^{98}Y β^- decay (0.548 s) 2017Ur03,1984Be50,1977Si05

History

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

Parent: ^{98}Y: E=0.0; $J^\pi=0^-$; $T_{1/2}$=0.548 s *2*; Q(β^-)=8992 *12*; %β^- decay=100.0

^{98}Y-J^π,$T_{1/2}$: From ^{98}Y Adopted Levels.

^{98}Y-Q(β^-): From 2017Wa10.

2017Ur03: ^{98}Y source obtained as a fission fragment and using Lohengrin separator. Measured Eγ, Iγ, $\beta\gamma$-coin, $\gamma\gamma$-coin using two clover Ge detectors for γ detection and three β detectors. The A=98 ions were deposited on a tape whose movement was correlated with the beam ON and beam OFF cycles. Deduced levels, J^π, multipolarities, β feedings. Angular correlation measurements were made in the study of prompt γ rays from ^{235}U(n,Fγ) and ^{252}Cf SF decay. Polarization measurements for three γ-ray cascades were also made in ^{235}U(n,Fγ). See these two datasets for data from Table IX in 2017Ur03.

1984Be50: measured Eγ, Iγ, $\gamma\gamma$-coin, $\gamma\gamma(\theta)$ using OSTIS separator at Grenoble. Only a decay scheme is given, with no uncertainties for Eγ and Iγ values. No β feedings were deduced in this work.

1977Si05: measured Eγ, Iγ, $\gamma\gamma$-coin, β, $\beta\gamma$-coin, (ce)γ(t). Two independent measurements of Eγ and Iγ were made, one using JOSEF separator at Julich and the other LOHENGRIN at Grenoble. Separate Eγ and Iγ data, as well as averages of the two were reported by 1977Si05.

2010Be30: A=98 nuclei produced by thermal neutron-induced fission out of a 400 μg/cm^2 ^{235}U target and selected by the Lohengrin mass separator at the high-flux reactor of the Institut Laue-Langevin in Grenoble, France. Detector array of a thin plastic scintillator, a $LaBr_3$(Ce) scintillation detector (LaBr) and a high-purity germanium clover detector (HPGe). Measured $\beta\gamma\gamma$-timing, lifetimes of both yrast and non-yrast states.

Others:

γ: 1987Ma58, 1979Bo26.

ce: 1975Kh05, 1982Ka03, 1983VaZJ, 1983VaZQ, 1984VeZU, 1985HaZH, 1994Lh01.

β, $\beta\gamma$-coin: 1988MaYY, 1983MaYZ, 1979Pe17, 1978St02.

Additional information 1.

$\beta\gamma$(t), $\beta\gamma\gamma$(t): 1989Ma38, 1982Ka03.

Q(β^-) data: 8840 *55* (1988GrZX,1978St02), 8780 *30* (1984BlZN), 8965 *40* (1983MaYZ), 8963 *41* (1988MaYY).

$T_{1/2}$(^{98}Y): 1986Wa17, 1983Re10, 1983En03, 1982Ga24, 1971Tr02.

^{98}Zr Levels

Level scheme is based on the works of 1977Si05 and 1984Be50, and extended significantly by 2017Ur03.

Previously proposed levels at 2047.8, 2478.9, 2796.8 and 3507.0 keV in 1984Be50, and γ rays from these levels have not been confirmed by 2017Ur03, and have been omitted here, while the γ rays are included as unplaced.

E(level)[†]	J^π[‡]	$T_{1/2}$	Comments
0.0	0^+	30.7 s *4*	$T_{1/2}$: from the Adopted Levels.
854.06 *6*	0^+	64 ns *7*	$T_{1/2}$: from the Adopted Levels. Measurements in this dataset: 63 ns *7* from (ce)γ(t) (1977Si05), weighted average of five values: 65 ns *15* for 269γ, 62 ns *15* for 369γ, 70 ns *15* for 737γ, 63 ns *15* for 890γ, and 54 ns *15* for 3310γ.
1222.91 *6*	2^+	2.63 ps *55*	$T_{1/2}$: from the Adopted Levels. Measurements in this dataset: <11 ps ($\beta\gamma$(t), 2010Be30), ≤21 ps ($\beta\gamma$(t),1989Ma38), <0.2 ns ($\beta\gamma$(t),1982Ka03).
1436.16 *7*	0^+	0.72 ns *8*	J^π: $\gamma\gamma(\theta)$ (1984Be50,1982Ka03). $T_{1/2}$: 0.72 ns *8* from $\beta\gamma$(t); unweighted average of 0.611 ns *33* (2010Be30), 0.865 ns *42* (1989Ma38), and 0.69 ns *10* (1982Ka03). Weighted average is 0.71 ns *9*, but reduced χ^2=11 is too large. Value is the same in the Adopted Levels.
1590.78 *6*	2^+		
1744.61 *6*	2^+		
1806.20 *10*	3^-		Population of 2778.7 level requires 1806 level, although not listed in Table VII of 2017Ur03. The level was known earlier from 1984Be50.
1859.37 *7*	0^+	0.290 ns *13*	J^π: $\gamma\gamma(\theta)$ (1984Be50,1982Ka03). $T_{1/2}$: $\beta\gamma$(t); weighted average of 0.318 ns *27* (2010Be30), 0.283 ns *15* (1989Ma38), 0.24 ns

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^{98}Y β^- decay (0.548 s) 2017Ur03,1984Be50,1977Si05 (continued)

^{98}Zr Levels (continued)

E(level)[†]	J$^\pi$[‡]	Comments
		10 (1982Ka03). Same value in the Adopted Levels.
2225.15 *8*	(2$^+$)	E(level): level proposed by 2017Ur03.
2778.71 *7*	(2$^+$)	E(level): level proposed by 2017Ur03.
3065.61 *15*	(1)	
4108.67 *13*	(1)	E(level): level proposed by 2017Ur03.
4165.18 *6*	1$^-$	
4271.11 *6*	1$^-$	E(level): level proposed by 2017Ur03.
4399.07 *12*	1$^-$	E(level): level proposed by 2017Ur03.
4452.58 *9*	1$^-$	
4492.35 *15*	1$^-$	E(level): level proposed by 2017Ur03.
6415+x		E(level): x<2577 *15* from Q(β^-)(^{98}Y g.s.)-S(n)(^{98}Zr), where Q(β^-)=8992 *12* for ^{98}Y g.s. decay, and S(n)=6415 *8*.

[†] From least-squares fit to Eγ data.
[‡] From the Adopted Levels.

β^- radiations

E(decay)	E(level)	Iβ^-[†#]	Log *ft*[‡]	Comments
(1.3×10^3[&] *13*)	6415+x	0.33 *3*		Iβ^-: from %β^-n=0.33 *3* for decay of ^{98}Y g.s.
(4500 *12*)	4492.35	2.29 *24*	5.3 *1*	av Eβ=1980.5 *58*
(4539 *12*)	4452.58	14.2 *15*	4.5 *1*	av Eβ=1999.6 *58* E(decay): 4430 *62* from (4450γ)(4430β), 4483 *88* from (3228γ)(β) (1988MaYY).
(4593 *12*)	4399.07	2.9 *4*	5.3 *1*	av Eβ=2025.2 *58*
(4721 *12*)	4271.11	4.0 *5*	5.2 *1*	av Eβ=2086.7 *58*
(4827 *12*)	4165.18	37 *4*	4.3 *1*	av Eβ=2137.8 *58* 4810 *100* from β(2941γ)-coin (1979Pe17), 4820 *45* (1988MaYY), 4854 *62* (β(3310γ)-coin (1988MaYY)).
(4883 *12*)	4108.67	1.04 *17*	5.8 *1*	av Eβ=2164.7 *58*
(5926 *12*)	3065.61	1.09 *16*	6.2 *1*	av Eβ=2667.0 *58*
(6213[@] *12*)	2778.71	<0.27	>8.9[1u]	av Eβ=2796.1 *58*
(7133 *12*)	1859.37	11.1 *12*	5.6 *1*	av Eβ=3247.1 *58* Log *ft*: value is low for 0$^-$ to 0$^+$ transition. For expected log *ft*>5.9 for first-forbidden transitions, Iβ≤5%, suggesting that intensities of 268.7γ and/or 636.5γ may be overestimated by few percent. 7049 *46* from (268γ)(7049β)-coin (1988MaYY).
(7247 *12*)	1744.61	3.0 *4*	8.3[1u] *1*	log *ft* value is lower than expected value of >8.5 for first-forbidden unique transitions. 4648 *64* from (1744γ)(4648β)-coin (1988MaYY).
(7401[@] *12*)	1590.78	<0.3	>9.5[1u]	av Eβ=3369.0 *58* 6605 *80* from (1591γ)(6605β-coin) (1988MaYY). Other: 1984BlZN.
(7556 *12*)	1436.16	5.5 *7*	6.0 *1*	av Eβ=3450.6 *58* 7437 *70* from (213γ)(7437β)-coin (1988MaYY).
(7769[@] *12*)	1222.91	<3.2	>8.4[1u]	av Eβ=3546.6 *58* 7250 *100* from (1223γ)(7248β)-coin (1988MaYY).
(8138[@] *12*)	854.06	<0.5	>7.2	av Eβ=3730.4 *58*
(8992 *12*)	0.0	18 *9*	5.8 *2*	av Eβ=4140.5 *58*

[†] Deduced by evaluators from γ+ce intensity balance.

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^{98}Y β^- decay (0.548 s) 2017Ur03,1984Be50,1977Si05 (continued)

β^- radiations (continued)

‡ Deduced by evaluators using LOGFT code.
# Absolute intensity per 100 decays.
@ Existence of this branch is questionable.
& Estimated for a range of levels.

^{98}Y β^- decay (0.548 s) 2017Ur03,1984Be50,1977Si05 (continued)

$\gamma(^{98}Zr)$

Iγ normalization: From Iγ(absolute)(1223γ)=36 *3* (1987Ma58) in the decay of ^{98}Y g.s.

E_γ [†]	I_γ [†c]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[a]	α[d]	Comments
152.7[‡e]	0.23[‡]	1744.61	2^+	1590.78	2^+	[M1+E2]	0.15 *9*	α(K)=0.13 *8*; α(L)=0.018 *12*; α(M)=0.0031 *20* α(N)=0.0004 *3*; α(O)=2.3×10^{-5} *12* Iγ=0.5 (1984Be50).
154.5[‡]	0.48[‡]	1590.78	2^+	1436.16	0^+	[E2]	0.228	α(K)=0.194 *3*; α(L)=0.0281 *4*; α(M)=0.00490 *7* α(N)=0.000661 *10*; α(O)=3.31×10^{-5} *5* Iγ=0.8 in 1984Be50.
213.2 *1*	14.6 *5*	1436.16	0^+	1222.91	2^+	E2	0.0714	α(K)=0.0617 *9*; α(L)=0.00815 *12*; α(M)=0.001418 *20* α(N)=0.000194 *3*; α(O)=1.087×10^{-5} *16* E_γ: 213.1 *1* from 1994Lh01. Precise Eγ=213.948 *22* (1979Bo26) from crystal spectrometer seems to be in error. Eγ=213.1 *2*, Iγ=12.0 *20* (1977Si05). Eγ=213.1, Iγ=11.3 (1984Be50). Mult.: (213γ)(1223γ)(θ): A_2=+0.36 *12*, A_4=+1.19 *19* (1984Be50), 1982Ka03.
(215.5 *2*)	0.044[&] *12*	1806.20	3^-	1590.78	2^+	[E1]	0.01222	α(K)=0.01078 *16*; α(L)=0.001199 *17*; α(M)=0.000207 *3* α(N)=2.91×10^{-5} *5*; α(O)=1.96×10^{-6} *3*
[x]241.5								γ with Iγ=5.6 in 1984Be50 placed from a 2047.8 level, based on γγ-coin, but 2048 level is populated only in the decay of 2.32-s isomer of ^{98}Y according to 2017Ur03 and 1977Si05, decaying by a 241.5γ.
268.7 *1*	22.6 *7*	1859.37	0^+	1590.78	2^+	E2	0.0316	α(K)=0.0275 *4*; α(L)=0.00347 *5*; α(M)=0.000603 *9* α(N)=8.32×10^{-5} *12*; α(O)=4.95×10^{-6} *7* Eγ=268.7, Iγ=18.6 (1984Be50). Eγ=268.6 *2*, Iγ=21.0 *20* (1977Si05). (269γ)(154γ)(θ): A_2=+0.50 *16*, A_4=+1.1 *3*; (269γ)(1591γ)(θ): A_2=+0.24 *21*, A_4=+1.03 *21* (1984Be50). (269γ)(737γ)(θ): A_2=+0.6 *3*, A_4=+1.5 *5* (1982Ka03).
[x]297.3[#]								Uncertain γ from only γγ-coin with 269γ and 213γ (1984Be50). This γ is not reported by 1977Si05 and 2017Ur03.
367.8 *1*	2.9 *2*	1590.78	2^+	1222.91	2^+	[M1+E2]		Eγ=367.5, Iγ=2.4 (1984Be50). Eγ=367.6 *2*, Iγ=2.0 *5* (1977Si05). I_γ: 3.1 *2* in 2017Ur03 (Table VII) is probably the total intensity from the two activities in ^{98}Y. Evaluators have subtracted 0.24 *3* units to account for contribution from the 2.32-s isomer decay obtained from intensity balance at 1591 level in ^{98}Y β^- decay (2.32 s).
368.8 *1*	1.74 *21*	1222.91	2^+	854.06	0^+	[E2]	0.0109	Eγ=368.5, Iγ=1.6 (1984Be50). Eγ=368.5 *2*, Iγ=1.5 *4* (1977Si05). I_γ: 2.5 *2* in 2017Ur03 (Table VII) is probably the total intensity from the two activities in ^{98}Y. Evaluators have subtracted 0.76 *7* units to account for contribution from the 2.32-s isomer decay obtained from intensity balance at 1223 level in ^{98}Y β^- decay (2.32 s).

$^{98}_{40}Zr_{58}$-4

^{98}Y β^- decay (0.548 s) 2017Ur03,1984Be50,1977Si05 (continued)

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

E_γ[†]	I_γ[†c]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[a]	δ[a]	$I_{(\gamma+ce)}$[c]	Comments
[x]386.1[@] 2									Iγ=2.5 *10* (1977Si05), contaminated by a neighboring nuclide.
423.0 2		1859.37	0^+	1436.16	0^+	E0[b]		0.29 *4*	E_γ: from ce data in 1994Lh01. Other: 1982Ka03. $I_{(\gamma+ce)}$: from I(E0)/I(E2(269γ))=0.0130 *16* (1994Lh01) and adopted I(269γ)=22.6 *7* here. Monopole strength (ρ)=0.237 *25* (1994Lh01), 0.29 *15* (1982Ka03).
521.6 *1*	5.5 *2*	1744.61	2^+	1222.91	2^+	M1+E2	+0.44 *4*		Eγ=521.6, Iγ=3.5 (1984Be50). Eγ=521.6 *2*, Iγ=6.0 *5* (1977Si05). (522γ)(123γ)(θ): A_2=+0.01 *16*, A_4=−0.28 *28* (1984Be50), δ(E2/M1)=+0.2 *1*.
[x]547.5[@] 2									Iγ=2.5 *10* (1977Si05), contaminated by a neighboring nuclide.
582.0 2		1436.16	0^+	854.06	0^+	E0[b]		0.95 *7*	E_γ: from ce data in 1994Lh01. Other: 1982Ka03. $I_{(\gamma+ce)}$: from I(E0)/I(E2(213γ))=0.065 *4* (1994Lh01) and adopted I(213γ)=14.6 *5* here. Monopole strength (ρ)=0.274 *15* (1994Lh01), 0.29 *8* (1982Ka03).
(583.2 *1*)	0.66[&] *10*	1806.20	3^-	1222.91	2^+	E1			
[x]600.0[@] 2									Iγ=2.5 *10* (1977Si05).
636.5 *1*	4.1 *2*	1859.37	0^+	1222.91	2^+	E2			Eγ=636.4, Iγ=3.3 (1984Be50). Eγ=636.2 *2*, Iγ=4.0 *10* (1977Si05). (636γ)(1223γ)(θ): A_2=+0.6 *4*, A_4=+0.9 *5* (1982Ka03).
[x]671.2[#]									γ with Iγ=0.5 in 1984Be50 placed from a 2478.9 level, but this level is not confirmed by 2017Ur03. Also γγ-coin with 213γ in 1984Be50 remained unexplained.
[x]734.9[#]									γ with Iγ=2.5 in 1984Be50 placed from a 2478.9 level, but this level is not confirmed by 2017Ur03.
736.8 *1*	3.6 *2*	1590.78	2^+	854.06	0^+	[E2]			Eγ=736.7, Iγ=4.5 (1984Be50). Eγ=736.7, Iγ=3.5 (1977Si05). I_γ: 3.9 *2* in 2017Ur03 (Table VII) is probably the total intensity from the two activities in ^{98}Y. Evaluators have subtracted 0.30 *3* units to account for contribution from the 2.32-s isomer decay obtained from intensity balance at 1591 level in ^{98}Y β^- decay (2.32 s).
789.0 2	0.5 *1*	2225.15	(2^+)	1436.16	0^+				
[x]840.3[@] 2									Iγ=2.5 *10* (1977Si05).
854.06 *6*		854.06	0^+	0.0	0^+	E0[b]		27.6 *7*	ce(K)/(γ+ce)=0.90; ce(L)/(γ+ce)=0.10 $I_{(\gamma+ce)}$: from intensity balance, corresponding to %I(γ+ce)=14.4 *14* in agreement with 15 *3* deduced by 1987Ma58 from ce(K)(854)/ce(K)(268γ) (1983VaZJ,1982Ka03). Others: 4.9 *18* (1983VaZJ), 26 *5* (1971Fo21). Values of I(E0)(absolute)=4.4 and 7.2 are also quoted by 1983VaZJ based mult(119γ) from ^{98}Sr β^-. This values agrees with value of 40 (relative to 100 for 1223γ) in 1984Be50, but a corresponding relative value of ≈200 in 1977Si05 was grossly over estimated.

$^{98}_{40}Zr_{58}$-5

^{98}Y β^- decay (0.548 s) 2017Ur03,1984Be50,1977Si05 (continued)

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

E_γ [†]	I_γ [†c]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[a]	Comments
							ceK/ceL=9.7 *19* (1975Kh05).
							Energy of E0 transition from level energy difference.
x887.9[#]							γ with Iγ=0.5 in 1984Be50 placed from a 2478.9 level, based on $\gamma\gamma$-coin, but this level is not confirmed by 2017Ur03.
890.6 *1*	3.0 *2*	1744.61	2^+	854.06	0^+		Eγ=890.3 *2*, Iγ=3.0 *10* (1977Si05).
x936.3[#]							γ with Iγ=0.5 in 1984Be50 placed from a 2796.8 level, but this level is not confirmed by 2017Ur03.
972.2 *2*	0.7 *1*	2778.71	(2^+)	1806.20	3^-		
x991.6[#]							Uncertain γ with Iγ=0.7 in 1984Be50 placed from a 2796.8 level, but this level is not confirmed by 2017Ur03. Also $\gamma\gamma$-coin with 213γ in 1984Be50 is inconsistent with proposed level scheme.
1002.3 *1*	1.1 *2*	2225.15	(2^+)	1222.91	2^+		
1033.9 *3*	0.5 *1*	2778.71	(2^+)	1744.61	2^+		
1099.5 *2*	0.8 *1*	4165.18	1^-	3065.61	(1)		
1187.8 *2*	0.4 *1*	2778.71	(2^+)	1590.78	2^+		
1222.9 *1*	69.8 *31*	1222.91	2^+	0.0	0^+	E2	Eγ=1223.0, Iγ=100 (1984Be50).
							Eγ=1222.8 *2*, Iγ=100.0 (1977Si05).
							I_γ: 100.0 *30* in 2017Ur03 (Table VII) is likely the total intensity from the two activities in ^{98}Y. Evaluators have subtracted 30.2 *8* units to account for contribution from the 2.32-s isomer decay obtained from intensity balance at 1223 level in ^{98}Y β^- decay (2.32 s). Adjusted intensity gives Iγ(1223)/100 decays=37.0 *17* consistent with measured Iγ/100 decays=36 *3* in 1987Ma58.
1386.3 *1*	3.2 *2*	4165.18	1^-	2778.71	(2^+)		
1492.4 *1*	1.5 *1*	4271.11	1^-	2778.71	(2^+)		
1555.7 *1*	2.8 *3*	2778.71	(2^+)	1222.91	2^+		
1590.9 *1*	24.7 *8*	1590.78	2^+	0.0	0^+	E2	Eγ=1590.9, Iγ=40.9 (1984Be50).
							Eγ=1590.7 *2*, Iγ=40.5 *20* (1977Si05).
							I_γ: 26.7 *8* in 2017Ur03 (Table VII) is probably the total intensity from the two activities in ^{98}Y. Evaluators have subtracted 2.04 *17* units to account for contribution from the 2.32-s isomer decay obtained from intensity balance at 1591 level in ^{98}Y β^- decay (2.32 s).
1744.5 *1*	7.0 *3*	1744.61	2^+	0.0	0^+		Eγ=1744.4, Iγ=14.9 (1984Be50).
							Eγ=1744.1 *5*, Iγ=11.5 *10* (1977Si05).
x1762.7[#]							γ with Iγ=5.4 in 1984Be50 placed from a 3507.0 level, but this level is not confirmed by 2017Ur03.
2045.9 *2*	0.3 *1*	4271.11	1^-	2225.15	(2^+)		
2174.4 *2*	1.5 *5*	4399.07	1^-	2225.15	(2^+)		
2225.2 *2*	0.5 *2*	2225.15	(2^+)	0.0	0^+		
2227.3 *2*	1.0 *2*	4452.58	1^-	2225.15	(2^+)		
2305.9 *1*	4.8 *2*	4165.18	1^-	1859.37	0^+		Eγ=2305.5, Iγ=9.8 (1984Be50).
							Eγ=2305.5 *5*, Iγ=5.5 *15* (1977Si05).
							(2305γ)(269γ)(θ): A_2=−0.28 *21*, A_4=+0.29 *27* (1984Be50).
2411.9 *2*	0.4 *1*	4271.11	1^-	1859.37	0^+		

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

E_γ [†]	I_γ [†c]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[a]	Comments
2420.6 *1*	7.6 *2*	4165.18	1^-	1744.61	2^+		Eγ=2420.6, Iγ=16.3 (1984Be50). Eγ=2420.6 *5*, Iγ=13.5 *20* (1977Si05).
2526.3 *1*	1.1 *1*	4271.11	1^-	1744.61	2^+		
2539.5 *2*	0.7 *1*	4399.07	1^-	1859.37	0^+		
2574.4 *1*	6.6 *2*	4165.18	1^-	1590.78	2^+	(E1)	Eγ=2573.9, Iγ=9.3 (1984Be50). Eγ=2573.9 *5*, Iγ=7.0 *15* (1977Si05).
2593.0 *3*	0.5 *1*	4452.58	1^-	1859.37	0^+		
2672.7 *2*	0.6 *1*	4108.67	(1)	1436.16	0^+		
2680.3 *1*	1.6 *1*	4271.11	1^-	1590.78	2^+	(E1)	
2707.8 *3*	0.6 *2*	4452.58	1^-	1744.61	2^+		
2728.9 *1*	2.2 *1*	4165.18	1^-	1436.16	0^+		Eγ=2728.3, Iγ=1.3 (1984Be50).
2779.0 *2*	0.4 *1*	2778.71	(2^+)	0.0	0^+		
2834.4 *3*	0.4 *1*	4271.11	1^-	1436.16	0^+		
2861.7 *3*	0.5 *1*	4452.58	1^-	1590.78	2^+		
2942.3 *1*	28.8 *8*	4165.18	1^-	1222.91	2^+	(E1)	Eγ=2941.3, Iγ=46.3 (1984Be50). Eγ=2941.3 *5*, Iγ=48.5 *30* (1977Si05). (2941γ)(1223γ)(θ): A_2=−0.18 *14*, A_4=+0.20 *27* (1984Be50).
2962.1 *5*	0.2 *1*	4399.07	1^-	1436.16	0^+		
3016.6 *2*	0.8 *1*	4452.58	1^-	1436.16	0^+		
3048.3 *1*	0.9 *1*	4271.11	1^-	1222.91	2^+		
3056.3 *3*	0.4 *1*	4492.35	1^-	1436.16	0^+		
3065.5 *2*	2.9 *2*	3065.61	(1)	0.0	0^+		Eγ=3064.4, Iγ=6.6 (1984Be50). Eγ=3064.4 *5*, Iγ=4.0 *15* (1977Si05).
3176.0 *3*	0.3 *1*	4399.07	1^-	1222.91	2^+		
x3203.7@ *5*							Iγ=6.5 *12* (1977Si05).
3229.8 *2*	6.1 *2*	4452.58	1^-	1222.91	2^+	E1	Eγ=3227.9, Iγ=13.7 (1984Be50). Eγ=3228.3 *5*, Iγ=11.5 *20* (1977Si05).
3254.4 *2*	1.0 *2*	4108.67	(1)	854.06	0^+		
3311.1 *1*	15.1 *5*	4165.18	1^-	854.06	0^+		Eγ=3310.0 *5*, Iγ=20 *3* (1977Si05).
x3375.7@ *5*							Iγ=5.5 *20* (1977Si05).
3416.9 *1*	1.0 *1*	4271.11	1^-	854.06	0^+		
x3468.6@ *5*							Iγ=5.5 *20* (1977Si05).
3598.4 *2*	0.8 *1*	4452.58	1^-	854.06	0^+		
3638.6 *3*	0.4 *1*	4492.35	1^-	854.06	0^+		
4108.5 *2*	0.4 *1*	4108.67	(1)	0.0	0^+		
4164.9 *2*	1.1 *1*	4165.18	1^-	0.0	0^+		
4271.3 *2*	0.5 *1*	4271.11	1^-	0.0	0^+		
4398.8 *2*	2.8 *1*	4399.07	1^-	0.0	0^+		
4452.4 *2*	17.0 *6*	4452.58	1^-	0.0	0^+		Eγ=4450.2, Iγ=24.8 (1984Be50). Eγ=4450.1 *5*, Iγ=28.5 *30* (1977Si05).
4492.0 *2*	3.6 *1*	4492.35	1^-	0.0	0^+		

$^{98}_{40}Zr_{58}$-7

^{98}Y β^- decay (0.548 s) 2017Ur03,1984Be50,1977Si05 (continued)

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

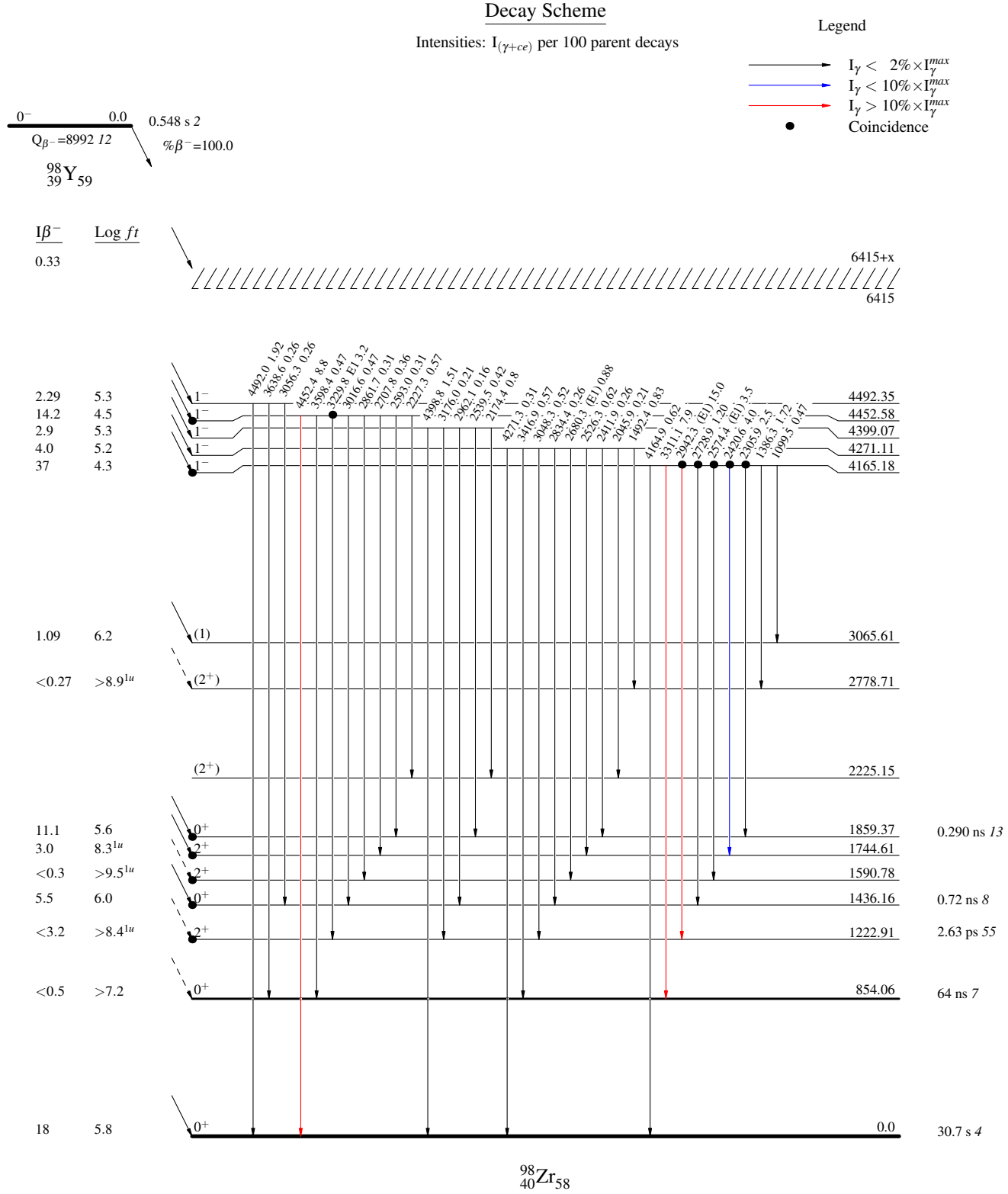
† From 2017Ur03, unless otherwise stated. To match the scale of relative intensities in 2017Ur03, and 1984Be50 or 1977Si05, multiply values in 2017Ur03 by a factor of ≈0.156.
‡ γ from 1984Be50, not reported by 2017Ur03. Intensity is readjusted to the scale in 2017Ur03.
# γ from 1984Be50 only, and placed in the level scheme, but corresponding level is not confirmed by 2017Ur03. Intensity is relative to 100 for 1223γ.
@ γ from 1977Si05 only. Intensity is relative to 100 for 1223γ.
& Assigned by evaluators from intensity balance at 1806 level and branching ratios from values given in Table VIII of 2017Ur03.
a From Adopted Gammas, based some on $\gamma\gamma(\theta)$ and RUL in the present work. Assumed assignments given in square brackets are from ΔJ^π in this dataset.
b No γ corresponding to ce seen. High multipolarities excluded by RUL from known $T_{1/2}$(level).
c For absolute intensity per 100 decays, multiply by 0.52 5.
d 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.
e Placement of transition in the level scheme is uncertain.
x γ ray not placed in level scheme.

$^{98}_{40}Zr_{58}$-8

^{98}Y β^- decay (0.548 s) 2017Ur03,1984Be50,1977Si05

Decay Scheme

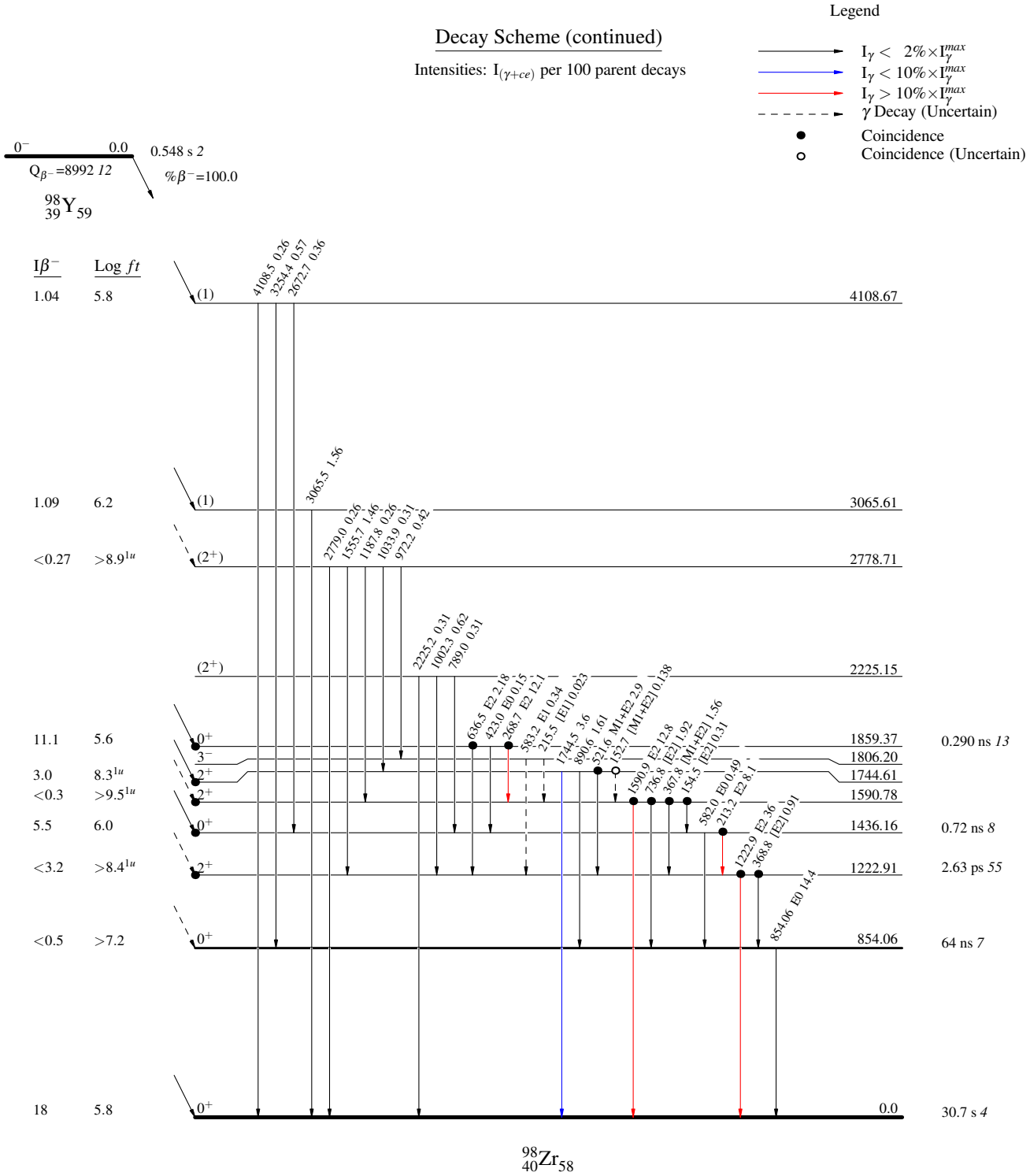
Intensities: $I_{(\gamma+ce)}$ per 100 parent decays



^{98}Y β^- decay (0.548 s) 2017Ur03,1984Be50,1977Si05

Decay Scheme (continued)

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays



$^{98}_{40}Zr_{58}$