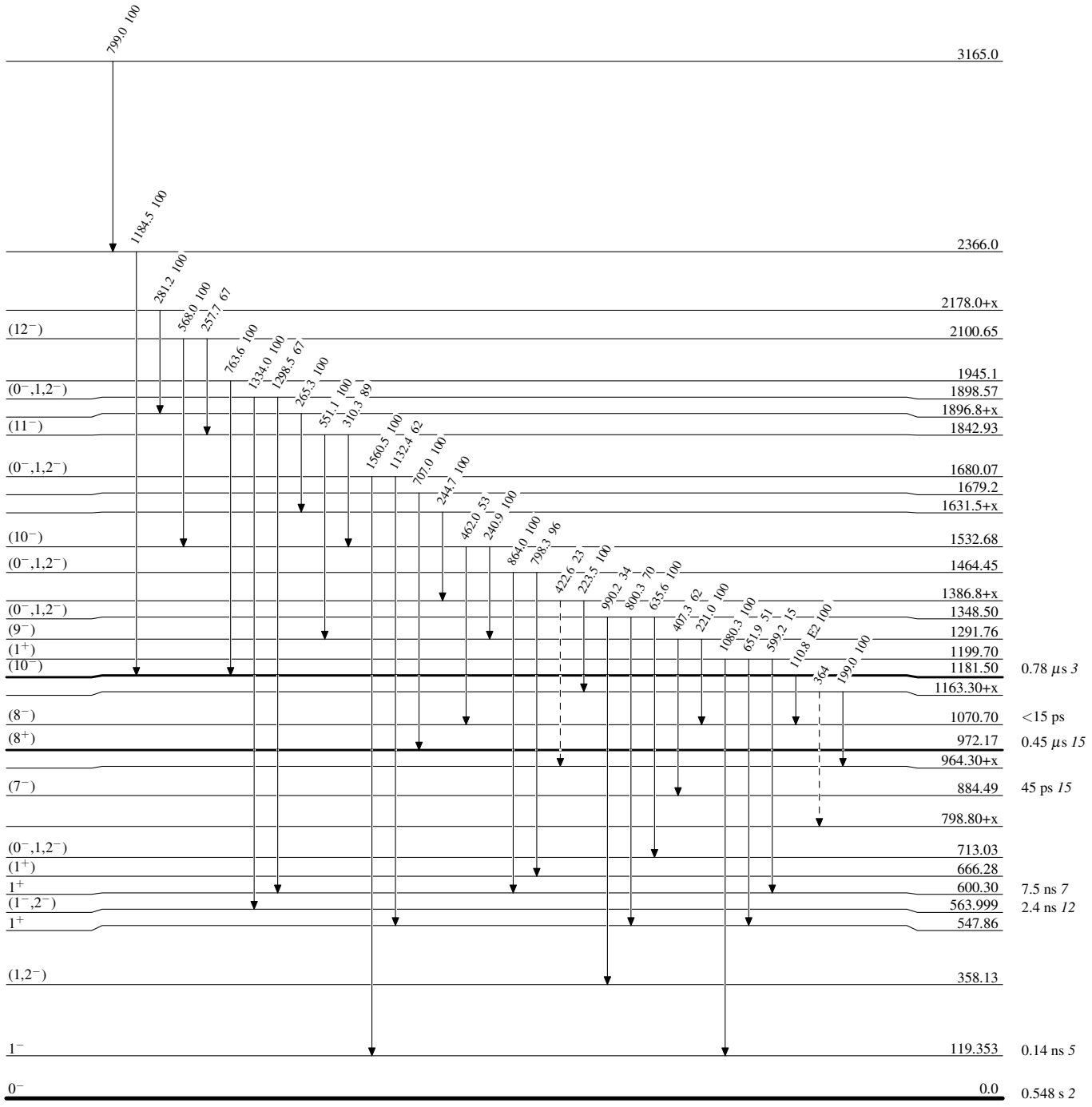
Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level

γ Decay (Uncertain)



$^{98}_{39}Y_{59}$

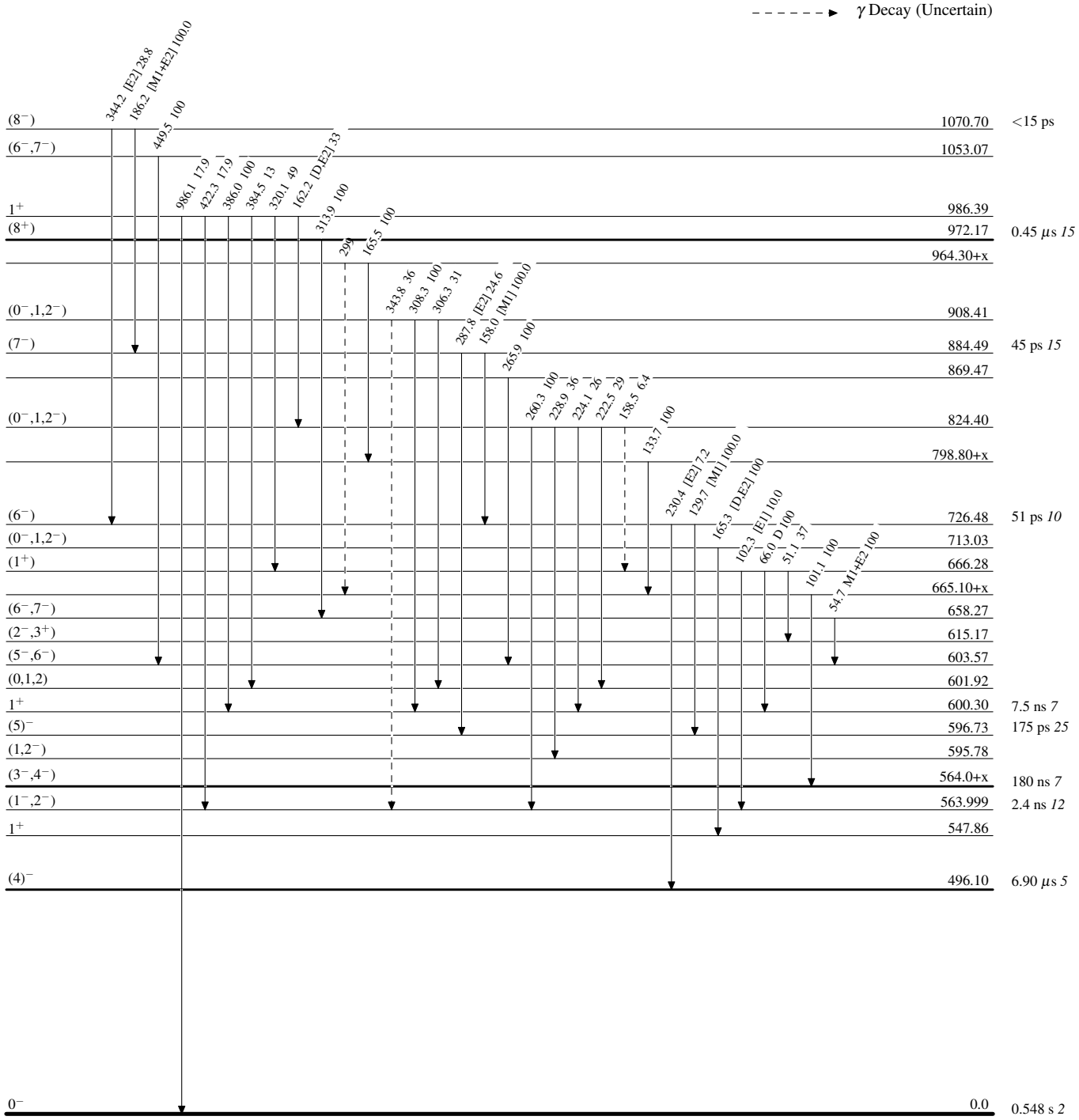
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

γ Decay (Uncertain)

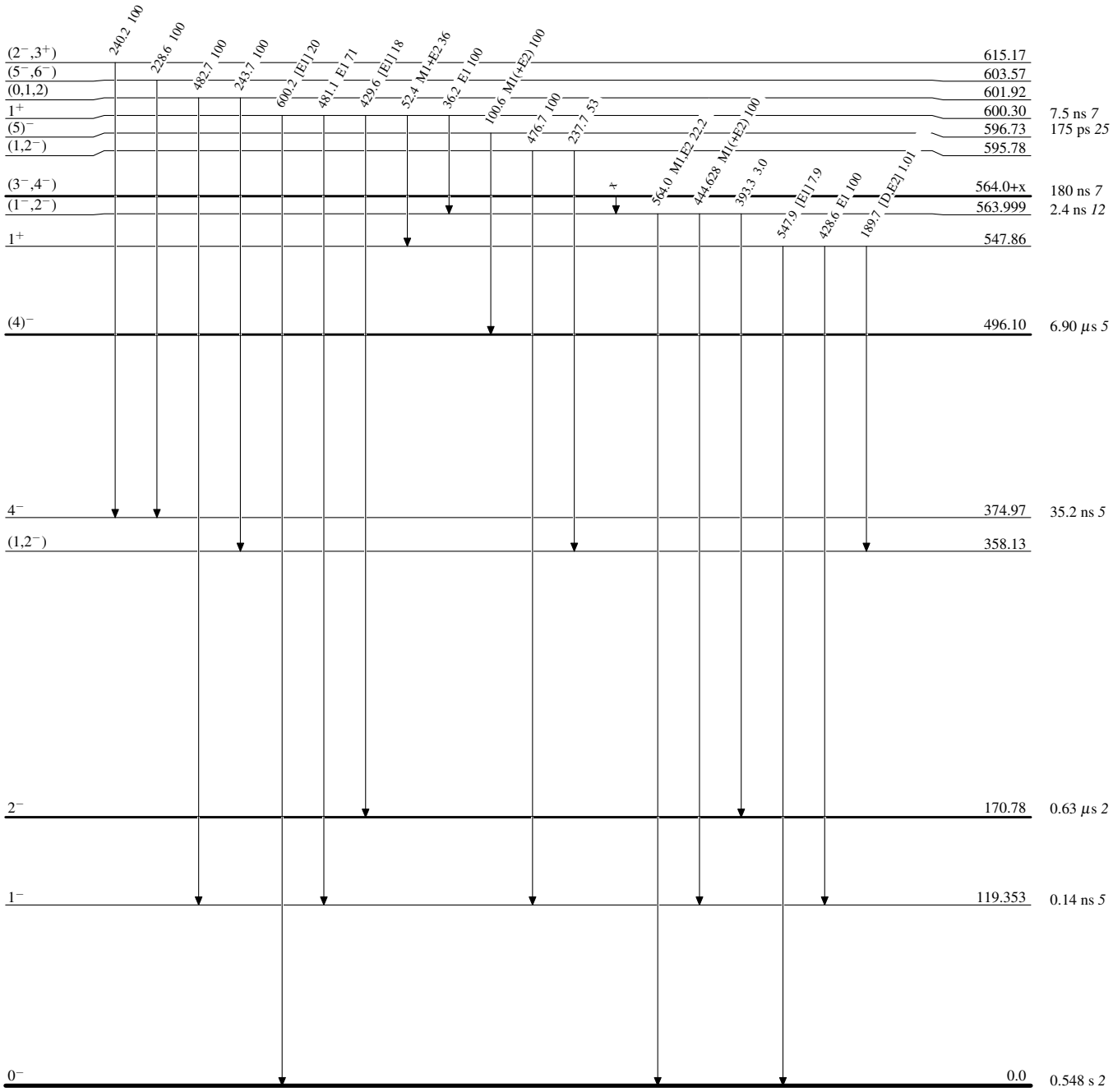


$^{98}_{39}Y_{59}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

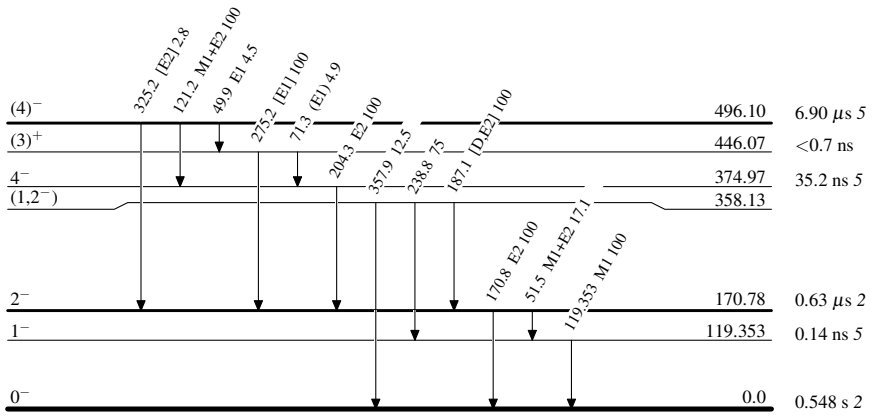


$^{98}_{39}Y_{59}$

Adopted Levels, Gammas

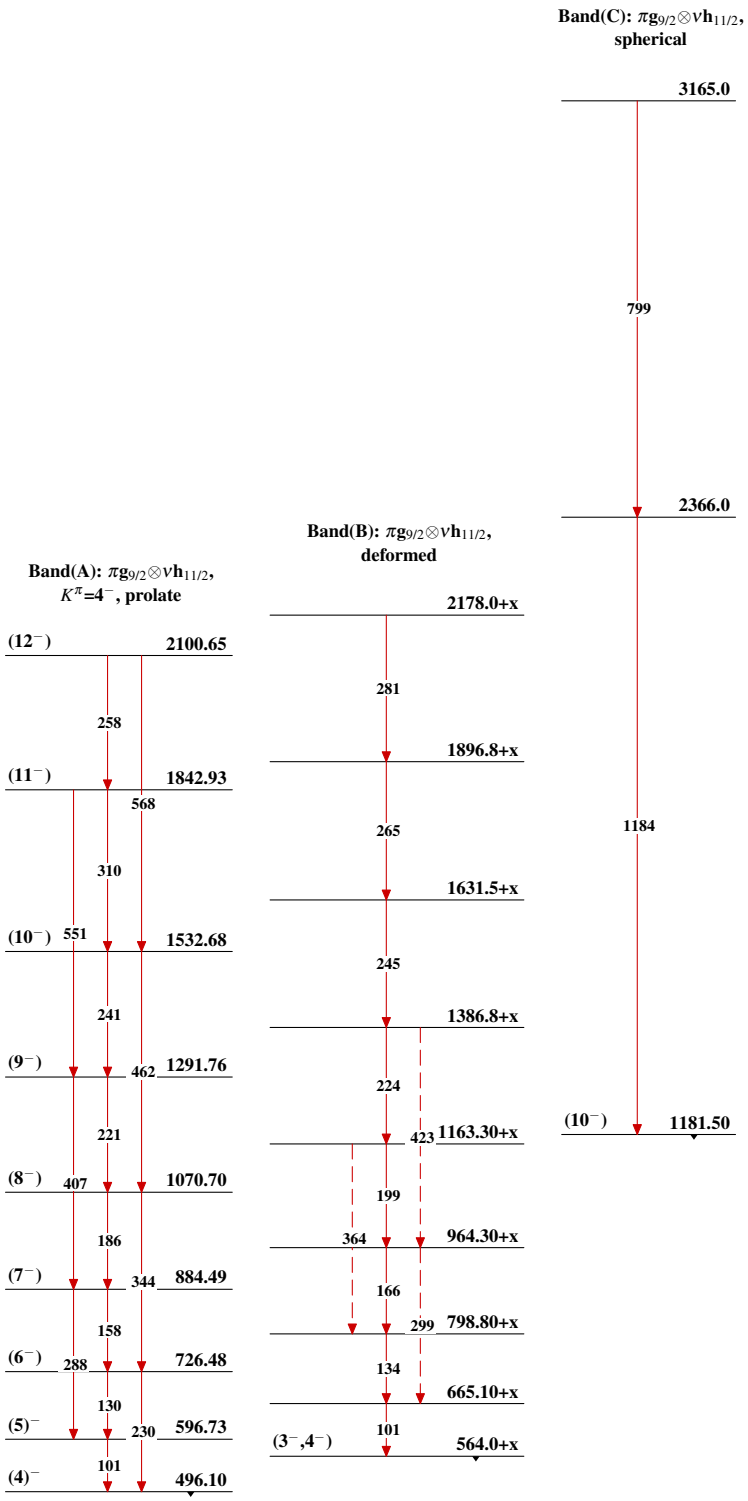
Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{98}_{39}Y_{59}$

Adopted Levels, Gammas



$^{98}_{39}Y_{59}$