^{234}Pa β^- decay (1.159 min) 1975Ar23,1990Sc09

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	E. Browne, J. K. Tuli	NDS 108, 681 (2007)	1-Jun-2006

Parent: ^{234}Pa: E=73.92+x; J^π=(0$^-$); $T_{1/2}$=1.159 min *11*; Q(β^-)=2195 *4*; %β^- decay=99.84 *4*

Additional information 1.

The β-decay scheme of 1.17-min ^{234}Pa is based mainly on studies by 1963Bj02, 1967Wa09, and 1975Ar23.

^{234}U Levels

Additional levels at 750 keV, 1353 keV, and 1759 keV have been proposed in 1999Nz01 with insufficient supporting experimental evidence.

E(level)[†]	J^π[‡]	$T_{1/2}$	Comments
0.0[a]	0$^+$		
43.4978[a] *10*	2$^+$		
143.24[a] *7*	4$^+$		
786.312[b] *5*	1$^-$		
809.96[c] *5*	0$^+$	<0.1 ns	$T_{1/2}$: From 1962Lo11.
849.23[b] *7*	3$^-$		
851.75[c] *4*	2$^+$		
926.688[d] *20*	2$^+$		
989.389[e] *18*	2$^-$		
1044.539[f] *6*	0$^+$		
1085.11[f] *4*	2$^+$		
1126.37[g] *4*	2$^+$		
1174.1 *4*	(1,2$^+$)		
1237.35[h] *5*	1$^-$		
1435.11 *5*	1$^-$[#]		
1457.46 *8*	(2$^-$)		
1501.0 *3*	(1)		
1553.69 *6*	(1)		
1570.61 *4*	1$^+$[@]		
1592.38 *6*	(1)		
1601.81 *4*	1$^+$		
1667.4 *4*	(1$^-$)		
1693.8? *6*	(1$^-$)		
1781.27 *8*	(0$^+$,1)		
1796.4[&] *6*	(1)		
1809.00 *7*	(1$^-$)		
1863.15 *7*	(1)		
1874.88 *7*	(1)		
1911.10 *5*	(1$^-$)		
1936.76 *7*	(1)		
1969.9 *5*	(1$^-$)		

[†] Deduced by evaluators from a least-squares fit to γ-ray energies.

[‡] From Adopted Levels.

[#] K=1$^-$: $\nu\nu$ 7/2[743],5/2[633] state.

[@] K=1: $\pi\pi$ 3/2[651],5/2[642] state.

[&] If the 338.1γ to (2$^-$) state is E1, then J^π(1796 level)=(1$^+$).

Continued on next page (footnotes at end of table)

^{234}Pa β^- decay (1.159 min) 1975Ar23,1990Sc09 (continued)

^{234}U Levels (continued)

[a] Band(A): $K^\pi=0^+$ g.s. band.
[b] Band(B): $K^\pi=0^-$ octupole-vibrational band.
[c] Band(C): $K^\pi=0^+$ collective band.
[d] Band(D): $K^\pi=2^+$ γ-vibrational band.
[e] Band(E): $K^\pi=2^-$ octupole-vibrational band.
[f] Band(F): $K^\pi=0^+$ band.
[g] Band(G): $K^\pi=2^+$ band.
[h] Band(H): $K^\pi=(0^-)$ band.

β^- radiations

β measurements:

1953St36;s		1955De40;s,$\beta\gamma$		1963Bj02;s,$\beta\gamma$	
Eβ	Iβ	Eβ		Eβ	Iβ
580	1%	600			
				1250 30	
1500	9%	1500		1530 50	
2305	90%	2300		2290 20	98%

Others: 1954Jo19, 1959Sc31.

E(decay)	E(level)	Iβ^-[†‡]	Log *ft*	Comments
(299 *4*)	1969.9	0.0039 *2*	6.8	av Eβ=83.0 *13*
(332 *4*)	1936.76	0.0097 *3*	6.6	av Eβ=93.0 *13*
(358 *4*)	1911.10	0.0508 *8*	6.0	av Eβ=101.0 *13*
(394 *4*)	1874.88	0.0256 *3*	6.4	av Eβ=112.3 *13*
(406 *4*)	1863.15	0.0032 *4*	7.4	av Eβ=116.0 *13*
(460 *4*)	1809.00	0.0149 *4*	6.9	av Eβ=133.3 *13*
(473 *4*)	1796.4	0.0022 *3*	7.7	av Eβ=137.4 *14*
(488 *4*)	1781.27	0.0355 *8*	6.6	av Eβ=142.3 *14*
(575 *4*)	1693.8?	0.0025 *4*	8.0	av Eβ=171.2 *14*
(602 *4*)	1667.4	0.0061 *5*	7.6	av Eβ=180.1 *14*
(667 *4*)	1601.81	0.00126 *23*	8.5	av Eβ=202.5 *14*
(677 *4*)	1592.38	0.0233 *18*	7.2	av Eβ=205.8 *14*
(698[#] *4*)	1570.61	0.00194 *21*	8.4	av Eβ=213.3 *14*
(715 *4*)	1553.69	0.0321 *6*	7.2	av Eβ=219.2 *14*
(768 *4*)	1501.0	0.0127 *6*	7.7	av Eβ=237.6 *15*
(834 *4*)	1435.11	0.0097 *4*	7.9	av Eβ=261.1 *15*
(1032 *4*)	1237.35	0.0109 *7*	8.2	av Eβ=333.1 *15*
(1095 *4*)	1174.1	0.0045 *3*	8.7	av Eβ=356.7 *15*
(1143 *4*)	1126.37	0.0043 *4*	9.4[1u]	av Eβ=361.0 *15*
(1224 *4*)	1044.539	1.002 *13*	6.5	av Eβ=405.6 *16*
(1280[#] *4*)	989.389	0.009 *3*	8.6	av Eβ=426.7 *16*
(1459 *4*)	809.96	0.948 *13*	6.8	av Eβ=496.0 *16*
(1483 *4*)	786.312	0.059 *4*	8.0	av Eβ=505.3 *16*
2290 *20*	0.0	97.57 *4*	5.5	av Eβ=820.5 *17*

[†] Deduced from intensity balance at each level.
[‡] Absolute intensity per 100 decays.
[#] Existence of this branch is questionable.

^{234}Pa β^- decay (1.159 min) 1975Ar23,1990Sc09 (continued)

$\gamma(^{234}U)$

Iγ normalization: The absolute intensities of photons from ^{234}Pa β^- decay were measured in equilibrium with its parents, ^{234}Th and ^{238}U, by various groups. The absolute intensity of Iγ(1001γ)=0.843% 8 per 100 1.17-min ^{234}Pa β^- decays has been adopted and used to normalize the decay scheme in this evaluation. This value is a weighted average (χ^2/ν=4.6) of the following absolute γ-ray intensities: Iγ(1001γ)=0.828% 18 (1971GuZY)(evaluators increased its uncertainty by 2% because the original value included only the statistical component). 0.834% 7 (1986Mo09); 0.839% 5 (1990Sc09); 0.788% 43 (1992Li02); 0.845% 21 (1992Si17); 0.818% 30 (1992Ja17); 0.910% 25 (1993Su37); 0.924% 17 (1999An40); 0.861% 15 (2003Yu06). Other recommended evaluated absolute intensities are: 0.839% 12 (1994Ak05, 1994Du15); 0.835% 11 (1998Ad08); 0.835% 4 (1999Nz01). Other: 1963Bj02. The experimentally deduced average radiation energy of 2258.8 keV *24* agrees well with 2265.3 keV *40* from the most recent mass adjustment (2003Au03) suggesting that the decay scheme is consistent and complete.

$\beta\gamma$: 1963Bj02, 1955De40.

$\gamma\gamma$, γce: see 1975Ar23, 1963Bj02.

Additional information 3.

$\gamma\gamma(\theta)$: 1960Wo05.

M(N,M,O) From ^{234}Np ε decay.

E(S,R,M) Transition was not observed in 1.17-min ^{234}Pa β^- decay. Energy is from "Adopted Levels, gammas".

E_γ[†]	I_γ[‡c]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	α[d]	Comments
(41.82)		851.75	2^+	809.96	0^+			Additional information 11.
43.498 *1*		43.4978	2^+	0.0	0^+	E2	713 *19*	α(L)=520 *14*; α(M)=143 *4*; α(N+..)=49.3 *14* α(N)=38.9 *11*; α(O)=8.91 *24*; α(P)=1.44 *4*; α(Q)=0.00339 *9* E_γ: From ^{238}Pu α decay. Ice(L2)=250; L2:L3:M=25:27:34 (1963Bj02). Additional information 7.
(62.70 *1*)	1.4 *5*	989.389	2^-	926.688	2^+	E1[&]	0.426	α(L)=0.320 *5*; α(M)=0.0791 *11*; α(N+..)=0.0266 *4* α(N)=0.0209 *3*; α(O)=0.00481 *7*; α(P)=0.000795 *12*; α(Q)=3.22×10^{-5} *5* I_γ: Deduced by evaluators from the ratios of Iγ(62.70γ)/Iγ(203γ)=1.5 *4*/1.19 *10* and Iγ(62.70γ)/Iγ(946γ)=1.5 *4*/13.0 *8*, in ^{234}Pa g.s. β^- decay.
(99.9)		143.24	4^+	43.4978	2^+	E2	13.42	α(L)=9.77 *14*; α(M)=2.71 *4*; α(N+..)=0.933 *13* α(N)=0.736 *11*; α(O)=0.1691 *24*; α(P)=0.0277 *4*; α(Q)=0.0001099 *16* Additional information 8. Mult.: From ^{234}Pa g.s. decay.
(135.32 *8*)	0.0051 *6*	1570.61	1^+	1435.11	1^-	[E1]	0.247	α(K)=0.190 *3*; α(L)=0.0428 *6*; α(M)=0.01043 *15*; α(N+..)=0.00355 *5* α(N)=0.00278 *4*; α(O)=0.000653 *10*; α(P)=0.0001156 *17*; α(Q)=6.07×10^{-6} *9* I_γ: Deduced from Iγ(135γ)/Iγ(1527γ)= 0.20 *2*/112 *5* in ^{234}Np ε decay.
(137.23 *5*)	0.056 *22*	1126.37	2^+	989.389	2^-	[E1]	0.239	α(K)=0.184 *3*; α(L)=0.0413 *6*; α(M)=0.01006 *15*; α(N+..)=0.00343 *5* α(N)=0.00268 *4*; α(O)=0.000630 *9*; α(P)=0.0001116 *16*; α(Q)=5.88×10^{-6} *9* I_γ: Deduced from Iγ(137.23γ)/Iγ(1082γ)=2.6 *8*/49 *3*, measured in ^{234}Pa g.s. decay.

$^{234}_{92}U_{142}$-3

^{234}Pa β^- decay (1.159 min) 1975Ar23,1990Sc09 (continued)

$\gamma(^{234}U)$ (continued)

E_γ [†]	I_γ [‡c]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	δ	α[d]	Comments
140.1 *10*	1.52 *17*	989.389	2^-	849.23	3^-	M1+E2[&]	1.2 *6*	5.3 *18*	α(K)=2.9 *22*; α(L)=1.76 *25*; α(M)=0.47 *9*; α(N+..)=0.16 *3* α(N)=0.127 *23*; α(O)=0.030 *5*; α(P)=0.0051 *7*; α(Q)=0.00015 *10* Iγ=0.42 *10* is expected from Iγ(140γ)/Iγ(203γ) =49 *5*/119 *10*, Iγ=0.37 *6* from Iγ(140γ)/Iγ(945γ) =0.49 *5*/13.0 *8*, measured in ^{234}Pa g.s. decay.
(166.5 *1*)	0.00029 *8*	1601.81	1^+	1435.11	1^-	[E1]		0.1514	α(K)=0.1179 *17*; α(L)=0.0253 *4*; α(M)=0.00613 *9*; α(N+..)=0.00210 *3* α(N)=0.001636 *23*; α(O)=0.000386 *6*; α(P)=6.92×10^{-5} *10*; α(Q)=3.85×10^{-6} *6* I_γ: Deduced from Iγ(166.5γ)/Iγ(1558γ)=0.6 *1*/1872 *20* in ^{234}Np ε decay.
184.7 *5*	2.0 *2*	1174.1	(1,2$^+$)	989.389	2^-				
193.4[e] *8*	0.85[e] *17*	1044.539	0^+	851.75	2^+	[E2]		0.847 *18*	α(K)=0.163 *3*; α(L)=0.499 *12*; α(M)=0.138 *4*; α(N+..)=0.0474 *11* α(N)=0.0374 *9*; α(O)=0.00862 *20*; α(P)=0.00144 *4*; α(Q)=1.371×10^{-5} *25* Additional information 13.
193.4[e] *8*	0.85[e] *17*	1237.35	1^-	1044.539	0^+	[E1]		0.1065 *19*	α(K)=0.0835 *15*; α(L)=0.0174 *3*; α(M)=0.00421 *8*; α(N+..)=0.00144 *3* α(N)=0.001123 *20*; α(O)=0.000266 *5*; α(P)=4.81×10^{-5} *9*; α(Q)=2.78×10^{-6} *5* Additional information 18.
(197.91 *15*)	0.032 *8*	1435.11	1^-	1237.35	1^-	[M1,E2]		2.0 *12*	α(K)=1.3 *12*; α(L)=0.473 *22*; α(M)=0.122 *4*; α(N+..)=0.0423 *9* α(N)=0.0330 *10*; α(O)=0.00782 *12*; α(P)=0.00141 *11*; α(Q)=7.E−5 *6* I_γ: Deduced from Iγ(197.9γ)/Iγ(1434.13γ)=0.018 *4*/6.38 *25* in ^{234}Np ε decay.
199.9 *10*	0.68 *13*	1126.37	2^+	926.688	2^+	(E0+E2+M1)[&]			ce(K)/(γ+ce)=0.45 *22*; ce(L)/(γ+ce)=0.16 *7*; ce(M)/(γ+ce)=0.040 *17*; ce(N+)/(γ+ce)=0.014 *6* ce(N)/(γ+ce)=0.011 *5*; ce(O)/(γ+ce)=0.0026 *11*; ce(P)/(γ+ce)=0.00046 *19*; ce(Q)/(γ+ce)=2.2×10^{-5} *20* Iγ(199.9γ)/Iγ(1082γ)=0.14 *5* from 6.75-h ^{234}Pa β^- decay, 0.64 *20* here. Use of the ratio from 6.75-h ^{234}Pa decay yields Iγ(199.9γ)=0.12 *5*. Since accuracy and correctness of a conversion coefficient rely on the measured Iγ and Ice values, because of the uncertainty on Iγ's, no conversion coefficient has been adopted, and I(γ+ce)≈5% [deduced from Ti(199.9γ)/Iγ(1082γ)≈5.9 in ^{234}Pa g.s. decay data] has been used for obtaining the Iβ value.
203.3 *8*	2.0 *5*	989.389	2^-	786.312	1^-	M1+E2[&]	1.5 *4*	1.4 *4*	α(K)=0.8 *4*; α(L)=0.420 *12*; α(M)=0.1109 *23*; α(N+..)=0.0384 *8*

$^{234}_{92}U_{142}$-4

^{234}Pa β^- decay (1.159 min) 1975Ar23,1990Sc09 (continued)

$\gamma(^{234}U)$ (continued)

E_γ[†]	I_γ[‡c]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	α[d]	Comments
								α(N)=0.0300 *7*; α(O)=0.00705 *16*; α(P)=0.00124 *5*; α(Q)=4.3×10^{-5} *15*
209.9 *4*	1.6 *2*	1781.27	(0$^+$,1)	1570.61	1$^+$			
(233.6 *2*)		1085.11	2$^+$	851.75	2$^+$			I$_{(\gamma+ce)}$: I(γ+ce)≈0.8%, from Ti(233.6γ)/Iγ(1042γ)≈0.7, deduced in ^{234}Np ε decay.
(235.9 *3*)	0.10 *5*	1085.11	2$^+$	849.23	3$^-$	[E1]	0.0673	α(K)=0.0532 *8*; α(L)=0.01067 *16*; α(M)=0.00258 *4*; α(N+..)=0.000885 *13* α(N)=0.000689 *10*; α(O)=0.0001639 *24*; α(P)=2.99×10^{-5} *5*; α(Q)=1.82×10^{-6} *3* I$_\gamma$: deduced by evaluators from branching of Iγ(235.9γ)/Iγ(942γ)=0.034 *13*, adopted from measurements in ^{238}Pu α decay and ^{234}Np ε decay.
236 *1*		1044.539	0$^+$	809.96	0$^+$	E0		ce(K)/(γ+ce)=0.80; ce(L)/(γ+ce)=0.15 E$_\gamma$: measured by 1963Bj02 (s ce). Eγ=234.6 *2* was measured in ^{234}Np decay. Total Ice=87 *9* from measured Ice(K)=70 and K/L=70/13.
[x]243.5 *8*	0.59 *10*							
247.7 *8*	0.29 *2*	1237.35	1$^-$	989.389	2$^-$	[M1,E2]	1.0 *7*	α(K)=0.7 *7*; α(L)=0.22 *5*; α(M)=0.056 *8*; α(N+..)=0.019 *3* α(N)=0.0151 *20*; α(O)=0.0036 *6*; α(P)=0.00066 *15*; α(Q)=4.E−5 *3* I$_\gamma$: Deduced by the evaluators from Iγ(247.79γ)/Iγ(1193.77γ)=0.109 *7*/6.02 *24* in ^{234}Np ε decay. Iγ=1.14 *25* was measured by 1975Ar23. The I(247.7γ) measured in 1.17-min ^{234}Pa β^-decay may possibly include contribution from another source.
258.227 *3*	90.8[a] *24*	1044.539	0$^+$	786.312	1$^-$	(E1)	0.0548	α(K)=0.0434 *7*; α(L)=0.00859 *12*; α(M)=0.00207 *3*; α(N+..)=0.000712 *10* α(N)=0.000555 *8*; α(O)=0.0001321 *19*; α(P)=2.42×10^{-5} *4*; α(Q)=1.499×10^{-6} *21* E$_\gamma$,I$_\gamma$: From 2000Ni13. Other intensity results: Iγ=97 *4* (1975Ar23), Iγ=87 *2* (1971GuZQ), Iγ=87 *4* (1986Mo09). Ice(K)<5 (not observed). @B@0@0@@@@@ @B@0@1@@@@@@14 80.9 *33* (1975Ar23).
275.5 *8*	0.37 *7*	1126.37	2$^+$	851.75	2$^+$	[M1,E2]	0.8 *6*	α(K)=0.5 *5*; α(L)=0.16 *4*; α(M)=0.039 *8*; α(N+..)=0.014 *3* α(N)=0.0106 *21*; α(O)=0.0025 *6*; α(P)=0.00047 *13*; α(Q)=2.7×10^{-5} *21*
299.0 *10*	0.77 *16*	1085.11	2$^+$	786.312	1$^-$	[E1]	0.0395 *7*	α(K)=0.0315 *5*; α(L)=0.00608 *10*; α(M)=0.001467 *24*; α(N+..)=0.000504 *8* α(N)=0.000392 *7*; α(O)=9.37×10^{-5} *15*; α(P)=1.73×10^{-5} *3*; α(Q)=1.105×10^{-6} *18* I$_\gamma$: Iγ(299γ)/Iγ(942γ)=0.10 *3* from ^{238}Pu α decay, 0.085 *10* from ^{234}Np ε decay, 0.30 *13* from 6.75-h ^{234}Pa β^- decay, and 0.26 *6* here. The adopted ratio of 0.10 *3* yields Iγ(299.0γ)=0.25 *8*.
311.0 *10*	0.10 *1*	1237.35	1$^-$	926.688	2$^+$	[E1]	0.0363 *6*	α(K)=0.0289 *5*; α(L)=0.00556 *9*; α(M)=0.001339 *22*; α(N+..)=0.000460 *8* α(N)=0.000358 *6*; α(O)=8.55×10^{-5} *14*; α(P)=1.579×10^{-5} *25*; α(Q)=1.019×10^{-6} *16* I$_\gamma$: Deduced from Iγ(310.52γ)/Iγ(1193.77γ)= 0.039 *4*/6.02 *24* in ^{234}Np ε decay. Iγ(311γ)=0.61 *12* was measured by 1975Ar23. The I(311.0γ) measured in 1.17-min ^{234}Pa β^-decay may possibly include contribution from another source. E$_\gamma$: Eγ=310.52 *10* from ^{234}Np ε decay.
(316.7 *1*)	0.22 *6*	1126.37	2$^+$	809.96	0$^+$	[E2]	0.1597	α(K)=0.0677 *10*; α(L)=0.0674 *10*; α(M)=0.0182 *3*; α(N+..)=0.00629 *9*

$^{234}_{92}U_{142}$-5

^{234}Pa β^- decay (1.159 min) 1975Ar23,1990Sc09 (continued)

$\gamma(^{234}U)$ (continued)

E_γ [†]	I_γ [‡c]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [#]	δ	α [d]	Comments
									α(N)=0.00494 *7*; α(O)=0.001150 *17*; α(P)=0.000197 *3*; α(Q)=4.01×10^{-6} *6* I_γ: Deduced by evaluators from Iγ(3167γ)/Iγ(1082γ)=10 *1*/49 *3* in ^{234}Pa g.s. decay.
338.1 *8*	1.3 *3*	1796.4	(1)	1457.46	(2$^-$)				The intensity imbalance at the 1457-keV level (Iβ=−0.0014 *6*) improves if the 338.1γ decaying to that level is E1 with α=0.0304.
(340.2 *1*)	0.08 *4*	1126.37	2$^+$	786.312	1$^-$	[E1]		0.0298	α(K)=0.0239 *4*; α(L)=0.00453 *7*; α(M)=0.001090 *16*; α(N+..)=0.000375 *6* α(N)=0.000292 *4*; α(O)=6.97×10^{-5} *10*; α(P)=1.292×10^{-5} *19*; α(Q)=8.49×10^{-7} *12* I_γ: Deduced from Iγ(340.1γ)/Iγ(1082γ)=3.9 *8*/49 *3* in ^{234}Pa g.s. β^- decay.
357.5 *10*	0.95 *20*	1911.10	(1$^-$)	1553.69	(1)				α(M1)=0.660, α(E1)=0.0270, α(E2)=0.1146.
362.8 *10*	0.81 *17*	1796.4	(1)	1435.11	1$^-$				If the 338.1γ, decaying to (2$^-$) state is E1, then the 362.8γ decaying to the 1$^-$ state is also E1, with α=0.0262.
387.6[f] *8*	1.1[f] *1*	1174.1	(1,2$^+$)	786.312	1$^-$				I_γ: 1.70 *17* was measured for this doubly placed γ. Iγ=0.465 *20* has been deduced by the evaluators for the 387.6γ deexciting the 1237-keV level. α: if the 184.7γ (decays to 2$^-$ state) is M1, then, J^π(1174 level)=1$^-$, and the 387.6γ (which decays to 1$^-$ state) should be M1,E2. α(M1)=0.529, α(E2)=0.0917, α(E1)=0.0228.
387.6[f] *8*	0.556[f] *20*	1237.35	1$^-$	849.23	3$^-$	[E2]		0.0899 *14*	α(K)=0.0463 *7*; α(L)=0.0321 *5*; α(M)=0.00858 *14*; α(N+..)=0.00296 *5* α(N)=0.00232 *4*; α(O)=0.000543 *9*; α(P)=9.45×10^{-5} *15*; α(Q)=2.54×10^{-6} *4* E_γ: 387.94 *6* was measured in ^{234}Np ε decay. I_γ: Deduced from Iγ(387.6γ)/Iγ(1193.77γ)= 0.208 *12*/6.02 *24* in ^{234}Np ε decay.
(427.4 *2*)	0.024 *6*	1237.35	1$^-$	809.96	0$^+$	[E1]		0.0185	α(K)=0.01488 *21*; α(L)=0.00274 *4*; α(M)=0.000657 *10*; α(N+..)=0.000226 *4* α(N)=0.0001758 *25*; α(O)=4.22×10^{-5} *6*; α(P)=7.88×10^{-6} *11*; α(Q)=5.40×10^{-7} *8* I_γ: Deduced from Iγ(427.4γ)/Iγ(1193.77γ)= 0.009 *2*/6.02 *24* in ^{234}Np ε decay.
(445.91 *10*)	0.036 *8*	1435.11	1$^-$	989.389	2$^-$	[M1,E2]		0.20 *14*	α(K)=0.15 *12*; α(L)=0.036 *16*; α(M)=0.009 *4*; α(N+..)=0.0031 *13* α(N)=0.0024 *10*; α(O)=0.00058 *25*; α(P)=0.00011 *5*; α(Q)=7.E−6 *6* I_γ: Deduced from Iγ(445.9γ)/Iγ(1434.13γ)=0.020 *4*/6.38 *25* in ^{234}Np ε decay.
450.97 *10*	3.70[a] *17*	1237.35	1$^-$	786.312	1$^-$	M1+E2	0.70	0.241	α(K)=0.187 *3*; α(L)=0.0400 *6*; α(M)=0.00979 *14*; α(N+..)=0.00341 *5* α(N)=0.00264 *4*; α(O)=0.000638 *9*; α(P)=0.0001213 *17*; α(Q)=8.79×10^{-6} *13* Additional information 19.

^{234}Pa β^- decay (1.159 min) 1975Ar23,1990Sc09 (continued)

$\gamma(^{234}U)$ (continued)

E_γ [†]	I_γ [‡c]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [#]	α [d]	Comments
453.58 *10*	2.53[a] *14*	1911.10	(1$^-$)	1457.46	(2$^-$)	[M1]	0.324	α(K)=0.258 *4*; α(L)=0.0495 *7*; α(M)=0.01193 *17*; α(N+..)=0.00416 *6* α(N)=0.00321 *5*; α(O)=0.000781 *11*; α(P)=0.0001507 *22*; α(Q)=1.201×10^{-5} *17* Additional information 36.
456.7 *10*	0.85 *17*	1693.8?	(1$^-$)	1237.35	1$^-$	[M1]	0.318	α(K)=0.253 *4*; α(L)=0.0485 *8*; α(M)=0.01171 *18*; α(N+..)=0.00408 *7* α(N)=0.00315 *5*; α(O)=0.000767 *12*; α(P)=0.0001479 *23*; α(Q)=1.179×10^{-5} *18*
468.43 *10*	2.72[a] *17*	1553.69	(1)	1085.11	2$^+$			Additional information 23.
475.74 *10*	2.84[a] *17*	1911.10	(1$^-$)	1435.11	1$^-$	[M1]	0.285	α(K)=0.227 *4*; α(L)=0.0434 *6*; α(M)=0.01048 *15*; α(N+..)=0.00365 *6* α(N)=0.00282 *4*; α(O)=0.000686 *10*; α(P)=0.0001323 *19*; α(Q)=1.055×10^{-5} *15* Additional information 37.
(485.44 *7*)	0.0226 *23*	1570.61	1$^+$	1085.11	2$^+$	[M1,E2]	0.16 *11*	α(K)=0.12 *10*; α(L)=0.028 *13*; α(M)=0.007 *3*; α(N+..)=0.0024 *11* α(N)=0.0019 *8*; α(O)=0.00045 *20*; α(P)=8.E−5 *4*; α(Q)=6.E−6 *5* I_γ: Deduced from Iγ(485γ)/Iγ(1527γ)= 0.89 *7*/112 *5* in ^{234}Np ε decay.
507.5 *10*	1.87 *17*	1592.38	(1)	1085.11	2$^+$			
509.2 *8*	2.5 *3*	1553.69	(1)	1044.539	0$^+$			
(516.60 *6*)	0.016 *4*	1601.81	1$^+$	1085.11	2$^+$	(M1)	0.228	α(K)=0.182 *3*; α(L)=0.0347 *5*; α(M)=0.00837 *12*; α(N+..)=0.00292 *4* α(N)=0.00226 *4*; α(O)=0.000548 *8*; α(P)=0.0001058 *15*; α(Q)=8.44×10^{-6} *12* I_γ: Deduced from Iγ(516γ)/Iγ(1558γ)= 31.3 *19*/1872 *20* in ^{234}Np ε decay.
(526.02 *10*)	0.011 *2*	1570.61	1$^+$	1044.539	0$^+$	[M1]	0.217	α(K)=0.1732 *25*; α(L)=0.0331 *5*; α(M)=0.00797 *12*; α(N+..)=0.00278 *4* α(N)=0.00215 *3*; α(O)=0.000522 *8*; α(P)=0.0001007 *15*; α(Q)=8.04×10^{-6} *12* I_γ: Deduced from Iγ(526γ)/Iγ(1527γ)= 0.43 *5*/112 *5* in ^{234}Np ε decay.
543.98 *10*	4.36 *19*	1781.27	(0$^+$,1)	1237.35	1$^-$		0.11 *10*	Additional information 29.
(557.24 *6*)	0.010 *2*	1601.81	1$^+$	1044.539	0$^+$	(M1)	0.186	α(K)=0.1485 *21*; α(L)=0.0283 *4*; α(M)=0.00682 *10*; α(N+..)=0.00238 *4* α(N)=0.00184 *3*; α(O)=0.000447 *7*; α(P)=8.62×10^{-5} *12*; α(Q)=6.88×10^{-6} *10* I_γ: Deduced from Iγ(557γ)/Iγ(1558γ)=21.4 *13*/1872 *20* in ^{234}Np ε decay.
[x]557.3 *10*	0.85 *17*							
572.0 *10*	1.03 *2*	1809.00	(1$^-$)	1237.35	1$^-$	[M1]	0.173	α(K)=0.1384 *21*; α(L)=0.0264 *4*; α(M)=0.00636 *10*; α(N+..)=0.00221 *4* α(N)=0.00171 *3*; α(O)=0.000416 *7*; α(P)=8.03×10^{-5} *12*; α(Q)=6.41×10^{-6} *10*
(581.19 *10*)	0.097 *12*	1570.61	1$^+$	989.389	2$^-$	[E1]	0.01006	α(K)=0.00815 *12*; α(L)=0.001445 *21*; α(M)=0.000345 *5*; α(N+..)=0.0001192 *17* α(N)=9.24×10^{-5} *13*; α(O)=2.23×10^{-5} *4*; α(P)=4.20×10^{-6} *6*; α(Q)=3.03×10^{-7} *5* I_γ: Deduced from Iγ(581γ)/Iγ(1527γ)= 3.8 *4*/112 *5* in ^{234}Np ε decay.
624.6 *10*	0.137 *15*	1435.11	1$^-$	809.96	0$^+$	[E1]	0.00877	α(K)=0.00712 *11*; α(L)=0.001252 *18*; α(M)=0.000299 *5*; α(N+..)=0.0001032 *15* α(N)=8.00×10^{-5} *12*; α(O)=1.93×10^{-5} *3*; α(P)=3.64×10^{-6} *6*; α(Q)=2.66×10^{-7} *4* I_γ: 1.42 *15* listed by 1975Ar23 is assumed by the evaluators to be in error: the ratio of Iγ(625γ)/Iγ(1434γ)=0.0119 *12* from Iγ's measured in ^{234}Np ε decay does not agree with the ratio that one obtains in 1.17-min ^{234}Pa β^- decay, if Iγ(625γ)=1.42 *5*. The ratio observed in ^{234}Np ε decay is adopted, since data of 1967Wa09 confirm it.
[x]647.7 *8*	1.87 *17*							

^{234}Pa β^- decay (1.159 min) 1975Ar23,1990Sc09 (continued)

$\gamma(^{234}U)$ (continued)

E_γ[†]	I_γ[‡c]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	α[d]	Comments
649.0[f] *10*	0.049[f] *10*	1435.11	1^-	786.312	1^-	[M1,E2]	0.08 *5*	α(K)=0.06 *4*; α(L)=0.012 *7*; α(M)=0.0031 *15*; α(N+..)=0.0011 *6* α(N)=0.0008 *4*; α(O)=0.00020 *10*; α(P)=3.8×10^{-5} *20*; α(Q)=2.7×10^{-6} *19* I_γ: 1.06 *22* was measured for this doubly-placed γ. The total Iγ is divided by the evaluators such that the Iγ(649γ)/Iγ(1434γ) ratio from the 1435-keV level and the Iγ(649γ)/Iγ(691γ) ratio from the 1500-keV level agree with those in ^{234}Np ε decay.
649.0[f] *10*	1.2[f] *3*	1501.0	(1)	851.75	2^+			
655.3 *10*	1.64 *17*	1781.27	(0^+,1)	1126.37	2^+		0.068 *60*	
670.8 *10*	0.44 *10*	1457.46	(2^-)	786.312	1^-	[M1,E2]	0.07 *5*	α(K)=0.05 *4*; α(L)=0.011 *6*; α(M)=0.0028 *14*; α(N+..)=0.0010 *5* α(N)=0.0008 *4*; α(O)=0.00018 *9*; α(P)=3.5×10^{-5} *18*; α(Q)=2.5×10^{-6} *17*
673.9 *10*	0.77 *16*	1911.10	(1^-)	1237.35	1^-	[M1]		
683.4 *10*	0.68 *13*	1809.00	(1^-)	1126.37	2^+	[E1]	0.00741	α(K)=0.00603 *9*; α(L)=0.001050 *15*; α(M)=0.000250 *4*; α(N+..)=8.65×10^{-5} *13* α(N)=6.70×10^{-5} *10*; α(O)=1.618×10^{-5} *24*; α(P)=3.06×10^{-6} *5*; α(Q)=2.26×10^{-7} *4*
691.0 *3*	10.6 *2*	1501.0	(1)	809.96	0^+			
695.5 *10*	1.93 *16*	1781.27	(0^+,1)	1085.11	2^+		0.059 *52*	Additional information 30.
699.02 *10*	6.8 *3*	1936.76	(1)	1237.35	1^-			
702.00 *10*	8.6[a] *2*	1553.69	(1)	851.75	2^+			Additional information 24.
705.94 *12*	6.7 *4*	849.23	3^-	143.24	4^+	[E1]	0.00698	α(K)=0.00568 *8*; α(L)=0.000987 *14*; α(M)=0.000235 *4*; α(N+..)=8.12×10^{-5} *12* α(N)=6.30×10^{-5} *9*; α(O)=1.519×10^{-5} *22*; α(P)=2.88×10^{-6} *4*; α(Q)=2.13×10^{-7} *3*
708.2 *10*	0.8	851.75	2^+	143.24	4^+	[E2]	0.0219	α(K)=0.01537 *22*; α(L)=0.00489 *7*; α(M)=0.001247 *19*; α(N+..)=0.000432 *7* α(N)=0.000337 *5*; α(O)=8.00×10^{-5} *12*; α(P)=1.458×10^{-5} *22*; α(Q)=7.28×10^{-7} *11*
(719.01 *7*)	0.031 *4*	1570.61	1^+	851.75	2^+	[M1+E2]	0.06 *4*	α(K)=0.05 *3*; α(L)=0.009 *5*; α(M)=0.0023 *12*; α(N+..)=0.0008 *4* α(N)=0.0006 *3*; α(O)=0.00015 *8*; α(P)=2.9×10^{-5} *15*; α(Q)=2.1×10^{-6} *14* I_γ: Deduced from Iγ(720γ)/Iγ(1527γ)= 1.22 *7*/112 *5* in ^{234}Np ε decay.
732.5 *10*	1.54 *17*	1969.9	(1^-)	1237.35	1^-			
740.10 *8*	13[a] *2*	1592.38	(1)	851.75	2^+			Additional information 27.
742.813 *5*	126.6 *24*	786.312	1^-	43.4978	2^+	E1	0.00636	α(K)=0.00518 *8*; α(L)=0.000895 *13*; α(M)=0.000213 *3*; α(N+..)=7.37×10^{-5} *11* α(N)=5.71×10^{-5} *8*; α(O)=1.378×10^{-5} *20*; α(P)=2.61×10^{-6} *4*; α(Q)=1.95×10^{-7} *3* E_γ,I_γ: From 2000Ni13. Other intensity results: Iγ=95.8 *4* (1975Ar23), Iγ=106.6 *24* (1971GuZQ), Iγ=117 *2* (1986Mo09). E_γ: From 1972Sa06. Ice(K)<1 (not observed).
(750.12 *6*)	0.021 *5*	1601.81	1^+	851.75	2^+	(M1)	0.0841	α(K)=0.0672 *10*; α(L)=0.01272 *18*; α(M)=0.00306 *5*; α(N+..)=0.001067

$^{234}_{92}U_{142}$-8

^{234}Pa β^- decay (1.159 min) 1975Ar23,1990Sc09 (continued)

$\gamma(^{234}U)$ (continued)

E_γ [†]	I_γ [‡c]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [#]	α [d]	Comments
								15 α(N)=0.000825 *12*; α(O)=0.000201 *3*; α(P)=3.87×10^{-5} *6*; α(Q)=3.09×10^{-6} *5* I_γ: Deduced by the evaluators from Iγ(750.7γ)/Iγ(1558γ)=44.0 *26*/1872 *20* in ^{234}Np ε decay.
[x]760.3 *10*	1.87 *17*							
(760.53 *15*)	0.0051 *11*	1570.61	1$^+$	809.96	0$^+$	[M1]	0.0811	α(K)=0.0648 *9*; α(L)=0.01226 *18*; α(M)=0.00295 *5*; α(N+..)=0.001029 *15* α(N)=0.000795 *12*; α(O)=0.000193 *3*; α(P)=3.73×10^{-5} *6*; α(Q)=2.98×10^{-6} *5* Deduced from Iγ(760γ)/Iγ(1527γ)= 0.20 *4*/112 *5* in ^{234}Np ε decay.
766.42 *10*	377 *4*	809.96	0$^+$	43.4978	2$^+$	(E2)	0.0187	α(K)=0.01336 *19*; α(L)=0.00396 *6*; α(M)=0.001003 *14*; α(N+..)=0.000348 *5* α(N)=0.000271 *4*; α(O)=6.45×10^{-5} *9*; α(P)=1.182×10^{-5} *17*; α(Q)=6.25×10^{-7} *9* E_γ: From 1972Sa06. Additional information 9.
781.75 *10*	9.23[a] *22*	1592.38	(1)	809.96	0$^+$			Other measurements: Iγ=7.5 *7* (1975Ar23), 7.2 *10* (1992Si17).
(783.4 *1*)	0.046 *3*	926.688	2$^+$	143.24	4$^+$	[E2]	0.0179	α(K)=0.01285 *18*; α(L)=0.00374 *6*; α(M)=0.000946 *14*; α(N+..)=0.000328 *5* α(N)=0.000255 *4*; α(O)=6.08×10^{-5} *9*; α(P)=1.116×10^{-5} *16*; α(Q)=5.99×10^{-7} *9* I_γ: Deduced by evaluators from Iγ(783.4γ)/Iγ(926.7γ)=0.29 *3*/9.3 *6*=0.031 *4* in ^{234}Pa g.s. decay.
786.28 *10*	64.6 *8*	786.312	1$^-$	0.0	0$^+$	(E1)	0.00573	α(K)=0.00467 *7*; α(L)=0.000804 *12*; α(M)=0.000191 *3*; α(N+..)=6.61×10^{-5} *10* α(N)=5.12×10^{-5} *8*; α(O)=1.237×10^{-5} *18*; α(P)=2.35×10^{-6} *4*; α(Q)=1.766×10^{-7} *25* E_γ: From 1972Sa06. Ice(K)<1 (not observed).
(791.94 *5*)	0.012 *4*	1601.81	1$^+$	809.96	0$^+$	[M1]	0.0728	α(K)=0.0582 *9*; α(L)=0.01100 *16*; α(M)=0.00265 *4*; α(N+..)=0.000923 *13* α(N)=0.000713 *10*; α(O)=0.0001735 *25*; α(P)=3.35×10^{-5} *5*; α(Q)=2.68×10^{-6} *4* I_γ: Deduced by the evaluators from the ratios of Iγ(791.9γ)/Iγ(1558γ)=25.4 *15*/1872 *20* in ^{234}Np ε decay.
805.75 *10*	7.0 *4*	849.23	3$^-$	43.4978	2$^+$	[E1]	0.00549	α(K)=0.00447 *7*; α(L)=0.000768 *11*; α(M)=0.000183 *3*; α(N+..)=6.31×10^{-5} *9* α(N)=4.89×10^{-5} *7*; α(O)=1.182×10^{-5} *17*; α(P)=2.25×10^{-6} *4*; α(Q)=1.693×10^{-7} *24*
808.20 *10*	3.3 *2*	851.75	2$^+$	43.4978	2$^+$	E0+E2		Ice(K)<20 (line questionable, 1963Bj02). α: deduced in ^{234}Np ε decay.
811		809.96	0$^+$	0.0	0$^+$	E0		$I_{(\gamma+ce)}$: I(γ+ce)=850 from Ice(811)/Iγ(1001)=0.51/0.60=0.85 (1963Bj02). E_γ: From 1963Bj02 (s ce). 809.8 from ^{234}Np ε decay, and 810.0 *7* from 6.75-h ^{234}Pa β^- decay. Additional information 10.
818.2 *5*	1.2 *3*	1667.4	(1$^-$)	849.23	3$^-$			
825.6 *5*	7.8 *4*	1911.10	(1$^-$)	1085.11	2$^+$			
844.1 *8*	1.3 *3*	1693.8?	(1$^-$)	849.23	3$^-$			
851.58 *10*	8.2 *1*	851.75	2$^+$	0.0	0$^+$	[E2]	0.01514	α(K)=0.01109 *16*; α(L)=0.00302 *5*; α(M)=0.000760 *11*; α(N+..)=0.000263 *4* α(N)=0.000205 *3*; α(O)=4.89×10^{-5} *7*; α(P)=9.03×10^{-6} *13*; α(Q)=5.10×10^{-7} *8*
866.8 *10*	1.35 *17*	1911.10	(1$^-$)	1044.539	0$^+$			
880.9 *5*	4.7 *5*	1667.4	(1$^-$)	786.312	1$^-$			
883.22 *10*	4.2 *4*	926.688	2$^+$	43.4978	2$^+$	E2	0.01409	α(K)=0.01040 *15*; α(L)=0.00276 *4*; α(M)=0.000692 *10*; α(N+..)=0.000240 *4*

$^{234}_{92}U_{142}$-9

^{234}Pa β^- decay (1.159 min) 1975Ar23,1990Sc09 (continued)

$\gamma(^{234}U)$ (continued)

E_γ[†]	I_γ[‡c]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	α[d]	Comments
								α(N)=0.000187 *3*; α(O)=4.46×10^{-5} *7*; α(P)=8.25×10^{-6} *12*; α(Q)=4.76×10^{-7} *7* I_γ: From 1975Ar23. Iγ=20.5 *7* (1971GuZQ) and Iγ=22.2 *2* (1990Sc09) significantly disagree with value from 1975Ar23, probably due to source contamination. Mult.: from ^{234}Pa g.s. decay. E_γ: measured by 1972Sa06 from decays of 6.75-h and 1.17-min ^{234}Pa in equilibrium with ^{238}U source. Additional information 12. Iγ(883)/Iγ(926)=1.3 *1* from ^{238}Pu α decay compares with Iγ(883)/Iγ(926)=1.10 *3* from ^{234}Pa(1.159 min) β^- decay suggesting most of its intensity de-excites the 927-keV level.
[x]887.29 *10*	8.42[a] *11*							Additional information 4.
921.72 *10*	15.19[a] *12*	1911.10	(1$^-$)	989.389	2$^-$			Additional information 38.
926.61 *10*	1.47 *16*	926.688	2$^+$	0.0	0$^+$	(E2)[&]	0.0128 *4*	α(K)=0.00956 *14*; α(L)=0.00245 *4*; α(M)=0.000613 *9*; α(N+..)=0.000213 *3* α(N)=0.0001653 *24*; α(O)=3.96×10^{-5} *6*; α(P)=7.34×10^{-6} *11*; α(Q)=4.35×10^{-7} *6* I_γ: From 1975Ar23. Iγ=20.5 *12* (1971GuZQ) and Iγ=20.6 *2* (1990Sc09) significantly disagree with value from 1975Ar23, probably due to source contamination.
936.3 *10*	1.3 *4*	1863.15	(1)	926.688	2$^+$			
941.96 *10*	3.0[a] *1*	1085.11	2$^+$	143.24	4$^+$	[E2]	0.01244	α(K)=0.00929 *13*; α(L)=0.00236 *4*; α(M)=0.000589 *9*; α(N+..)=0.000204 *3* α(N)=0.0001587 *23*; α(O)=3.80×10^{-5} *6*; α(P)=7.05×10^{-6} *10*; α(Q)=4.21×10^{-7} *6* Additional information 16.
945.94 *2*	12 *1*	989.389	2$^-$	43.4978	2$^+$	(E1)[&]	0.00412	α(K)=0.00337 *5*; α(L)=0.000571 *8*; α(M)=0.0001355 *19*; α(N+..)=4.69×10^{-5} *7* α(N)=3.63×10^{-5} *5*; α(O)=8.79×10^{-6} *13*; α(P)=1.675×10^{-6} *24*; α(Q)=1.286×10^{-7} *18* I_γ: From 1975Ar23. Iγ=30.2 *7* (1971GuZQ) and Iγ=28.2 *3* (1990Sc09) significantly disagree with value from 1975Ar23, probably due to source contamination.
960.0 *10*	1.0 *4*	1809.00	(1$^-$)	849.23	3$^-$			
996.1 *20*	6.7 *5*	1781.27	(0$^+$,1)	786.312	1$^-$			
1001.03 *10*	1000.0 *24*	1044.539	0$^+$	43.4978	2$^+$	E2	0.01107	α(K)=0.00835 *12*; α(L)=0.00204 *3*; α(M)=0.000507 *8*; α(N+..)=0.0001760 *25* α(N)=0.0001367 *20*; α(O)=3.28×10^{-5} *5*; α(P)=6.10×10^{-6} *9*; α(Q)=3.76×10^{-7} *6* E_γ: measurement of 1972Sa06. Ice(K)=5.7. Additional information 15.

$^{234}_{92}U_{142}$-10

^{234}Pa β^- decay (1.159 min) 1975Ar23,1990Sc09 (continued)

$\gamma(^{234}U)$ (continued)

E_γ[†]	I_γ[‡c]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	α[d]	Comments
1041.70 *10*	1.47[a] *8*	1085.11	2^+	43.4978	2^+	[E2,M1]	0.023 *13*	α(K)=0.018 *11*; α(L)=0.0036 *18*; α(M)=0.0009 *4*; α(N+..)=0.00030 *15* α(N)=0.00023 *11*; α(O)=6.E−5 *3*; α(P)=1.1×10^{-5} *6*; α(Q)=8.E−7 *5* Ice(K)<0.8 (not observed). Additional information 17.
1059.4 *8*	2.71 *12*	1911.10	(1$^-$)	851.75	2^+			
1061.86 *10*	2.54[a] *14*	1911.10	(1$^-$)	849.23	3^-			Additional information 39.
1081.9 *10*	1.07 *22*	1126.37	2^+	43.4978	2^+	(M1)[&]	0.0318	α(K)=0.0255 *4*; α(L)=0.00478 *7*; α(M)=0.001151 *17*; α(N+..)=0.000401 *6* α(N)=0.000310 *5*; α(O)=7.53×10^{-5} *11*; α(P)=1.454×10^{-5} *21*; α(Q)=1.167×10^{-6} *17*
1084.25 *10*	1.0 *3*	1085.11	2^+	0.0	0^+	[E2]	0.00952	α(K)=0.00726 *11*; α(L)=0.001694 *24*; α(M)=0.000419 *6*; α(N+..)=0.0001455 *21* α(N)=0.0001130 *16*; α(O)=2.71×10^{-5} *4*; α(P)=5.07×10^{-6} *8*; α(Q)=3.24×10^{-7} *5*
1120.6 *8*	2.04 *17*	1969.9	(1$^-$)	849.23	3^-			
1124.93[f] *10*	0.4[f] *1*	1126.37	2^+	0.0	0^+	[E2]	0.00888	α(K)=0.00681 *10*; α(L)=0.001558 *22*; α(M)=0.000385 *6*; α(N+..)=0.0001338 *19* α(N)=0.0001036 *15*; α(O)=2.49×10^{-5} *4*; α(P)=4.67×10^{-6} *7*; α(Q)=3.02×10^{-7} *5*; α(IPF)=2.81×10^{-7} *5* I_γ: 4.0 *5* was measured for this doubly-placed γ. Iγ(leaving 1126 level)=0.53 *3*, deduced by the evaluators from Iγ(1126γ)/Iγ(1082γ)=29 *3*/49 *3* in ^{234}Pa g.s. β^- decay.
1124.93[f] *10*	3.6[f] *1*	1911.10	(1$^-$)	786.312	1^-			
1174.2 *10*	2.3 *2*	1174.1	(1,2$^+$)	0.0	0^+			
1193.73 *12*	16.14[a] *12*	1237.35	1^-	43.4978	2^+	E1	0.00277	α(K)=0.00226 *4*; α(L)=0.000377 *6*; α(M)=8.93×10^{-5} *13*; α(N+..)=4.12×10^{-5} *6* α(N)=2.39×10^{-5} *4*; α(O)=5.80×10^{-6} *9*; α(P)=1.109×10^{-6} *16*; α(Q)=8.70×10^{-8} *13*; α(IPF)=1.026×10^{-5} *15* E_γ: measurement of 1972Sa06. Additional information 20.
[x]1220.37 *10*	1.08[a] *10*							Additional information 5.
1237.26 *10*	6.24[a] *11*	1237.35	1^-	0.0	0^+	E1	0.00262	α(K)=0.00213 *3*; α(L)=0.000354 *5*; α(M)=8.38×10^{-5} *12*; α(N+..)=5.11×10^{-5} *8* α(N)=2.25×10^{-5} *4*; α(O)=5.44×10^{-6} *8*; α(P)=1.042×10^{-6} *15*; α(Q)=8.20×10^{-8} *12*; α(IPF)=2.21×10^{-5} *4* Additional information 21.
[x]1353.0 *15*	1.29[@] *9*							
1392.7 *10*	4.11 *24*	1435.11	1^-	43.4978	2^+	E1	0.00221	α(K)=0.001743 *25*; α(L)=0.000288 *4*; α(M)=6.82×10^{-5} *10*; α(N+..)=0.0001120 *17* α(N)=1.83×10^{-5} *3*; α(O)=4.43×10^{-6} *7*; α(P)=8.50×10^{-7} *12*; α(Q)=6.75×10^{-8} *10*; α(IPF)=8.84×10^{-5} *14*

$^{234}_{92}U_{142}$-11

^{234}Pa β^- decay (1.159 min) 1975Ar23,1990Sc09 (continued)

$\gamma(^{234}U)$ (continued)

E_γ [†]	I_γ [‡c]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	α[d]	Comments
								E_γ: From 1975Ar23. Iγ=3.89 *10* measured by 1990Sc09 and 1.56 *15* measured by 1975Ar23 do not agree. Iγ of 1990Sc09 may include some counts from the 1393.9γ of ^{234}Pa g.s. decay. However, the 1434γ deexciting the same level should not have any interference from the ^{234}Pa g.s. decay. The ratio, Iγ(1392γ)/Iγ(1434γ)=0.356 *20* from Iγ's measured in ^{234}Np ε decay; this ratio is 0.402 *12* and 0.190 *28* from Iγ's of 1990Sc09 and 1975Ar23, respectively. The ratio of 0.356 *20* is used by the evaluators to obtain Iγ(1392γ) given here.
1413.88 *10*	2.69[a] *8*	1457.46	(2$^-$)	43.4978	2$^+$	[E1]	0.00217	α(K)=0.001700 *24*; α(L)=0.000281 *4*; α(M)=6.64×10^{-5} *10*; α(N+..)=0.0001235 *18* α(N)=1.780×10^{-5} *25*; α(O)=4.32×10^{-6} *6*; α(P)=8.28×10^{-7} *12*; α(Q)=6.59×10^{-8} *10*; α(IPF)=0.0001005 *1* Additional information 22.
1434.14 *10*	11.56[a] *23*	1435.11	1$^-$	0.0	0$^+$	E1	0.00213	α(K)=0.001660 *24*; α(L)=0.000274 *4*; α(M)=6.48×10^{-5} *9*; α(N+..)=0.0001348 *19* α(N)=1.737×10^{-5} *25*; α(O)=4.21×10^{-6} *6*; α(P)=8.08×10^{-7} *12*; α(Q)=6.44×10^{-8} *9*; α(IPF)=0.0001123 *16* Other measurements: Iγ=8.2 *9* (1975Ar23), 9.4 *15* (1992Si17).
1458.5 *15*	2.2 *5*	1501.0	(1)	43.4978	2$^+$			
1501 *2*	≈1.1[@]	1501.0	(1)	0.0	0$^+$			
1510.21 *10*	15.5[a] *2*	1553.69	(1)	43.4978	2$^+$			Additional information 25.
1527.27 *10*	2.39[a] *9*	1570.61	1$^+$	43.4978	2$^+$	E2+M1	0.009 *4*	α(K)=0.007 *4*; α(L)=0.0014 *6*; α(M)=0.00033 *14*; α(N+..)=0.00022 *10* α(N)=9.E−5 *4*; α(O)=2.1×10^{-5} *9*; α(P)=4.1×10^{-6} *17*; α(Q)=3.2×10^{-7} *15*; α(IPF)=0.00011 *5* Other measurement: Iγ=2.1 *3* (1975Ar23).
1550.0 *10*	1.35 *8*	1592.38	(1)	43.4978	2$^+$			
1553.75 *10*	9.75[a] *11*	1553.69	(1)	0.0	0$^+$			Additional information 26.
1558.4 *10*	0.85 *10*	1601.81	1$^+$	43.4978	2$^+$	M1	0.01228	α(K)=0.00971 *14*; α(L)=0.00181 *3*; α(M)=0.000434 *7*; α(N+..)=0.000330 *5* α(N)=0.0001169 *17*; α(O)=2.84×10^{-5} *4*; α(P)=5.49×10^{-6} *8*; α(Q)=4.43×10^{-7} *7*; α(IPF)=0.000178 *3*
1570.67 *10*	1.29[a] *10*	1570.61	1$^+$	0.0	0$^+$	M1	0.01204	α(K)=0.00951 *14*; α(L)=0.001769 *25*; α(M)=0.000425 *6*; α(N+..)=0.000335 *5* α(N)=0.0001145 *16*; α(O)=2.79×10^{-5} *4*; α(P)=5.38×10^{-6} *8*; α(Q)=4.34×10^{-7} *6*; α(IPF)=0.000187 *3* Other measurement: Iγ=1.2 *3* (1975Ar23).
1593.87 *10*	2.25[a] *7*	1592.38	(1)	0.0	0$^+$			Additional information 28.
1601.8 *15*	0.56 *25*	1601.81	1$^+$	0.0	0$^+$	(M1)	0.01146	α(K)=0.00902 *13*; α(L)=0.001679 *24*; α(M)=0.000403 *6*; α(N+..)=0.000351 *5* α(N)=0.0001086 *16*; α(O)=2.64×10^{-5} *4*; α(P)=5.10×10^{-6} *8*; α(Q)=4.11×10^{-7} *6*; α(IPF)=0.000210 *4*
1667.6 *10*	1.37[@] *8*	1667.4	(1$^-$)	0.0	0$^+$			
1694.1 *10*	0.54[@] *11*	1693.8?	(1$^-$)	0.0	0$^+$			
[x]1720.5 *15*	0.40[@] *17*							
[x]1732.2 *15*	2.2 *3*							

^{234}Pa β^- decay (1.159 min) 1975Ar23,1990Sc09 (continued)

$\gamma(^{234}U)$ (continued)

E_γ [†]	I_γ [‡ c]	E_i(level)	J_i^π	E_f	J_f^π	Comments
1737.75 *10*	25.3 [a] *2*	1781.27	$(0^+,1)$	43.4978	2^+	Additional information 31.
[x]1759.81 *10*	1.74 [a] *6*					Additional information 6.
1765.44 *10*	10.4 [a] *1*	1809.00	(1^-)	43.4978	2^+	Additional information 32.
1796.2 *10*	0.50 *8*	1796.4	(1)	0.0	0^+	
1809.04 *10*	4.44 [a] *8*	1809.00	(1^-)	0.0	0^+	Other measurements: Iγ=4.3 *5* (1975Ar23), 3.9 *8* (1992Si17).
1819.69 *10*	1.05 [a] *6*	1863.15	(1)	43.4978	2^+	Additional information 33.
1831.36 *10*	20.7 [a] *2*	1874.88	(1)	43.4978	2^+	Additional information 34.
1863.09 *10*	1.44 *11*	1863.15	(1)	0.0	0^+	Other measurement: Iγ=1.21 *25* (1975Ar23).
1867.69 *10*	11.0 [a] *1*	1911.10	(1^-)	43.4978	2^+	Additional information 40.
1874.88 *10*	9.72 [a] *11*	1874.88	(1)	0.0	0^+	Additional information 35.
1893.51 *11*	2.25 [a] *6*	1936.76	(1)	43.4978	2^+	Additional information 42.
1911.19 *11*	7.41 [a] *8*	1911.10	(1^-)	0.0	0^+	Additional information 41.
1926.5 *10*	0.54 *5*	1969.9	(1^-)	43.4978	2^+	
1937.04 *13*	2.49 [a] *8*	1936.76	(1)	0.0	0^+	Additional information 43.
1970.0 *15*	0.49 *4*	1969.9	(1^-)	0.0	0^+	
[x]2022.24 [b] *12*	0.22 *2*					
[x]2041.23 [b] *13*	0.13 *1*					
[x]2065.80 [b] *13*	0.084 *12*					
[x]2093.19 [b] *38*	0.024 *7*					
[x]2102.14 [b] *15*	0.072 *10*					
[x]2136.69 [b] *14*	0.084 *5*					

[†] Weighted average of values in 1975Ar23 and 1990Sc09, except as noted. Energies in 1967Wa09 (semi) and 1963Bj02 (s ce) generally agree with those given here. Earlier measurements: 1953St36, 1954Cr32, 1954Jo19, 1955De40, 1956On07, 1959Sc31.

[‡] From 1999Nz01, deduced by using a statistical analysis of experimental results reported in 1992Si17, 1990Sc09, 1986Mo09, 1975Ar23, 1971GuZQ, 1967Wa09, and 1963Bj02, unless otherwise noted. The Normalized Residuals (1994Ka08) method was applied to discrepant data in 1999Nz01.

[#] From conversion electron data in 1963Bj02. The intensities of strong conversion electron lines have a 10% precision. Conversion electron data from ^{234}Pa (6.75 h) and ^{234}Np decay also have been used here.

[@] Transitions identified in equilibrium spectrum (^{234}Th + ^{234}Pa g.s. + 1.17-min ^{234}Pa). Intensities have been corrected for contributions from ^{234}Pa g.s. decay (1975Ar23).

[&] From ^{234}Pa g.s. decay.

[a] Measured by 1990Sc09 following the decay of ^{238}U, in equilibrium with its daughter nuclei. Only γ rays that do not have any or have negligible contributions from ^{234}Pa g.s. decay have been included here. See 1990Sc09 for their complete list of experimental γ-ray intensities.

[b] Reported only by 2004Br43. Intensity relative to Iγ(1001γ)=1000.

[c] For absolute intensity per 100 decays, multiply by 8.42×10^{-4} *8*.

[d] Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies,

$^{234}_{92}U_{142}$-13

$\gamma(^{234}U)$ (continued)

assigned multipolarities, and mixing ratios, unless otherwise specified.

[e] Multiply placed with undivided intensity.

[f] Multiply placed with intensity suitably divided.

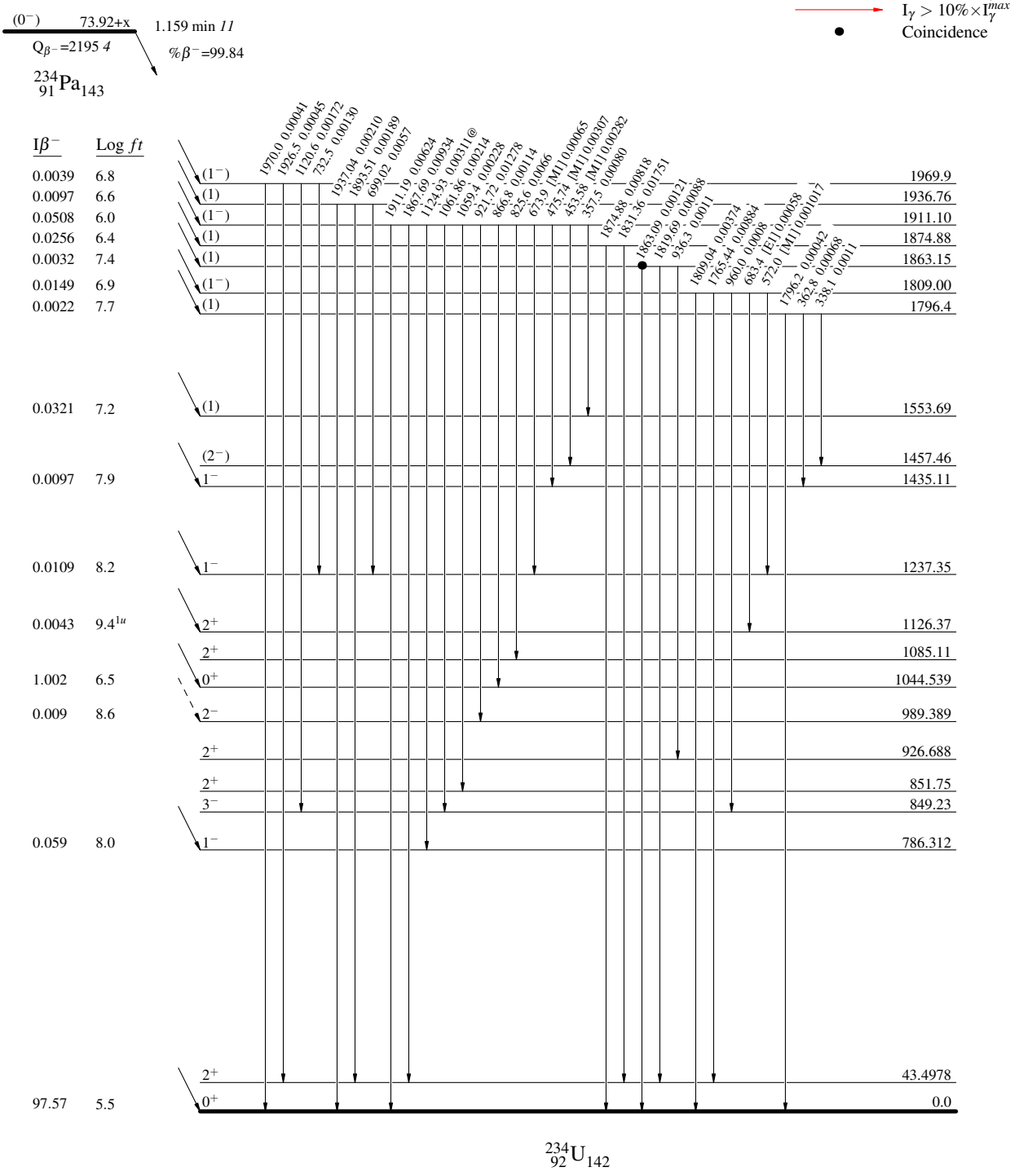
[x] γ ray not placed in level scheme.

^{234}Pa β^- decay (1.159 min) 1975Ar23,1990Sc09

Decay Scheme

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
@ Multiply placed: intensity suitably divided

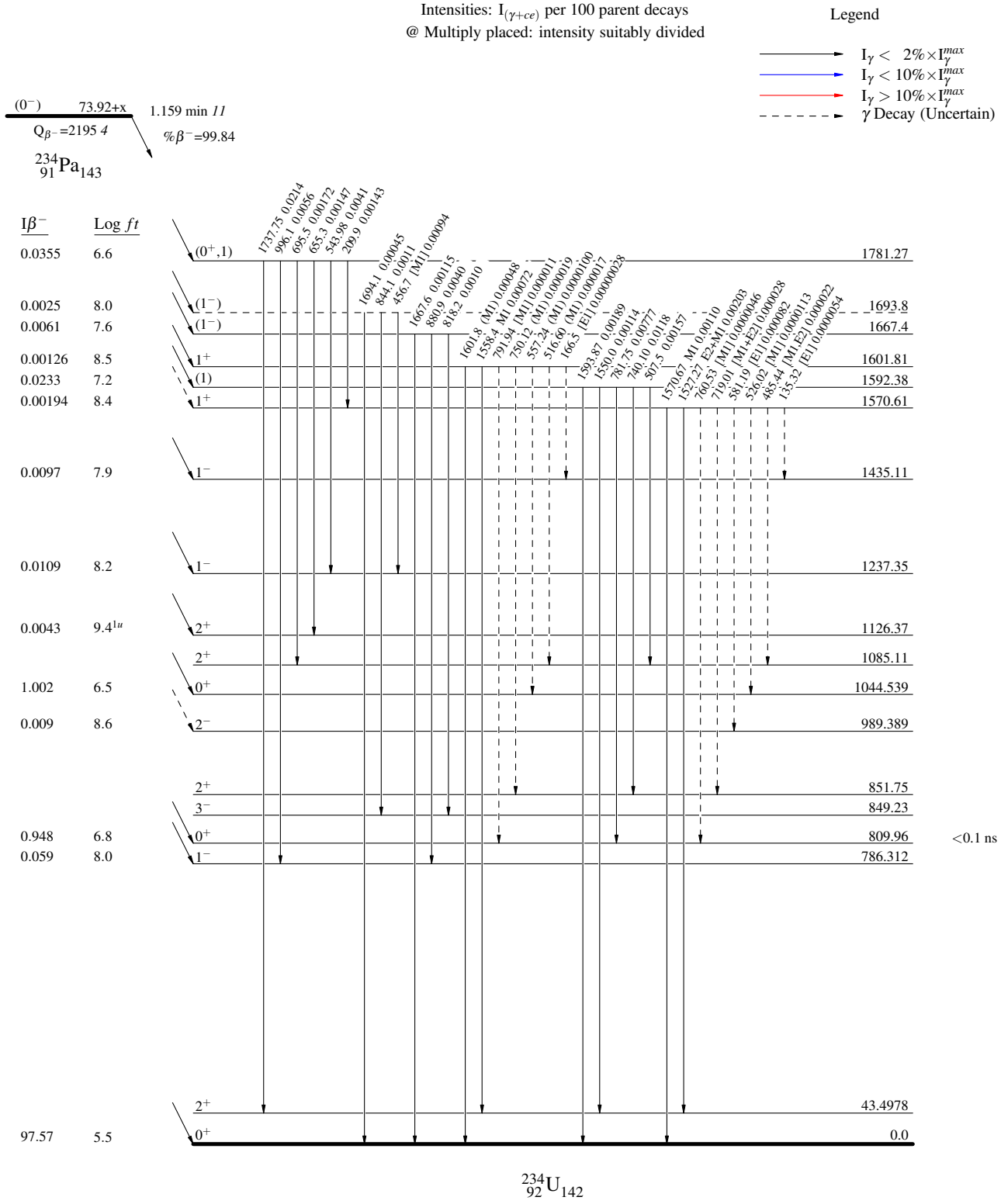
Legend
$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$
Coincidence



^{234}Pa β^- decay (1.159 min) 1975Ar23,1990Sc09

Decay Scheme (continued)

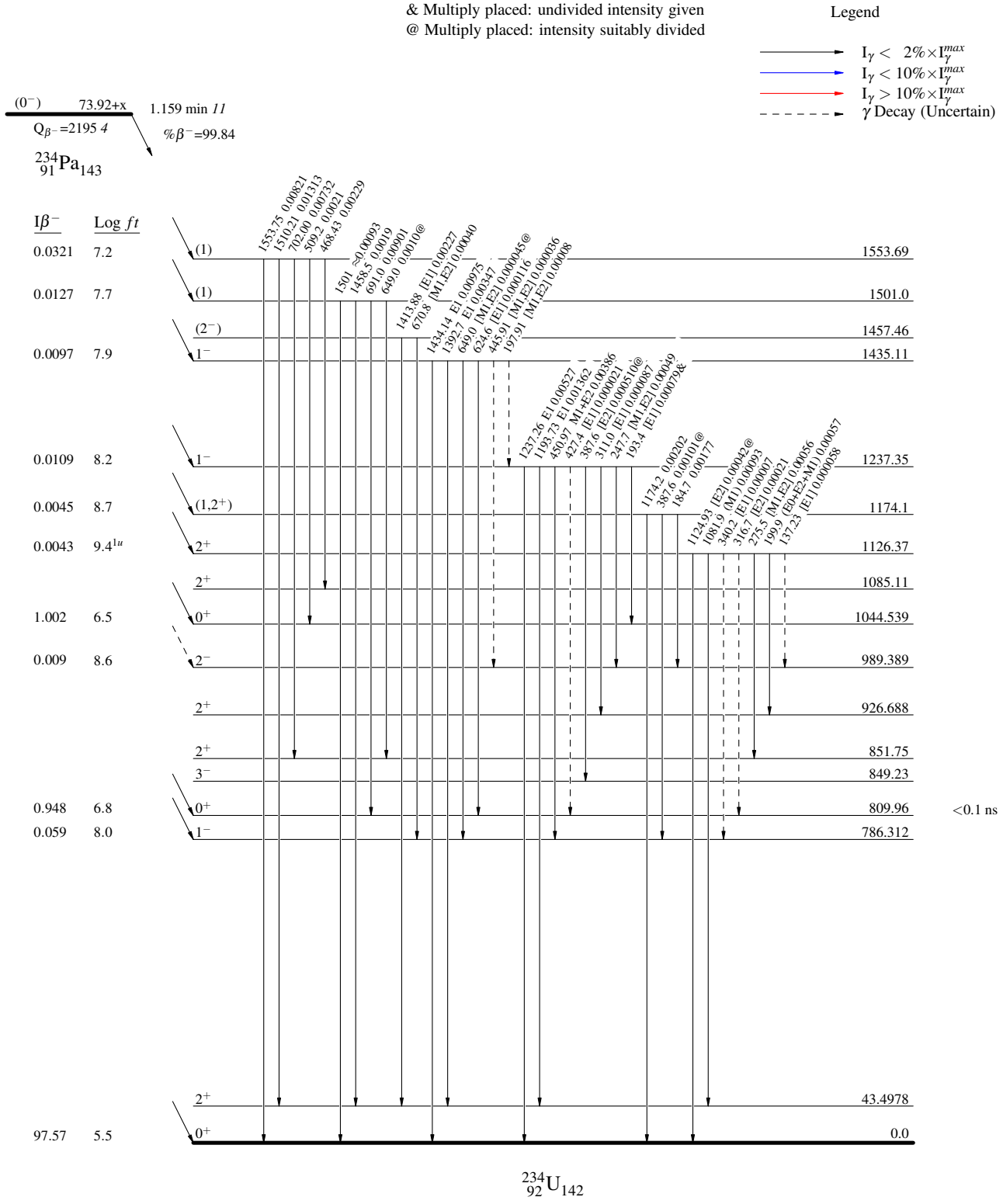
Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
@ Multiply placed: intensity suitably divided



^{234}Pa β^- decay (1.159 min) 1975Ar23,1990Sc09

Decay Scheme (continued)

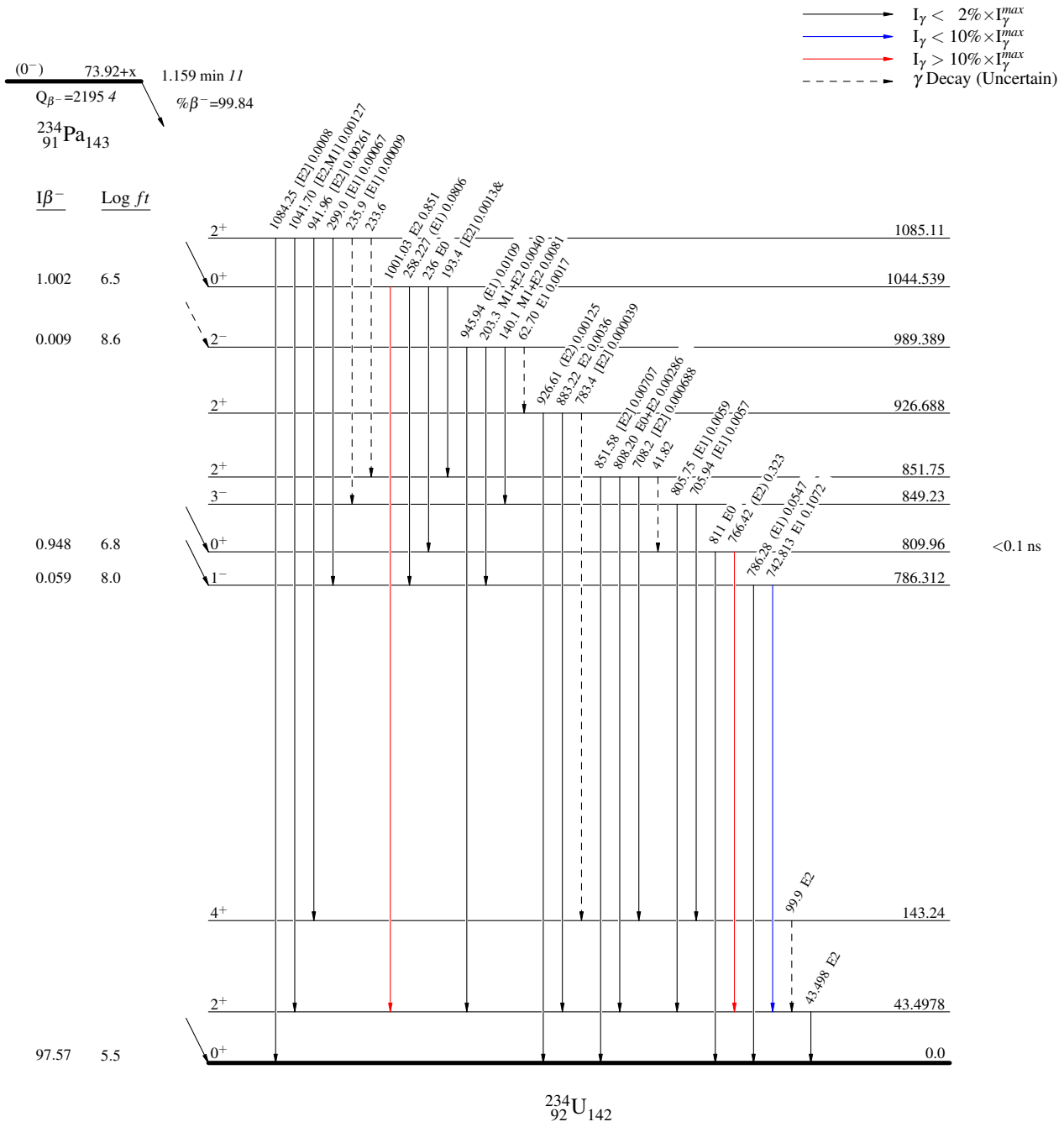
Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided



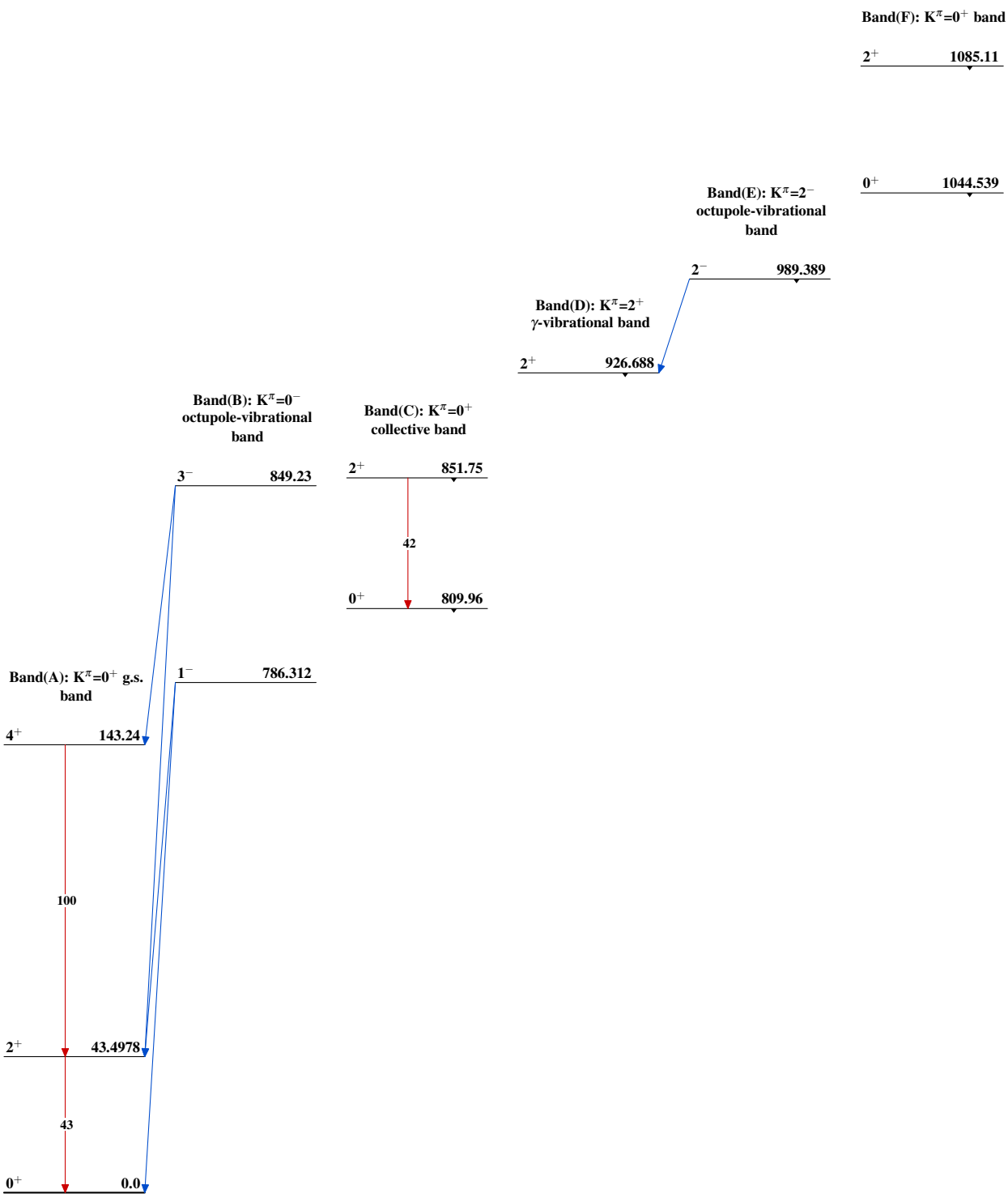
^{234}Pa β^- decay (1.159 min) 1975Ar23,1990Sc09

Decay Scheme (continued)

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

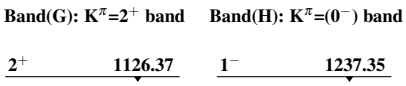


^{234}Pa β^- decay (1.159 min) 1975Ar23,1990Sc09



$^{234}_{92}U_{142}$

^{234}Pa β^- decay (1.159 min) 1975Ar23,1990Sc09 (continued)



$^{234}_{92}U_{142}$