^{94}Y β^- decay 1976Si11

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	D. Abriola(a), A. A. Sonzogni	NDS 107, 2423 (2006)	1-Jan-2006

Parent: ^{94}Y: E=0.0; $J^\pi=2^-$; $T_{1/2}$=18.7 min *1*; Q(β^-)=4918 *7*; %β^- decay=100.0

^{94}Zr Levels

E(level)	J^π†	$T_{1/2}$†	E(level)	J^π†
0.0	0^+	stable	3059.40 *18*	$(1,2,3)^+$
918.75 *5*	2^+	6.9 ps *15*	3219.42 *13*	(1,2,3)
1300.12 *17*	0^+	0.291 ns *11*	3361.17 *18*	(1,2,3)
1469.64 *11*	4^+	0.500 ns *13*	3724.9? *6*	$(2,3,4)^+$
1671.39 *8*	2^+		3961.8? *3*	$(2)^+$
2057.64 *10*	3^-		4002.2 *15*	$(1,2)^+$
2151.36 *21*	2^+		4052.4 *15*	$(1,2)^+$
2331.6 *4*	4^+		4098.5 *15*	$(1,2)^+$
2366.18 *15*	2^+		4198.8? *4*	$(1,2)^+$
2846.3 *3*	(1^-)		4237.6? *5*	$(1,2,3)^+$
2908.03? *20*	(2^+)		4637.9? *9*	$(1,2,3)^+$
2945.1 *5*	5^-		4669.8? *9*	$(1^-,2^-,3^-)$

† From Adopted Levels.

β^- radiations

av Eβ=1.78 MeV *7* measured with Si-Li detector system (1982Al01).

E(decay)	E(level)	Iβ^-†‡	Log *ft*	Comments
(248# *7*)	4669.8?	0.028 *11*	5.78 *18*	av Eβ=70.5
(280# *7*)	4637.9?	0.020 *8*	6.10 *18*	av Eβ=80.7
(680# *7*)	4237.6?	0.112 *25*	6.66 *10*	av Eβ=224.8
(719# *7*)	4198.8?	0.30 *5*	6.32 *8*	av Eβ=240.0
(820 *7*)	4098.5	0.022 *12*	7.66 *24*	av Eβ=279.9
(866 *7*)	4052.4	0.006 *3*	8.31 *22*	av Eβ=298.6
(916 *7*)	4002.2	0.011 *6*	8.14 *24*	av Eβ=319.2
(956# *7*)	3961.8?	0.27 *4*	6.82 *7*	av Eβ=335.9
(1193# *7*)	3724.9?	0.067 *17*	7.79 *11*	av Eβ=436.2
(1557 *7*)	3361.17	0.57 *7*	7.31 *6*	av Eβ=596.1
(1699 *7*)	3219.42	0.95 *11*	7.24 *5*	av Eβ=659.8
(1859 *7*)	3059.40	1.01 *13*	7.37 *6*	av Eβ=732.5
(1973 *7*)	2945.1	0.078 *18*	10.81^{2u} *10*	av Eβ=814.4
(2010# *7*)	2908.03?	0.21 *4*	8.19 *9*	av Eβ=801.9
(2072 *7*)	2846.3	0.41 *5*	7.95 *6*	av Eβ=830.3
(2552 *7*)	2366.18	0.56 *7*	8.19 *6*	av Eβ=1053.7
(2586 *7*)	2331.6	<0.03	$>10.8^{1u}$	av Eβ=1073.6
(2767 *7*)	2151.36	0.33 *4*	8.57 *6*	av Eβ=1154.6
(2860 *7*)	2057.64	5.3 *5*	7.42 *5*	av Eβ=1198.8
(3247 *7*)	1671.39	3.3 *4*	7.87 *6*	av Eβ=1381.8
(3448 *7*)	1469.64	4.1 *4*	9.39^{1u} *5*	av Eβ=1475.6
(3618 *7*)	1300.12	1.83 *20*	9.87^{1u} *5*	av Eβ=1555.5
(3999 *7*)	918.75	39.6 *22*	7.181 *25*	av Eβ=1740.8

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^{94}Y β^- decay 1976Si11 (continued)

β^- radiations (continued)

E(decay)	E(level)	Iβ^-[†][‡]	Log *ft*	Comments
(4918 *7*)	0.0	41 *4*	9.35[1u] *5*	av Eβ=2174.0 Iβ^-: β^- spectrum has first-unique forbidden shape (1971Ca34). The value Iβ(918.8 level)/Iβ(g.s.)=2.3 *3* deduced from β^- spectra (1971Ca34) is probably wrong because of uncertainties due to source thickness and because of the small energy interval measured (1975Ca13).

[†] Deduced from intensity balance assuming Iγ normalization=0.56 *3*.
[‡] Absolute intensity per 100 decays.
[#] Existence of this branch is questionable.

$\gamma(^{94}Zr)$

Iγ normalization: From comparison with known absolute intensities of 1024.2γ (^{91}Sr), 266.9γ and 947.1γ (^{93}Y), and 954.2γ (^{95}Y) in the ^{235}U thermal fission products (1975Ca13). The earlier value Iγ normalization=0.736 *22* (1971Ca34) which was deduced from β-spectra (Iβ(918 level)/Iβ(g.s.)=2.3 *3*) is rejected by 1975Ca13.
1976Si11: Ge(Li), FWHM=2.0 keV at 1332 keV. Measured Eγ, Iγ.
1975Ca13: deduced absolute intensity of 919.2γ.
1973Si43: Ge(Li), FWHM=2.1 keV at 1332 keV. Measured Eγ, Iγ, $\gamma\gamma$. Plastic scin, measured β-spectra, $\beta\gamma$.
1972Ho03: Ge(Li), FWHM=5.4 keV at 1332 keV. Measured Eγ, Iγ.
1971Ca34: Ge(Li), FWHM=4 keV. NaI(Tl). Measured Eγ, Iγ, $\gamma\gamma$. Magnetic spectrometer, measured β-spectra.
Other measurements: 1966Fi04, 1959Kn38.
The decay scheme of 1976Si11 is adopted. It is based on the $\gamma\gamma$ measurements of 1971Ca34. Levels based on the γ-ray energies alone are denoted as questionable.

E$_\gamma$[†]	I$_\gamma$[†&]	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Mult.[@]	δ[@]	α[a]	Comments
308.2 *3*	0.10 *2*	2366.18	2$^+$	2057.64	3$^-$	E1(+M2)	+0.04 *+22−27*	0.005 *3*	α=0.005 *3*; α(K)=0.0040 *22*; α(L)=0.0004 *3*
381.6 *2*	3.6 *3*	1300.12	0$^+$	918.75	2$^+$	[E2]		0.0099	α=0.0099; α(K)=0.0085 *3*; α(L)=0.00102 *3*
550.9 *1*	8.8 *5*	1469.64	4$^+$	918.75	2$^+$	[E2]		0.00319	α=0.00319; α(K)=0.00276 *9*; α(L)=0.00032 *1*
588 *1*	0.3 *1*	2057.64	3$^-$	1469.64	4$^+$				
694.7 *3*	0.34 *6*	2366.18	2$^+$	1671.39	2$^+$	M1(+E2)		0.00160 *8*	α=0.00160 *8*; α(K)=0.00139 *7*; α(L)=0.00015 *1*
752.6 *1*	2.5 *2*	1671.39	2$^+$	918.75	2$^+$				
887.5[#] *4*	0.14 *3*	2945.1	5$^-$	2057.64	3$^-$				
918.74[‡] *5*	100	918.75	2$^+$	0.0	0$^+$	E2		0.00083	α=0.00083; α(K)=0.00072 *2*
1001.8 *3*	0.11 *3*	3059.40	(1,2,3)$^+$	2057.64	3$^-$				
1066.5 *3*	0.11 *3*	2366.18	2$^+$	1300.12	0$^+$	E2		0.00051	α=0.00051; α(K)=0.00051 *2*
1138.9 *1*	10.7 *7*	2057.64	3$^-$	918.75	2$^+$				
1161.8 *1*	1.24 *15*	3219.42	(1,2,3)	2057.64	3$^-$				
1232.6 *2*	0.59 *6*	2151.36	2$^+$	918.75	2$^+$	M1+E2	−1.7 *+8−14*	0.00038	α=0.00038; α(K)=0.00038
1236.6[b] *2*	0.23 *6*	2908.03?	(2$^+$)	1671.39	2$^+$				
1303.8 *6*	0.08 *2*	3361.17	(1,2,3)	2057.64	3$^-$				
[x]1384.4 *6*	0.05 *2*								
1411.9 *7*	0.14 *3*	2331.6	4$^+$	918.75	2$^+$	E2(+M3)	−0.13 *+13−9*	0.00029 *4*	α=0.00029 *4*; α(K)=0.00029 *3*

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^{94}Y β^- decay 1976Si11 (continued)

$\gamma(^{94}Zr)$ (continued)

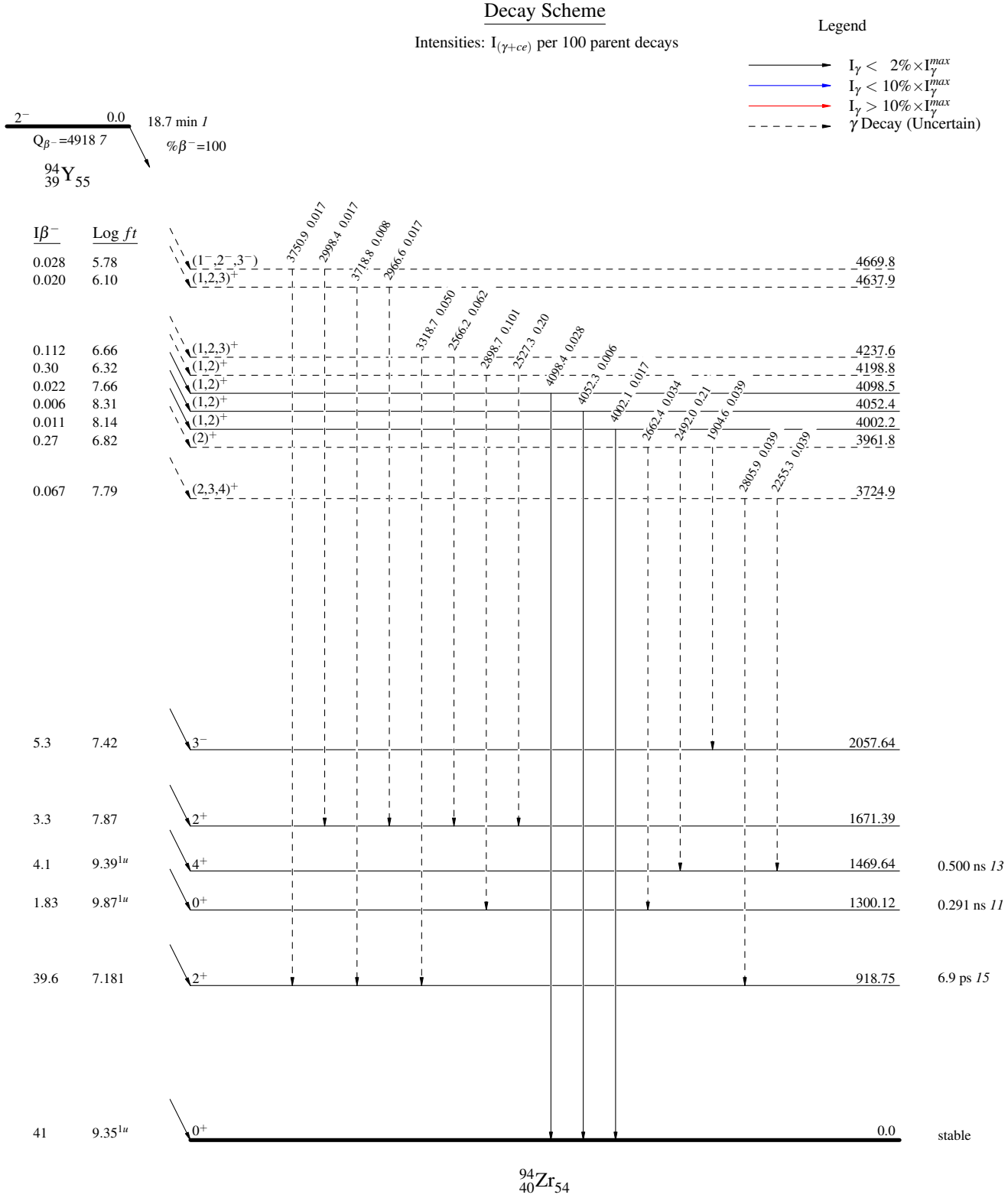
E_γ [†]	I_γ [†&]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [@]	δ [@]	α [a]	Comments
1447.4 *2*	0.45 *7*	2366.18	2^+	918.75	2^+	M1+E2	+0.64 *+14−12*	0.00027	α=0.00027; α(K)=0.00027
[x]1587.9 *6*	0.06 *2*								
[x]1630.0 *5*	0.06 *2*								
1671.4 *1*	4.4 *4*	1671.39	2^+	0.0	0^+				
1891.6 *2*	0.69 *8*	3361.17	(1,2,3)	1469.64	4^+				
1904.6[b] *8*	0.06 *2*	3961.8?	$(2)^+$	2057.64	3^-				
1927.5 *6*	0.07 *2*	2846.3	(1^-)	918.75	2^+				
[x]1940.6 *6*	0.07 *2*								
1989.3[b] *7*	0.07 *2*	2908.03?	(2^+)	918.75	2^+				
2140.6 *2*	1.7 *2*	3059.40	$(1,2,3)^+$	918.75	2^+				
2255.3[b] *7*	0.06 *2*	3724.9?	$(2,3,4)^+$	1469.64	4^+				
2300.5 *3*	0.32 *5*	3219.42	(1,2,3)	918.75	2^+				
[x]2348.7 *10*	0.06 *2*								
2442.1 *3*	0.25 *5*	3361.17	(1,2,3)	918.75	2^+				
2492.0[b] *3*	0.38 *6*	3961.8?	$(2)^+$	1469.64	4^+				
2527.3[b] *4*	0.36 *6*	4198.8?	$(1,2)^+$	1671.39	2^+				
2566.2[b] *5*	0.11 *3*	4237.6?	$(1,2,3)^+$	1671.39	2^+				
2662.4[b] *10*	0.05 *2*	3961.8?	$(2)^+$	1300.12	0^+				
2805.9[b] *10*	0.06 *2*	3724.9?	$(2,3,4)^+$	918.75	2^+				
2846.3 *3*	0.66 *7*	2846.3	(1^-)	0.0	0^+				
2898.7[b] *6*	0.18 *4*	4198.8?	$(1,2)^+$	1300.12	0^+				
2908.4[b] *8*	0.08 *3*	2908.03?	(2^+)	0.0	0^+				
2966.6[b] *10*	0.02 *1*	4637.9?	$(1,2,3)^+$	1671.39	2^+				
2998.4[b] *10*	0.030 *15*	4669.8?	$(1^-,2^-,3^-)$	1671.39	2^+				
[x]3190.3 *10*	0.032 *15*								
[x]3264.4 *7*	0.11 *3*								
3318.7[b] *7*	0.09 *3*	4237.6?	$(1,2,3)^+$	918.75	2^+				
[x]3477.3 *10*	0.04 *2*								
[x]3541.5 *10*	0.02 *1*								
[x]3599.8 *10*	0.030 *15*								
[x]3666.5 *15*	0.02 *1*								
3718.8[b] *15*	0.015 *10*	4637.9?	$(1,2,3)^+$	918.75	2^+				
3750.9[b] *15*	0.02 *1*	4669.8?	$(1^-,2^-,3^-)$	918.75	2^+				
[x]3795.2 *15*	0.02 *1*								
4002.1 *15*	0.02 *1*	4002.2	$(1,2)^+$	0.0	0^+				
4052.3 *15*	0.010 *5*	4052.4	$(1,2)^+$	0.0	0^+				
4098.4 *15*	0.04 *2*	4098.5	$(1,2)^+$	0.0	0^+				

[†] From 1976Si11.
[‡] Measured by 1979Bo26 using a curved-crystal spectrometer.
[#] Placed from the 3219 level by 1976Si11 but excitation function in (n,n′γ) indicates deexcitation of a lower-excited level.
[@] From ^{94}Zr(n,n′γ) (1978Gl04).
[&] For absolute intensity per 100 decays, multiply by 0.56 *3*.
[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.

^{94}Y β^- decay 1976Si11

Decay Scheme

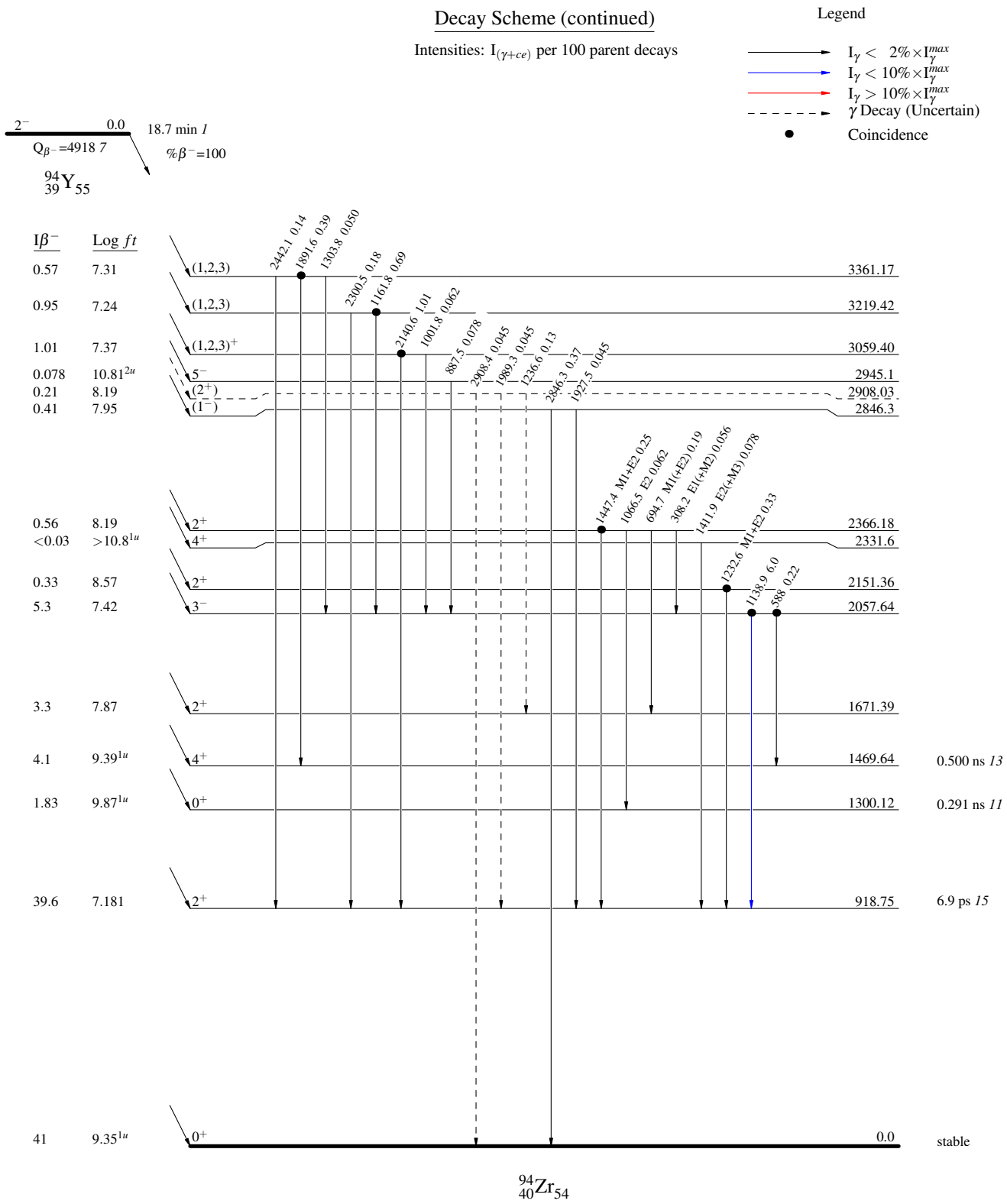
Intensities: $I_{(\gamma+ce)}$ per 100 parent decays



^{94}Y β^- decay 1976Si11

Decay Scheme (continued)

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



^{94}Y β^- decay 1976Si11

Decay Scheme (continued)

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