^{93}Y β^- decay 1973Ta15

History			
Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Coral M. Baglin	NDS 112, 1163 (2011)	15-Dec-2010

Parent: ^{93}Y: E=0.0; $J^\pi=1/2^-$; $T_{1/2}$=10.18 h *8*; Q(β^-)=2895 *10*; %β^- decay=100.0

Additional information 1.

Others: 1972Oh06, 1972Oh03, 1971Ho15, 1969Ar06, 1968Po06, 1959Kn38.

1973Ta15: Ge(Li); measured Eγ, Iγ, $\gamma\gamma$ coin.

1972Oh06:Ge(Li), Si(Li), plastic, anthracene detectors; measured Eγ, Iγ, ce(K)(267γ), $\gamma\gamma$ coin, 679γ-267$\gamma(\theta)$. See also 1972Oh03.

1971Ho15:Ge(Li) and NaI detectors; measured Eγ, Iγ, $\gamma\gamma$ coin.

1969Ar06: Ge(Li); measured Eγ, Iγ, $\gamma\gamma$ coin.

1968Po06: Ge(Li); measured Eγ, Iγ.

1959Kn38: β spectrometer, NaI; measured Eβ, Eγ, I(267ce(K))/Iβ, Iγ/Iβ, $\gamma\gamma$ coin.

A total energy release of 2896 *39* is calculated for this decay scheme using the RADLST code, In good agreement with Q=2895 *10*.

^{93}Zr Levels

E(level)[†]	J^π[‡]	$T_{1/2}$[‡]	Comments
0.0	$5/2^+$	1.61×10^6 y *5*	%β^-=100
266.87 *6*	$3/2^+$	1.45 ns *5*	J^π: not 5/2, from $\gamma\gamma(\theta)$ (1972Oh06).
947.14 *7*	$1/2^+$		
1168.6? *2*	$1/2^+$		Denoted as uncertain because proposed by 1969Ar06 only.
1425.41 *9*	$3/2^+,5/2^+$		
1450.45 *8*	$(1/2^+,3/2,5/2^+)$		
1470.15 *8*	$(1/2^+,3/2,5/2^+)$		
1909.56 *11*	$1/2^+$		
1918.56[#] *21*	$(1/2,3/2,5/2^+)$		
2094.69[#] *21*	$1/2^+$		
2184.62 *7*	$(1/2^+,3/2)$		
2457.65 *15*	$(1/2^+,3/2)$		
2473.84 *20*			

[†] From least-squaress fit to Eγ.
[‡] From Adopted Levels.
[#] Observed by 1973Ta15 only.

β^- radiations

β^- spectrum measured by 1959Kn38.

E(decay)	E(level)	Iβ^-[†]	Log *ft*	Comments
(421 *10*)	2473.84	0.0114 *20*	8.44 *9*	av Eβ=128.4 *36*
(437 *10*)	2457.65	0.26 *5*	7.14 *9*	av Eβ=134.1 *36*
(710 *10*)	2184.62	1.70 *25*	7.06 *7*	av Eβ=236.5 *40*
(800 *10*)	2094.69	0.024 *5*	9.10 *10*	av Eβ=272.2 *41*
(976 *10*)	1918.56	0.030 *6*	9.32 *9*	av Eβ=344.3 *42*
(985 *10*)	1909.56	0.065 *10*	9.00 *7*	av Eβ=348.1 *42*
(1425 *10*)	1470.15	0.15 *3*	9.25 *9*	av Eβ=537.4 *45*
(1445 *10*)	1450.45	0.38 *6*	8.87 *7*	av Eβ=546.1 *45*
(1470 *10*)	1425.41	0.28 *4*	9.03 *7*	av Eβ=557.2 *45*
(1726 *10*)	1168.6?	0.005 *6*	11.1 *6*	av Eβ=672.4 *46*

Continued on next page (footnotes at end of table)

^{93}Y β^- decay 1973Ta15 (continued)

β^- radiations (continued)

E(decay)	E(level)	Iβ^-[†]	Log *ft*	Comments
(1948 *10*)	947.14	2.7 *5*	8.54 *9*	av Eβ=773.4 *46*
(2628 *10*)	266.87	4.9 *9*	8.82 *8*	av Eβ=1089.5 *47*
2880 *15*	0.0	89.5 *16*	9.098[1u] *13*	av Eβ=1216.5 *47* Eβ from 1983Ia02 (other: 2890 *20* (1959Kn38)). β^- spectrum has unique first-forbidden shape (1959Kn38).

[†] Absolute intensity per 100 decays.

$\gamma(^{93}Zr)$

Iγ normalization: 0.0066 *11*, 0.0081 *12*, 0.0087 *15* from %Iγ=6.4 *10*, 2.3 *3*, 1.8 *3* for 267γ, 950γ multiplet, 1918γ, respectively (1959Kn38). The weighted average of these is 0.0076 *7*, but evaluator adopts the fractional uncertainty of the most precise datum to allow for the possibility that the uncertainty in Iγ/Iβ may be largely systematic.

E_γ †	I_γ ‡&	E_i(level)	J_i^π	E_f	J_f^π	Mult.	δ	α[a]	Comments
266.9 *1*	976† *53*	266.87	3/2+	0.0	5/2+	M1+E2	1.2 *+12−5*	0.025 *5*	α(K)exp=0.022 *4* α(K)=0.022 *4*; α(L)=0.0027 *6*; α(M)=0.00047 *10*; α(N+..)=6.9×10^{-5} *14* α(N)=6.5×10^{-5} *13*; α(O)=4.0×10^{-6} *7* α(K)exp from 1972Oh06; misprinted as 0.022 *40* in 1972Oh03. Other: 0.024 (1959Kn38) (from I(267ce(K))/Iβ=0.00152 and Iγ(267γ)/Iβ=0.064 *10*). Mult.,δ: from α(K)exp.
273.0@ *10*	9.5@ *20*	2457.65	(1/2+,3/2)	2184.62	(1/2+,3/2)				
x287.0 *10*	10.0 *15*								
x341.5 *5*	5.9 *2*								Eγ,Iγ: from 1971Ho15; also reported by 1969Ar06.
x387.5 *10*	1.0 *6*								Eγ,Iγ: only from 1972Oh06.
680.2 *1*	87.7 *18*	947.14	1/2+	266.87	3/2+	(M1+E2)		0.00166 *10*	α(K)=0.00146 *8*; α(L)=0.000164 *12*; α(M)=2.85×10^{-5} *20*; α(N+..)=4.3×10^{-6} *3* α(N)=4.0×10^{-6} *3*; α(O)=2.80×10^{-7} *12* δ,Mult.: δ(D,Q)=−3.2 to −4.0 or +0.23 to +0.29 if abs(δ(267))=1.2; based on A_2=−0.005 *21*, A_4=−0.02 *4* for 680γ-267γ(θ) (1972Oh06).
714.4# *2*	2.3# *3*	2184.62	(1/2+,3/2)	1470.15	(1/2+,3/2,5/2+)				
947.1 *1*	279 *14*	947.14	1/2+	0.0	5/2+				
962.3# *2*	1.6# *2*	1909.56	1/2+	947.14	1/2+				
971.0# *8*	0.9# *3*	1918.56	(1/2,3/2,5/2+)	947.14	1/2+				
987.7# *3*	1.4# *3*	2457.65	(1/2+,3/2)	1470.15	(1/2+,3/2,5/2+)				
1158.5 *2*	4.0† *4*	1425.41	3/2+,5/2+	266.87	3/2+				
1168.61[b] *20*	1.4† *5*	1168.6?	1/2+	0.0	5/2+				1169-keV peak stronger than expected for 2191γ double escape peak alone (1973Ta15); unplaced by 1973Ta15.
1183.5 *1*	6.4 *7*	1450.45	(1/2+,3/2,5/2+)	266.87	3/2+				
x1184.7 *6*	2.6 *5*								

^{93}Y β^- decay 1973Ta15 (continued)

$\gamma(^{93}Zr)$ (continued)

E_γ[†]	I_γ[‡&]	E_i(level)	J_i^π	E_f	J_f^π	Comments
1203.3 *1*	14.3 *7*	1470.15	$(1/2^+,3/2,5/2^+)$	266.87	$3/2^+$	
1237.4 *1*	3.9[†] *9*	2184.62	$(1/2^+,3/2)$	947.14	$1/2^+$	
1425.4 *1*	32.6 *9*	1425.41	$3/2^+,5/2^+$	0.0	$5/2^+$	
1450.5 *1*	43.6 *18*	1450.45	$(1/2^+,3/2,5/2^+)$	0.0	$5/2^+$	
1470.1 *1*	8.7 *17*	1470.15	$(1/2^+,3/2,5/2^+)$	0.0	$5/2^+$	
1642.7 *1*	6.9 *4*	1909.56	$1/2^+$	266.87	$3/2^+$	
1651.7 *2*	3.1 *4*	1918.56	$(1/2,3/2,5/2^+)$	266.87	$3/2^+$	
1827.8 *2*	3.1 *4*	2094.69	$1/2^+$	266.87	$3/2^+$	
1917.8 *1*	206 *4*	2184.62	$(1/2^+,3/2)$	266.87	$3/2^+$	
2184.6 *1*	20.9 *9*	2184.62	$(1/2^+,3/2)$	0.0	$5/2^+$	
2190.8 *2*	22.5 *14*	2457.65	$(1/2^+,3/2)$	266.87	$3/2^+$	
2457.3[#] *3*	0.9[#] *2*	2457.65	$(1/2^+,3/2)$	0.0	$5/2^+$	
2473.8 *2*	1.50 *14*	2473.84		0.0	$5/2^+$	
[x]2605 *3*	1.5 *6*					E_γ: close to 2614γ(^{228}Th) which is a common impurity (1973Ta15).

[†] From 1973Ta15.
[‡] Weighted average of data from 1973Ta15 and 1968Po06, normalized so Ti(276γ)=1000 (assuming α(267γ)=0.025).
[#] From 1973Ta15; γ not reported by other authors.
[@] From 1971Ho15; γ not reported by other authors.
[&] For absolute intensity per 100 decays, multiply by 0.0076 *11*.
[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.

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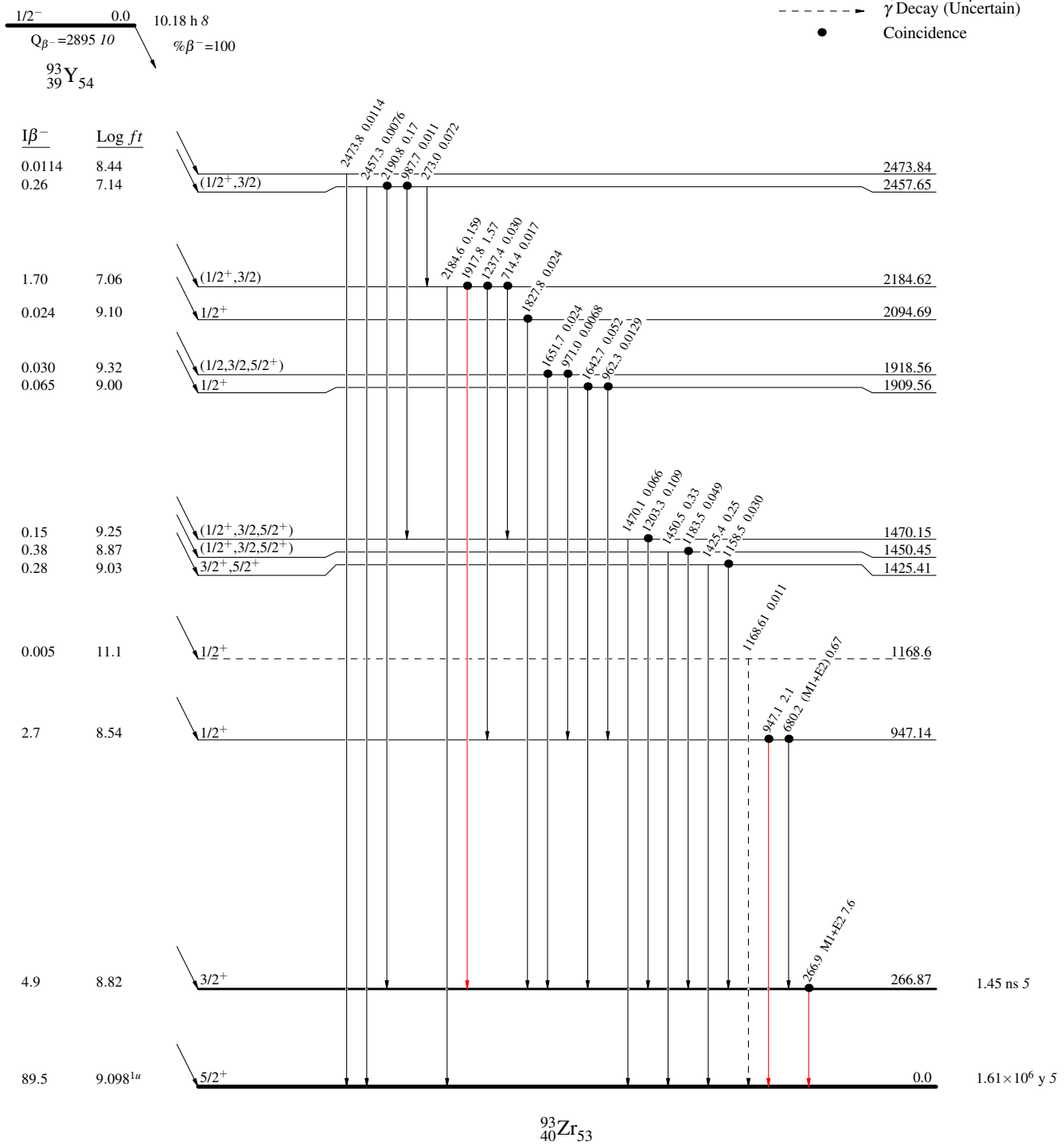
Decay Scheme

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



$^{93}_{40}Zr_{53}$