^{236}Pu α decay 1994Ar08

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	E. Browne	NDS 107, 2579 (2006)	1-Nov-2004

Parent: ^{236}Pu: E=0.0; $J^\pi=0^+$; $T_{1/2}$=2.858 y *8*; Q(α)=5867.07 *8*; %α decay=100.0

^{236}Pu source produced by ^{238}U(p,3n)^{236}Np(22.5 h), which decays to ^{236}Pu. Chemical separation of plutonium. Measured Eγ, Iγ, γγ coin using Germanium detectors. Others: 1956Hu96, 1963Le17.

^{232}U Levels

E(level)	J^π	$T_{1/2}$	Comments
0.0†	0^+		
47.58† *2*	2^+	254 ps *20*	$T_{1/2}$: delayed coincidence measurement (1960Be25).
156.54† *3*	4^+		
322.65† *6*	6^+		
540.7† *1*	8^+		
563.2‡ *2*	1^-		
629.0‡ *1*	3^-		No alpha particle group feeds this level (Iα < 1×10^{-6} %).
691.45# *4*	0^+		
734.56# *6*	2^+		
746.8‡ *1*	5^-		
833.5# *2*	4^+		
866.9@ *1*	2^+		
927.3& *1*	(0^+)		
967.6& *1*	(2^+)		

† Band(A): $K^\pi=0^+$ g.s. rotational band.
‡ Band(B): $K^\pi=0^-$ Octupole vibrational band.
# Band(C): $K^\pi=0^+$ Beta vibrational band.
@ Band(D): $K^\pi=2^+$ Gamma vibrational band.
& Band(E): $K^\pi=(0^+)$ Two-phonon octupole vibrational band.

α radiations

Eα	E(level)	Iα‡	HF	Comments
4816.4	967.6	1.53×10^{-5}	6.7	
4856.0	927.3	1.33×10^{-5}	15	
4915.4	866.9	1.21×10^{-5} *6*	41	
4948.2	833.5	6×10^{-7}	1400	Iα: Assuming an E0 intensity of (3.2×10^{-7} *9* %) for the 677-keV γ ray, and a total photon intensity of≈2.7×10^{-7} % for the sum of all the γ rays that de-excite the 833-keV level (1994Ar08).
5033.5	746.8	2.46×10^{-6}	1260	
5045.5	734.56	1.3×10^{-5} *1*	286	
5087.9	691.45	5.8×10^{-4} *10*	12	
5214.0	563.2	2.6×10^{-4} *1*	171	
5236.1	540.7	1.3×10^{-5} *2*	4690	
5450.4	322.65	1.85×10^{-3}	639	
5613.7	156.54	0.23	44	

Continued on next page (footnotes at end of table)

^{236}Pu α decay 1994Ar08 (continued)

α radiations (continued)

Eα	E(level)	Iα[‡]	HF
5720.87[†] *10*	47.58	30.8[†] *3*	1.3
5767.53[†] *8*	0.0	69.1[†] *3*	1.0

[†] Values recommended in 1991Ry01. Others: 1976BaZZ, 1979Ry01, 1984Ry02.
[‡] Absolute intensity per 100 decays.

γ(^{232}U)

E_γ	I_γ[‡#]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	δ	α[@]	$I_{(\gamma+ce)}$[#]	Comments
47.57 *2*	0.065	47.58	2^+	0.0	0^+	E2		468		α(L)=342; α(M)=94
108.95 *2*	0.0225	156.54	4^+	47.58	2^+	E2		9.2		α(L)=6.62; α(M)=1.84; α(N+..)=0.692
166.09 *5*	7.35×10^{-4} *2*	322.65	6^+	156.54	4^+	E2		1.56		α(K)=0.204; α(L)=0.99; α(M)=0.273; α(N+..)=0.101
218.0 *1*	8.4×10^{-6} *1*	540.7	8^+	322.65	6^+	E2		0.558		α(K)=0.136; α(L)=0.307; α(M)=0.084; α(N+..)=0.0312
338.5 *1*	7.2×10^{-6} *1*	967.6	(2^+)	629.0	3^-	[E1]		0.0304		α(K)=0.0243; α(L)=0.00462; α(M)=0.00110; α(N+..)=0.00039
364.0 *1*	1.09×10^{-5} *15*	927.3	(0^+)	563.2	1^-	[E1]		0.0260		α(K)=0.0208; α(L)=0.00392; α(M)=0.00094; α(N+..)=0.00033
404.46 *10*	5.5×10^{-6} *1*	967.6	(2^+)	563.2	1^-	[E1]		0.0209		α(K)=0.0168; α(L)=0.00310; α(M)=0.00074; α(N+..)=0.00026
423.85 *20*	6.3×10^{-7} *1*	746.8	5^-	322.65	6^+	[E1]		0.0189		α(K)=0.0152; α(L)=0.00280; α(M)=0.00067; α(N+..)=0.00024
472.34 *10*	2.5×10^{-6} *2*	629.0	3^-	156.54	4^+	E1		0.0152		α(K)=0.0122; α(L)=0.00222; α(M)=0.00053; α(N+..)=0.00019
515.58 *2*	1.63×10^{-4} *5*	563.2	1^-	47.58	2^+	E1		0.0127		α(K)=0.0103; α(L)=0.00185
563.19 *2*	1.14×10^{-4} *4*	563.2	1^-	0.0	0^+	E1		0.0107		α(K)=0.0087; α(L)=0.00155
577.95 *10*	1.2×10^{-6} *2*	734.56	2^+	156.54	4^+	[E2]		0.0342		α(K)=0.0224; α(L)=0.0089
581.41 *10*	4.1×10^{-6} *2*	629.0	3^-	47.58	2^+	E1		0.0101		α(K)=0.00817; α(L)=0.00145
590.28 *10*	1.8×10^{-6} *1*	746.8	5^-	156.54	4^+	[E1]		0.0098		α(K)=0.00795; α(L)=0.00141
643.87 *3*	2.25×10^{-4} *9*	691.45	0^+	47.58	2^+	[E2]		0.0270		α(K)=0.0184; α(L)=0.00650
677.0 *2*	9.5×10^{-8} *4*	833.5	4^+	156.54	4^+	[E0]+E2				
687.04 *10*	2.3×10^{-6} *1*	734.56	2^+	47.58	2^+	E0+E2			6.8×10^{-6} *20*	
691.3[&] *1*		691.45	0^+	0.0	0^+	E0			3.5×10^{-4} *10*	$I_{(\gamma+ce)}$: From 1963Le17.
710.1 *3*	3.2×10^{-7} *1*	866.9	2^+	156.54	4^+	E2		0.0221		α(K)=0.0155; α(L)=0.00495
734.55 *10*	3.08×10^{-6} *13*	734.56	2^+	0.0	0^+	[E2]		0.0206		α(K)=0.0146; α(L)=0.00452
811.26 *20*	9.4×10^{-7} *1*	967.6	(2^+)	156.54	4^+	[E2]		0.0169		α(K)=0.0123; α(L)=0.00348
819.27 *10*	6.0×10^{-6} *2*	866.9	2^+	47.58	2^+	E2		0.0166		α(K)=0.0121; α(L)=0.00340
866.88 *10*	4.9×10^{-6} *3*	866.9	2^+	0.0	0^+	E2		0.0148		α(K)=0.0109; α(L)=0.00295
879.9 *1*	2.1×10^{-6} *1*	927.3	(0^+)	47.58	2^+	[E2]		0.0144		α(K)=0.0106; α(L)=0.00284
920.23 *20*	9.6×10^{-7} *1*	967.6	(2^+)	47.58	2^+	M1+E2	1.14 *20*	0.030 *4*		α(K)=0.024 *3*; α(L)=0.0049 *6*
[x]927.69 *20*	3.6×10^{-7} *4*									
967.9 *3*	3.5×10^{-7} *8*	967.6	(2^+)	0.0	0^+	[E2]		0.0120		α(K)=0.0090; α(L)=0.00226

[†] From Adopted Gammas.
[‡] Iγ are per 100 decays of ^{236}Pu. Relative experimental values normalized to an absolute scale from a decay scheme γ-ray transition intensity balance using Iα(g.s.)=69.1 % 3 (1994Ar08).
[#] Absolute intensity per 100 decays.
[@] Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies,

$^{232}_{92}U_{140}$-3

$\gamma(^{232}U)$ (continued)

assigned multipolarities, and mixing ratios, unless otherwise specified.
& Placement of transition in the level scheme is uncertain.
x γ ray not placed in level scheme.

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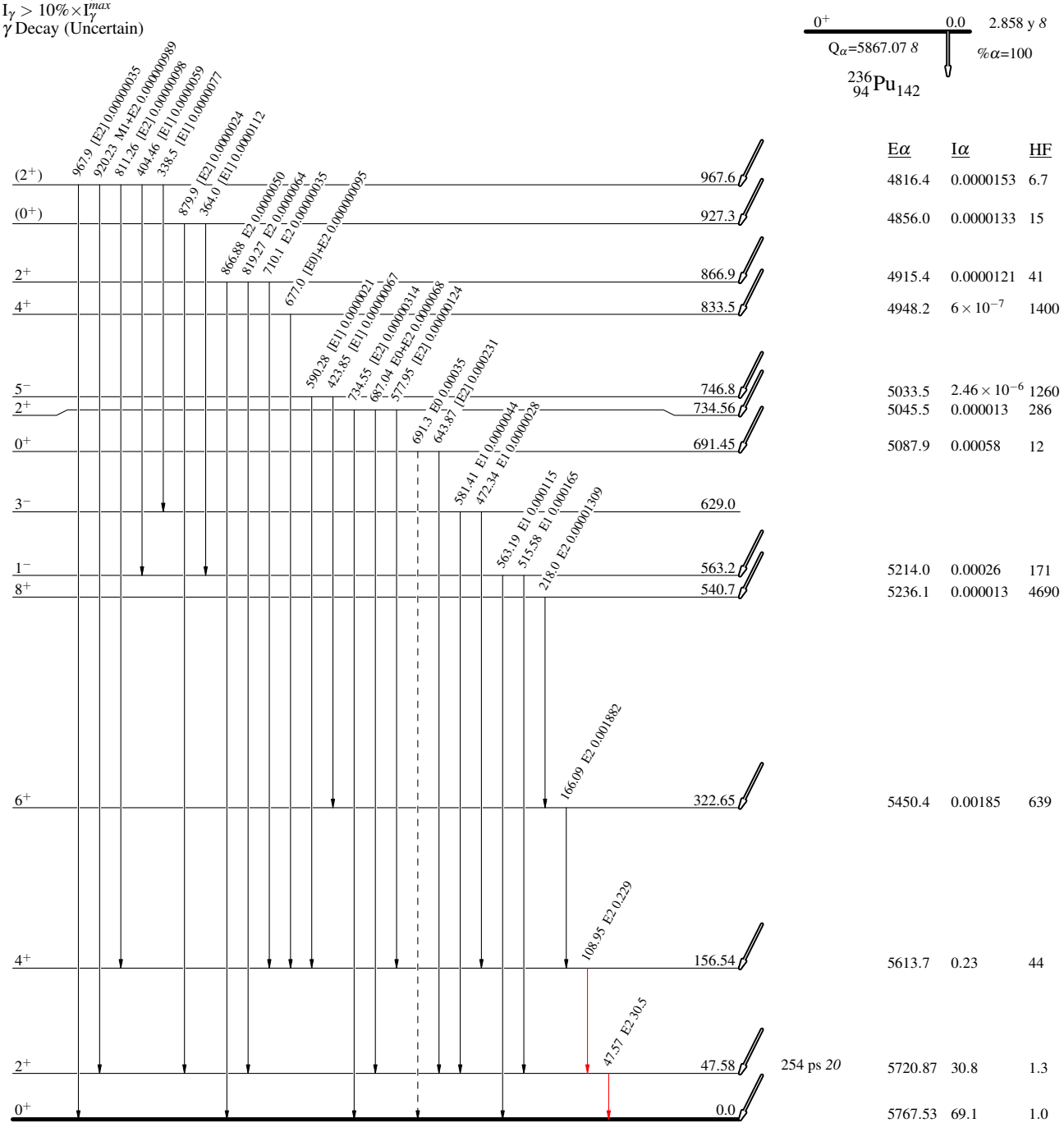
Decay Scheme

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)



	Eα	Iα	HF
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927.3	4856.0	0.0000133	15
866.9	4915.4	0.0000121	41
833.5	4948.2	6×10^{-7}	1400
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734.56	5045.5	0.000013	286
691.45	5087.9	0.00058	12
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540.7	5236.1	0.000013	4690
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47.58	5720.87	30.8	1.3
0.0	5767.53	69.1	1.0

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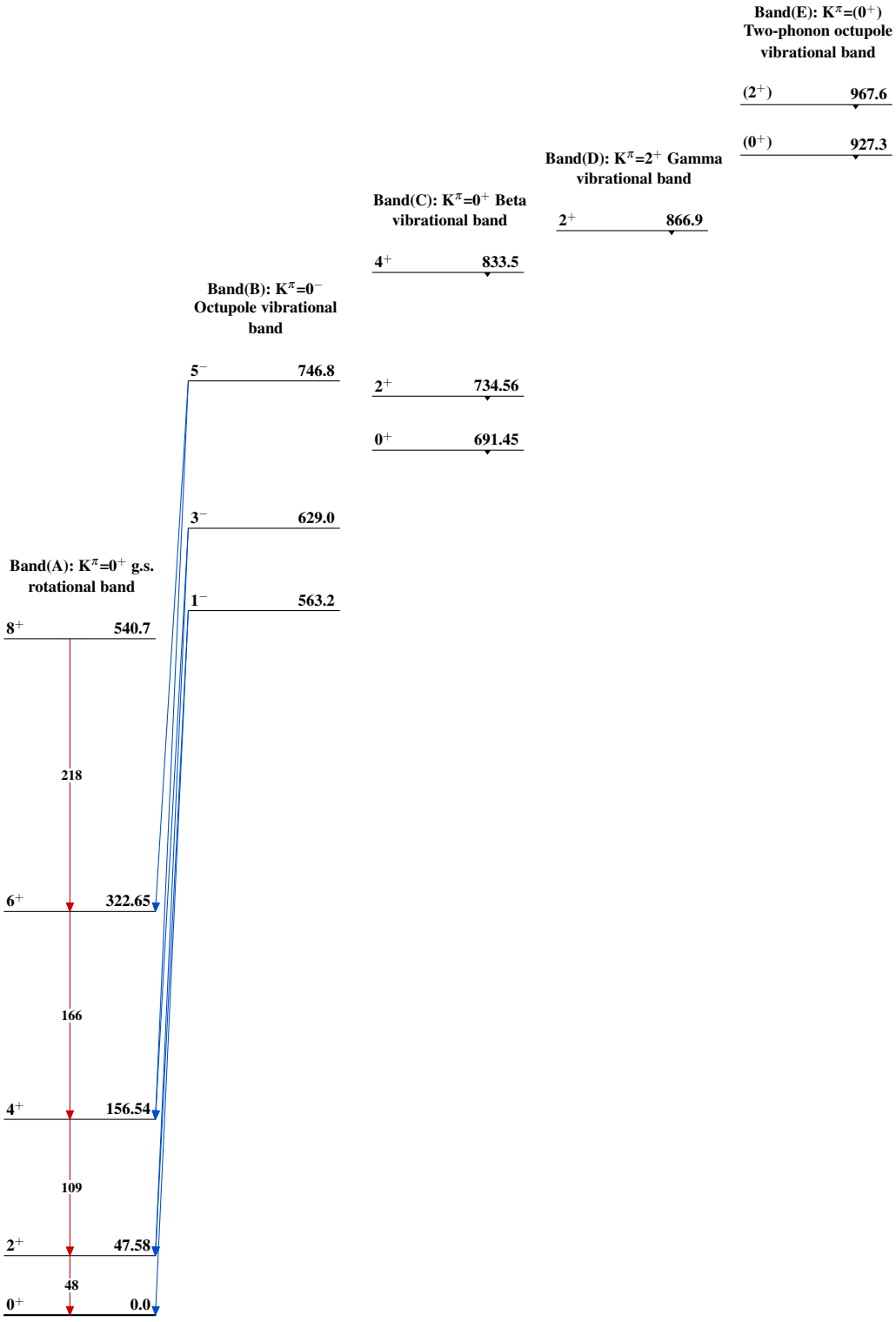

$^{232}_{92}U_{140}$