^{98}Sr β^- decay (0.653 s) 2017Ur03,2002PfZZ,1987Ma58

History

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

Parent: ^{98}Sr: E=0; $J^\pi=0^+$; $T_{1/2}$=0.653 s *2*; Q(β^-)=5872 *9*; %β^- decay=100.0

^{98}Sr-$T_{1/2}$: From ^{98}Sr Adopted Levels.

^{98}Sr-Q(β^-): From 2017Wa10.

2017Ur03: ^{98}Sr source obtained as a fission fragment and using Lohengrin separator. Measured Eγ, Iγ, $\beta\gamma$-coin $\gamma\gamma$-coin, $\gamma\gamma(\theta)$ 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, total conversion coefficients, multipolarities, and β feedings.

2002PfZZ: measured Eγ, Iγ, $\gamma\gamma$, $\beta\gamma$(t), $\gamma\gamma$(t) at the isotope separators JOSEF, OSTIS and TRISTAN. (circa 1987 work, results of which were made available to the evaluators in August 2002, courtesy of B. Pfeiffer, as an unpublished manuscript by K. Sistemich et al.).

1987Ma58: source from ^{98}Rb β^- decay produced by mass-separation in ^{235}U(n,F). Measured Eγ, Iγ, $\gamma\gamma$, absolute Iγ. See 1988MaYY (from the same group) for ce and $\gamma\gamma(\theta)$ data.

Others:

γ: 1979Bo26, 1977Wo07, 1975Si23.

ce: 1982Ka03, 1980JuZY.

$T_{1/2}$(^{98}Sr decay): 1986Wa17, 1982Ga24, 1981En05, 1979Pe17, 1979En02, 1978Wo09, 1971Tr02.

$\gamma\gamma(\theta)$: 1989BeZG.

$\gamma\gamma$(t): 1979ScZV.

β, $\beta\gamma$ (Q value for decay): 1988GrZX (and 1978St02), 1984BlZN, 1983MaYZ, 1979Pe17, 1978St02.

Additional information 1.

^{98}Y Levels

According to 2017Ur03, upper limit for the population of a level at 446.2 keV is less than 0.2% based on a spectrum gated on the 275.2-keV.

A tentative 586 level decaying by a 211.3γ with relative intensity of ≈0.2 in 2002PfZZ and 1987Ma58 is omitted here as it is not confirmed by 2017Ur03.

E(level)[†]	J^π[‡]	$T_{1/2}$[‡]	Comments
0.0	0^-	0.548 s *2*	J^π: from (428γ)(119γ)(θ) and α(K)exp values 1-1-0 or 1-2-2 spin sequences are possible (1988MaYY,1989BeZG) for 548-119-0 levels, but (428γ)(119γ)(θ) data in SF decay (2017Ur03) supports 1-1-0 spin sequence.
119.353 *3*	1^-	0.14 ns *5*	J^π: see J^π comment for g.s. about $\gamma\gamma(\theta)$ data. $T_{1/2}$: from γ(t) in 1987Oh05. Other: ≈11 ns from $\beta\gamma$(t) or $\gamma\gamma$(t) (1979ScZV), details of this measurement are not available.
170.78 *5*	2^-	0.63 μs *2*	$T_{1/2}$: other: 0.62 μs from $\beta\gamma$(t) or $\gamma\gamma$(t) (1979ScZV), details of this measurement are not available.
358.12 *7*	$(1,2^-)$		J^π: (2) in 2017Ur03.
374.98 *16*	4^-	35.2 ns *5*	E(level): level required by 240.2γ from 615 level in Table V of 2017Ur03, although 2017Ur03 stated that this level was not populated in this decay, and was not listed in their Table V. 2002PfZZ and 1987Ma58 show a weak population of this level.
496.27? *19*	$(4)^-$	6.90 μs *5*	Level not listed by 2017Ur03, who deduced that population of this level is <0.2%. With $J^\pi=4^-$, this level is not expected to be populated in β^- decay from 0^+ parent.
547.87 *6*	1^+		
563.999 *19*	$(1^-,2^-)$	2.4 ns *12*	J^π: $(1^-,2)$ in 2017Ur03. The (36γ)(445γ)(θ) data in ^{252}Cf SF decay (2017Ur03) support J=1 or 2 for 564 level. $T_{1/2}$: $\beta\gamma$(t) (2004Br14). Other: ≈4 ns (1979ScZV). Same value in Adopted Levels.
564.0+x?	$(3^-,4^-)$	180 ns *7*	Additional information 2. See level population in ^{248}Cm SF decay (2017Ur03).

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^{98}Sr β^- decay (0.653 s) 2017Ur03,2002PfZZ,1987Ma58 (continued)

^{98}Y Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[‡]	Comments
595.78 *8*	(1,2$^-$)		A 595.4 *2* γ with renormalized intensity of 1.8 *3* is reported from this level only by 2002PfZZ. It is omitted here as a gamma ray of such an intensity should have been seen in 2017Ur03 and 1987Ma58. Jπ: (1$^-$,2) in 2017Ur03.
600.30 *4*	1$^+$	7.5 ns *7*	$T_{1/2}$: βγ(t) (2004Br14). Other: 9 ns (1979ScZV).
601.92 *8*	(0,1,2)[#]		Jπ: (1$^-$,2) in 2017Ur03.
615.18 *16*			E(level): level from 2017Ur03 only with proposed J=(2,3).
666.28 *7*	(1$^+$)		Jπ: (1$^-$,2) in 2017Ur03.
713.04 *10*	(0$^-$,1,2$^-$)[#]		Jπ: (2) in 2017Ur03.
824.40 *6*	(0$^-$,1,2$^-$)[#]		Jπ: (2) in 2017Ur03.
908.41 *15*	(0$^-$,1,2$^-$)[#]		Jπ: (2) in 2017Ur03.
986.39 *6*	1$^+$		Jπ: 1 in 2017Ur03. 2017Ur03 place an 864.2 *2* γ from this level with an intensity of 0.25 *5*, but this γ ray fits poorly in the decay scheme, with a deviation of 3 keV. Evaluators note that an 864.0 *2* γ with the same relative intensity is placed by 2017Ur03 from 1464 level, in agreement with previous studies 2002PfZZ and 1987Ma58. Evaluators omit the 864.2γ from 986 level.
1199.72 *9*	(1$^+$)		Jπ: (1$^-$,2) in 2017Ur03.
1348.51 *11*	(0$^-$,1,2$^-$)[#]		Jπ: (1$^-$,2) in 2017Ur03.
1464.45 *15*	(0$^-$,1,2$^-$)[#]		Jπ: (1$^-$,2) in 2017Ur03.
1680.07 *15*	(0$^-$,1,2$^-$)[#]		Jπ: (1$^-$,2) in 2017Ur03.
1898.51 *15*	(0$^-$,1,2$^-$)[#]		Jπ: (1$^-$,2) in 2017Ur03.
4245+y			E(level): y<1627 *14*, from Q(β^-)(^{98}Sr)=5872 *9* and S(n)(^{98}Y)=4245 *10* (2017Wa10).

[†] From a least-squares fit to Eγ data. Reduced χ^2=1.67 is below the critical χ^2 at 95% confidence level, with no significant deviations of experimental γ-energies with fitted values.
[‡] From Adopted Levels. For certain levels, additional comments for half-life measurements are given.
[#] 0$^-$,1,2$^-$ from possible β feeding (allowed, first-forbidden or second forbidden unique) from 0$^+$ parent.

β^- radiations

βγ-coin with 119γ, 428γ, 445γ, 564γ (1978St02) gives Q(β^-)=5880 *120*. Other: Q(β^-)=5903 *40* (1983MaYZ).

E(decay)	E(level)	Iβ$^-$[†‡]	Log *ft*[†]	Comments
(8×10^2[@] *8*)	4245+y	0.23 *3*		Iβ$^-$: from %β$^-$n=0.23 *3* for ^{98}Sr decay.
(3973 *9*)	1898.51	0.34 *6*	6.0 *1*	av Eβ=1730.6 *44*
(4192 *9*)	1680.07	0.41 *6*	6.0 *1*	av Eβ=1835.3 *44*
(4408 *9*)	1464.45	0.37 *5*	6.14 *6*	av Eβ=1938.7 *44*
(4523 *9*)	1348.51	0.68 *7*	5.93 *5*	av Eβ=1994.4 *44*
(4672 *9*)	1199.72	1.7 *3*	5.6 *1*	av Eβ=2065.9 *44*
(4886 *9*)	986.39	6.9 *5*	5.07 *4*	av Eβ=2168.5 *44*
(4964 *9*)	908.41	0.63 *12*	6.1 *1*	av Eβ=2206.0 *44*
(5048 *9*)	824.40	0.91 *24*	6.0 *1*	av Eβ=2246.4 *44*
(5159 *9*)	713.04	0.37 *8*	6.5 *1*	av Eβ=2300.0 *44*
(5206 *9*)	666.28	3.2 *9*	5.5 *1*	av Eβ=2322.5 *44*
(5270[#] *9*)	601.92	0.7 *6*	6.2 *4*	av Eβ=2353.5 *44*
(5272 *9*)	600.30	49 *8*	4.4 *1*	av Eβ=2354.3 *44* βγ-coin reported (1984BlZN).

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^{98}Sr β^- decay (0.653 s) 2017Ur03,2002PfZZ,1987Ma58 (continued)

β^- radiations (continued)

E(decay)	E(level)	Iβ^-[†‡]	Log *ft*[†]	Comments
(5276 *9*)	595.78	1.8 *4*	5.8 *1*	av Eβ=2356.5 *44*
(5308[#] *9*)	563.999	<11	>5.0	av Eβ=2371.8 *44* Iβ^-: limit is from Iβ=4 *7* from intensity balance.
(5324 *9*)	547.87	14 *3*	4.9 *1*	av Eβ=2379.5 *44* E(decay): 5130 *40* from β(428γ) (1979Pe17).
(5376[#] *9*)	496.27?	0.22 *8*	6.8 *2*	av Eβ=2404.4 *44* Iβ^-: apparent β feeding, as no feeding is expected from 0^+ parent.
(5514[#] *9*)	358.12	1.0 *7*	6.1 *3*	av Eβ=2470.9 *44*
(5701 *9*)	170.78	2.5 *12*	7.7[1u] *2*	av Eβ=2554.2 *44* The log *ft* value is low for first-forbidden unique transition, implying that β feeding is overestimated.
(5753 *9*)	119.353	11 *4*	5.2 *2*	av Eβ=2585.9 *44* Iβ^-,Log *ft*: too low for a first-forbidden β transition, which suggests excessive β feeding for 119.3 level. For log *ft*>5.9 for such transitions, β feeding should be <3%.
(5872[#] *9*)	0.0	<3	>5.8	av Eβ=2643.4 *44*

[†] Beta feedings deduced from γ-transition intensity balances. The log *ft* values were deduced using the LOGFT code. Values for weak β feedings (<2% or so) and for those with large uncertainties are considered as approximate, since Q value of 5872 keV (and the highest populated level at 1899 keV) allows possible β feedings to higher unobserved levels. The J^π assignments based on such log *ft* values are considered tentative.

[‡] Absolute intensity per 100 decays.

[#] Existence of this branch is questionable.

[@] Estimated for a range of levels.

$\gamma(^{98}Y)$

Iγ normalization: From ΣI(γ+ce to g.s.)=98.3 *15*, allowing for possible <3% β feeding to the ^{98}Y g.s. (consistent with log *ft*>5.9 for the first forbidden transitions), and adopted %β^-n=0.23 *3* for ^{98}Sr decay. This value agrees well with absolute Iγ=73% *6* for 119.3γ measured by 1987Ma58, but does not agree with γ normalization factor of 0.95 *8* if measured absolute Iγ=38 *3* for 444.6γ (1987Ma58) is used. The reason for the latter disagreement is the much larger measured relative intensity of 54 measured in 1987Ma58, as compared to 40.0 *15* in 2017Ur03 and 45 in 2002PfZZ. 2017Ur03 deduced a γ-normalization factor of 0.79 *3*, using absolute Iγ values of 428.6 and 444.7 γ rays from the previous evaluation (2003Si07).

A 595.4 *2* γ from 595 level with renormalized intensity of 1.8 *3* is reported only by 2002PfZZ. It is omitted here as a gamma ray of such an intensity should have been detected in 2017Ur03 and 1987Ma58.

E_γ[†]	I_γ[†&]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	δ[‡]	α[a]	Comments
x		564.0+x?	(3$^-$,4$^-$)	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.
36.2 *1*	14.0 *30*	600.30	1$^+$	563.999	(1$^-$,2$^-$)	E1		2.02 *4*	%Iγ=10.4 *14* α(exp)=1.9 *3* (2017Ur03); α(K)exp=1.6 *4* (2002PfZZ); α(exp)=1.9 *2* (2002PfZZ) α(exp)=1.0 *3* (1987Ma58) 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* Eγ=36.3 *1*, Iγ=32 *5* (2002PfZZ). Iγ=28 for 36.5γ (1987Ma58). δ(M2/E1)<0.04 (2017Ur03,2002PfZZ).
51.1 *2*	1.0 *5*	666.28	(1$^+$)	615.18				1.0 *2*	%Iγ=0.7 *4* γ from 2017Ur03 only.
51.5 *1*	1.0 *3*	170.78	2$^-$	119.353	1$^-$	M1+E2	0.26 *+7−8*	1.9 *4*	%Iγ=0.74 *22* 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* Eγ=51.4 *1*, Iγ=2.5 *4* (2002PfZZ). Iγ=0.7 for 51.5γ (1987Ma58).
52.4 *1*	5.0 *5*	600.30	1$^+$	547.87	1$^+$	M1+E2	0.43 *10*	2.7 *7*	%Iγ=3.7 *4* α(exp)=2.7 *6* (2017Ur03); α(K)exp=1.2 *6* (2002PfZZ); α(exp)=1.3 *3* (2002PfZZ,1987Ma58) 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* Eγ=52.5 *1*, Iγ=11.2 *9* (2002PfZZ). Iγ=8 for 52.5γ (1987Ma58). Mult.,δ: from α(total)exp (2017Ur03). Other: δ(E2/M1)<0.22 (2002PfZZ,1987Ma58).
64.0[@b] *3*	0.05[@] *5*	666.28	(1$^+$)	601.92	(0,1,2)				%Iγ=0.04 *4*
66.0 *1*	2.7 *2*	666.28	(1$^+$)	600.30	1$^+$	D		0.5 *1*	%Iγ=2.01 *17* α(exp)=0.3 *1* (2017Ur03); α(exp)=1.5 *7* (2002PfZZ) Eγ=66.0 *1*, Iγ=3.6 *6* (2002PfZZ). Iγ=2.1 for 66.0γ (1987Ma58). Mult.: from α(total)exp in 2017Ur03. Other: δ(E2/M1)=0.53 *16* from α(total)exp in 2002PfZZ, factor of ≈5 higher than in 2017Ur03.

^{98}Sr β^- decay (0.653 s) 2017Ur03,2002PfZZ,1987Ma58 (continued)

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

E_γ [†]	I_γ [†&]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [‡]	δ [‡]	α [a]	Comments
70.8 [@b] *10*	0.05 [@] *5*	666.28	(1^+)	595.78	$(1,2^-)$				%Iγ=0.04 *4*
102.3 *1*	0.27 *5*	666.28	(1^+)	563.999	$(1^-,2^-)$	[E1]		0.1006	%Iγ=0.20 *4* 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* Eγ=102.3 *1*, Iγ=0.3 *1* (2002PfZZ). Iγ=0.3 for 101.8γ (1987Ma58).
119.353 [#] *3*	99.5 *38*	119.353	1^-	0.0	0^-	M1		0.1115	%Iγ=74.0 *13* 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* Eγ=119.3 *1* (2017Ur03). Iγ=221 *10* (2002PfZZ), 100 for 119.4γ (1987Ma58). Measured absolute intensity=73 *6* per 100 decays of ^{98}Sr (1987Ma58).
121.3 [b] *1*	0.27 *9*	496.27?	$(4)^-$	374.98	4^-	M1+E2	−0.8 *2*	0.27 *6*	%Iγ=0.20 *7* 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* E_γ,I_γ: from 2002PfZZ, intensity is renormalized to 99.5 for 119.3γ. Iγ=0.1 for 120.9γ (1987Ma58).
158.5 [b] *3*	0.09 *5*	824.40	$(0^-,1,2^-)$	666.28	(1^+)				%Iγ=0.07 *4* E_γ,I_γ: from 2002PfZZ, intensity is renormalized to 99.5 for 119.3γ. Iγ=0.2 for a tentative 157.7γ in 1987Ma58. This γ is not reported by 2017Ur03, and is not included in Adopted Gammas.
162.2 *1*	1.3 *2*	986.39	1^+	824.40	$(0^-,1,2^-)$	[D,E2]		0.11 *8*	%Iγ=0.97 *16* Eγ=162.0 *1*, Iγ=2.5 *4* (2002PfZZ). Iγ=1.2 for 161.8γ (1987Ma58).
165.3 *1*	0.85 *5*	713.04	$(0^-,1,2^-)$	547.87	1^+	[D,E2]		0.10 *8*	%Iγ=0.63 *5* Eγ=165.1 *1*, Iγ=1.4 *2* (2002PfZZ). Iγ=0.6 for 164.9γ (1987Ma58).
170.8 *1*	5.2 *3*	170.78	2^-	0.0	0^-	E2		0.1507	%Iγ=3.9 *3* 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* Eγ=170.8 *1*, Iγ=8.3 *7* (2002PfZZ). Iγ=4.2 for 170.7γ (1987Ma58).
187.1 *2*	2.0 *5*	358.12	$(1,2^-)$	170.78	2^-	[D,E2]		0.06 *4*	%Iγ=1.5 *4* Eγ=187.6 *2*, Iγ=1.2 *2* (2002PfZZ). Iγ=0.7 for 187.2γ (1987Ma58).
189.7 *2*	0.37 *5*	547.87	1^+	358.12	$(1,2^-)$	[D,E2]		0.06 *4*	%Iγ=0.28 *4* Eγ=189.6 *1*, Iγ=0.7 *1* (2002PfZZ). Iγ=0.3 for 189.5γ (1987Ma58).
204.2 *2*	0.54 *5*	374.98	4^-	170.78	2^-	E2		0.0791	%Iγ=0.40 *4* α(K)=0.0684 *10*; α(L)=0.00892 *13*; α(M)=0.001525 *22*

$^{98}_{39}Y_{59}$-5

^{98}Sr β^- decay (0.653 s) 2017Ur03,2002PfZZ,1987Ma58 (continued)

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

E_γ [†]	I_γ [†&]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [‡]	α [a]	Comments
								α(N)=0.000197 *3*; α(O)=1.102×10^{-5} *16* E_γ,I_γ: from 2002PfZZ, intensity is renormalized to 99.5 for 119.3γ. Iγ=0.6 for 204.0γ (1987Ma58).
222.5 *1*	0.4 *1*	824.40	(0$^-$,1,2$^-$)	601.92	(0,1,2)			%Iγ=0.30 *8* Eγ=222.4 *1*, Iγ=0.7 *1* (2002PfZZ). Iγ=0.4 for 222.4γ (1987Ma58).
224.1 *1*	0.36 *5*	824.40	(0$^-$,1,2$^-$)	600.30	1$^+$			%Iγ=0.27 *4* E_γ,I_γ: from 2002PfZZ, intensity is renormalized to 99.5 for 119.3γ. Iγ=0.4 for 224.0 in 1987Ma58. This γ is not reported by 2017Ur03.
228.9 *1*	0.5 *1*	824.40	(0$^-$,1,2$^-$)	595.78	(1,2$^-$)			%Iγ=0.37 *8* Eγ=228.5 *1*, Iγ=0.4 *1* (2002PfZZ).
237.7 *2*	1.0 *5*	595.78	(1,2$^-$)	358.12	(1,2$^-$)			%Iγ=0.7 *4* Eγ=237.9 *2*, Iγ=0.7 *4* (2002PfZZ). Iγ=0.3 for 237.4γ (1987Ma58).
238.8 *1*	1.5 *3*	358.12	(1,2$^-$)	119.353	1$^-$			%Iγ=1.12 *23* Eγ=238.8 *1*, Iγ=3.7 *3* (2002PfZZ). Iγ=2.1 for 238.7γ (1987Ma58).
240.2 *1*	1.0 *5*	615.18		374.98	4$^-$			%Iγ=0.7 *4*
242.1[@b] *2*	0.18[@] *5*	600.30	1$^+$	358.12	(1,2$^-$)			%Iγ=0.13 *4*
243.7 *2*	1.0 *5*	601.92	(0,1,2)	358.12	(1,2$^-$)			%Iγ=0.7 *4* Eγ=243.7 *3*, Iγ=0.7 *1* (2002PfZZ). Iγ=0.3 for 243.7γ (1987Ma58).
260.3 *1*	1.4 *1*	824.40	(0$^-$,1,2$^-$)	563.999	(1$^-$,2$^-$)			%Iγ=1.04 *9* Eγ=260.4 *1*, Iγ=2.1 *2* (2002PfZZ). Iγ=1.1 for 260.2γ (1987Ma58).
[x]280.3[@] *2*	0.27[@] *5*							%Iγ=0.20 *4* In $\gamma\gamma$ coin with 119γ.
306.3 *2*	0.2 *1*	908.41	(0$^-$,1,2$^-$)	601.92	(0,1,2)			%Iγ=0.15 *8* Eγ=305.8 *2*, Iγ=0.8 *2* (2002PfZZ). Iγ=0.2 for 305.5γ (1987Ma58).
308.3 *2*	0.64 *12*	908.41	(0$^-$,1,2$^-$)	600.30	1$^+$			%Iγ=0.48 *9* Eγ=307.4 *2*, Iγ=0.7 *3* (2002PfZZ). Iγ=1.0 for 307.0γ (1987Ma58).
311.8[@b] *4*	0.14[@] *9*	908.41	(0$^-$,1,2$^-$)	595.78	(1,2$^-$)			%Iγ=0.10 *7*
320.1 *1*	1.9 *2*	986.39	1$^+$	666.28	(1$^+$)			%Iγ=1.41 *16* Eγ=320.2 *1*, Iγ=4.7 *4* (2002PfZZ). Iγ=2.4 for 320.0γ (1987Ma58).
343.8[b] *2*	0.23 *9*	908.41	(0$^-$,1,2$^-$)	563.999	(1$^-$,2$^-$)			%Iγ=0.17 *7* E_γ,I_γ: from 2002PfZZ, intensity is renormalized to 99.5 for 119.3γ. Iγ=0.4 for a tentative 344.1γ in 1987Ma58. This γ is not reported by 2017Ur03.
357.9 *2*	0.25 *5*	358.12	(1,2$^-$)	0.0	0$^-$			%Iγ=0.19 *4* Eγ=358.2 *2*, Iγ=0.4 *2* (2002PfZZ).
384.5 *1*	0.5 *2*	986.39	1$^+$	601.92	(0,1,2)			%Iγ=0.37 *15* Eγ=384.3 *2*, Iγ=1.2 *3* (2002PfZZ). Iγ=0.2 for 384.0γ (1987Ma58).
386.0 *1*	3.9 *2*	986.39	1$^+$	600.30	1$^+$			%Iγ=2.90 *18* Eγ=386.0 *1*, Iγ=10.0 *10* (2002PfZZ). Iγ=6.0 for 386.0γ (1987Ma58). Additional information 3.
393.3 *1*	1.2 *3*	563.999	(1$^-$,2$^-$)	170.78	2$^-$			%Iγ=0.89 *23* Eγ=393.5 *2*, Iγ=0.8 *2* (2002PfZZ).
422.3 *1*	0.70 *5*	986.39	1$^+$	563.999	(1$^-$,2$^-$)			%Iγ=0.52 *5* Eγ=422.2 *1*, Iγ=1.2 *2* (2002PfZZ). Iγ=1.2 for 422.2γ (1987Ma58).
428.6 *1*	36.5 *15*	547.87	1$^+$	119.353	1$^-$	E1	0.00177	%Iγ=27.2 *13*

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

^{98}Sr β^- decay (0.653 s) 2017Ur03,2002PfZZ,1987Ma58 (continued)

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

E_γ[†]	I_γ[†&]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	δ[‡]	α[a]	Comments
									α(K)exp=0.016 *3* (2002PfZZ,1988MaYY) Eγ=428.5 *1*, Iγ=84 *4* (2002PfZZ). Iγ=42 for 428.4γ (1987Ma58). δ(M2/E1)<0.17. (428γ)(119γ)(θ): A_2=−0.33 *5*, A_4=+0.09 *8* (2002PfZZ, 1988MaYY,1989BeZG); A_2=−0.23 *6*, A_4=+0.07 *10* (2002PfZZ).
429.6 *1*	2.5 *4*	600.30	1^+	170.78	2^-	[E1]			%Iγ=1.9 *3* Eγ=429.3 *2*, Iγ=3.4 *12* (2002PfZZ). Iγ=5 for 429.3γ (1987Ma58).
444.628[#] *20*	40.0 *15*	563.999	$(1^-,2^-)$	119.353	1^-	M1(+E2)	<0.9	0.0046 *8*	%Iγ=29.8 *13* α(K)exp=0.0037 *4* (2002PfZZ,1988MaYY) Eγ=444.7 *1* (2017Ur03). Iγ=100.0 *10* (2002PfZZ), 54 for 444.6γ (1987Ma58). Measured absolute intensity=38 *3* per 100 decays of ^{98}Sr (1987Ma58). (445γ)(119γ)(θ): A_2=−0.33 *5*, A_4=+0.06 *8* (2002PfZZ, TRISTAN); A_2=−0.20 *2*, A_4=+0.06 *3* (2002PfZZ,OSTIS).
476.7 *1*	1.9 *1*	595.78	$(1,2^-)$	119.353	1^-				%Iγ=1.41 *9* Eγ=476.5 *1*, Iγ=4.6 *5* (2002PfZZ). Iγ=1.8 for 476.4γ (1987Ma58).
481.1 *1*	10.0 *10*	600.30	1^+	119.353	1^-	E1			%Iγ=7.4 *8* α(K)exp=0.0013 *8* (1988MaYY,2002PfZZ) Eγ=480.8 *1*, Iγ=24.7 *18* (2002PfZZ). Iγ=13 for 480.9γ (1987Ma58). δ(M2/E1)<0.35.
482.7 *2*	1.0 *5*	601.92	(0,1,2)	119.353	1^-				%Iγ=0.7 *4* Eγ=482.5 *2*, Iγ=3.7 *5* (2002PfZZ). Iγ=1.8 for 482.5γ (1987Ma58).
547.9 *1*	2.9 *1*	547.87	1^+	0.0	0^-	[E1]			%Iγ=2.16 *11* Eγ=547.7 *2*, Iγ=6.0 *16* (2002PfZZ). Iγ=3.7 for 547.6γ (1987Ma58).
564.0 *1*	8.9 *4*	563.999	$(1^-,2^-)$	0.0	0^-	M1,E2			%Iγ=6.6 *4* α(K)exp=0.0025 *7* (2002PfZZ,1988MaYY) Eγ=563.9 *1*, Iγ=25.1 *16* (2002PfZZ). Iγ=16 for 563.8γ (1987Ma58).
599.3 *2*	0.18 *5*	1199.72	(1^+)	600.30	1^+				%Iγ=0.13 *4* Eγ=599.2 *2*, Iγ=0.5 *3* (2002PfZZ).
600.2 *1*	2.8 *4*	600.30	1^+	0.0	0^-	[E1]			%Iγ=2.1 *3* Eγ=600.1 *2*, Iγ=9.2 *8* (2002PfZZ). Iγ=6 for 600.2γ (1987Ma58).
603.7[@b] *2*	0.2[@] *1*	1199.72	(1^+)	595.78	$(1,2^-)$				%Iγ=0.15 *8* This γ is not confirmed by 2017Ur03, thus treated as uncertain by evaluators, and not included in the Adopted dataset.

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

^{98}Sr β^- decay (0.653 s) 2017Ur03,2002PfZZ,1987Ma58 (continued)

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

E_γ [†]	I_γ [†&]	E_i(level)	J_i^π	E_f	J_f^π	Comments
635.6 *1*	0.44 *5*	1348.51	$(0^-,1,2^-)$	713.04	$(0^-,1,2^-)$	%Iγ=0.33 *4* Eγ=635.2 *2*, Iγ=0.5 *2* (2002PfZZ). Iγ=0.4 for a tentative 635.2γ (1987Ma58).
651.9 *1*	0.61 *5*	1199.72	(1^+)	547.87	1^+	%Iγ=0.45 *4* Eγ=651.9 *1*, Iγ=1.1 *2* (2002PfZZ). Iγ=0.7 for a tentative 651.7γ (1987Ma58).
752.2[@b] *2*	0.23[@] *9*	1348.51	$(0^-,1,2^-)$	595.78	$(1,2^-)$	%Iγ=0.17 *7* This γ is not confirmed by 2017Ur03, thus treated as uncertain by evaluators, and is not included in the Adopted dataset.
798.3 *2*	0.24 *4*	1464.45	$(0^-,1,2^-)$	666.28	(1^+)	%Iγ=0.18 *3* Eγ=798.4 *2*, Iγ=0.9 *2* (2002PfZZ). Iγ=0.8 for a tentative 799.2γ (1987Ma58).
800.3 *2*	0.31 *6*	1348.51	$(0^-,1,2^-)$	547.87	1^+	%Iγ=0.23 *5* Eγ=800.1 *3*, Iγ=0.9 *3* (2002PfZZ).
864.0 *2*	0.25 *5*	1464.45	$(0^-,1,2^-)$	600.30	1^+	%Iγ=0.19 *4* Eγ=864.4 *3*, Iγ=0.9 *3* (2002PfZZ).
[x]961.4[@] *2*	0.23[@] *14*					%Iγ=0.17 *11*
986.1 *2*	0.70 *8*	986.39	1^+	0.0	0^-	%Iγ=0.52 *7* Eγ=986.2 *3*, Iγ=0.5 *2* (2002PfZZ).
990.2 *2*	0.15 *3*	1348.51	$(0^-,1,2^-)$	358.12	$(1,2^-)$	%Iγ=0.112 *23* Eγ=990.1 *3*, Iγ=0.4 *2* (2002PfZZ).
1080.3 *2*	1.2 *1*	1199.72	(1^+)	119.353	1^-	%Iγ=0.89 *8* Eγ=1080.1 *2*, Iγ=1.3 *4* (2002PfZZ). Iγ=1.2 for 1080.2γ (1987Ma58).
1132.4 *2*	0.21 *6*	1680.07	$(0^-,1,2^-)$	547.87	1^+	%Iγ=0.16 *5* Eγ=1131.9 *4*, Iγ=0.3 *1* (2002PfZZ).
1298.5 *2*	0.18 *6*	1898.51	$(0^-,1,2^-)$	600.30	1^+	%Iγ=0.13 *5* Eγ=1301.2 *6*, Iγ=0.5 *2* (2002PfZZ).
1334.2 *2*	0.27 *5*	1898.51	$(0^-,1,2^-)$	563.999	$(1^-,2^-)$	%Iγ=0.20 *4* Eγ=1333.0 *3*, Iγ=0.6 *3* (2002PfZZ).
1560.5 *2*	0.34 *5*	1680.07	$(0^-,1,2^-)$	119.353	1^-	%Iγ=0.25 *4* Eγ=1560.4 *4*, Iγ=0.9 *5* (2002PfZZ).

[†] From 2017Ur03, unless otherwise stated. Corresponding values from 2002PfZZ are in general agreement, but with several differences. Intensities in 2002PfZZ should be multiplied by 0.45 to have these on the relative scale as in 2017Ur03, the multiplicative factor deduced from relative intensities of 221 in 2002PfZZ and 99.5 in 2017Ur03 for 119.3γ. Corresponding factor would be 0.40 if the intensities from the two studies are normalized to that of the 444.6γ. Values available from 1987Ma58 are also in general agreement with those in 2017Ur03, although, no uncertainties are provided in this work. Intensities in 1987Ma58 are on the same scale as those in 2017Ur03.

[‡] From Adopted Levels, Gammas dataset, based mainly on ce data in ^{235}U(n,F), unless otherwise stated. Other: 1982Ka03.

[#] From curved-crystal measurement (1979Bo26).

[@] From 2002PfZZ only. Intensities are renormalized to 99.5 for 119.3γ. These γ rays are not included in the Adopted dataset, due to its uncertain existence, and non-confirmation in 2017Ur03 and 1987Ma58.

[&] For absolute intensity per 100 decays, multiply by 0.74 *3*.

$^{98}_{39}Y_{59}$-8

γ(^{98}Y) (continued)

[a] 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.
[b] Placement of transition in the level scheme is uncertain.
[x] γ ray not placed in level scheme.

^{98}Sr β^- decay (0.653 s) 2017Ur03,2002PfZZ,1987Ma58

Decay Scheme

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

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)
- Coincidence

0^+ 0 0.653 s *2*
Q_{β^-}=5872 *9* $\%\beta^-$=100.0
$^{98}_{38}Sr_{60}$

Iβ⁻	Log *ft*		
0.23		4245+y	
		4245	
0.34	6.0	(0⁻,1,2⁻)	1898.51
0.41	6.0	(0⁻,1,2⁻)	1680.07
0.37	6.14	(0⁻,1,2⁻)	1464.45
0.68	5.93	(0⁻,1,2⁻)	1348.51
1.7	5.6	(1⁺)	1199.72
0.37	6.5	(0⁻,1,2⁻)	713.04
3.2	5.5	(1⁺)	666.28
49	4.4	1⁺	600.30
1.8	5.8	(1,2⁻)	595.78
<11	>5.0	(1⁻,2⁻)	563.999
14	4.9	1⁺	547.87
1.0	6.1	(1,2⁻)	358.12
11	5.2	1⁻	119.353
		0⁻	0.0

1334.2 0.20; 1298.5 0.13; 1560.5 0.25; 1132.4 0.16; 864.0 0.19; 798.3 0.18; 990.2 0.111; 800.3 0.23; 752.2 0.17; 635.6 0.33; 1080.3 0.96; 651.9 0.45; 603.7 0.22; 599.3 0.13

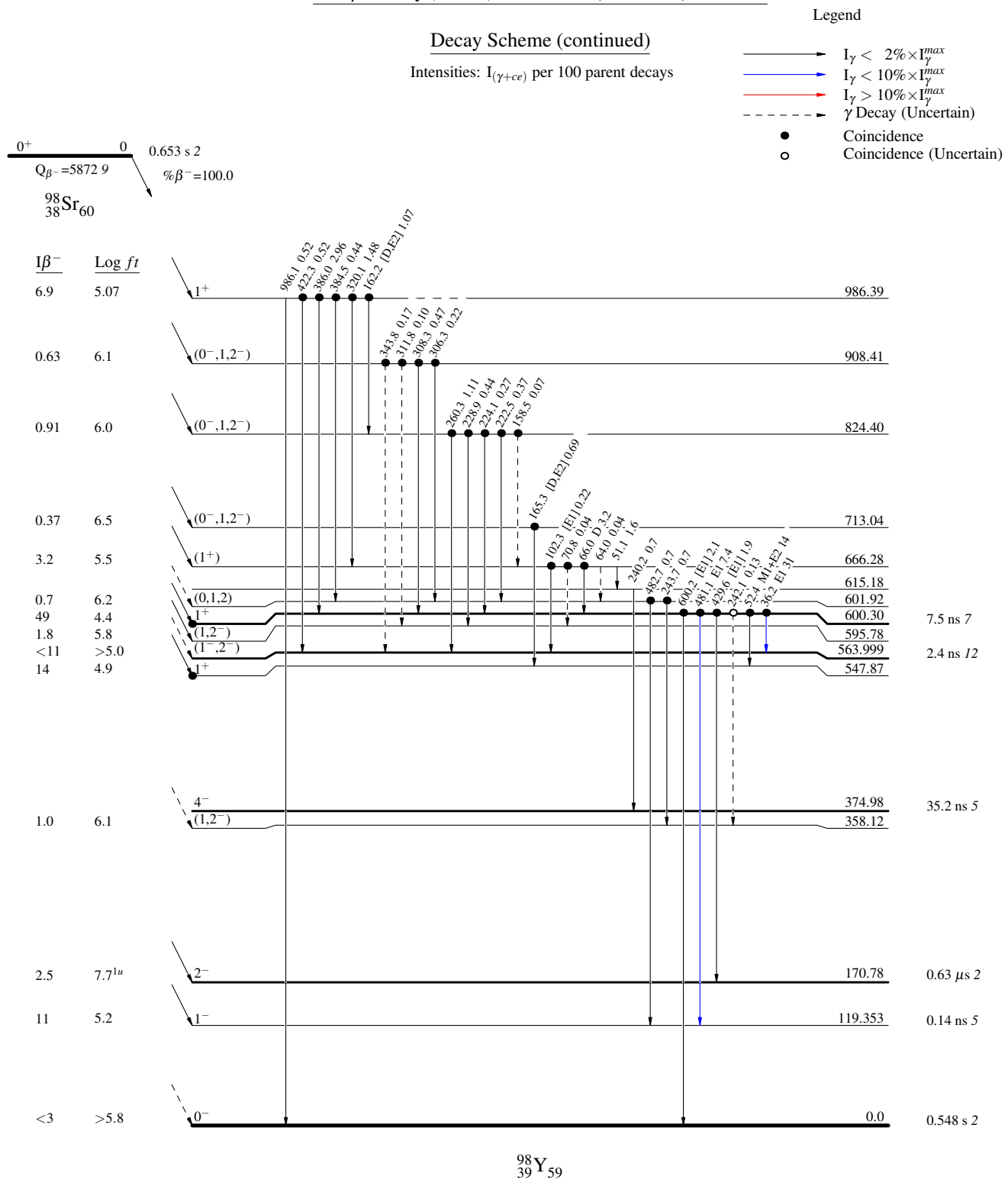
7.5 ns *7*
2.4 ns *12*
0.14 ns *5*
0.548 s *2*

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

^{98}Sr β^- decay (0.653 s) 2017Ur03,2002PfZZ,1987Ma58

Decay Scheme (continued)

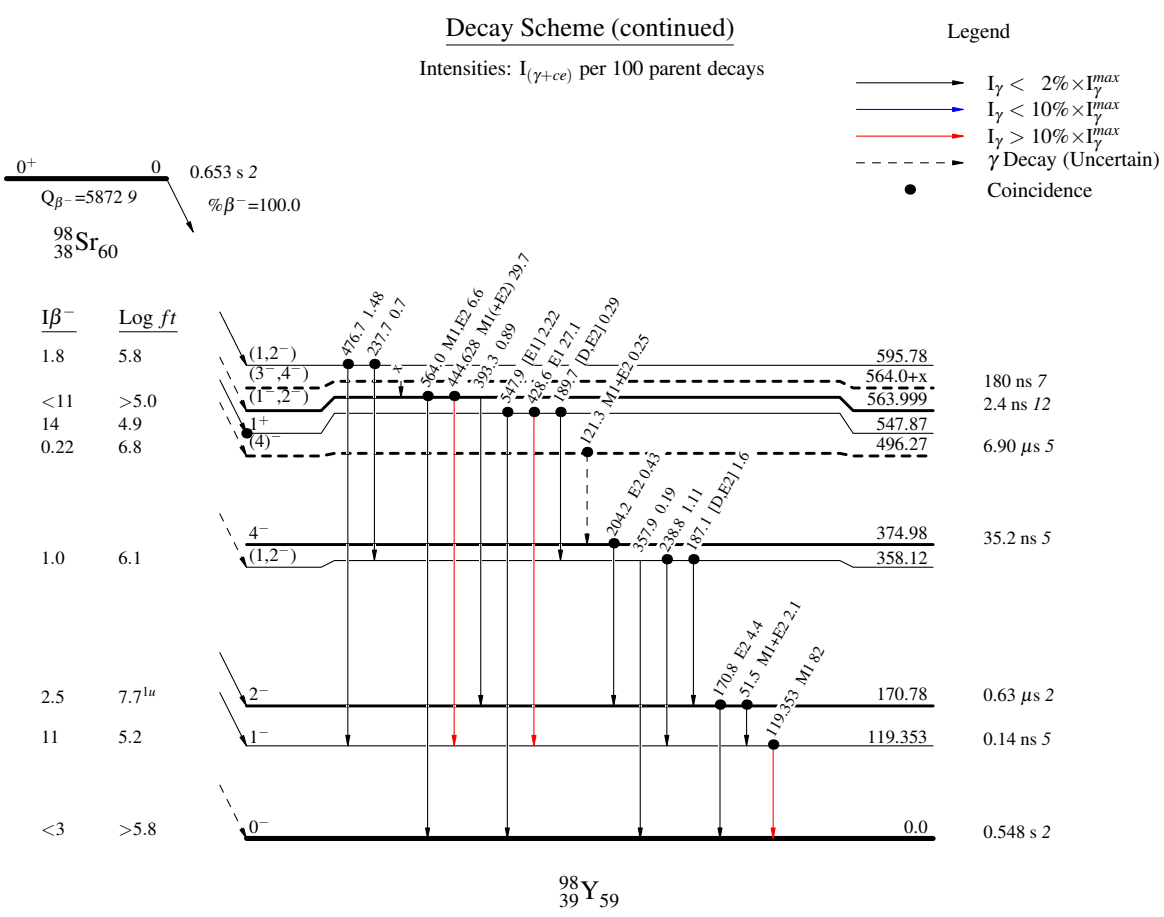
Intensities: $I_{(\gamma+ce)}$ per 100 parent decays



^{98}Sr β^- decay (0.653 s) 2017Ur03,2002PfZZ,1987Ma58

Decay Scheme (continued)

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



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