^{240}Am $\varepsilon+\beta^+$ decay 1972Ah07,1971LeZO,1972PoZS

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	C. Morse	NDS 206,359 (2025)	27-Sep-2024

Parent: ^{240}Am: E=0; J$^\pi$=(3$^-$); T$_{1/2}$=50.8 h *3*; Q(ε)=1385 *14*; %ε+%β^+ decay=100

^{240}Am-Configuration=ν1/2[631]$\otimes\pi$5/2[523], K^π=3$^-$.

^{240}Am-T$_{1/2}$: from 1972Ah07. Others: 50 h (1950St61), 53 h (1952Hi63), 51.0 h *5* (1960Gl01); 50.9 h *7* (1966Bi03), 50.7 h *8* (1972PoZS).

^{240}Am-Q($\varepsilon+\beta^+$): From 2021Wa16.

^{240}Am-%ε+%β^+ decay: %α=1.9×10^{-4} *7* as recommended by 1986LoZT; ≈1.9×10^{-4} (1970Go42); %β^-<6×10^{-6} (1960Gl01).

1972Ah07: Measured Eγ, Iγ, ce, (ce)(γ) coin, mass-separated source, Ge(Li) and Si(Li) detectors. Source prepared by ^{237}Np(α,n) reaction at 30 MeV. Subsequent to chemical separation the source was run through the Argonne isotope separator to obtain enriched ^{240}Am samples. A total of 14 γ rays were reported: 42.9, 98.9 and 12 γ rays from 888 to 1295 keV. In the level scheme, eight γ rays were assigned amongst five excited states. Conversion electron intensities were given in percent per ^{240}Am decay, but no uncertainties were quoted in these intensities and the procedure to normalize ce intensities to γ-ray intensities was not explained.

1971LeZO: Measured Eγ, Iγ, $\gamma\gamma$, ce, chemically separated source, Ge(Li) detectors singles and Compton-suppressed, Si(Li) electron spectrometer, (x ray)γ coin using two NaI(Tl) detectors. A total of 31 γ rays and two conversion lines (for 42.9γ and 99.0γ) reported. Full experimental details about normalization of electron spectra and spectral (γ and ce) figures are not available in this report.

1972PoZS: Measured Eγ, Iγ, half-life, chemically separated source prepared by ^{237}Np(α,n) reaction at 50 MeV. Ge(Li) detector used. A total of 23 γ rays reported between 305 and 1296 keV. Small impurities of ^{140}La, ^{143}Ce and ^{239}Am were present in the source. Twenty γ rays were placed in a level scheme essentially based on the one from 1971LeZO. No uncertainties were quoted on γ-ray intensities, except for the ratio Iγ(889γ)/Iγ(988γ).

Others: 1957Sm77, 1960Gl01, 1966Bi03.

^{240}Pu Levels

E(level)[†]	J$^\pi$[#]	T$_{1/2}$	Comments
0.0[@]	0$^+$		
42.87[@] *4*	2$^+$		
141.80[@] *8*	4$^+$		
294.3[@] *7*	6$^+$		
598.0[&] *9*	1$^-$		
649.4[&] *6*	3$^-$		Configuration=π5/2[642]$\otimes\pi$5/2[523], K^π=0$^-$.
742.5[‡&] *7*	5$^-$		
901.5[‡a] *9*	2$^+$		
958.97[b] *21*	(2$^-$)		
992.5[‡a] *8*	4$^+$		
1002.2[‡b] *3*	(3$^-$)		E(level): level population proposed as a result of revised placement of 959.3γ according to the level scheme from the decay of 61.9-min ^{240}Np.
1030.65[c] *7*	(3)$^+$	1.32 ns *15*	T$_{1/2}$: from 1976BuZP. Configuration=ν1/2[631]$\otimes\nu$5/2[622].
1076.4[c] *3*	(4$^+$)		
1137.5[d] *3*	(2$^+$)		
1177.93[d] *22*	(3$^+$)		
1223.09 *22*	(2$^+$)		
1232.1[d] *7*	(4$^+$)		
1262.15 *25*	(3$^+$)		
1337.08? *25*	(2$^+$,3,4$^+$)		

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^{240}Am ε+β^+ decay 1972Ah07,1971LeZO,1972PoZS (continued)

^{240}Pu Levels (continued)

† From least-squares fit to Eγ′s.
‡ Level from 1971LeZO only.
# From Adopted Levels.
@ Band(A): K^π=0$^+$, g.s. band.
& Band(B): K^π=0$^-$, octupole band.
a Band(C): K^π=0$^+$ band.
b Band(D): K^π=(1$^-$) band.
c Band(E): K^π=(3)$^+$ band.
d Band(F): K^π=(2$^+$) band.

ε,β^+ radiations

av Eβ: Additional information 1.

E(decay)	E(level)	Iβ^+ †	Iε†	Log *ft*	I($\varepsilon+\beta^+$)†	Comments
(123 *14*)	1262.15		0.0462 *24*	8.04 *16*	0.0462 *24*	εL=0.7 *19*
(153 *14*)	1232.1		0.010 *3*	9.00 *21*	0.010 *3*	εK=0.17 *9*; εL=0.57 *6*; εM+=0.265 *26*
(162 *14*)	1223.09		0.0172 *13*	8.85 *15*	0.0172 *13*	εK=0.23 *9*; εL=0.53 *6*; εM+=0.243 *25*
(207 *14*)	1177.93		0.066 *4*	8.64 *11*	0.066 *4*	εK=0.428 *49*; εL=0.399 *32*; εM+=0.172 *13*
(248 *14*)	1137.5		0.0234 *23*	9.33 *9*	0.0234 *23*	εK=0.524 *28*; εL=0.336 *18*; εM+=0.141 *7*
(309 *14*)	1076.4		0.035 *4*	9.44 *8*	0.035 *4*	εK=0.602 *14*; εL=0.284 *9*; εM+=0.1148 *35*
(354 *14*)	1030.65		98.2 *19*	6.16 *5*	98.2 *19*	εK=0.636 *10*; εL=0.260 *6*; εM+=0.1038 *24* ε(K)/ε=0.588 *15* (1971LeZO) from (K-x ray)/γ ray intensities.
(383 *14*)	1002.2		0.039 *5*	9.65 *7*	0.039 *5*	εK=0.651 *8*; εL=0.250 *5*; εM+=0.0987 *19*
(393 *14*)	992.5		0.106 *11*	9.24 *6*	0.106 *11*	εK=0.656 *7*; εL=0.2468 *47*; εM+=0.0971 *18*
(426 *14*)	958.97		0.089 *6*	9.413 *49*	0.089 *6*	εK=0.670 *6*; εL=0.2374 *38*; εM+=0.0928 *15*
(484 *14*)	901.5		0.014 *3*	10.35 *10*	0.014 *3*	εK=0.6876 *43*; εL=0.2253 *27*; εM+=0.0870 *11*
(736 *14*)	649.4		0.033 *13*	10.42 *17*	0.033 *13*	εK=0.7271 *18*; εL=0.1983 *10*; εM+=0.07459 *48*
(787 *14*)	598.0		0.0067 *24*	>11.4	0.0067 *24*	εK=0.6638 *34*; εL=0.2411 *21*; εM+=0.0951 *9*
(1243‡ *14*)	141.80	5.228×10^{-6}	<1	9.4	<1	av Eβ=121 *7*; εK=0.7529 *8*; εL=0.1806 *4*; εM+=0.06651 *24* I($\varepsilon+\beta^+$): based on log *ft*=9.1 and 9.9 for two other K-forbidden (ΔK=3,ΔJ=1) β transitions in the level scheme. Others: 1.4 *12* from measured electron and γ-ray intensities in 1972Ah07 (assuming 4% uncertainty on measured electron intensities); 4 *3* from electron and γ-ray intensities of 1971LeZO. As expected, both these values are consistent with no β feeding to the 42.9 level.
(1342‡ *14*)	42.87	3.229×10^{-5}	<1	9.5	<1	av Eβ=169 *7*; εK=0.7554 *7*; εL=0.17885 *36*; εM+=0.06572 *23* I($\varepsilon+\beta^+$): based on log *ft*=9.1 and 9.9 for two other K-forbidden (ΔK=3,ΔJ=1) β transitions in the level scheme. Others: −8 *4* from measured electron and γ-ray intensities in 1972Ah07 (assuming 4% uncertainty on measured electron intensities); 12 *14* from electron and γ-ray intensities of 1971LeZO. As expected both these are consistent with no β feeding to the 42.9 level.

Continued on next page (footnotes at end of table)

^{240}Am ε+β^+ decay 1972Ah07,1971LeZO,1972PoZS (continued)

ε,β^+ radiations (continued)

† Absolute intensity per 100 decays.
‡ Existence of this branch is questionable.

$\gamma(^{240}Pu)$

Iγ normalization, I(γ+ce) normalization: Determined by assuming that the electron−capture feeding to the ground state is zero and to the first two excited states is less than 1% each, such that $\Sigma I_{\gamma+ce}$=99 *1* for all transitions feeding these states.

Pu K x-ray intensities (per 100 decays of ^{240}Am) from 1972Ah07:

I(Kα_2, 99.53 keV *2*)=18.6 *6*.

I(Kα_1, 103.74 keV *2*)=29.0 *10*.

I(Kβ_1+Kβ_3, 116.25 keV *3*+117.23 keV *3*)=10.8 *4*.

I(Kβ_2+Kβ_4+K to $O_{2,3}$, 120.65 keV *3*+121.56 keV *3*)= 3.80 *15*.

Experimental conversion coefficients are from ce data of 1972Ah07, unless otherwise stated.

Additional information 2.

E_γ[†]	I_γ[†a]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[@]	α[&]	$I_{(\gamma+ce)}$[a]	Comments
42.87 *4*	0.111 *2*	42.87	2+	0.0	0+	E2	901 *13*	99.98 *1*	α(L2)exp=366 *37*; α(L3)exp=333 *33*; α(M)exp=227 *23*; %Iγ=0.1093 *23* α(L)=654 *10*; α(M)=182.5 *27*; α(N)=50.1 *7*; α(O)=11.77 *17*; α(P)=1.841 *27*; α(Q)=0.00388 *6* E_γ: from ce spectrum (1957Sm77). Other: 42.9 *1* (1972Ah07). $I_{(\gamma+ce)}$: 100−(summed intensity of γ rays to g.s. from levels above 42.9). Others: 92 from electron intensities of 1972Ah07 (uncertainties are not given by 1972Ah07 but expected to about 4% as in some other papers by the same group, e.g. 1974Po08); 112 *14* (1971LeZO). I_γ: from I(γ+ce) and α. 1972Ah07 give measured intensity of 0.09 *1*. Ice(L2)=33, Ice(L3)=30, Ice(M)=20.5, Ice(N+)=7.3 (1972Ah07). (L1+L2)/L3=1.2 *1*, L/M=3.7 *3* (1971LeZO).
98.9 *1*	1.49 *4*	141.80	4+	42.87	2+	E2	16.62 *25*	26.2 *6*	α(L1)exp+α(L2)exp=7.6 *8*; α(L3)exp=4.8 *5*; α(M)exp=3.6 *4*; %Iγ=1.466 *30* α(L)=12.06 *18*; α(M)=3.38 *5*; α(N)=0.928 *14*; α(O)=0.2187 *32*; α(P)=0.0348 *5* α(Q)=0.0001219 *18* E_γ: from γ spectrum (1972Ah07). Others: 98.9 *2* (1957Sm77), 99.0 *1* (1972Ah07) from ce spectrum. $I_{(\gamma+ce)}$: from intensity balance at 141.78 level and assuming β feeding of 0.5% *5*. Others: 27.1 from conversion electron intensity data of 1972Ah07 (uncertainties are not given by 1972Ah07 but expected to about 4% as in some other papers by the same group, e.g. 1974Po08); 30 *3* (1971LeZO). I_γ: from I(γ+ce) and α. 1972Ah07 give measured intensity of 1.5 *2*. Ice(L1+L2)=11.4, Ice(L3)=7.2, Ice(M)=5.4, Ice(N+)=1.97 (1972Ah07). (L1+L2)/L3=1.67 *15* (1971LeZO).
152.4[‡] *10*	0.012[‡] *3*	294.3	6+	141.80	4+	E2	2.50 *8*		α(M)exp=0.47 *13* (1971LeZO); %Iγ=0.0118 *30* α(K)=0.1961 *28*; α(L)=1.68 *6*; α(M)=0.468 *15*; α(N)=0.129 *4*; α(O)=0.0304 *10* α(P)=0.00491 *16*; α(Q)=2.77×10^{-5} *7*

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$\gamma(^{240}Pu)$ (continued)

E_γ[†]	I_γ[†a]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[@]	α[&]	Comments
249.7[‡] *10*	0.020[‡] *3*	992.5	4^+	742.5	5^-	[E1]	0.0620 *10*	%Iγ=0.0197 *30* α(K)=0.0487 *8*; α(L)=0.01000 *17*; α(M)=0.00243 *4*; α(N)=0.000656 *11*; α(O)=0.0001597 *27* α(P)=2.85×10^{-5} *5*; α(Q)=1.427×10^{-6} *23*
251.8[‡] *10*	0.005[‡] *2*	901.5	2^+	649.4	3^-	[E1]	0.0608 *10*	%Iγ=0.0049 *20* α(K)=0.0478 *8*; α(L)=0.00980 *17*; α(M)=0.00238 *4*; α(N)=0.000643 *11*; α(O)=0.0001566 *26* α(P)=2.80×10^{-5} *5*; α(Q)=1.402×10^{-6} *23*
303.7[#] *10*	0.009[#] *2*	901.5	2^+	598.0	1^-	[E1]	0.0403 *6*	%Iγ=0.0089 *20* α(K)=0.0319 *5*; α(L)=0.00633 *10*; α(M)=0.001535 *24*; α(N)=0.000415 *7* α(O)=0.0001013 *16*; α(P)=1.828×10^{-5} *29*; α(Q)=9.54×10^{-7} *15*
343.7[#] *10*	0.049[#] *5*	992.5	4^+	649.4	3^-	[E1]	0.0309 *5*	%Iγ=0.048 *5* α(K)=0.0245 *4*; α(L)=0.00479 *7*; α(M)=0.001158 *18*; α(N)=0.000313 *5*; α(O)=7.66×10^{-5} *12* α(P)=1.390×10^{-5} *21*; α(Q)=7.44×10^{-7} *11*
382.1[#b] *10*	0.053[#] *5*	1030.65	$(3)^+$	649.4	3^-	[E1]	0.0247 *4*	%Iγ=0.052 *5* α(K)=0.01972 *30*; α(L)=0.00379 *6*; α(M)=0.000915 *14*; α(N)=0.000247 *4*; α(O)=6.06×10^{-5} *9* α(P)=1.105×10^{-5} *17*; α(Q)=6.04×10^{-7} *9* B(E1)(W.u.)=1.27×10^{-9} *+21−17* Placed on the basis of energy fit.
447.8[‡] *10*	0.013[‡] *4*	742.5	5^-	294.3	6^+	[E1]	0.01791 *26*	%Iγ=0.013 *4* α(K)=0.01435 *21*; α(L)=0.00269 *4*; α(M)=0.000649 *10*; α(N)=0.0001755 *26* α(O)=4.31×10^{-5} *6*; α(P)=7.91×10^{-6} *12*; α(Q)=4.46×10^{-7} *7*
507.9[#] *10*	0.072[#] *6*	649.4	3^-	141.80	4^+	[E1]	0.01397 *20*	%Iγ=0.071 *6* α(K)=0.01122 *16*; α(L)=0.002073 *30*; α(M)=0.000499 *7*; α(N)=0.0001348 *20* α(O)=3.32×10^{-5} *5*; α(P)=6.11×10^{-6} *9*; α(Q)=3.52×10^{-7} *5*
555.4[‡] *10*	≈0.01[‡]	598.0	1^-	42.87	2^+	[E1]	0.01176 *17*	%Iγ≈0.01 α(K)=0.00947 *14*; α(L)=0.001729 *25*; α(M)=0.000415 *6*; α(N)=0.0001123 *16* α(O)=2.77×10^{-5} *4*; α(P)=5.11×10^{-6} *7*; α(Q)=2.99×10^{-7} *4*
600.7[‡] *10*	0.014[‡] *6*	742.5	5^-	141.80	4^+	[E1]	0.01013 *15*	%Iγ=0.014 *6* α(K)=0.00817 *12*; α(L)=0.001479 *21*; α(M)=0.000355 *5*; α(N)=9.60×10^{-5} *14* α(O)=2.365×10^{-5} *34*; α(P)=4.38×10^{-6} *6*; α(Q)=2.59×10^{-7} *4*
606.7[#] *10*	0.070[#] *8*	649.4	3^-	42.87	2^+	[E1]	0.00994 *14*	%Iγ=0.069 *8* α(K)=0.00802 *11*; α(L)=0.001450 *21*; α(M)=0.000348 *5*; α(N)=9.41×10^{-5} *14* α(O)=2.319×10^{-5} *33*; α(P)=4.30×10^{-6} *6*; α(Q)=2.55×10^{-7} *4*
888.85 *5*	25.1 *4*	1030.65	$(3)^+$	141.80	4^+	E2	0.01549 *22*	α(K)exp=0.0112 *4* (1971LeZO); α(L3)exp=0.00025 *2*; α(M)exp=0.00120 *10*;

From ENSDF

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γ(^{240}Pu) (continued)

E_γ[†]	I_γ[†a]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[@]	δ[@]	α[&]	Comments
									%Iγ=24.7 *5* α(K)=0.01127 *16*; α(L)=0.00315 *4*; α(M)=0.000797 *11*; α(N)=0.0002172 *30* α(O)=5.31×10^{-5} *7*; α(P)=9.67×10^{-6} *14*; α(Q)=4.49×10^{-7} *6* B(E2)(W.u.)=0.00220 *+28−23* Mult.: from K/L3=44 *5* (1972Ah07), 39 *20* (1971LeZO) and α(K)exp values from 1972Ah07 and 1971LeZO. Others: δ(E2/M1)>5 (1971LeZO), >4.5 (1972Ah07). Ice(K)=0.276, Ice(L3)=0.0063, Ice(M)=0.030, Ice(N+)=0.012 (1972Ah07). Eγ: weighted average of 1971LeZO, 1972Ah07 and 1972PoZS.
916.1 *2*	0.090 *6*	958.97	(2$^-$)	42.87	2$^+$	[E1]		0.00472 *7*	%Iγ=0.089 *6* α(K)=0.00384 *5*; α(L)=0.000666 *9*; α(M)=0.0001589 *22*; α(N)=4.30×10^{-5} *6* α(O)=1.064×10^{-5} *15*; α(P)=1.992×10^{-6} *28*; α(Q)=1.245×10^{-7} *17*
934.6[#] *5*	0.025[#] *3*	1076.4	(4$^+$)	141.80	4$^+$	[M1,E2]		0.035 *21*	%Iγ=0.0247 *30* α(K)=0.027 *17*; α(L)=0.0056 *29*; α(M)=0.0014 *7*; α(N)=3.8×10^{-4} *18*; α(O)=9 α(P)=1.8×10^{-5} *9*; α(Q)=1.1×10^{-6} *7*
938.0[#] *6*	0.007[#] *3*	1232.1	(4$^+$)	294.3	6$^+$	[E2]		0.01396 *20*	%Iγ=0.0069 *30* α(K)=0.01026 *14*; α(L)=0.00276 *4*; α(M)=0.000695 *10*; α(N)=0.0001894 *27* α(O)=4.64×10^{-5} *7*; α(P)=8.48×10^{-6} *12*; α(Q)=4.05×10^{-7} *6*
959.3 *3*	0.039 *5*	1002.2	(3$^-$)	42.87	2$^+$	[E1]		0.00435 *6*	%Iγ=0.038 *5* α(K)=0.00354 *5*; α(L)=0.000613 *9*; α(M)=0.0001461 *20*; α(N)=3.95×10^{-5} *6*; α(O)=9.79×10^{-6} *14* α(P)=1.835×10^{-6} *26*; α(Q)=1.152×10^{-7} *16* Eγ: placed in consistency with results from 61.9-min ^{240}Np decay. The placement from 959 level proposed by 1971LeZO and 1972PoZS is in disagreement.
987.79 *6*	73.2 *10*	1030.65	(3)$^+$	42.87	2$^+$	E2(+M1)	>10	0.01282 *25*	α(K)exp=0.0090 *7*; α(L1)exp+α(L2)exp=0.00220 *18*; α(L3)exp=0.000120 *10*; α(M)exp=0.00060 *5* %Iγ=72.2 *7* α(K)=0.00952 *19*; α(L)=0.00246 *4*; α(M)=0.000617 *10*; α(N)=0.0001681 *28* α(O)=4.12×10^{-5} *7*; α(P)=7.56×10^{-6} *13*; α(Q)=3.73×10^{-7} *8* B(E2)(W.u.)=0.0037 *+6−4* Mult.: from (L1+L2)/L3=18.3 *20* and K/L3=84 *9* (1972Ah07). Others: δ(E2/M1)>6 (1971LeZO), >4.5 (1972Ah07). Ice(K)=0.74, Ice(L1+L2)=0.161, Ice(L3)=0.0088, Ice(M)=0.044,

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γ(^{240}Pu) (continued)

E_γ[†]	I_γ[†a]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[@]	α[&]	Comments
								Ice(N+)=0.019 (1972Ah07). K/L=3.77 *11*; L1/L2=1.5 +*10*−*5*; (L1+L2)/L3=20 *2* (1971LeZO). E_γ: weighted average of 1971LeZO, 1972Ah07 and 1972PoZS.
1033.5 *3*	0.010 *1*	1076.4	(4$^+$)	42.87	2$^+$	[E2]	0.01161 *16*	%Iγ=0.0099 *10* α(K)=0.00868 *12*; α(L)=0.002189 *31*; α(M)=0.000548 *8*; α(N)=0.0001492 *21* α(O)=3.66×10^{-5} *5*; α(P)=6.73×10^{-6} *9*; α(Q)=3.38×10^{-7} *5*
1036.1 *3*	0.016 *2*	1177.93	(3$^+$)	141.80	4$^+$	[M1,E2]	0.027 *15*	%Iγ=0.0158 *20* α(K)=0.021 *12*; α(L)=0.0043 *21*; α(M)=0.0011 *5*; α(N)=2.9×10^{-4} *14*; α(O)=7.1×10^{-5} *35* α(P)=1.3×10^{-5} *7*; α(Q)=8
1089.8[#] *10*	0.0031[#] *6*	1232.1	(4$^+$)	141.80	4$^+$	[M1,E2]	0.024 *13*	%Iγ=0.0031 *6* α(K)=0.019 *11*; α(L)=0.0038 *19*; α(M)=9; α(N)=2.5×10^{-4} *12*; α(O)=6.2×10^{-5} *30* α(P)=1.2×10^{-5} *6*; α(Q)=7
1094.7 *3*	0.016 *1*	1137.5	(2$^+$)	42.87	2$^+$	[M1,E2]	0.023 *13*	%Iγ=0.0158 *10* α(K)=0.018 *11*; α(L)=0.0037 *18*; α(M)=9; α(N)=2.5×10^{-4} *12*; α(O)=6.2×10^{-5} *30* α(P)=1.2×10^{-5} *6*; α(Q)=7
1120.3 *4*	0.011 *1*	1262.15	(3$^+$)	141.80	4$^+$	[M1,E2]	0.022 *12*	%Iγ=0.01085 *99* α(K)=0.017 *10*; α(L)=0.0035 *17*; α(M)=9; α(N)=2.3×10^{-4} *11*; α(O)=5.8×10^{-5} *28* α(P)=1.1×10^{-5} *5*; α(Q)=7
1135.1 *3*	0.049 *3*	1177.93	(3$^+$)	42.87	2$^+$	[M1,E2]	0.021 *12*	%Iγ=0.0483 *30* α(K)=0.017 *9*; α(L)=0.0034 *16*; α(M)=8; α(N)=2.3×10^{-4} *11*; α(O)=5.6×10^{-5} *27* α(P)=1.1×10^{-5} *5*; α(Q)=7
1137.4[#] *5*	0.0073[#] *20*	1137.5	(2$^+$)	0.0	0$^+$	[E2]	0.00969 *14*	%Iγ=0.0072 *20* α(K)=0.00735 *10*; α(L)=0.001755 *25*; α(M)=0.000437 *6*; α(N)=0.0001188 *17* α(O)=2.92×10^{-5} *4*; α(P)=5.39×10^{-6} *8*; α(Q)=2.83×10^{-7} *4*
1180.3 *3*	0.0102 *8*	1223.09	(2$^+$)	42.87	2$^+$	[M1,E2]	0.019 *10*	%Iγ=0.0101 *8* α(K)=0.015 *8*; α(L)=0.0031 *15*; α(M)=7.5×10^{-4} *35*; α(N)=2.0×10^{-4} *10*; α(O)=5.1×10^{-5} *24* α(P)=1.0×10^{-5} *5*; α(Q)=6.0×10^{-7} *33*
1190.0[b] *10*	0.0005 *3*	1232.1	(4$^+$)	42.87	2$^+$	[E2]	0.00891 *13*	%Iγ=0.00049 *30* α(K)=0.00679 *10*; α(L)=0.001585 *22*; α(M)=0.000393 *6*; α(N)=0.0001070 *15* α(O)=2.63×10^{-5} *4*; α(P)=4.87×10^{-6} *7*; α(Q)=2.60×10^{-7} *4*

γ(^{240}Pu) (continued)

E_γ[†]	I_γ[†a]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[@]	α[&]	Comments
1195.5[#b] *4*	0.0026[#] *5*	1337.08?	(2$^+$,3,4$^+$)	141.80	4$^+$			%Iγ=0.0026 *5*
1219.3 *3*	0.035 *2*	1262.15	(3$^+$)	42.87	2$^+$	[M1,E2]	0.018 *9*	%Iγ=0.0345 *20* α(K)=0.014 *8*; α(L)=0.0028 *13*; α(M)=6.9×10^{-4} *32*; α(N)=1.9×10^{-4} *9*; α(O)=4.7×10^{-5} *22* α(P)=9; α(Q)=5.5×10^{-7} *30*
1223.0[#] *3*	0.007[#] *1*	1223.09	(2$^+$)	0.0	0$^+$	[E2]	0.00847 *12*	%Iγ=0.0069 *10* α(K)=0.00648 *9*; α(L)=0.001491 *21*; α(M)=0.000369 *5*; α(N)=0.0001005 *14* α(O)=2.473×10^{-5} *35*; α(P)=4.58×10^{-6} *6*; α(Q)=2.471×10^{-7} *35*
1294.1[b] *3*	0.009 *1*	1337.08?	(2$^+$,3,4$^+$)	42.87	2$^+$			%Iγ=0.0089 *10*

[†] Weighted averages of values from 1971LeZO and 1972Ah07 are taken when possible. Except for the two most intense transitions, values from 1972PoZS are not considered in deducing recommended values since the energies seem consistently higher (by up to 1 keV at the highest energies) and the intensities are given without uncertainties. The intensities given by 1972PoZS are in general agreement with those from 1971LeZO.

[‡] γ from 1971LeZO only.

[#] From 1971LeZO. Corresponding value from 1972PoZS is in general agreement but less precise. This γ ray was not reported by 1972Ah07.

[@] From ce data of 1972Ah07 and 1971LeZO.

[&] Additional information 3.

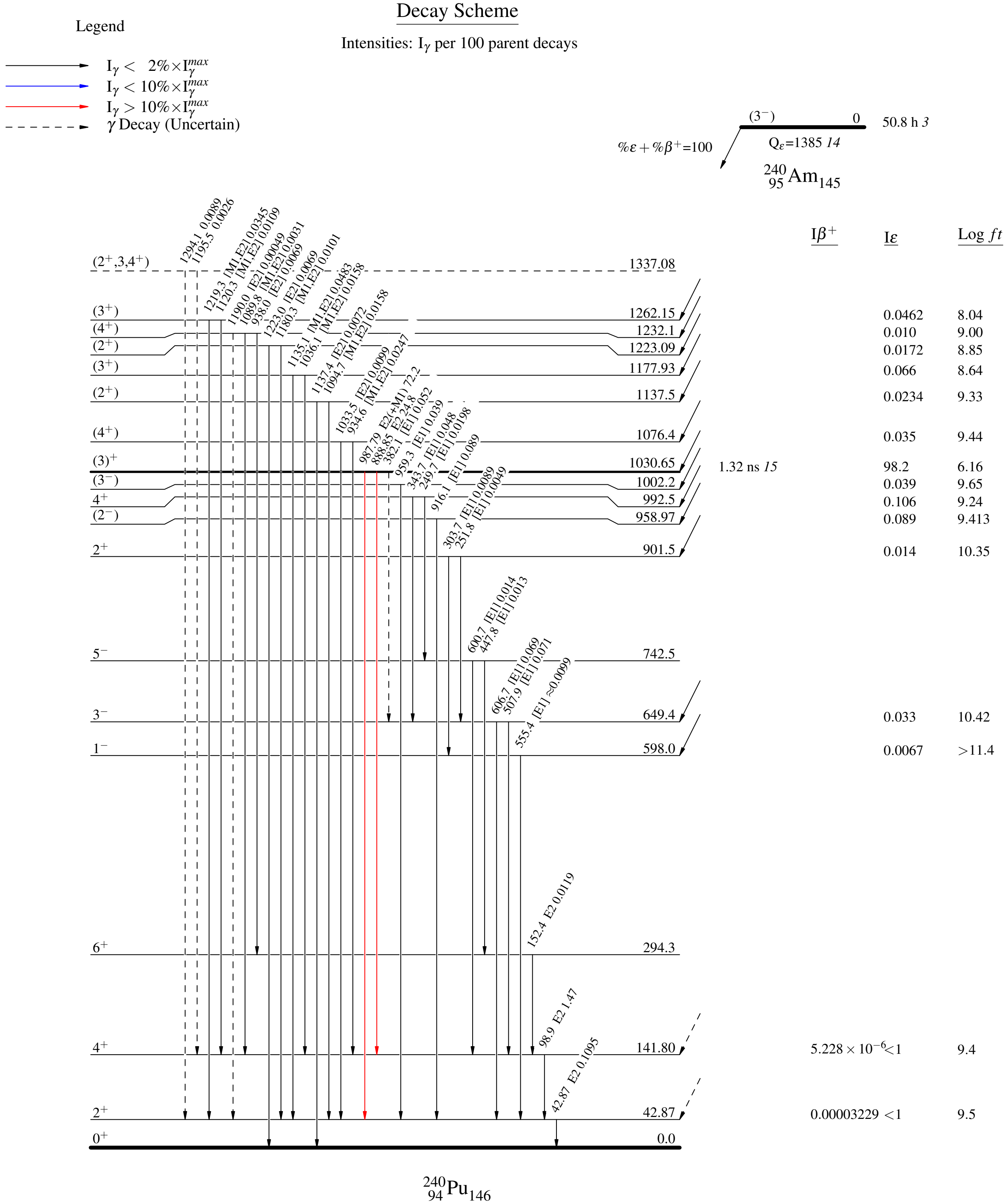
[a] For absolute intensity per 100 decays, multiply by 0.986 *15*.

[b] Placement of transition in the level scheme is uncertain.

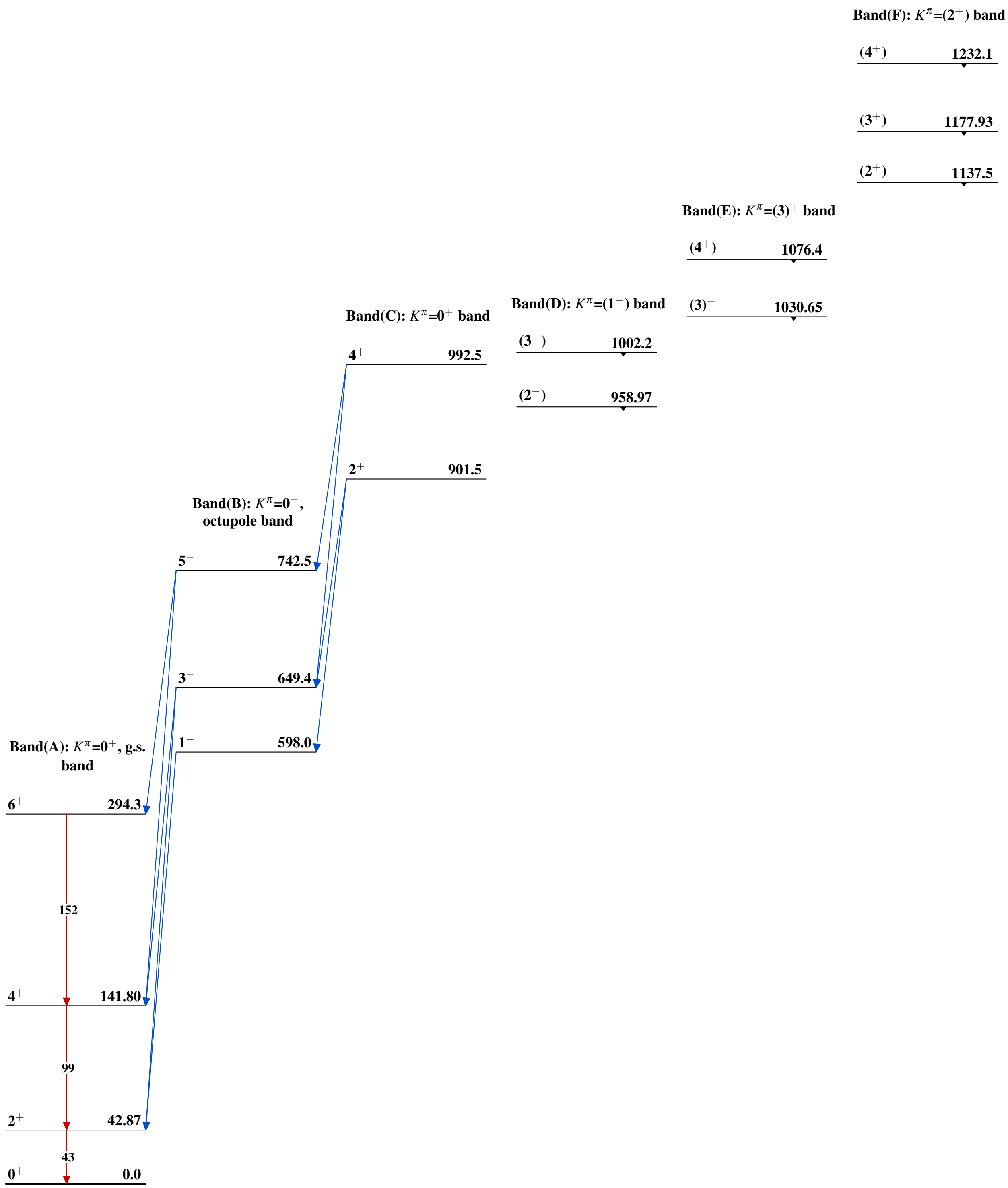
^{240}Am $\varepsilon+\beta^+$ decay 1972Ah07,1971LeZO,1972PoZS

Decay Scheme

Intensities: I_γ per 100 parent decays



^{240}Am ε decay 1972Ah07,1971LeZO,1972PoZS



$^{240}_{94}Pu_{146}$