Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Shaofei Zhu	NDS 182, 2 (2022).	1-Apr-2022

Q(β^-)=−3139 *SY*; S(n)=7352 *21*; S(p)=5430.5 *18*; Q(α)=5867.15 *8* 2021Wa16
ΔQ(β^-)=120 (2021Wa16).
S(2n)=13591 *7*, S(2p)=9821.4 *16* (2021Wa16).
α: Additional information 1.

^{236}Pu Levels

Cross Reference (XREF) Flags

A	^{236}Np β^- decay (155×10^3 y)	E	^{236}Am ε decay (2.9 min)
B	^{236}Np β^- decay (22.5 h)	F	^{235}U(α,3nγ)
C	^{240}Cm α decay	G	^{237}Np(^{209}Bi,^{210}Pbγ)
D	^{236}Am ε decay (3.6 min)		

E(level)†	J$^\pi$‡	T$_{1/2}$	XREF	Comments
0#	0$^+$	2.858 y *8*	ABCDEFG	%α=100; %SF=1.9×10^{-7} *4* %SF: from T$_{1/2}$(SF)=1.5×10^9 y *3* as unweighted average of 3.5×10^9 y *10* (1952Gh27), 2.09×10^9 y *6* (1988SeZY), 1.36×10^9 y *20* (1990Og01,1995Hu21) and 1.13×10^9 y *13* (1995Hu21). T$_{1/2}$: weighted average of 2.851 y *8* (1957Ho66) and 2.866 y *9* (1984Na30). Other value: 2.7 y *3* (1949Ja01). ^{236}Pu decay by ^{28}Mg emission observed by 1995Hu21 (15 tracks), 1990Og01 (two ^{28}Mg tracks). Partial T$_{1/2}$=1.06×10^{14} y *28* (1995Hu21), ≈1.5×10^{14} y (1990Og01). T$_{1/2}$(^{28}Mg, Calculated)= 4.12×10^{13} y (Cluster model,1994Bu07), 2.52×10^{12} y (Effective liquid drop model, 1993Go18).
44.63# *9*	2$^+$		ABCDEFG	
147.45# *9*	4$^+$		A CDEFG	
305.80# *10*	6$^+$		A CD FG	
515.70# *22*	8$^+$		FG	
698.31@ *12*	1$^-$		E	
758.02@ *17*	3$^-$		E	
773.5# *3*	10$^+$		FG	
866.00@ *15*	5$^-$		D	
1074.3# *4*	12$^+$		FG	
1185.45 *15*	5$^-$	1.2 μs *3*	D	%IT=100 J$^\pi$: M1 γ to 5$^-$; γ to 4$^+$ and 6$^+$; proposed as K-isomer with configuration=((π 5/2[523])(π 5/2[642])), K^π=5$^-$ (2005As01).
1311.51& *23*	(0$^-$)		E	J$^\pi$: from systematics with ^{240}Pu.
1340.82& *19*	(2$^-$)		E	J$^\pi$: from systematics with ^{240}Pu.
1413.6# *4*	14$^+$		FG	
1786.0# *5*	16$^+$		FG	
2188.0 *7*	18$^+$		G	
2615.7 *9*	20$^+$		G	
≈3.×10^3	(0$^+$)	37 ps *4*		%SF≤100 J$^\pi$: ground state in the second potential well from syst of fission isomers (1974MeYP,1977Me08). E(level): from ^{237}Np(p,2n) and ^{234}U(α,2n) (1974MeYP). T$_{1/2}$: from 1977Me08 using ^{234}U(α,2n) reaction; other: 40 ps *15* (1974MeYP).

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Adopted Levels, Gammas (continued)

^{236}Pu Levels (continued)

E(level)†	J$^{\pi}$‡	$T_{1/2}$	XREF	Comments
				Q(intrinsic)=37 b +14−8 (1977Me08). %SF: no γ decay observed (1977Me08).
3063.7 *10*	22^{+}		G	
3529.6 *11*	24^{+}		G	
4.1×10^{3} *2*		34 ns *8*		%SF≤100 E(level),$T_{1/2}$: from ^{237}Np(p,2n) (1969La14). J$^{\pi}$: not determined, possible two-quasi-particle K-isomer in the second potential well from syst of fission isomers (1977Me08). %SF: no γ decay observed (1969La14).

† Deduced by the evaluator from a least-squares fit to γ-ray energies.
‡ From band structure, unless indicated otherwise.
# Band(A): K^{π}=0^{+} g.s. rotational band. Band assignment from energy systematics (1983Ha31).
@ Band(B): K^{π}=0^{-} octupole vibrational band. Assignment based on decay branching ratio to g.s. band (2005As01).
& Band(C): K^{π}=0^{-} (π, 5/2[523])(π, 5/2[642]), from syst with ^{240}Pu (2005As01).

γ(^{236}Pu)

E_i(level)	J$^{\pi}_{i}$	E_{γ}	I_{γ}	E_f	J$^{\pi}_{f}$	Mult.	α	Comments
44.63	2^{+}	44.63 *10*	100	0	0^{+}	E2	741 *13*	α(L)=538 *10*; α(M)=150.1 *27*; α(N)=41.2 *7*; α(O)=9.69 *17*; α(P)=1.515 *27*; α(Q)=0.00326 *6* E_{γ},I_{γ},Mult.: from ^{236}Np β^{-} decay (22.5 h).
147.45	4^{+}	102.82 *2*	100	44.63	2^{+}	[E2]	13.87 *19*	α(L)=10.06 *14*; α(M)=2.82 *4*; α(N)=0.775 *11*; α(O)=0.1826 *26*; α(P)=0.0291 *4* α(Q)=0.0001055 *15* E_{γ},I_{γ}: from ^{236}Np β^{-} decay (153×10^{3} y).
305.80	6^{+}	158.35 *2*	100	147.45	4^{+}	E2	2.139 *30*	α(K)=0.1927 *27*; α(L)=1.413 *20*; α(M)=0.394 *6*; α(N)=0.1084 *15*; α(O)=0.0256 *4* α(P)=0.00414 *6*; α(Q)=2.465×10^{-5} *35* E_{γ},I_{γ}: from ^{236}Np β^{-} decay (153×10^{3} y). Mult.: from ^{235}U(α,3nγ).
515.70	8^{+}	209.9† *2*	100†	305.80	6^{+}	E2	0.714 *10*	α(K)=0.1402 *20*; α(L)=0.417 *6*; α(M)=0.1157 *17*; α(N)=0.0318 *5*; α(O)=0.00753 *11* α(P)=0.001235 *18*; α(Q)=1.096×10^{-5} *16* Mult.: from ^{235}U(α,3nγ).
698.31	1^{-}	653.68‡ *12*	100‡ *15*	44.63	2^{+}	[E1]	0.00865 *12*	α(K)=0.00699 *10*; α(L)=0.001254 *18*; α(M)=0.000300 *4*; α(N)=8.12×10^{-5} *11* α(O)=2.004×10^{-5} *28*; α(P)=3.72×10^{-6} *5*; α(Q)=2.229×10^{-7} *31*
		698.3‡ *2*	71‡ *11*	0	0^{+}	[E1]	0.00766 *11*	α(K)=0.00620 *9*; α(L)=0.001104 *15*; α(M)=0.000264 *4*; α(N)=7.15×10^{-5} *10* α(O)=1.765×10^{-5} *25*; α(P)=3.28×10^{-6} *5*; α(Q)=1.985×10^{-7} *28*
758.02	3^{-}	610.8‡ *3*	58‡ *11*	147.45	4^{+}	[E1]	0.00982 *14*	α(K)=0.00792 *11*; α(L)=0.001431 *20*; α(M)=0.000343 *5*; α(N)=9.28×10^{-5} *13* α(O)=2.289×10^{-5} *32*; α(P)=4.24×10^{-6} *6*; α(Q)=2.516×10^{-7} *35*
		713.3‡ *2*	100‡ *17*	44.63	2^{+}	[E1]	0.00737 *10*	α(K)=0.00597 *8*; α(L)=0.001060 *15*;

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Adopted Levels, Gammas (continued)

$\gamma(^{236}Pu)$ (continued)

E_i(level)	J^π_i	E_γ	I_γ	E_f	J^π_f	Mult.	α	Comments
								α(M)=0.000254 *4*; α(N)=6.86×10^{-5} *10* α(O)=1.694×10^{-5} *24*; α(P)=3.15×10^{-6} *4*; α(Q)=1.912×10^{-7} *27*
773.5	10$^+$	257.8† *2*	100†	515.70	8$^+$	[E2]	0.346 *5*	α(K)=0.1006 *14*; α(L)=0.1785 *26*; α(M)=0.0492 *7*; α(N)=0.01350 *19*; α(O)=0.00321 *5* α(P)=0.000532 *8*; α(Q)=6.41×10^{-6} *9*
866.00	5$^-$	560.3$^\#$ *2*	43$^\#$ *8*	305.80	6$^+$	[E1]	0.01156 *16*	α(K)=0.00931 *13*; α(L)=0.001699 *24*; α(M)=0.000408 *6*; α(N)=0.0001103 *15* α(O)=2.72×10^{-5} *4*; α(P)=5.02×10^{-6} *7*; α(Q)=2.94×10^{-7} *4*
		718.6$^\#$ *2*	100$^\#$ *16*	147.45	4$^+$	[E1]	0.00727 *10*	α(K)=0.00589 *8*; α(L)=0.001045 *15*; α(M)=0.0002502 *35*; α(N)=6.77×10^{-5} *9* α(O)=1.671×10^{-5} *23*; α(P)=3.11×10^{-6} *4*; α(Q)=1.888×10^{-7} *26*
1074.3	12$^+$	300.8† *2*	100†	773.5	10$^+$	[E2]	0.2097 *30*	α(K)=0.0769 *11*; α(L)=0.0970 *14*; α(M)=0.0265 *4*; α(N)=0.00729 *10*; α(O)=0.001735 *25* α(P)=0.000291 *4*; α(Q)=4.39×10^{-6} *6*
1185.45	5$^-$	319.50$^\#$ *11*	66$^\#$ *10*	866.00	5$^-$	M1(+E2)	0.6 *4*	α(K)=0.4 *4*; α(L)=0.12 *4*; α(M)=0.030 *9*; α(N)=0.0081 *23*; α(O)=0.0020 *6*; α(P)=3.6×10^{-4} *13* α(Q)=1.8×10^{-5} *14* Mult.: from ^{236}Am ε decay (3.6 min).
		879.7$^\#$ *2*	100$^\#$ *14*	305.80	6$^+$	[E1]	0.00506 *7*	α(K)=0.00412 *6*; α(L)=0.000717 *10*; α(M)=0.0001712 *24*; α(N)=4.63×10^{-5} *6* α(O)=1.145×10^{-5} *16*; α(P)=2.144×10^{-6} *30*; α(Q)=1.334×10^{-7} *19* B(E1)(W.u.)=9.0×10^{-11} *26*
		1037.8$^\#$ *2*	53$^\#$ *8*	147.45	4$^+$	[E1]	0.00380 *5*	α(K)=0.00309 *4*; α(L)=0.000532 *7*; α(M)=0.0001268 *18*; α(N)=3.43×10^{-5} *5*; α(O)=8.50×10^{-6} *12* α(P)=1.596×10^{-6} *22*; α(Q)=1.010×10^{-7} *14* B(E1)(W.u.)=2.9×10^{-11} *9*
1311.51	(0$^-$)	613.2‡ *2*	100‡	698.31	1$^-$			
1340.82	(2$^-$)	582.8‡ *2*	100‡ *15*	758.02	3$^-$			
		642.5‡ *2*	53‡ *9*	698.31	1$^-$			
1413.6	14$^+$	339.3† *2*	100†	1074.3	12$^+$	[E2]	0.1459 *21*	α(K)=0.0620 *9*; α(L)=0.0614 *9*; α(M)=0.01670 *24*; α(N)=0.00458 *6*; α(O)=0.001094 *16* α(P)=0.0001850 *26*; α(Q)=3.31×10^{-6} *5*
1786.0	16$^+$	372.4† *3*	100†	1413.6	14$^+$	[E2]	0.1120 *16*	α(K)=0.0524 *7*; α(L)=0.0437 *6*; α(M)=0.01181 *17*; α(N)=0.00324 *5*; α(O)=0.000774 *11* α(P)=0.0001319 *19*; α(Q)=2.68×10^{-6} *4*
2188.0	18$^+$	402.0 *5*	100	1786.0	16$^+$			
2615.7	20$^+$	427.7$^@$ *5*	100$^@$	2188.0	18$^+$			
3063.7	22$^+$	448.0$^@$ *5*	100$^@$	2615.7	20$^+$			
3529.6	24$^+$	465.9$^@$ *5*	100$^@$	3063.7	22$^+$			

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Adopted Levels, Gammas (continued)

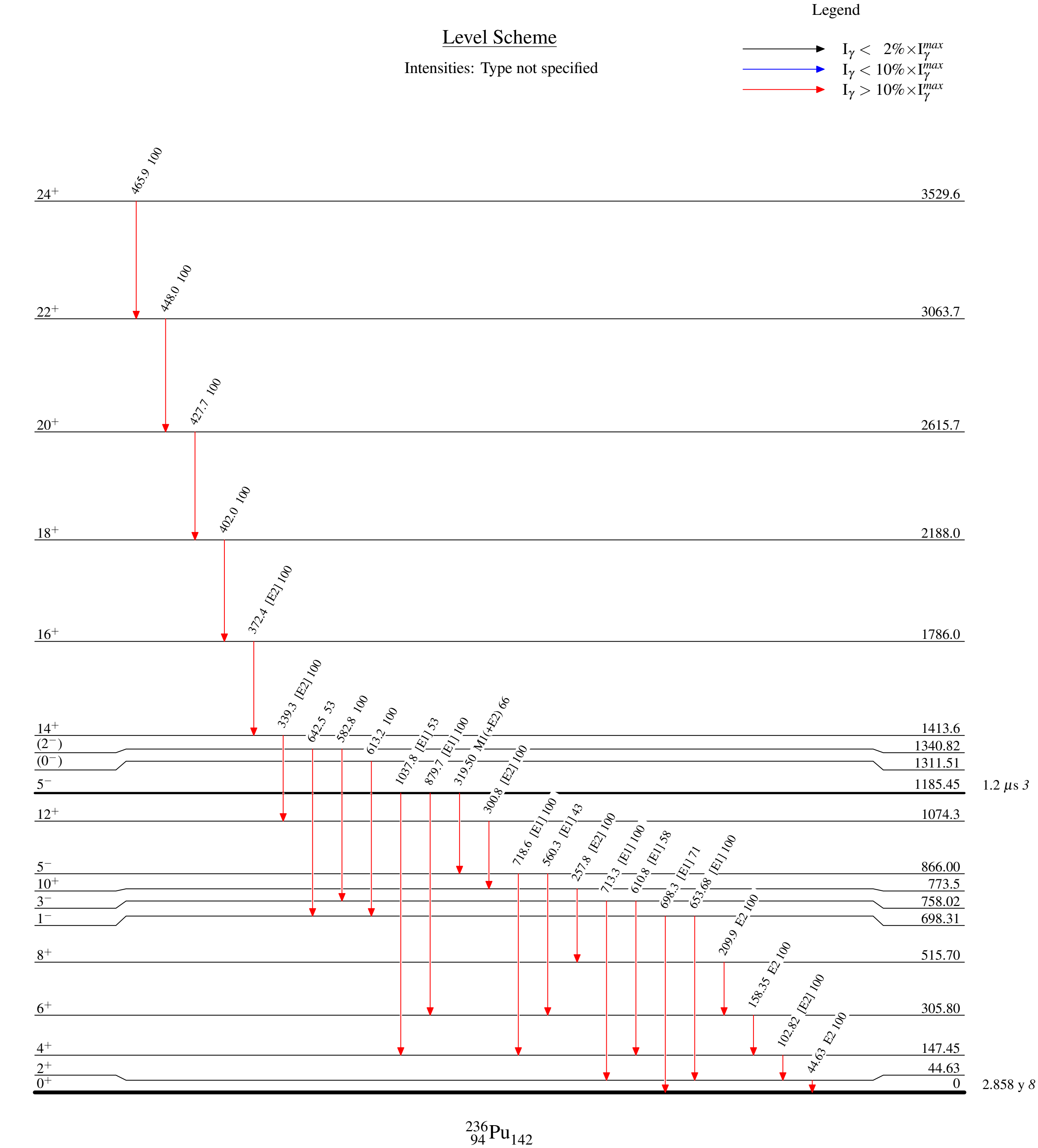
$\gamma(^{236}Pu)$ (continued)

† From $^{235}U(\alpha,3n\gamma)$.
‡ From ^{236}Am ε decay (2.9 min).
# From ^{236}Am ε decay (3.6 min).
@ From $^{237}Np(^{209}Bi,^{210}Pb\gamma)$.

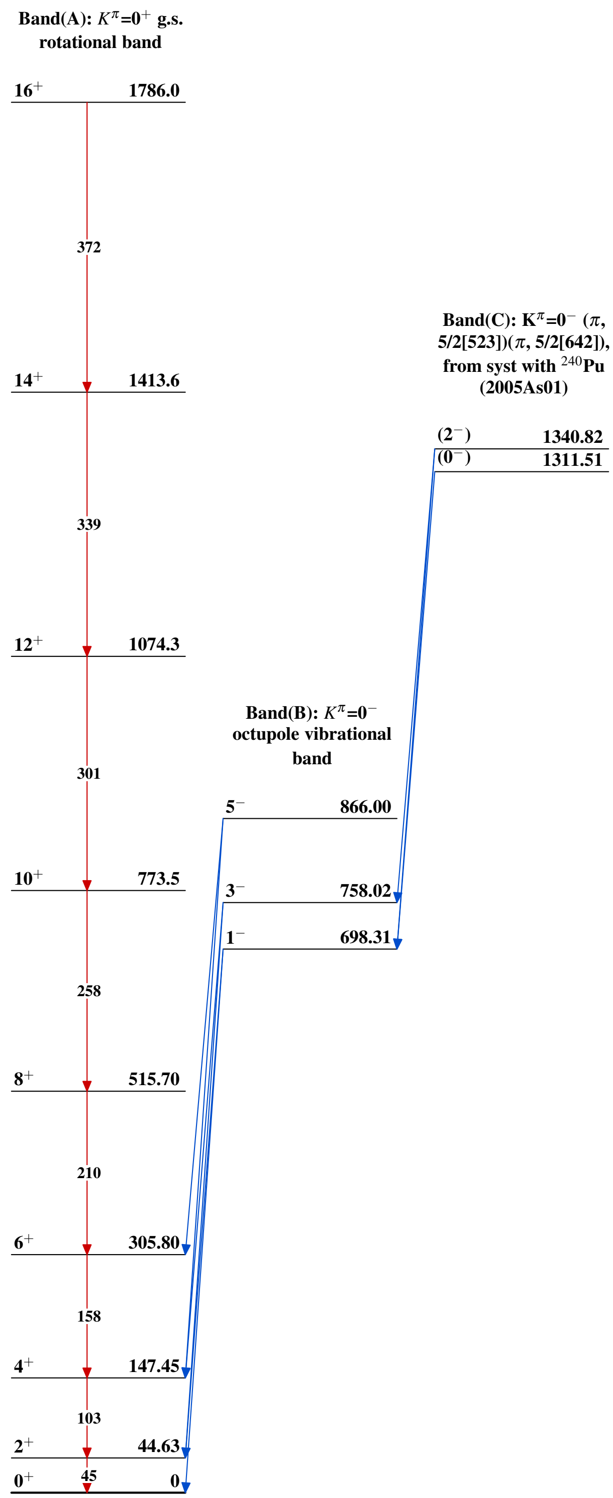
Adopted Levels, Gammas

Level Scheme

Intensities: Type not specified



Adopted Levels, Gammas



$^{236}_{94}Pu_{142}$

Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	E. Browne, J. K. Tuli	NDS 127, 191 (2015)	1-Jun-2014

Q(β^-)=−2258.3 *51*; S(n)=6999.8 *13*; S(p)=5997.5 *4*; Q(α)=5593.20 *19* 2012Wa38

Additional information 1.

Energies of vibrational states (K=0^+, 2^+, 0^-, 1^-, 2^-, 3^-), and B(E2), B(E3) values for the excitation of 2^+, 3^- levels have been calculated by 1965So04, 1970Ne08, 1971Ko31, 1975LeZR, 1975IvZZ. See also 1969Bl13, 1992Ra14, 1993Sa15, 1994Mi14 see 1964So02 for calculated energies of two-quasiparticle states in ^{238}Pu and also for structure of some collective states.

Discovery of ^{238}Pu: 2013Fr02.

Alpha Decay: 2014Ba07, 2013De12, 2013Fe03, 2013Is13, 2013Se17, 2012Is08, 2011Ni11, 2011Qi06, 2011Zh36, 2010Le01, 2010Ni02, 2010Wa23, 2010Wa31, 2009De32, 2009Dr05, 2009Ni06, 2009Wa01, 2009Zh28, 2006Ch34, 2006De05, 2006Ha20, 2006Ha53, 2006Xu08, 2006Xu15, 2005Sh42, 2004Ca24, 2004ChZY, 2004Le07, 2003Ba64, 2003Jo04.

Nuclear reactions: 2013Bo29, 2010Wa07, 2002Be08, 2002Lo18.

^{239}Pu(n,2n): 2002Be08.

^{238}U β-β^- Decay: 2012Zu07,2010Ba07, 2006Ba35, 2005Tr01, 2004Ra13, 2003Cr04, 2002Hi09.

Cluster Decay.

^{238}Pu(^{32}Si): 2014Ba09, 2013Qi04, 2013Zd01, 2013Zd02, 2012Ku23, 2012Ba35, 2012Mi17, 2012Sa31, 2012So15, 2012Ta10, 2010Si12, 2010Zh51, 2009Ar11, 2009Qi07, 2009Ro16, 2008Bh05, 2005Bh02, 2005Ku04, 2005Ku32, 2004Ba64, 2004Re22, 2002Ba80.

^{238}Pu(^{28}Mg): 2013Na25, 2012Sa31, 2012So15, 2011Sh13, 2010Sa29, 2010Zh51, 2009Ar11, 2009Qi07, 2009Ro16, 2008Bh05, 2002Ba80, 2002Du16.

^{238}Pu(^{30}Mg): 2013Qi04, 2013Zd01, 2013Zd02, 2012Ba35, 2012Ku29, 2012Ku16, 2012Qi01, 2012Sa31 2012Si01 2012So15 2011Si13, 2010Sa29, 2010Si12. 2009Ar05, 2009Ar11, 2009Ro16 2008Bh05 2005Ku32, 2004Ba64, 2004He16, 2002Du16, 2002Ba80.

^{238}Pu(^{34}Si): 2009Qi07.

Nuclear Structure: 2014Lu01, 2013Af01, 2013Bo24, 2013Li30, 2013Ni02, 2013To12, 2012Ib02, 2012Ko06, 2012Lu02, 2012Mi06, 2012Pr09, 2012Ro29, 2012Ro34, 2011Af04, 2011Bo12, 2011In03, 2011Li44, 2011Ri05, 2011Wa30, 2010Bu02, 2010Is01, 2010Ko36, 2010Ra10, 2010Vr01, 2009So02, 2008Bu11, 2007Ba18, 2007Bo46, 2007Sh17, 2006De23, 2006Ra21, 2006Sa35, 2005Al40, 2005Bu38, 2005Du18, 2005La04, 2005Za02, 2004Go33, 2004Sa55, 2003Bu11, 2003Bu27, 2003Mi18, 2003Ra17, 2003Za01, 2002Do15, 2002Ma85, 2002Ra25, 2002Re31.

Isomer energy calculations – 1992Bh03. Other: 2011He12.

Fission Isomers and Super Deformed Bands: 2002Si26.

Quadrupole moments calculations – 1992Bh04.

^{238}Pu Levels

Cross Reference (XREF) Flags

A	^{238}Am ε decay	F	^{240}Pu(p,t)
B	^{238}Np β^- decay	G	^{238}U(α,4nγ)
C	^{242}Cm α decay	H	^{239}Pu(^{207}Pb,^{208}Pbγ)
D	Coulomb excitation	I	^{239}Pu(^{117}Sn,^{118}Snγ)
E	^{239}Pu(d,t)		

E(level)	J^{π} [e]	$T_{1/2}$	XREF	Comments
0.0[†]	0^+	87.7 y *1*	ABCDEFGHI	%α=100; %SF=1.9×10^{-7} *1* $T_{1/2}$,%SF: recommended by 1986LoZT. $T_{1/2}$: 86.41 y *30* specific activity ^{238}Pu/^{242}Cm (1957Ho71), 87.77 y *2* by calorimetry (1973JoYT), 86.98 y *39* by specific activity (1976Po08), 87.71 y *3* specific activity ^{238}Pu/^{242}Cm (1977Di04), 87.98 y *51* relative activity using $T_{1/2}$(^{239}Pu)=24110 y (1981Ag06).

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Adopted Levels, Gammas (continued)

^{238}Pu Levels (continued)

E(level)	$J^{\pi e}$	$T_{1/2}$	XREF	Comments
				$T_{1/2}$(SF)=4.77×10^{10} y *14* (1972Ha11), 4.63×10^{10} y *12* (1975GaZX), 5.1×10^{10} y *6* (1961Dr04).
44.065[†] *15*	2$^+$	175 ps *3*	ABCDEFGHI	J^π: E2 to g.s. $T_{1/2}$: weighted average of 177 ps *5* from aga9ta0 in ^{242}Cm α decay, and 174 ps *3* from B(E2) in Coulomb excitation.
145.936[†] *21*	4$^+$		ABCDEFGH	B(E4)↑=1.9 *7* J^π: E2 to 2$^+$. Coul. ex. B(E4)↑: from Coul. ex.
303.36[†] *6*	6$^+$		BC FGHI	
512.55[†] *15*	8$^+$		C GHI	J^π: E2 γ to 303 level.
605.18[‡] *3*	1$^-$		ABC	J^π: E1 to g.s.. The intensity ratio for the transitions to 0$^+$ and 2$^+$ agree with theory for K=0, not with K=1.
661.44[‡] *4*	3$^-$		ABCD	B(E3)↑=0.71 *12* J^π: E1+M2 γ's to 2$^+$ and 4$^+$. B(E3)↑: from Coul. ex.
763.24[‡] *11*	5$^-$		BC	J^π: M1+E2 γ from (4)$^-$ determines π=−. γ's to 4$^+$ and 6$^+$ then give J=5. Member of K=0 octupole band.
771.9[†] *5*	10$^+$		GHI	
911.6[‡] *8*	7$^-$		H	
941.47[#] *8*	0$^+$		ABC EF	J^π: E0 to g.s.
962.783[@] *23*	1$^-$		ABC	J^π: E1 to g.s.. The configuration was proposed by 1972Ah04 on the basis of log *ft* ratios in ε decay and energy calculations of 1964So02.
968.2? *4*	(2$^-$)	<8.5 ns	B	J^π: 114.4γ from (4)$^-$ is probably E2. γ to 2$^+$. 1972Wi22 propose K=2, J^π=2$^-$. $T_{1/2}$: from delayed ceγ coincidence.
983.09[#] *7*	2$^+$	0.55 ps *+15−11*	ABCDEF	J^π: E0+E2 to 2$^+$. $T_{1/2}$: from B(E2) in Coulomb excitation.
985.45[@] *5*	2$^-$		AB	J^π: M1 to 3$^-$. log *ft*=7.5 (log $f^{1u}t$=8.2) from 1$^+$ rules out 3$^-$ and 4$^-$ M1. The log ft for the ε feeding rules out J^π=3$^-$,4$^-$.
1018.6? *3*			C	
1028.537[&] *16*	2$^+$		ABC F	J^π: E2 to g.s.
1069.929[&] *22*	3$^+$		B	J^π: M1+E2 γ's to 2$^+$ and 4$^+$ log ft for the β^- feeding, photon intensity ratios, and band parameter suggest K=2, J^π=3$^+$.
1077.7[†f] *5*	12$^+$		GHI	
1082.55[c] *6*	(4)$^-$	8.5 ns *5*	B	J^π: E1+M2 to 4$^+$. Configuration proposed by 1972Wi22. $T_{1/2}$: from $\beta\gamma$(t) in ^{238}Np decay (1970Be57).
1102.4[‡f] *5*	9$^-$		H	
1125.75[&] *17*	(4$^+$)		C	J^π: γ's to 2$^+$ and 4$^+$. Possible member of K=2 band.
1134 *4*	(0$^+$)		F	J^π: L(p,t)=(0).
1174.4 *4*	(2$^+$)		A	J^π: from γ transitions to 0$^+$, 2$^+$ states J^π=1±,2$^+$. Intensity ratio is not in good agreement with Alaga rule for J=1, but it agrees well for J=2.
1202.45[d] *8*	(3)$^-$		B	J^π: M1(+E2) to (4)$^-$. γ to 2$^+$.
1228.65[a] *18*	0$^+$		A C E	J^π: E0 to g.s.
1252 *2*			F	
1264.20[a] *15*	2$^+$		A C E	J^π: E0+E2+M1 to 2$^+$.
1310.3? *3*	1$^+$,2$^+$		A	J^π: M1 to 2$^+$. log *ft*=7.4 from 1$^+$ rules out 3$^+$.
1340.4[‡f] *6*	11$^-$		H	
1426.4[†] *6*	14$^+$		GHI	

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Adopted Levels, Gammas (continued)

^{238}Pu Levels (continued)

E(level)	J$^{\pi}$[e]	T$_{1/2}$	XREF	Comments
1426.61[bf] *24*	0$^+$		A	J$^{\pi}$: E0 to g.s.
1447.24 *19*	1$^-$		A	J$^{\pi}$: E0 to 1$^-$ intensity ratio of gammas to g.s. band suggests K=0.
1458.29[b] *22*	2$^+$		A	J$^{\pi}$: E0+E2+M1 to 2$^+$ energy spacing of the 1426 and 1458 levels and the ratio of ft′s for the ε feedings to these levels suggest that they are members of a band.
1559.82 *14*	1$^-$		A	J$^{\pi}$: M1+E2 to 2$^-$. γ to g.s. gammas to 0$^+$, 1$^-$, 2$^+$ levels.
1596.3 *3*	(2$^+$)		A	J$^{\pi}$: gammas to 0$^+$, 2$^+$, and possibly 4$^+$. J=1 is not ruled out if the placement of 1450γ to 4$^+$ is not correct.
1621.29 *12*	1$^-$		A	J$^{\pi}$: E1 to 0$^+$ E0+M1+E2 transitions with about equal intensity to K,J^{π}=0,1$^-$ and 1,1$^-$ states imply that the configuration of the 1621 state is probably a mixture of K=0 and K=1.
1621.8[‡f] *6*	13$^-$		H	
1636.40 *13*	1$^-$		A	J$^{\pi}$: E1 to 0$^+$ E0 transitions with about same intensity to K,J^{π}=0,1$^-$ and 1,1$^-$ states imply that the configuration of the 1636.6 state is a mixture of K=0 and K=1.
1651.2 *4*	1,2$^+$		A	J$^{\pi}$: γ′s to 0$^+$ and 2$^+$.
1726.34 *22*	1,2$^+$		A	J$^{\pi}$: γ′s to 0$^+$ and 2$^+$.
1783.5 *3*	1,2$^+$		A	J$^{\pi}$: γ′s to 0$^+$ and 2$^+$.
1815.5[†f] *5*	16$^+$		GHI	
1898.42 *22*	2$^-$		A	J$^{\pi}$: M1 γ′s to 1$^-$ and 3$^-$.
1944.6[‡f] *4*	15$^-$		H	
2241.7[†f] *6*	18$^+$		GHI	
2308.2[‡f] *5*	17$^-$		H	
≈2400		0.6 ns *2*		%SF≤100 %SF: only SF decay observed. T$_{1/2}$: 0.5 ns *2* ^{236}U(α,2n) (1973Li01), 0.7 ns *2* ^{238}Pu(d,pn) (1974MeYP). 1972We09 calculated T$_{1/2}$(SF)=0.95 ns, T$_{1/2}$(γ)=7.0 μs. E=2400 *200* from thresholds (1973Li01). Calculated energies are: E=2250 (1972We09), E=2000 (1971Pa33), E=1800 (1972Ma11). Assignment: ^{236}U(α,2n) excit (1973Li01).
2702.3[†f] *8*	20$^+$		HI	
2708.7[‡f] *6*	19$^-$		H	
3143.8[‡f] *8*	21$^-$		H	
3195.4[†f] *8*	22$^+$		HI	
≈3500	(0$^+$)	6.0 ns *15*		%SF≤100 %SF: only SF decay observed. T$_{1/2}$: 6.5 ns *15* ^{236}U(α,2n) (1970Bu02,1971Br39), 5.0 ns *20* ^{236}U(α,2n) (1973Li01). Other measurements: 1973Na35, 1969Me11. E=3700 *200* from ^{236}U(α,2n) thresholds (1973Li01), E=3400 *400* estimated from excitation functions (1973Br38). Angular distribution of fission fragments following ^{232}Th(α,F) and ^{236}U(a,2nf) reactions were measured, and possible spin assignments were proposed from measured anisotropy by 1974SpZS. See also 1975Kh06 for a discussion on spin of this isomeric state. Assignment: ^{236}U(α,2n) excit (1971Br39,1973Li01).
3610.6[‡f] *10*	23$^-$		H	
3717.1[†f] *10*	24$^+$		HI	
4105.2[‡f] *11*	25$^-$		H	
4263.7[†f] *11*	26$^+$		HI	
4623.2[‡f] *13*	27$^-$		H	
4833.3[†f] *13*	28$^+$		H	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{238}Pu Levels (continued)

E(level)	J^{π}[e]	XREF
5161.3[‡][f]	(29^-)	H
5426.5?[†][f] 9	(30^+)	H

[†] Band(A): $K^{\pi}=0^+$ g.s. band.
[‡] Band(B): $K^{\pi}=0^-$ octupole-vibrational band.
[#] Band(C): $K^{\pi}=0^+$ β-vibrational band.
[@] Band(D): $K^{\pi}=1^-$ ν 7/2(743)-ν 5/2(622) band.
[&] Band(E): $K^{\pi}=2^+$.
[a] Band(F): $K^{\pi}=0^+$.
[b] Band(G): $K^{\pi}=0^+$.
[c] Band(H): $K^{\pi}=4^-$ ν 7/2(743)+ν 1/2(631) state.
[d] Band(I): $K^{\pi}=3^-$ ν 7/2(743)-ν 1/2(631) state.
[e] From an energy fit to the g.s. band in addition to other arguments as given.
[f] From ^{239}Pu(^{207}Pb,^{208}Pbγ).

Adopted Levels, Gammas (continued)

$\gamma(^{238}Pu)$

E_i(level)	J_i^π	E_γ[†]	I_γ[#]	E_f	J_f^π	Mult.[@]	δ[@]	α[&]	$I_{(\gamma+ce)}$	Comments
44.065	2^+	44.06 *2*	100	0.0	0^+	E2		775		α(L)= 566; α(M)= 157 B(E2)(W.u.)=285 *5* α,α(L),α(M): values given are the E2 theory values lowered by 3% (see 1987Ra01).
145.936	4^+	101.88 *3*	100	44.065	2^+	E2		14.8		α(L)= 10.7; α(M)= 2.99; N+= 1.15
303.36	6^+	157.42 *5*	100	145.936	4^+	E2		2.24		α(K)= 0.197; α(L)= 1.48; α(M)= 0.412; N+= 0.157
512.55	8^+	209.20 *14*	100	303.36	6^+	E2		0.73		E_γ: From ^{248}Cm a decay. Mult.: from ce(L2)/ce(L3) in (α,4nγ).
605.18	1^-	561.17 *5*	100	44.065	2^+	E1		0.0116		α(K)= 0.0093; α(L)=0.00170
		605.18 *5*	73 *2*	0.0	0^+	E1		0.0101		
661.44	3^-	515.53 *7*	55 *1*	145.936	4^+	E1+M2	0.114 *17*	0.023 *3*		I_γ: from ε decay. Values of ≈0.64 from β^- decay and 0.67 from α decay depend on splitting the intensity of the doubly placed 713γ on the basis of model-dependent arguments.
		617.41[a] *5*	100[a]	44.065	2^+	E1+M2	0.077 *17*	0.0122 *13*		
763.24	5^-	459.80 *20*	≈3.4	303.36	6^+					I_γ: from ε and α decay, see comment on 515γ from the 661 level.
		617.36[a]	100[a]	145.936	4^+					
771.9	10^+	259.4[‡] *5*	100	512.55	8^+	E2				
911.6	7^-	608.7[b] *5*	100	303.36	6^+					
941.47	0^+	336.38 *15*	2.8 *16*	605.18	1^-	[E1]				I_γ: from ^{242}Cm α decay, if I(897.33γ)=100.
		897.33 *10*	100 *7*	44.065	2^+	(E2)		0.0154		
		941.5 *2*		0.0	0^+	E0			59 *7*	$I_{(\gamma+ce)}$: from ^{238}Am ε decay, I(γ+ce)/Iγ(897γ)=0.62 from 1960As10 in α decay. The value of 1.4 *2* in β^- decay appears to be discrepant.
962.783	1^-	301.5 *1*	1.68 *9*	661.44	3^-	E2		0.213		α(K)= 0.0780; α(L)= 0.098; α(M)= 0.0269; N+= 0.0103
		357.62 *7*	7.80 *16*	605.18	1^-	M1+E2	2.43 *20*	0.224 *15*		
		918.69 *4*	82.0 *8*	44.065	2^+	E1		0.00471		
		962.77 *3*	100.0 *8*	0.0	0^+	E1		0.00434		α(K)=0.00353; α(L)= 612×10^{-6}
968.2?	(2^-)	924[b]	100	44.065	2^+	[E1]				B(E1)(W.u.)>2.0×10^{-8}
		968.9[b] *4*	12 *6*	0.0	0^+	[M2]		0.122		B(M1)(W.u.)>0.016
983.09	2^+	321.75 *20*	1.8 *7*	661.44	3^-	[E1]		0.036		B(E1)(W.u.)=4.7×10^{-5} *24*
		378.05 *13*	4.4 *7*	605.18	1^-	[E1]		0.0255		B(E1)(W.u.)=6.8×10^{-5} *22*
		837.11 *15*	35 *2*	145.936	4^+	[E2]		0.0176		B(E2)(W.u.)=3.1 *10*
		938.95 *10*	43 *3*	44.065	2^+	E0+E2		4.4 *4*		
		983.0 *3*	100 *30*	0.0	0^+	[E2]		0.0129		B(E2)(W.u.)=3.9 *12*
985.45	2^-	323.98 *9*	2.8 *1*	661.44	3^-	M1+E2	2.8 *8*	0.29 *6*		
		380.29 *13*	2.2 *2*	605.18	1^-	[M1]		0.665		Mult.: From 1981Le15.
		941.38 *5*	100.0 *10*	44.065	2^+	[E1+M2]	−0.17 *+1 −2*	0.0083 *6*		

Adopted Levels, Gammas (continued)

$\gamma(^{238}Pu)$ (continued)

E_i(level)	J^{π}_i	E_{γ}[†]	I_{γ}[#]	E_f	J^{π}_f	Mult.[@]	δ[@]	α[&]	$I_{(\gamma+ce)}$	Comments
1018.6?		974.5[b] 3		44.065	2^+					
1028.537	2^+	882.63 3	3.19 2	145.936	4^+	E2		0.0159		α(K)= 0.0115; α(L)=0.00328
		984.45 2	100 1	44.065	2^+	M1+E2	>+23	0.00129		
		1028.54 2	72.6 3	0.0	0^+	E2		0.0119		α(K)= 0.0089; α(L)=0.00226 Mult.: from 1981Le15.
1069.929	3^+	923.98 2	30.0 2	145.936	4^+	M1+E2	+44 +72−8	0.00145		
		1025.87 2	100	44.065	2^+	M1+E2	>+31	0.00119		
1077.7	12^+	305.9[‡] 5	100	771.9	10^+					
1082.55	$(4)^-$	114.4 4	1.51 27	968.2?	(2^-)	(E2)		8.67		B(E2)(W.u.)=0.46 6
		319.29 11	2.3 3	763.24	5^-	M1+E2	1.0 5	0.66 23		
		421.14 11	6.0 2	661.44	3^-	[M1]		0.29		
		936.61 6	100.0 14	145.936	4^+	E1+M2	−0.24 4	0.009 5		B(E1)(W.u.)=2.01×10^{-8} 12
1102.4	9^-	190.8[‡] 6	60 19	911.6	7^-					
		330.5[‡b] 6	35 11	771.9	10^+					
		589.9[‡] 5	100 24	512.55	8^+	E1				
1125.75	(4^+)	979.80 20	100	145.936	4^+					
		1081.7 3	19 7	44.065	2^+					
1174.4	(2^+)	1130.2 5	100	44.065	2^+					
		1174.5 5	83 22	0.0	0^+					
1202.45	$(3)^-$	119.9 1	100 4	1082.55	$(4)^-$	M1(+E2)	<0.38	3.81 21		α(L)= 2.69; α(M)= 0.657; N+= 0.246
		132.49 11	2.4 2	1069.929	3^+	[E1]		0.271		
		174.0 2	22.0 5	1028.537	2^+	[E1]		0.143		
1228.65	0^+	1184.55 21	100	44.065	2^+	E2		0.0091		α(K)=0.00695; α(L)=0.00163
		1228.7 3		0.0	0^+	E0			9.2 12	
1264.20	2^+	1118.25 21	100	145.936	4^+	[E2]		0.0102		
		1220.15 21	81 15	44.065	2^+	E0+E2+M1		0.26 3		
1310.3?	$1^+,2^+$	1266.2 3	100	44.065	2^+	M1		0.0268		α(K)= 0.0213; α(L)=0.00413
1340.4	11^-	238.0 6	74 25	1102.4	9^-	E2				
		262.6[b]		1077.7	12^+					E_{γ}: From authors′ figure, not in their table.
		568.5 6	100 29	771.9	10^+	E1				
1426.4	14^+	348.8[‡] 5	100	1077.7	12^+					
1426.61	0^+	821.5 4	100	605.18	1^-	E1		0.00574		α(K)=0.00465; α(L)= 818×10^{-6}
		1426.6 3		0.0	0^+	E0			8.5 12	
1447.24	1^-	841.9 4		605.18	1^-	E0			4.4 5	
		1403.2 3	100 9	44.065	2^+	E1		0.00229		α(K)=0.00187; α(L)= 316×10^{-6}
		1447.3 3	62 4	0.0	0^+	E1		0.00217		α(K)=0.00177; α(L)= 300×10^{-6}
1458.29	2^+	1414.0 3	≈23	44.065	2^+	E0+E2+M1				
		1458.5 3	100	0.0	0^+					
1559.82	1^-	574.0 3	77 19	985.45	2^-	M1+E2	3.2 5	0.055 6		
		597.0 3	100 12	962.783	1^-	[M1+E2]		0.12 8		
		954.7 3	≈58	605.18	1^-	[M1+E2]		0.035 22		
		1515.9 3	79 10	44.065	2^+					

Adopted Levels, Gammas (continued)

γ(^{238}Pu) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[#]	E_f	J^π_f	Mult.[@]	α[&]	$I_{(\gamma+ce)}$	Comments
1559.82	1⁻	1560.0 *3*	65 *10*	0.0	0⁺				
1596.3	(2⁺)	633.0[b] *5*	≈77	962.783	1⁻				
		1450.4[b] *5*	≈77	145.936	4⁺				
		1552.2 *3*	100 *16*	44.065	2⁺				
		1596.5 *5*	≈31	0.0	0⁺				
1621.29	1⁻	658.4 *2*	6.2 *7*	962.783	1⁻	E0+E2+M1	1.39 *14*		
		679.5 *4*	8.8 *9*	941.47	0⁺	E1	0.00809		α(K)=0.00654; α(L)=0.00117
		1016.2 *2*	9.7 *10*	605.18	1⁻	E0+E2+M1	0.66 *7*		
		1577.3 *3*	100 *8*	44.065	2⁺	E1			α(K)=0.00154
		1621.4 *4*	≈0.6	0.0	0⁺				
1621.8	13⁻	281.5 *6*	100 *39*	1340.4	11⁻				
		544.1 *6*	73 *33*	1077.7	12⁺	E1			
1636.40	1⁻	653.3 *5*	≈4.4	983.09	2⁺				
		673.4 *2*		962.783	1⁻	E0		3.3 *4*	
		1031.3 *3*		605.18	1⁻	E0		4.2 *4*	
		1592.5 *3*	38 *4*	44.065	2⁺				
		1636.6 *3*	100 *9*	0.0	0⁺	E1			
1651.2	1,2⁺	1607.0 *4*	100	44.065	2⁺				
		1651.4 *5*	18 *7*	0.0	0⁺				
1726.34	1,2⁺	1682.2 *3*	100	44.065	2⁺	E1,E2			
		1726.4 *3*	59 *9*	0.0	0⁺				
1783.5	1,2⁺	1739.4 *4*	48 *15*	44.065	2⁺				
		1783.6 *4*	100	0.0	0⁺				
1815.5	16⁺	389.0[‡‡] *5*	100	1426.4	14⁺	E2			
1898.42	2⁻	935.2[b] *3*	≈27	962.783	1⁻				
		1237.0 *3*	81 *7*	661.44	3⁻	M1	0.0285		α(K)= 0.0227; α(L)=0.00440
		1293.2 *3*	100 *9*	605.18	1⁻	M1	0.0254		α(K)= 0.0202; α(L)=0.00391
1944.6	15⁻	323.1 *5*	100 *44*	1621.8	13⁻				
		518.3 *5*	57 *29*	1426.4	14⁺				
2241.7	18⁺	426.2[‡] *5*	100	1815.5	16⁺	E2			
2308.2	17⁻	363.5 *5*	100 *48*	1944.6	15⁻	E2			
		492.8 *5*	46 *46*	1815.5	16⁺				
2702.3	20⁺	460.6 *5*	100	2241.7	18⁺				
2708.7	19⁻	400.5 *5*	100	2308.2	17⁻	E2			
		467.1 *5*	≈38	2241.7	18⁺				
3143.8	21⁻	435.1 *5*	100 *49*	2708.7	19⁻	E2			
		441.6[b] *5*	38 *20*	2702.3	20⁺				
3195.4	22⁺	493.10[‡] *17*	100	2702.3	20⁺				
3610.6	23⁻	415.7[b] *5*	40	3195.4	22⁺				
		466.8 *5*	100	3143.8	21⁻				
3717.1	24⁺	521.7[‡] *5*	100	3195.4	22⁺				

$^{238}_{94}$Pu$_{144}$-7

Adopted Levels, Gammas (continued)

$\gamma(^{238}$Pu) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[#]	E_f	J^π_f	Mult.[@]
4105.2	25⁻	494.6 *6*	100	3610.6	23⁻	E2
4263.7	26⁺	546.6[‡] *5*	100	3717.1	24⁺	
4623.2	27⁻	518.0[‡] *7*	100	4105.2	25⁻	
4833.3	28⁺	569.6[‡] *6*	100	4263.7	26⁺	
5161.3	(29⁻)	538.5[‡b] *7*	100	4623.2	27⁻	
5426.5?	(30⁺)	592.2[‡b] *6*	100	4833.3	28⁺	

[†] From β^- decay, α decay, and ε decay, except where from in-beam studies as noted.
[‡] From ^{239}Pu(^{207}Pb,^{208}Pbγ).
[#] Branching ratios are from β^- decay, α decay, and ε decay.
[@] From ce data in β^-, ε decay, and $\gamma(\theta)$ in ^{239}Pu(^{207}Pb,^{208}Pbγ).
[&] 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.
[a] Multiply placed with intensity suitably divided.
[b] Placement of transition in the level scheme is uncertain.

From ENSDF

$^{238}_{94}$Pu$_{144}$-8

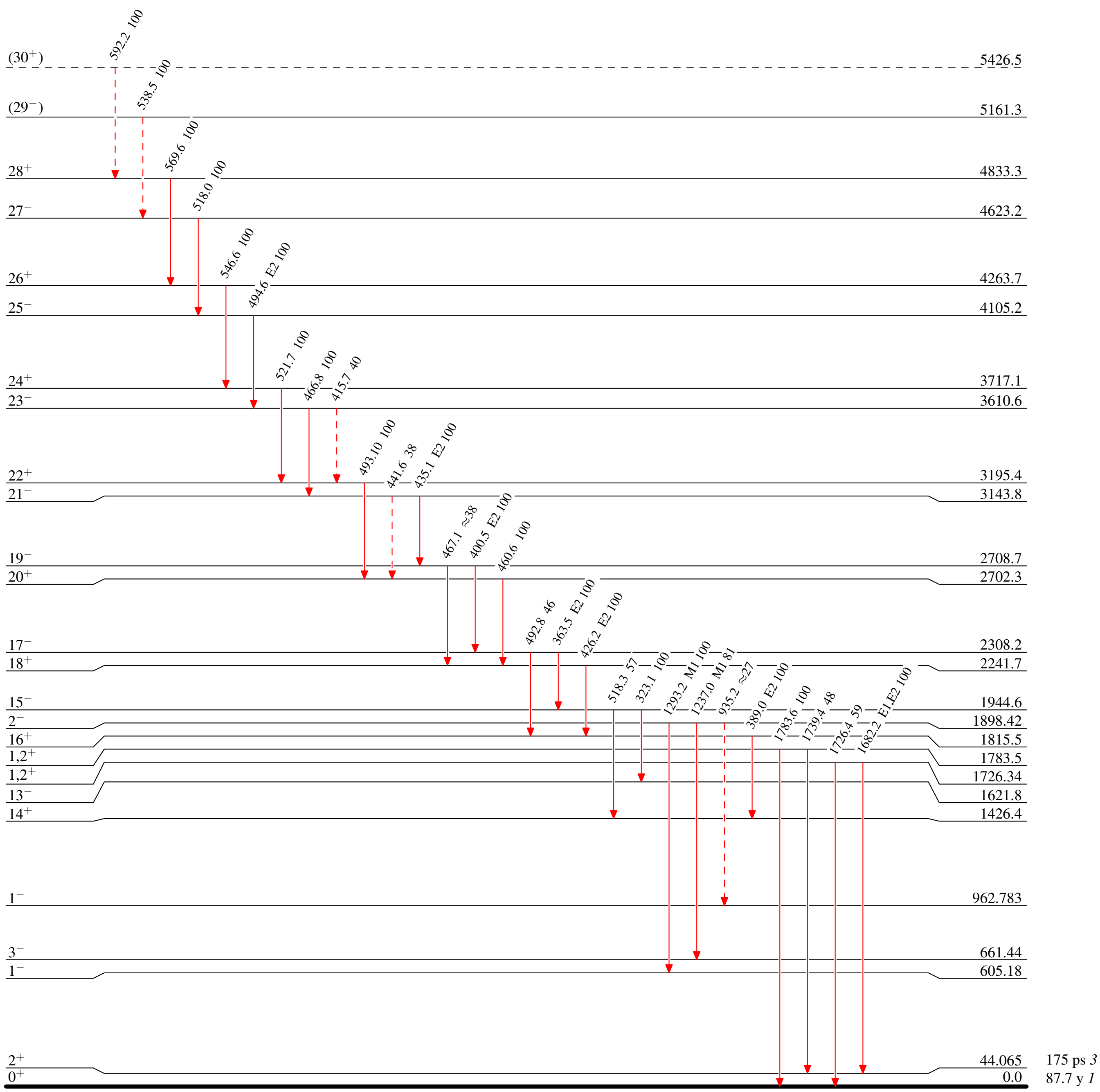
Adopted Levels, Gammas

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)

Level Scheme

Intensities: Type not specified



$^{238}_{94}Pu_{144}$

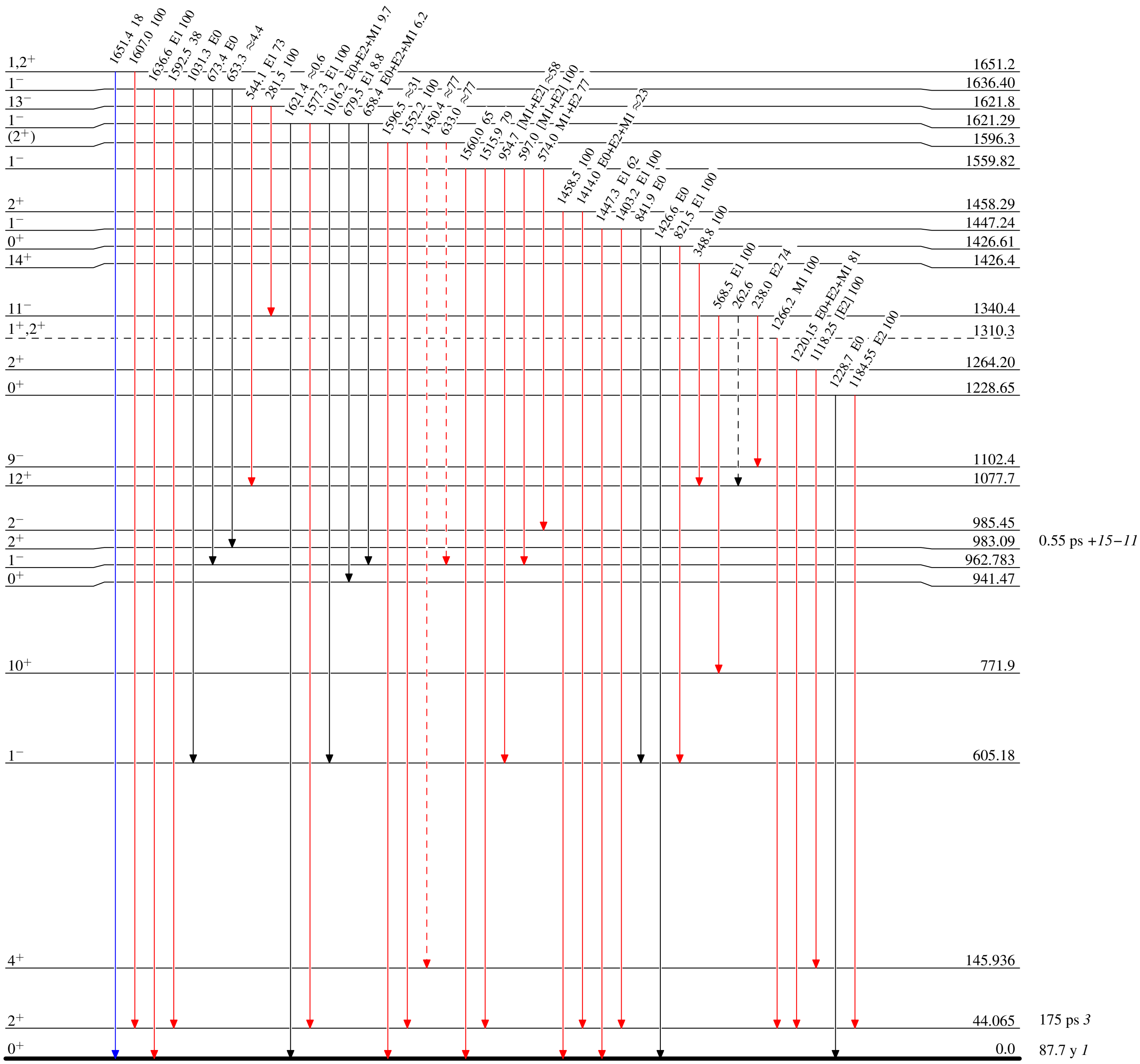
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified

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)

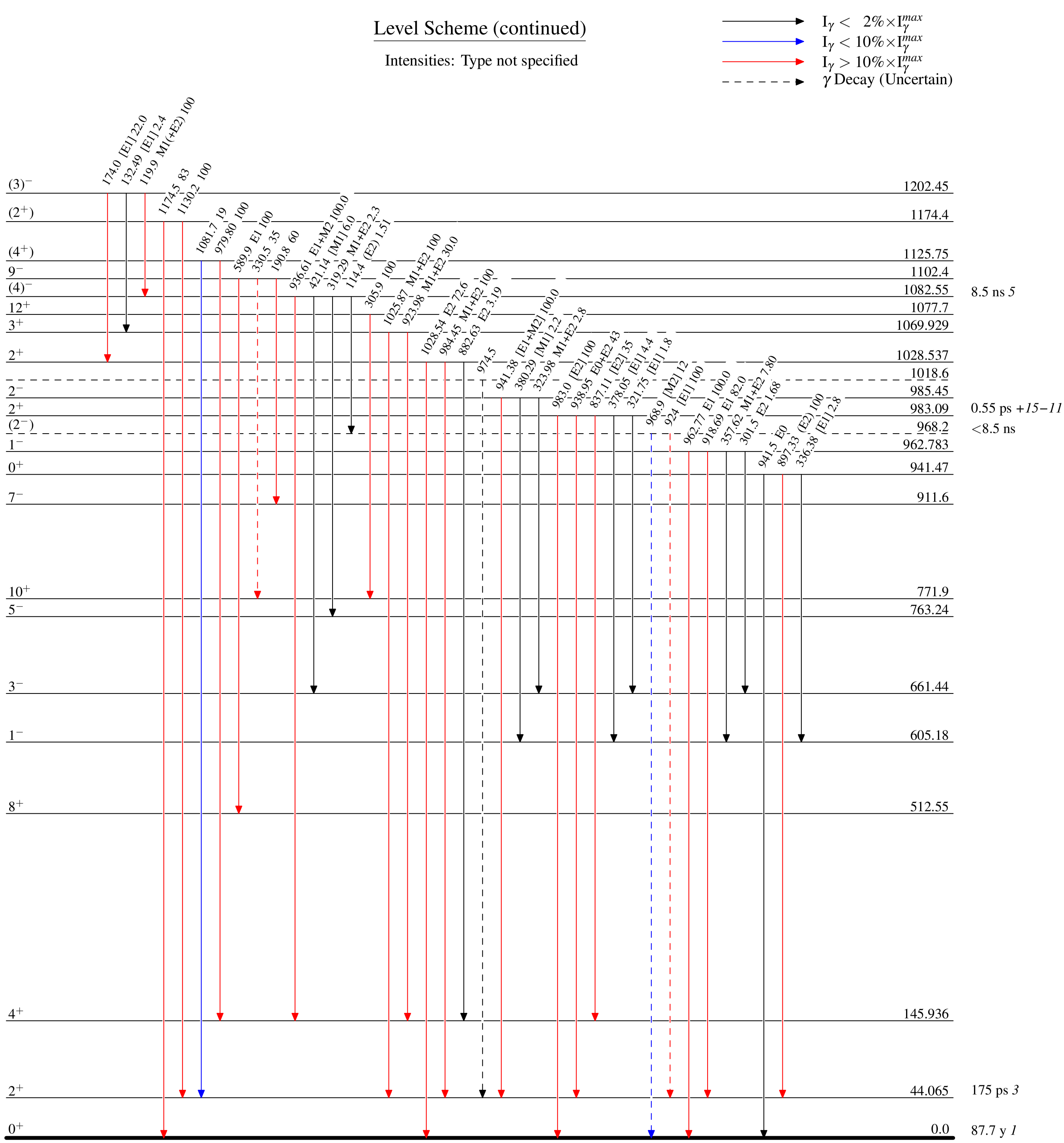


$^{238}_{94}Pu_{144}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified



$^{238}_{94}Pu_{144}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified

@ Multiply placed: intensity suitably divided

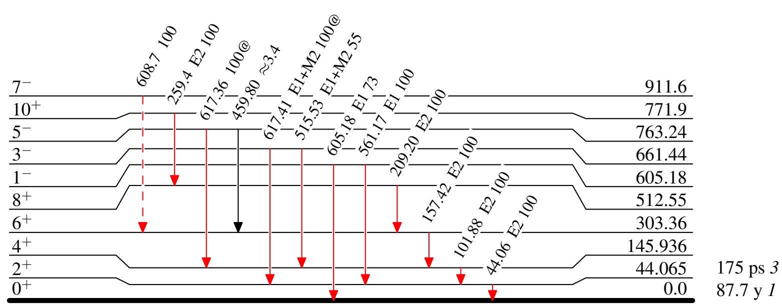
Legend

$I_\gamma < 2\% \times I_\gamma^{max}$

$I_\gamma < 10\% \times I_\gamma^{max}$

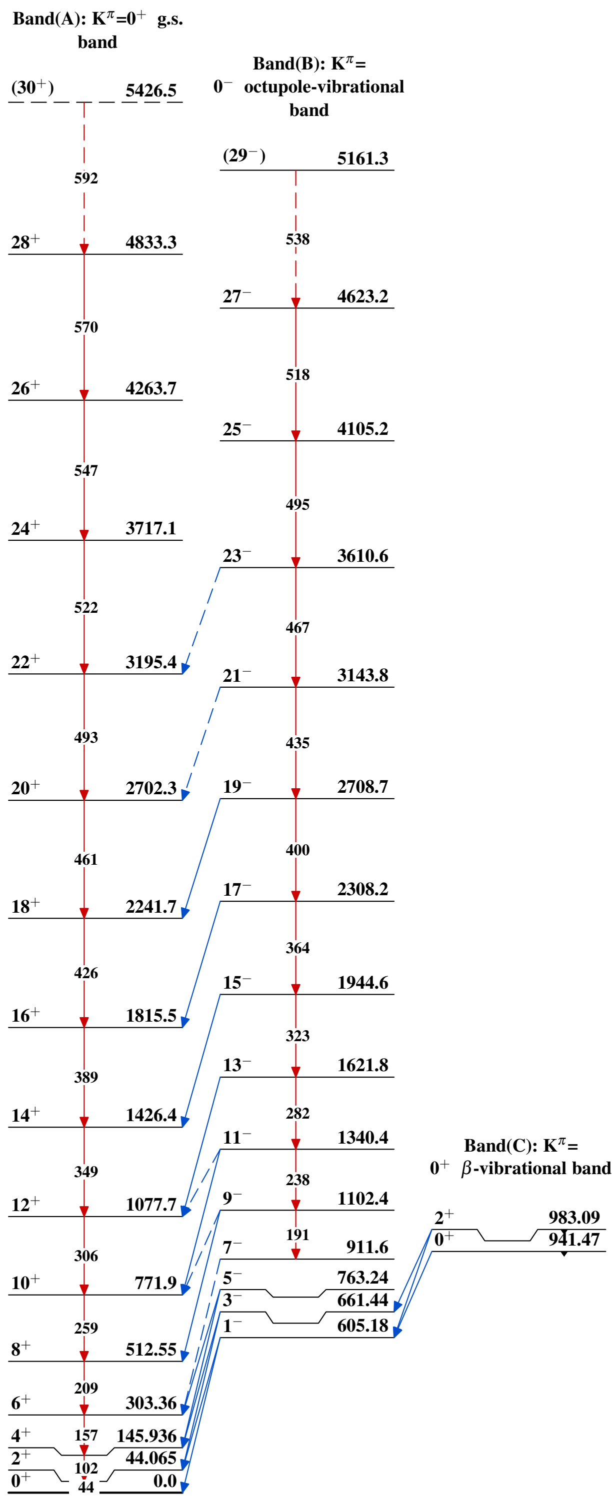
$I_\gamma > 10\% \times I_\gamma^{max}$

γ Decay (Uncertain)



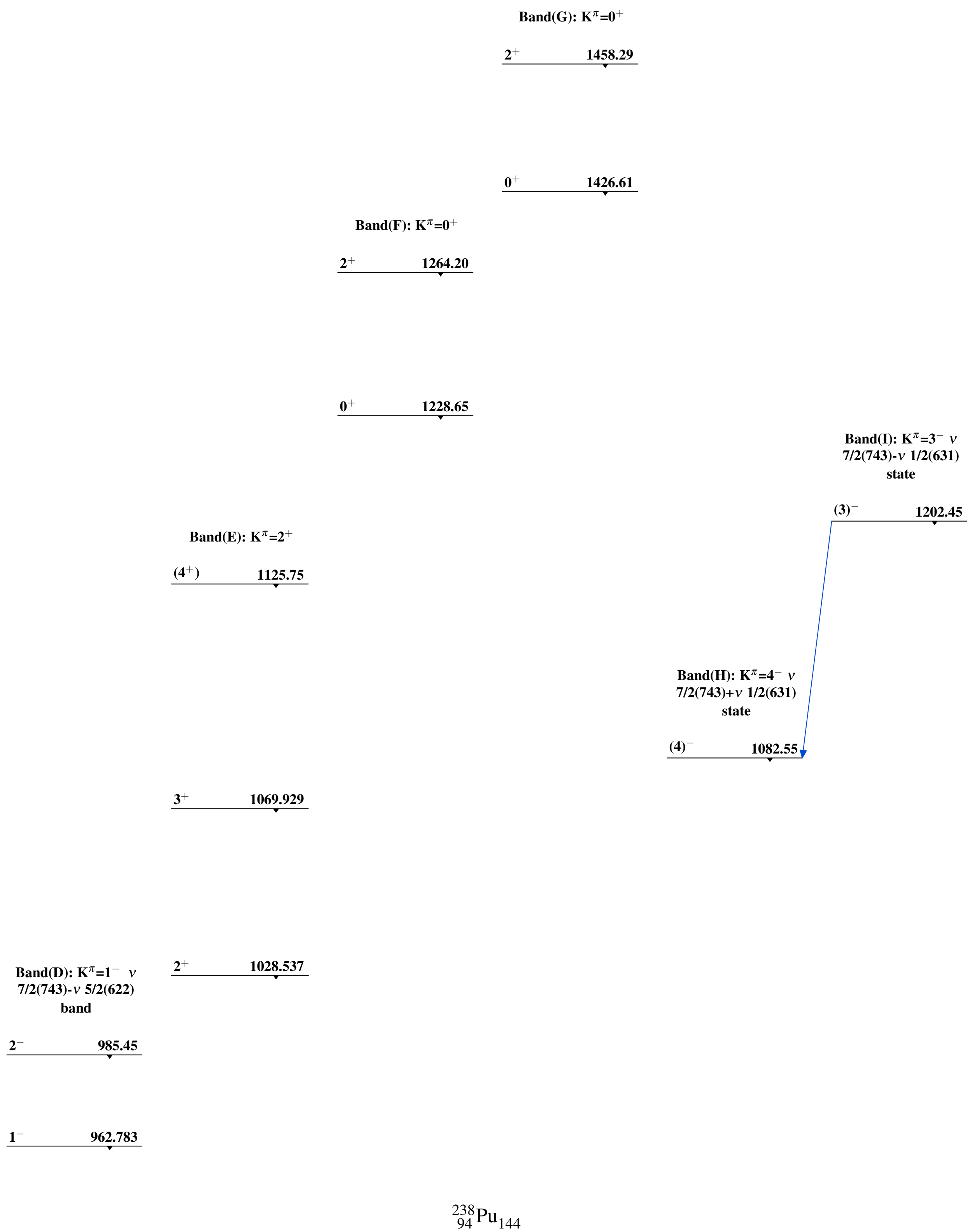
$^{238}_{94}Pu_{144}$

Adopted Levels, Gammas



$^{238}_{94}Pu_{144}$

Adopted Levels, Gammas (continued)



Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh, E. Browne	NDS 109,2439 (2008)	31-Jul-2008

Q(β^-)=−1385 *14*; S(n)=6534.20 *23*; S(p)=6474.4 *11*; Q(α)=5255.76 *14* 2012Wa38

Note: Current evaluation has used the following Q record −1385 146534.20 *23* 6474.4 *10* 5255.75 *14* 2003Au03.

Additional information 1.

1989Ru07: Measured isotope shifts and hyperfine structure.

2004Be51: nuclear structure calculations, microscopic study of ^{240}Pu structure using mean-field approach, discussed rotational bands, superdeformation, etc.

2008Ch15: structure calculations, octupole deformation.

See '^{239}Pu(n,X):resonances' dataset in the ENSDF database for ^{240}Pu for energies and width parameters of 993 resonances up to 2.95 keV.

^{240}Pu Levels

A second fission isomer of half-life 29 ns *4* was reported by 1970El03 in ^{239}Pu(n,γ); but not confirmed in later studies of 1973Na03 and 1970Bu02.

Cross Reference (XREF) Flags

A	^{240}Np β^- decay (61.9 min)	F	^{239}Pu(n,γ) E=thermal	K	^{240}Pu(n,n′)
B	^{240}Np β^- decay (7.22 min)	G	^{239}Pu(n,γ) E=0.3-58 eV	L	^{240}Pu(d,d′)
C	^{240}Am ε decay (50.8 h)	H	^{239}Pu(n,γ) E=2 keV	M	Coulomb excitation
D	^{244}Cm α decay (18.11 y)	I	^{239}Pu(d,p)	N	^{241}Am(^{209}Bi,^{210}Poγ)
E	^{238}U(α,2nγ)	J	^{239}Pu(d,pF)	O	^{242}Pu(p,t)

E(level)[†]	J$^\pi$[#]	$T_{1/2}$	XREF	Comments
0.0[&]	0+ [@]	6561 y *7*	ABCDEFGHI KLMNO	%α=100; %SF=5.7×10^{-6} *2* %^{34}Si<1.3×10^{-11} <r^2>$^{1/2}$=5.84 fm *4* (2004An14 evaluation). $T_{1/2}$: weighted average (using LWM method, normalized residuals and Rajeval′s technique) of 6545 y *19* (2007Ah05,α counting and ratio of activities measured in growth of ^{240}Pu in ^{244}Cm source over 37.2 y interval, half-life of 18.11 y *3* was used for ^{244}Cm decay); 6574 y *6* (1984Be19); 6571 y *9* (1984St06); 6552.2 y *20* (1984Lu04,uncertainty increased to 0.1%); 6552.4 y *17* (1984Ru04; uncertainty increased to 0.1%); 6569 y *6* (1978Ja11); 6524 y *10* (1968Oe02, re-estimated as 6537 y *15* in a 1986 evaluation report of a Coordinated Research Program (CRP) of the International Atomic Energy Agency (IAEA)). Others: 6620 y *50* (1959Do64, re-estimated as 6610 y *55* by 1978Ja11); 6600 y *100* (1956Bu92); 6300 y *600* (1954Fa11); 6760 y *27* (1951Wa54); 6240 y *120* (1951We21); 6580 y *40* (1951In03, re-estimated as 6500 y *45* by 1978Ja11). The uncertainty on the weighted average is 4 y, it has been increased to 0.1% as recommended by the 1986 CRP of IAEA for long half-lives. The DDEP evaluation (2006BeZL) gives the same value. 1989Ho24 evaluation gives 6560 y *10*. $T_{1/2}$(SF)=1.15×10^{11} y *2*, weighted average (of first six values listed below) as adopted in the DDEP evaluation (2006BeZL); 2000Ho27 evaluation adopted 1.14×10^{11} y *1*. Original measurements: 1.15×10^{11} y *2* (1991Iv01); 1.12×10^{11} y *2* (1989Dy01); 1.17×10^{11} y *3* (1988SeZY); 1.15×10^{11} y *3* (1984An25); 1.15×10^{11} y *3* (1979BuZC); 1.176×10^{11} y *25* (1967Fi13); 1.27×10^{11} y *5* (priv. comm. to 1967Fi13); 1.45×10^{11} y *2*

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Adopted Levels, Gammas (continued)

^{240}Pu Levels (continued)

E(level)[†]	Jπ[#]	$T_{1/2}$	XREF	Comments
				(1963Ma50); 1.340×10^{11} y *15* (1962Wa13); 1.20×10^{11} y (1959Mi90,1954Ch74); 1.225×10^{11} y *30* (1954Ba14); 1.314×10^{11} y *26* (1953Ki72). %^{34}Si decay mode: an upper limit was deduced based on an attempt to detect ^{34}Si particles from ^{240}Pu decay as described (p222) in an article by P.B. Price and S.W. Barwick in book: Particle Emission from Nuclei (editors: D.N. Poenaru and M.S. Ivascu), p255 (1989). From the same reference 2003Au02 quote %^{34}Si<1.3×10^{-13}, which seems to be the value per decay.
42.824[&] *8*	2^+[@]	167 ps *6*	ABCDEFGHI KLMNO	B(E2)↑=13.33 *18* (1973Be44) Jπ: E2 γ to 0^+. $T_{1/2}$: as adopted by 2001Ra27 from weighted average of following six values from different methods: 1. from B(E2) in Coul. ex.: 163 ps *4* (1973Be44), 173 ps *6* (1971Fo17), 168 ps *6* (1965Fr11). 2. from γγ(t) in ^{244}Cm α decay: 164 ps *5* (1970To08), 173 ps *15* (1960Be25). 3. recoil-distance Doppler-shift method in ^{244}Cm α decay: 160 ps *20* (1964No01).
141.690[&] *15*	4^+[@]		ABCDEF I KLMNO	B(E4)↑=1.3 *6* (1973Be44) Jπ: E2 γ to 2^+.
294.319[&] *24*	6^+[@]		ABCDE KLMN	Jπ: ΔJ=2, E2 γ to 4^+.
497.37[&] *20*	8^+[@]		DE LMN	Jπ: ΔJ=(2) γ to 6^+.
597.34[a] *4*	1^-[@]		BCD FGH KL	Jπ: E1 γ's to 0^+ and 2^+.
648.86[a] *4*	3^-[@]		ABCD F LM	B(E3)↑=0.41 *6* (1974Mc15) Jπ: σ(θ) in (d,d′); γ's to 2^+ and 4^+.
742.33[a] *4*	5^-[@]	<2 ns	A C L	Jπ: σ(θ) in (d,d′); γ's to 4^+ and 6^+. $T_{1/2}$: from ^{240}Np β^- decay (61.9 min).
747.4[&] *3*	10^+[@]		E MN	Jπ: ΔJ=(2) γ to 8^+.
860.71[b] *7*	0^+		B D FGHI O	Jπ: L(p,t)=0.
878.1?[a] *4*	(7^-)[@]		M	Jπ: possible γ to 6^+, possible γ from 9^-.
900.32[b] *4*	2^+		BCD F HI K O	Jπ: E2 γ to 4^+; γ's to 0^+ and 4^+.
938.06[c] *6*	(1^-)		B D FGH L	XREF: D(?). Jπ: from (n,γ) E=2 keV.
958.85[c] *6*	(2^-)		ABC FGH	Jπ: E1 from 1^+ resonance level in (n,γ) E=2 keV.
992.4[b] *5*	4^+		C	Jπ: γ's to 3^- and 5^-; band assignment.
1001.94[c] *8*	(3^-)		A C I L O	Jπ: σ(θ) in (d,d′).
1030.55[d] *4*	$(3)^+$	1.32 ns *15*	A C F	Jπ: E2 γ's to 2^+ and 4^+; band member. $T_{1/2}$: from 1976BuZP (^{240}Am ε decay).
1037.55[c] *6*	(4^-)		A	Jπ: (M1+E2) γ from (5^-); γ to 3^-; band member.
1041.1[&] *3*	12^+[@]		E MN	Jπ: ΔJ=(2) γ to 10^+.
1056.8[a] *3*	(9^-)[@]		M	Jπ: ΔJ=1 γ's to 8^+ and 10^+.
1076.22[d] *9*	(4^+)		A C L	Jπ: γ's to 2^+ and 4^+; band systematics.
1089.45[e] *10*	0^+		B HI O	Jπ: L(p,t)=0.
1115.53[c] *6*	(5^-)		A L	Jπ: (M1+E2) γ from (5^-); γ's to 4^+ and 6^+.
1130.95[e] *9*	(2^+)		B H	Jπ: γ's to 0^+ and 4^+.
1136.97[f] *13*	(2^+)		BC HI L O	XREF: L(1135)O(1137). Jπ: σ(θ) in (d,d′), (d,p) and (p,t).
1138.3?[b] *4*	(6^+)		M	Jπ: possible γ to 4^+ and from (8^+); possible band member.
1161.53[c] *7*	(6^-)		A	Jπ: (M1+E2) γ from (5^-); γ to 6^+; band member.
1177.63[f] *8*	(3^+)		A C	E(level): from different set of γ rays observed in the two decays:

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{240}Pu Levels (continued)

E(level)[†]	Jπ[#]	$T_{1/2}$	XREF	Comments
				139.9, 147.2 and 175.4 γ rays in ^{240}Np β^- decay (61.9 min); and 1036.1 and 1135.1 γ rays in ^{240}Am ε decay (50.8 h), it appears that two different levels may be populated near 1177 keV. It should be stated, however, that the gamma-ray placements do not seem to be firmly established in ^{240}Np decay. Jπ: γ's to 2^+ and 4^+; band member.
1180.5 *4*	(2^+)		H	Jπ: from (n,γ) E=2 keV.
1199 *2*			L	
1222.99 *13*	(2^+)		BC Hi L o	Jπ: γ's to 0^+ and 2^+.
1232.46[f] *10*	(4^+)		A C i o	Jπ: γ's to 4^+ and 6^+; band member.
1240.8[g] *3*	(2^-)		B FGH	Jπ: E1 γ from 1^+; band member.
1262.08 *24*	(3^+)		C	Jπ: γ's to 2^+ and 4^+.
1277.6[a] *3*	(11^-)[@]		M	Jπ: ΔJ=(2) γ to (9^-); ΔJ=1 γ to 10^+.
1282[g] *2*	(3^-)		L	Jπ: σ(θ) in (d,d′).
1308.74[h] *5*	(5^-)	165 ns *10*	A	Jπ: (M1+E2) γ to (4^-) and (6^-). $T_{1/2}$: from ^{240}Np β^- decay (61.9 min).
1321.13? *10*	(1,2^+)		B	Jπ: γ to 0^+.
1323.4?[b] *4*	(8^+)		M	Jπ: possible band member.
1337.02 *24*	(2^+,3,4^+)		C	Jπ: γ's to 2^+ and 4^+.
1374.8[&] *4*	14^+[@]		E MN	Jπ: ΔJ=2 γ to 12^+.
1379 *4*			L	
1407 *3*			L	
1410.75[i] *11*	$0^{(-)}$		B F H	Jπ: π=+ assumed by 1970Sc12 from an estimate of an upper limit of α(K)exp<2.8×10^{-2} for the 813.4γ. However, from ^{239}Pu(n,γ) reaction (1975WeZA,1972OtZZ) Jπ=0^-. J=0 from γγ(θ) in ^{240}Np β^- decay (7.22 min).
1413.0	($^+$)		H	Jπ: from (n,γ) E=2 keV.
1438.45[i] *8*	$2^{(-)}$		B GH	Jπ: 1970Sc12 assumed that this level has Jπ=2^+ and is member of a two-phonon octupole vibrational band. However, from ^{239}Pu(n,γ) reaction (1975WeZA,1972OtZZ) π=−. J=2 from γγ(θ) in ^{240}Np β^- decay (7.22 min).
1488.17 *7*	(1,2^+)		B F H	Jπ: γ to 0^+.
1525.86[j] *8*	(0^+)		B H	Jπ: M1 γ from 1^+ resonance in (n,γ); possible band member.
1539.67 *6*	(1^-)		B H	XREF: H(1538). Jπ: E1 γ from 1^+; γ's to 0^+ and 2^+.
1539.8[a] *4*	(13^-)[@]		M	Jπ: ΔJ=1 γ to 12^+; ΔJ=(2) γ to (11^-).
1557.0[b] *3*	(10^+)		M	Jπ: ΔJ=1 γ to (9^-); possible γ to (11^-).
1558.87[j] *5*	(2^+)		B H	Jπ: γ's to 0^+ and 4^+.
1574			L	
1580 *5*			O	
1607.72 *13*	(1^-)		B H L	XREF: L(1609). Jπ: E1 γ from 1^+ resonance level is M1; γ to 0^+.
1626.77 *15*	(1,2^+)		B H	Jπ: γ to 0^+.
1633.37 *7*	(1,2^+)		B H	Jπ: γ to 0^+.
1641 *5*			L	
1675 *2*			L	
1710.43 *8*	(2^+)		B H	Jπ: γ's to 0^+ and 4^+.
1745.7[&] *4*	16^+[@]		MN	Jπ: ΔJ=(2) γ to 14^+.
1752 *3*			L	
1775.27 *15*	(1^-)		B F H	Jπ: from (n,γ) E=2 keV.
1784 *3*			L	
1796.34 *13*	(1,2^+)		B H	Jπ: γ to 0^+.

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Adopted Levels, Gammas (continued)

^{240}Pu Levels (continued)

E(level)[†]	Jπ[#]	$T_{1/2}$	XREF	Comments
1808.02 *13*	$(1^-,2^+)$		B	Jπ: γ's to 0^+ and 3^-.
1830.3[b] *4*	(12^+)		M	Jπ: ΔJ=1 γ to (11^-); ΔJ=2 γ to (10^+).
1841.8[a] *4*	(15^-)[@]		M	Jπ: ΔJ=2 γ to (13^-); γ to 14^+.
1861 *3*			L	
1881.1	(0,1,2)		F	Jπ: primary γ from 1^+.
1902 *3*			L	
1917.8 *3*	(1^-)		B H L	XREF: L(1923). Jπ: from (n,γ) E=2 keV.
1954.51 *8*	(2^+)		B	Jπ: γ's to 0^+ and 4^+.
1996.41 *17*	$(1,2^+)$		B	Jπ: γ's to 0^+.
2117.5 *10*	$(1,2^+)$		B	Jπ: γ to 0^+.
2127.4	$(^-)$		H	Jπ: from (n,γ) E=2 keV.
2136.8[b] *4*	(14^+)		M	Jπ: ΔJ=1 γ to (13^-); ΔJ=2 γ to (12^+).
2151.6[&] *5*	18^+[@]		MN	Jπ: ΔJ=(2) γ to 16^+.
2182.6[a] *4*	(17^-)[@]		M	Jπ: ΔJ=(2) γ to (15^-); γ to 16^+.
2475.1[b] *4*	(16^+)		M	Jπ: ΔJ=1 γ to (15^-); ΔJ=2 γ to (14^+).
2560.5[a] *5*	(19^-)[@]		M	Jπ: ΔJ=(2) γ to (17^-); γ to 18^+.
2590.2[&] *5*	20^+[@]		MN	Jπ: ΔJ=(2) γ to 18^+.
2837.1[b] *5*	(18^+)		M	Jπ: ΔJ=2 γ to (16^+); γ to (17^-).
2973.8[a] *5*	(21^-)[@]		M	Jπ: ΔJ=(2) γ to (19^-); γ to 20^+.
3059.8[&] *6*	22^+[@]		MN	Jπ: ΔJ=(2) γ to 20^+.
3218.3[b] *5*	(20^+)		M	Jπ: ΔJ=2 γ to (18^+); γ to (19^-).
3421.1[a] *6*	(23^-)[@]		M	Jπ: ΔJ=(2) γ to (21^-); γ to 22^+.
3559.0[&] *6*	24^+[@]		MN	Jπ: ΔJ=2 γ to 22^+.
3626.6[b] *6*	(22^+)		M	Jπ: γ's to (20^+) and (21^-).
3900.6[a] *6*	(25^-)[@]		M	Jπ: ΔJ=2 γ to (23^-); γ to 24^+.
4063.5[b] *8*	(24^+)		M	Jπ: γ (22^+).
4086.3[&] *6*	26^+[@]		M	Jπ: ΔJ=(2) γ to 24^+.
4410.8[a] *6*	(27^-)[@]		M	Jπ: ΔJ=2 γ to (23^-); γ to 26^+.
4530.9[b] *9*	(26^+)		M	Jπ: γ (24^+).
4639.4[&] *7*	28^+[@]		M	Jπ: γ's to 26^+ and 27^-.
4950.0[a] *7*	(29^-)[@]		M	Jπ: γ to (27^-), possible γ to 28^+.
5030.0[b] *10*	(28^+)		M	Jπ: γ (26^+).
5220.3[&] *7*	30^+[@]		M	Jπ: γ's to 28^+ and 29^-.
5512.2[a] *8*	(31^-)[@]		M	Jπ: γ to (29^-).
5559.2[b] *12*	(30^+)		M	Jπ: γ (28^+).
5819.3[&] *8*	32^+[@]		M	Jπ: γ to 30^+.
6096.3?[a] *9*	(33^-)[@]		M	Jπ: possible γ to (31^-).
x[k]	(0^+)	3.6 ns *2*	E	%SF>0 %SF: Only SF decay observed. E(level): x=2250 *200*, deduced from the level density of $K^\pi=0^+$ bandheads in ^{239}Pu(d,pF) (2001Hu12,2001Th16). Other: 2800 *200* (estimate by 1971Br39,1970Bu02,1973Na03). Fission isomer observed in ^{238}U(α,2n); ^{239}Pu(n,γ) and ^{239}Pu(d,p). $T_{1/2}$: weighted average of 3.8 ns +6−4 (1986De04); 3.5 ns 2 (1978Go10); 3.0 ns 5 (1973Li01); 2.4 ns 5 (1973Na03); 3.8 ns 3 (1971Br39,1970Bu02); 4.6 ns 6 (1970El03,1969El06), 4.4 ns 8 (1969VaZX); 7 ns *2* (1969Me11); 9 ns *4* (1969La14). Others: 1972Ga42, 1970Vi05, 1968Pa16.
20.1+x[k]	(2^+)		E	
66.8+x[k]	(4^+)		E	

Adopted Levels, Gammas (continued)

^{240}Pu Levels (continued)

E(level)†	Jπ#	T1/2	XREF	Comments
139.9+x[k]	(6+)		E	
239.2+x[k]	(8+)		E	
364.5+x?[‡k]	(10+)		E	
516.9+x?[k]	(12+)		E	
554.7+x[o]	(1−)		E	
589.7+x[o]	(3−)		E	
769.9+x[p] 10	(0+)		E	
785.1+x[p] 11	(2+)		E	
806.2+x[l] 1	(2−)		E	
825.0+x[p] 11	(4+)		E	
825.6+x[l] 2	(3−)		E	
836.0+x[m] 5	(1−)		E	
846.8+x[m] 3	(2−)		E	
851.1+x[l] 4	(4−)		E	
866.0+x[m] 10	(3−)		E	
882.8+x[l] 6	(5−)		E	
891.2+x[m] 3	(4−)		E	
892.4+x[p] 12	(6+)		E	
918.8+x[m] 3	(5−)		E	
920.7+x[l] 12	(6−)		E	
936.4+x?[s]	(1−)		E	
952.5+x?[s]	(2−)		E	
960.7+x[m] 2	(6−)		E	
966.5+x[l] 13	(7−)		E	
970.6+x?[s]	(3−)		E	
986.8+x[p] 13	(8+)		E	
998.3+x[m] 7	(7−)		E	
1012.2+x?[s]	(4−)		E	
1019+x?[l]	(8−)		E	
1044.0+x?[s]	(5−)		E	
1054.9+x[m] 5	(8−)		E	
1078+x?[l]	(9−)		E	
1104+x?[m]	(9−)		E	
1104.2+x?[p]	(10+)		E	
1109.0+x?[s]	(6−)		E	
1161.5+x?[s]	(7−)		E	
1172+x?[m]	(10−)		E	
1230.4+x?[s]	(8−)		E	
1232+x?[m]	(11−)		E	
1246.5+x?[t]	(1−)		E	
1261.0+x?[t]	(2−)		E	
1287.0+x?[t]	(3−)		E	
1300.9+x?[s]	(9−)		E	
1322.0+x?[t]	(4−)		E	
1344.5+x?[n]	(1−)		E	
1360.9+x[n] 2	(2−)		E	
1366.5+x?[t]	(6−)		E	
1382.9+x?[s]	(10−)		E	
1386.6+x[n] 3	(3−)		E	
1421.0+x?[t]	(6−)		E	
1421.4+x[n] 6	(4−)		E	
1461.8+x?[s]	(11−)		E	
1465.7+x[n] 6	(5−)		E	
1485.5+x?[t]	(7−)		E	

Adopted Levels, Gammas (continued)

^{240}Pu Levels (continued)

E(level)[†]	J^{π}[#]	$T_{1/2}$	XREF	Comments
1518.7+x[n] *13*	(6^-)		E	
1559.0+x?[t]	(8^-)		E	
1580.5+x[n] *14*	(7^-)		E	
1641.5+x?[t]	(9^-)		E	
1654.7+x?[n]	(8^-)		E	
1732+x?[n]	(9^-)		E	
1733.5+x?[t]	(10^-)		E	
1816+x?[n]	(10^-)		E	
1835.0+x?[t]	(11^-)		E	
1910.0+x?[n]	(11^-)		E	
2011.0+x?[n]	(12^-)		E	
2184+x[q]	(0^+)		J	
2276+x[q]	(0^+)		J	
2375+x[q]	(0^+)		J	
2435+x[q]	(0^+)		J	
2453+x[q]	(0^+)		J	
2483+x[q]	(0^+)		J	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{240}Pu Levels (continued)

E(level)[†]	Jπ[#]	XREF	E(level)[†]	Jπ[#]	XREF	E(level)[†]	Jπ[#]	XREF
						769.9+x[p] *10*	(0+)	E
						785.1+x[p] *11*	(2+)	E
						806.2+x[l] *1*	(2−)	E
						825.0+x[p] *11*	(4+)	E
						825.6+x[l] *2*	(3−)	E
						836.0+x[m] *5*	(1−)	E
						846.8+x[m] *3*	(2−)	E
						851.1+x[l] *4*	(4−)	E
						866.0+x[m] *10*	(3−)	E
						882.8+x[l] *6*	(5−)	E
						891.2+x[m] *3*	(4−)	E
						892.4+x[p] *12*	(6+)	E
						918.8+x[m] *3*	(5−)	E
						920.7+x[l] *12*	(6−)	E
						936.4+x?[s]	(1−)	E
						952.5+x?[s]	(2−)	E
						960.7+x[m] *2*	(6−)	E
						966.5+x[l] *13*	(7−)	E
						970.6+x?[s]	(3−)	E
						986.8+x[p] *13*	(8+)	E
						998.3+x[m] *7*	(7−)	E
						1012.2+x?[s]	(4−)	E
						1019+x?[l]	(8−)	E
						1044.0+x?[s]	(5−)	E
						1054.9+x[m] *5*	(8−)	E
						1078+x?[l]	(9−)	E
						1104+x?[m]	(9−)	E
						1104.2+x?[p]	(10+)	E
						1109.0+x?[s]	(6−)	E
						1161.5+x?[s]	(7−)	E
						1172+x?[m]	(10−)	E
						1230.4+x?[s]	(8−)	E
						1232+x?[m]	(11−)	E
						1246.5+x?[t]	(1−)	E
						1261.0+x?[t]	(2−)	E
						1287.0+x?[t]	(3−)	E
						1300.9+x?[s]	(9−)	E
						1322.0+x?[t]	(4−)	E
						1344.5+x?[n]	(1−)	E
						1360.9+x[n] *2*	(2−)	E
						1366.5+x?[t]	(6−)	E
						1382.9+x?[s]	(10−)	E
						1386.6+x[n] *3*	(3−)	E
						1421.0+x?[t]	(6−)	E
						1421.4+x[n] *6*	(4−)	E
						1461.8+x?[s]	(11−)	E
						1465.7+x[n] *6*	(5−)	E
						1485.5+x?[t]	(7−)	E
						1518.7+x[n] *13*	(6−)	E
						1559.0+x?[t]	(8−)	E
						1580.5+x[n] *14*	(7−)	E
						1641.5+x?[t]	(9−)	E
						1654.7+x?[n]	(8−)	E
						1732+x?[n]	(9−)	E
						1733.5+x?[t]	(10−)	E

Adopted Levels, Gammas (continued)

^{240}Pu Levels (continued)

E(level)[†]	Jπ[#]	XREF
1816+x?[n]	(10^-)	E
1835.0+x?[t]	(11^-)	E
1910.0+x?[n]	(11^-)	E
2011.0+x?[n]	(12^-)	E
2184+x[q]	(0^+)	J
2276+x[q]	(0^+)	J
2375+x[q]	(0^+)	J
2435+x[q]	(0^+)	J
2453+x[q]	(0^+)	J
2483+x[q]	(0^+)	J
2800+x[r]	(0^+)	J

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{240}Pu Levels (continued)

[†] From least-squares fit to Eγ′s.
[‡] Extrapolated from moment of inertia plot for the band (2001Ga05).
[#] For K^π=0$^+$ ground-state, K^π=0$^-$ octupole band and K^π=0$^+$ band based on 860.7 level, band associations are also used as arguments for J^π assignments in addition to other arguments as listed. For SD bands, the assignments are as proposed by 2001Ga05 and 2000Pa40, with parentheses added by the evaluators due to lack of firm arguments for these assignments.
[@] From fit to the bands for lower members of the bands. Above 14$^+$ in the g.s. band and above 5$^-$ in K^π=0$^-$ band, the assignments are from Coulomb excitation work of 1998Ha08 with parentheses added by the evaluators.
[&] Band(A): K$^\pi$=0$^+$ g.s. band. A=7.16, B=−0.0038.
[a] Band(B): K$^\pi$=0$^-$ octupole band. Band from 1998Ha08 AND 2007WaZV. A=5.135, B=0.0013.
[b] Band(C): K$^\pi$=0$^+$ band. This band starts out as β vibrational band, at $\hbar\omega\approx$0.2 MeV, it is crossed by a 2-quasiparticle (possibly neutrons) excitation (2007WaZV). A=6.60, B=−0.0007.
[c] Band(D): K$^\pi$=1$^-$ band. A=6.42, B=−0.0035 for odd spin; A=5.6, B=0.0005 for even spin.
[d] Band(E): K$^\pi$=3$^+$,ν1/2[631]+ν5/2[622]. A=5.7 if B=0.
[e] Band(F): K$^\pi$=0$^+$ band.
[f] Band(G): K$^\pi$=2$^+$ band.
[g] Band(H): K$^\pi$=2$^-$ band.
[h] Band(I): K$^\pi$=5$^-$, π5/2[642]+π5/2[523].
[i] Band(J): K$^\pi$=0$^-$, π5/2[642]-π5/2[523].
[j] Band(K): K$^\pi$=0$^+$ band.
[k] Band(L): SD-1 Band, K$^\pi$=0$^+$. Band from 2000Pa40, 2001Ga05, 2001Th16. Ground-state band in the second minimum. Population intensity 13% (2001Th16).
[l] Band(M): SD-2 Band, K$^\pi$=2$^-$. Band from 2000Pa40, 2001Ga05, 2001Th16. Population intensity=41%.
[m] Band(N): SD-3 Band, K$^\pi$=1$^-$. Band from 2000Pa40, 2001Ga05, 2001Th16. Population intensity=15%.
[n] Band(O): SD-4 Band, K$^\pi$=1$^-$. Band from 2000Pa40, 2001Ga05, 2001Th16. Population intensity=20%.
[o] Band(P): SD-5 Band, K$^\pi$=0$^-$ octupole band. Band from 2000Pa40, 2001Ga05, 2001Th16. Population intensity=3%.
[p] Band(Q): SD-6 band, K$^\pi$=0$^+$ β band. Band from 2001Ga05, 2001Th16. Population intensity=1.7%.
[q] Band(R): K$^\pi$=0$^+$ SD bandheads. Bandheads attributed to 3-phonon β-vibrations (2001Hu12). X=2250 *200*.
[r] Band(S): K$^\pi$=0$^+$ SD bandheads. Bandheads attributed to 4-phonon β-vibrations. This structure may be composed of 13 separate rotational bands (2001Hu12); x=2250 *200*.
[s] Band(T): SD-7 band, K$^\pi$=1$^-$. Tentative band assignment from 2001Th16. Population intensity 1%.
[t] Band(U): SD-8 band, K$^\pi$=1$^-$. Tentative band assignment from 2001Th16. Population intensity 6%.

Adopted Levels, Gammas (continued)

$\gamma(^{240}Pu)$

A γ-ray cascade reported in Coulomb excitation (2007WaZV): 303.5-340.3-370.7-405.8-437.5-466.8 possibly belongs to ^{240}Pu.

E_i(level)	J^π_i	E_γ[‡]	I_γ[†]	E_f	J^π_f	Mult.[#]	δ	α[h]	$I_{(\gamma+ce)}$	Comments
42.824	2^+	42.824[@] *8*	100	0.0	0^+	E2		906		B(E2)(W.u.)=287 *11* α(L)=658 *10*; α(M)=183 *3*; α(N+..)=64.1 *9* α(N)=50.4 *7*; α(O)=11.84 *17*; α(P)=1.85 *3*; α(Q)=0.00390 *6* Mult.: from ^{240}Am ε decay, ^{244}Cm α decay.
141.690	4^+	98.860[@] *13*	100	42.824	2^+	E2		16.65		α(L)=12.08 *17*; α(M)=3.38 *5*; α(N+..)=1.185 *17* α(N)=0.930 *13*; α(O)=0.219 *3*; α(P)=0.0349 *5*; α(Q)=0.0001222 *18* Mult.: from ^{240}Am ε decay.
294.319	6^+	152.630[@] *20*	100	141.690	4^+	E2		2.49		α(K)=0.196 *3*; α(L)=1.665 *24*; α(M)=0.465 *7*; α(N+..)=0.1629 *23* α(N)=0.1278 *18*; α(O)=0.0302 *5*; α(P)=0.00488 *7*; α(Q)=2.76×10^{-5} *4*
497.37	8^+	203.1 *2*	100	294.319	6^+	(E2)[d]		0.807		α(K)=0.1471 *21*; α(L)=0.480 *7*; α(M)=0.1332 *20*; α(N+..)=0.0467 *7* α(N)=0.0366 *6*; α(O)=0.00867 *13*; α(P)=0.001419 *21*; α(Q)=1.201×10^{-5} *18*
597.34	1^-	554.60 *7*	100	42.824	2^+	E1[c]		0.01179		α(K)=0.00949 *14*; α(L)=0.001734 *25*; α(M)=0.000417 *6*; α(N+..)=0.0001458 *21* α(N)=0.0001126 *16*; α(O)=2.77×10^{-5} *4*; α(P)=5.13×10^{-6} *8*; α(Q)=2.99×10^{-7} *5*
		597.40 *7*	61 *2*	0.0	0^+	E1[c]		0.01024		α(K)=0.00826 *12*; α(L)=0.001495 *21*; α(M)=0.000359 *5*; α(N+..)=0.0001256 *18* α(N)=9.70×10^{-5} *14*; α(O)=2.39×10^{-5} *4*; α(P)=4.43×10^{-6} *7*; α(Q)=2.62×10^{-7} *4*
648.86	3^-	507.20 *10*	100	141.690	4^+					
		606.10 *7*	97 *5*	42.824	2^+					
742.33	5^-	448.01[&] *6*	67 *3*	294.319	6^+	[E1]		0.0179		B(E1)(W.u.)>0.39×10^{-6} α(K)=0.01433 *20*; α(L)=0.00269 *4*; α(M)=0.000648 *9*; α(N+..)=0.000227 *4* α(N)=0.0001753 *25*; α(O)=4.31×10^{-5} *6*; α(P)=7.90×10^{-6} *11*; α(Q)=4.45×10^{-7} *7*
		600.57[&] *6*	100 *5*	141.690	4^+	[E1]		0.01013		B(E1)(W.u.)>0.24×10^{-6} α(K)=0.00818 *12*; α(L)=0.001480 *21*; α(M)=0.000355 *5*; α(N+..)=0.0001243 *18* α(N)=9.60×10^{-5} *14*; α(O)=2.37×10^{-5} *4*; α(P)=4.38×10^{-6} *7*; α(Q)=2.59×10^{-7} *4*
747.4	10^+	250.2 *2*	100	497.37	8^+	(E2)[d]		0.383		α(K)=0.1059 *15*; α(L)=0.202 *3*; α(M)=0.0556 *8*; α(N+..)=0.0195 *3* α(N)=0.01527 *22*; α(O)=0.00363 *6*; α(P)=0.000600 *9*; α(Q)=6.92×10^{-6} *10*
860.71	0^+	263.37 *7*	89 *2*	597.34	1^-	[E1]		0.0550		α(K)=0.0433 *6*; α(L)=0.00881 *13*; α(M)=0.00214 *3*;

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

E_i(level)	J_i^{π}	E_γ[‡]	I_γ[†]	E_f	J_f^{π}	Mult.[#]	α[h]	$I_{(\gamma+ce)}$	Comments
									α(N+..)=0.000745 *11* α(N)=0.000578 *9*; α(O)=0.0001409 *20*; α(P)=2.52×10^{-5} *4*; α(Q)=1.277×10^{-6} *18*
860.71	0^+	817.89 *10*	100	42.824	2^+	E2[c]	0.0183		α(K)=0.01302 *19*; α(L)=0.00389 *6*; α(M)=0.000990 *14*; α(N+..)=0.000348 *5* α(N)=0.000270 *4*; α(O)=6.59×10^{-5} *10*; α(P)=1.194×10^{-5} *17*; α(Q)=5.27×10^{-7} *8*
		860.7		0.0	0^+	E0		15 *4*	q_K^2(E0/E2)=7 *3*, X(E0/E2)=0.048 *16* (2005Ki02 evaluation). Mult.: from ^{244}Cm α decay.
878.1?	(7^-)	583.7[j] *4*		294.319	6^+				
900.32	2^+	251.47 *7*	73 *3*	648.86	3^-	[E1]	0.0610		α(K)=0.0480 *7*; α(L)=0.00983 *14*; α(M)=0.00239 *4*; α(N+..)=0.000832 *12* α(N)=0.000645 *9*; α(O)=0.0001571 *22*; α(P)=2.81×10^{-5} *4*; α(Q)=1.406×10^{-6} *20*
		302.98 *7*	85 *3*	597.34	1^-	[E1]	0.0405		α(K)=0.0320 *5*; α(L)=0.00637 *9*; α(M)=0.001543 *22*; α(N+..)=0.000538 *8* α(N)=0.000417 *6*; α(O)=0.0001018 *15*; α(P)=1.84×10^{-5} *3*; α(Q)=9.59×10^{-7} *14*
		758.61 *8*	100 *3*	141.690	4^+	E2[c]	0.0212		α(K)=0.01484 *21*; α(L)=0.00474 *7*; α(M)=0.001212 *17*; α(N+..)=0.000427 *6* α(N)=0.000331 *5*; α(O)=8.06×10^{-5} *12*; α(P)=1.453×10^{-5} *21*; α(Q)=6.09×10^{-7} *9*
		857.48 *10*	42 *2*	42.824	2^+	[M1,E2]	0.04 *3*		α(K)=0.034 *22*; α(L)=0.007 *4*; α(M)=0.0017 *9*; α(N+..)=0.0006 *3* α(N)=0.00047 *24*; α(O)=0.00012 *6*; α(P)=2.2×10^{-5} *12*; α(Q)=1.3×10^{-6} *9*
		900.37 *10*	14 *2*	0.0	0^+	[E2]	0.01512		α(K)=0.01103 *16*; α(L)=0.00305 *5*; α(M)=0.000771 *11*; α(N+..)=0.000272 *4* α(N)=0.000210 *3*; α(O)=5.14×10^{-5} *8*; α(P)=9.38×10^{-6} *14*; α(Q)=4.39×10^{-7} *7*
938.06	(1^-)	289.21 *10*	1.4 *3*	648.86	3^-				
		340.70 *10*	5.0 *5*	597.34	1^-				
		895.30 *10*	5 *1*	42.824	2^+				
		938.02 *10*	100 *4*	0.0	0^+				
958.85	(2^-)	309.99 *9*	4.3 *4*	648.86	3^-				
		361.55 *10*	3.5 *6*	597.34	1^-				
		915.98 *9*	100 *3*	42.824	2^+				
992.4	4^+	249.7[a] *10*	41 *6*	742.33	5^-	[E1]	0.0620 *11*		α(K)=0.0487 *8*; α(L)=0.01000 *17*; α(M)=0.00243 *5*; α(N+..)=0.000846 *15* α(N)=0.000656 *12*; α(O)=0.000160 *3*; α(P)=2.85×10^{-5} *5*; α(Q)=1.427×10^{-6} *24*
		343.7[a] *10*	100 *10*	648.86	3^-	[E1]	0.0309		α(K)=0.0245 *4*; α(L)=0.00479 *8*; α(M)=0.001158 *18*; α(N+..)=0.000404

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

E_i(level)	J^π_i	E_γ[‡]	I_γ[†]	E_f	J^π_f	Mult.[#]	δ	α[h]	Comments
									7 α(N)=0.000313 *5*; α(O)=7.66×10^{-5} *12*; α(P)=1.390×10^{-5} *22*; α(Q)=7.44×10^{-7} *12*
992.4	4^+	697.8[a]	71 *16*	294.319	6^+				
1001.94	(3^-)	959.1[&] *1*	100	42.824	2^+				
1030.55	$(3)^+$	382.1[j] *10*	0.072 *7*	648.86	3^-	[E1]		0.0247	α(K)=0.0197 *3*; α(L)=0.00379 *6*; α(M)=0.000915 *14*; α(N+..)=0.000319 *5* α(N)=0.000247 *4*; α(O)=6.06×10^{-5} *10*; α(P)=1.105×10^{-5} *17*; α(Q)=6.04×10^{-7} *9*
		888.85[a] *5*	34.2 *7*	141.690	4^+	E2		0.01550	B(E2)(W.u.)=2.2×10^{-3} *3* α(K)=0.01127 *16*; α(L)=0.00315 *5*; α(M)=0.000797 *12*; α(N+..)=0.000281 *4* α(N)=0.000217 *3*; α(O)=5.31×10^{-5} *8*; α(P)=9.68×10^{-6} *14*; α(Q)=4.49×10^{-7} *7* Mult.: from ^{240}Am ε decay.
		987.79[a] *6*	100.0 *10*	42.824	2^+	E2(+M1)	>10	0.0128 *3*	B(E2)(W.u.)=3.8×10^{-3} *5* α(N)=0.000168 *3*; α(O)=4.13×10^{-5} *7*; α(P)=7.57×10^{-6} *13*; α(Q)=3.74×10^{-7} *8* Mult.: from ^{240}Am ε decay.
1037.55	(4^-)	295.20[&] *10*	3.2 *4*	742.33	5^-				
		388.70[&] *10*	6.6 *5*	648.86	3^-				
		895.80[&] *10*	100 *5*	141.690	4^+				
1041.1	12^+	293.8 *2*	100	747.4	10^+	(E2)[d]		0.226	α(K)=0.0802 *12*; α(L)=0.1063 *16*; α(M)=0.0291 *5*; α(N+..)=0.01022 *15* α(N)=0.00800 *12*; α(O)=0.00190 *3*; α(P)=0.000319 *5*; α(Q)=4.65×10^{-6} *7*
1056.8	(9^-)	178.4[j] *4*		878.1?	(7^-)				
		309.4 *3*	36 *36*	747.4	10^+	D[d]			
		559.2 *3*	100 *71*	497.37	8^+	D[d]			
1076.22	(4^+)	934.50[&] *10*	100 *12*	141.690	4^+				
		1033.50[&] *20*	40 *4*	42.824	2^+				
1089.45	0^+	1046.62 *10*	100	42.824	2^+				
1115.53	(5^-)	466.70[&] *10*	4.5 *4*	648.86	3^-				
		821.20[&] *10*	4.5 *4*	294.319	6^+				
		973.90[&] *10*	100 *5*	141.690	4^+				
1130.95	(2^+)	989.20 *10*	100 *7*	141.690	4^+				E_γ: poor fit. Level-energy difference=990.26.

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

E_i(level)	J^π_i	E_γ[‡]	I_γ[†]	E_f	J^π_f	Mult.[#]	α[h]	Comments
1130.95	(2+)	1088.30 *20*	39 *4*	42.824	2+			
		1131.00 *20*	75 *6*	0.0	0+			
1136.97	(2+)	1094.20 *20*	100 *15*	42.824	2+			
		1137.0 *4*	67 *10*	0.0	0+			
1138.3?	(6+)	145.8[j] *4*		992.4	4+			
1161.53	(6−)	419.20[&] *10*	9.8 *8*	742.33	5−			
		867.20[&] *10*	100 *6*	294.319	6+			
1177.63	(3+)	139.90[&] *10*		1037.55	(4−)			
		147.2[ig] *1*		1030.55	(3)+			
		175.40[&j] *10*		1001.94	(3−)			
		1036.1[a] *3*	33 *4*	141.690	4+			
		1135.1[a] *3*	100 *6*	42.824	2+			
1222.99	(2+)	1180.20 *20*	100 *8*	42.824	2+			
		1223.00 *20*	80 *12*	0.0	0+			
1232.46	(4+)	938.20[&] *10*	100 *17*	294.319	6+			
		1090.50[&] *20*	44 *9*	141.690	4+			
		1190.0[a] *10*	7 *4*	42.824	2+			
1240.8	(2−)	1198.0 *3*	100	42.824	2+			
1262.08	(3+)	1120.3[a] *4*	31 *3*	141.690	4+			
		1219.3[a] *3*	100 *6*	42.824	2+			
1277.6	(11−)	220.7 *3*	22 *11*	1056.8	(9−)	(E2)[d]	0.594	α(K)=0.1299 *19*; α(L)=0.338 *6*; α(M)=0.0936 *15*; α(N+..)=0.0328 *5* α(N)=0.0257 *4*; α(O)=0.00610 *10*; α(P)=0.001003 *16*; α(Q)=9.59×10^{-6} *14*
		236.6 *3*	39 *22*	1041.1	12+	[d]		
		530.1 *3*	100 *50*	747.4	10+	D[d]		
1308.74	(5−)	147.20[i&g] *10*	4.0 *3*	1161.53	(6−)	(M1,E2)[&]	6 *3*	α(K)=4 *4*; α(L)=1.7 *3*; α(M)=0.44 *11*; α(N+..)=0.16 *4* α(N)=0.12 *3*; α(O)=0.029 *7*; α(P)=0.0051 *7*; α(Q)=0.00016 *13*
		193.30[&] *10*	22.1 *11*	1115.53	(5−)	(M1,E2)[&]	2.5 *16*	α(K)=1.7 *16*; α(L)=0.62 *3*; α(M)=0.161 *5*; α(N+..)=0.0566 *15* α(N)=0.0440 *15*; α(O)=0.01067 *16*; α(P)=0.00188 *14*; α(Q)=7.E−5 *6*
		271.30[&] *10*	22.5 *11*	1037.55	(4−)	(M1,E2)[&]	0.9 *7*	α(K)=0.7 *6*; α(L)=0.20 *6*; α(M)=0.050 *11*; α(N+..)=0.018 *4* α(N)=0.014 *3*; α(O)=0.0033 *8*; α(P)=0.00061 *18*; α(Q)=2.8×10^{-5} *23*
		306.80[&] *10*	1.6 *2*	1001.94	(3−)	(E2)	0.197	α(K)=0.0742 *11*; α(L)=0.0899 *13*; α(M)=0.0246 *4*; α(N+..)=0.00863 *13* α(N)=0.00675 *10*; α(O)=0.001608 *23*; α(P)=0.000270 *4*; α(Q)=4.20×10^{-6} *6* Mult.: (M1+E2) from ce data, E2 required by ΔJ^π.
		566.34[&] *6*	100 *5*	742.33	5−	(M1,E2)[&]	0.13 *9*	α(K)=0.10 *8*; α(L)=0.022 *11*; α(M)=0.005 *3*; α(N+..)=0.0019 *9* α(N)=0.0015 *7*; α(O)=0.00036 *18*; α(P)=7.E−5 *4*; α(Q)=4.E−6 *3*

Adopted Levels, Gammas (continued)

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

E_i(level)	J_i^π	E_γ[‡]	I_γ[†]	E_f	J_f^π	Mult.[#]	α[h]	Comments
1308.74	(5^-)	1014.40[&] 10	0.83 22	294.319	6^+			
		1167.10[&] 10	17.8 11	141.690	4^+			
1321.13?	$(1,2^+)$	1321.10[j] 10	100	0.0	0^+			
1323.4?	(8^+)	185.0[j] 3	100 67	1138.3?	(6^+)			
		445.2[j] 4		878.1?	(7^-)			
1337.02	$(2^+,3,4^+)$	1195.5[a] 4	100 19	141.690	4^+			
		1294.1[a] 3	35 4	42.824	2^+			
1374.8	14^+	333.7 3	100	1041.1	12^+	(E2)[d]	0.1533	α(K)=0.0639 9; α(L)=0.0654 10; α(M)=0.0178 3; α(N+..)=0.00625 9 α(N)=0.00488 7; α(O)=0.001165 17; α(P)=0.000197 3; α(Q)=3.44×10^{-6} 5
1410.75	$0^{(-)}$	813.41 10	100	597.34	1^-			
1438.45	$2^{(-)}$	789.59 10	100 17	648.86	3^-			
		841.11 10	83 9	597.34	1^-			
		1438.5	<0.6	0.0	0^+			
1488.17	$(1,2^+)$	1445.30 10	100 3	42.824	2^+			
		1488.20 10	53 3	0.0	0^+			
1525.86	(0^+)	928.55 10	100 13	597.34	1^-			
		1483.00 10	18 3	42.824	2^+			
1539.67	(1^-)	580.70 20	0.53 15	958.85	(2^-)			
		890.60 20	1.3 2	648.86	3^-			
		942.39 10	7.2 7	597.34	1^-			
		1496.90 10	100 2	42.824	2^+			
		1539.62 9	63.2 15	0.0	0^+			
1539.8	(13^-)	165.0 3	7 7	1374.8	14^+			
		262.1 3	75 36	1277.6	(11^-)	(Q)[d]		
		498.7 3	100 64	1041.1	12^+	D[d]		
1557.0	(10^+)	233.5 3	69 46	1323.4?	(8^+)			
		279.6[j] 4		1277.6	(11^-)			
		500.3 3	100 65	1056.8	(9^-)	D[d]		
1558.87	(2^+)	910.10 10	100 14	648.86	3^-			
		961.62 10	93 5	597.34	1^-			
		1417.20 10	16 3	141.690	4^+			
		1515.90 10	11 4	42.824	2^+			
		1558.80 10	4.3 14	0.0	0^+			
1607.72	(1^-)	518.2 3	11 4	1089.45	0^+			
		959.0 2	13 4	648.86	3^-			
		1607.60 20	100 9	0.0	0^+			
1626.77	$(1,2^+)$	1584.10 20	100 12	42.824	2^+			
		1626.60 20	29 6	0.0	0^+			

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Adopted Levels, Gammas (continued)

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

E_i(level)	J^π_i	E_γ[‡]	I_γ[†]	E_f	J^π_f	Mult.[#]
1633.37	$(1,2^+)$	496.7 *3*	6.5 *13*	1136.97	(2^+)	
		1036.5 *3*	1.9 *13*	597.34	1^-	
		1590.50 *10*	63 *3*	42.824	2^+	
		1633.33 *10*	100 *3*	0.0	0^+	
1710.43	(2^+)	573.40 *20*	28 *7*	1136.97	(2^+)	
		1061.60 *20*	100 *24*	648.86	3^-	
		1113.20 *20*	62 *10*	597.34	1^-	
		1568.60 *20*	21 *3*	141.690	4^+	
		1667.60 *10*	66 *10*	42.824	2^+	
		1711.0 *10*	7 *4*	0.0	0^+	
1745.7	16^+	371.0 *3*	100	1374.8	14^+	(Q)[d]
1775.27	(1^-)	1732.40 *20*	67 *34*	42.824	2^+	
		1775.30 *20*	100 *33*	0.0	0^+	
1796.34	$(1,2^+)$	475.0 *3*	100 *27*	1321.13?	$(1,2^+)$	
		573.40 *20*	73 *18*	1222.99	(2^+)	
		837.60 *20*	73 *27*	958.85	(2^-)	
		1796.2 *3*	27 *9*	0.0	0^+	
1808.02	$(1^-,2^+)$	1159.20 *20*	40 *13*	648.86	3^-	
		1210.5 *5*	100 *30*	597.34	1^-	
		1765.20 *20*	47 *7*	42.824	2^+	
		1807.9 *4*	13 *7*	0.0	0^+	
1830.3	(12^+)	273.2 *3*	100 *55*	1557.0	(10^+)	Q[d]
		290.6[j] *4*		1539.8	(13^-)	
		552.7 *4*	90 *48*	1277.6	(11^-)	D[d]
1841.8	(15^-)	302.1 *3*	100 *44*	1539.8	(13^-)	Q[d]
		467.1 *3*	65 *37*	1374.8	14^+	
1917.8	(1^-)	1874.9 *3*	100 *8*	42.824	2^+	
		1918.0 *10*	7 *3*	0.0	0^+	
1954.51	(2^+)	1305.80 *20*	100 *26*	648.86	3^-	
		1357.20 *20*	57 *13*	597.34	1^-	
		1812.80 *10*	22 *9*	141.690	4^+	
		1911.4 *3*	61 *4*	42.824	2^+	
1996.41	$(1,2^+)$	1398.5 *5*	100 *40*	597.34	1^-	
		1953.60 *20*	46 *10*	42.824	2^+	
		1996.7 *4*	20 *8*	0.0	0^+	
2117.5	$(1,2^+)$	2074.80[j] *20*	100 *16*	42.824	2^+	
		2117.5 *10*	23 *13*	0.0	0^+	
2136.8	(14^+)	295.0[j] *3*	32 *19*	1841.8	(15^-)	
		306.5 *3*	100 *56*	1830.3	(12^+)	Q[d]

From ENSDF

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

E_i(level)	J_i^π	E_γ[‡]	I_γ[†]	E_f	J_f^π	Mult.[#]	α[h]	Comments
2136.8	(14+)	597.1 *3*	78 *46*	1539.8	(13−)	D[d]		
2151.6	18+	405.9 *3*	100	1745.7	16+	(Q)[d]		
2182.6	(17−)	340.7 *3*	100 *89*	1841.8	(15−)	(Q)[d]		
		436.8 *3*	34 *42*	1745.7	16+			
2475.1	(16+)	292.6[j] *4*		2182.6	(17−)			
		338.2 *3*	100 *92*	2136.8	(14+)	Q[d]		
		633.3 *4*	31 *31*	1841.8	(15−)	D[d]		
2560.5	(19−)	377.9 *3*	100 *72*	2182.6	(17−)	(Q)[d]		
		408.9 *3*	21 *5*	2151.6	18+			
2590.2	20+	438.6 *3*	100	2151.6	18+	(E2)[d]	0.0726	α(K)=0.0390 *6*; α(L)=0.0247 *4*; α(M)=0.00659 *10*; α(N+..)=0.00232 *4* α(N)=0.00181 *3*; α(O)=0.000434 *7*; α(P)=7.49×10^{-5} *11*; α(Q)=1.87×10^{-6} *3*
2837.1	(18+)	362.0 *3*	100 *71*	2475.1	(16+)	Q[d]		
		654.6 *3*	33 *26*	2182.6	(17−)			
2973.8	(21−)	383.6 *3*	21 *5*	2590.2	20+			
		413.3 *3*	100 *62*	2560.5	(19−)	(Q)[d]		
3059.8	22+	469.6 *3*	100	2590.2	20+	(E2)[d]	0.0612	α(K)=0.0345 *5*; α(L)=0.0196 *3*; α(M)=0.00522 *8*; α(N+..)=0.00184 *3* α(N)=0.001430 *21*; α(O)=0.000344 *5*; α(P)=5.97×10^{-5} *9*; α(Q)=1.612×10^{-6} *23*
3218.3	(20+)	381.2 *3*	100 *80*	2837.1	(18+)	Q[d]		
		657.8 *3*	18 *12*	2560.5	(19−)			
3421.1	(23−)	361.3 *3*	21 *7*	3059.8	22+			
		447.3 *3*	100 *38*	2973.8	(21−)	(Q)[d]		
3559.0	24+	499.2 *3*	100	3059.8	22+	(E2)[d]	0.0528	α(K)=0.0310 *5*; α(L)=0.01610 *23*; α(M)=0.00426 *6*; α(N+..)=0.001498 *22* α(N)=0.001167 *17*; α(O)=0.000281 *4*; α(P)=4.90×10^{-5} *7*; α(Q)=1.417×10^{-6} *20*
3626.6	(22+)	408.3 *4*		3218.3	(20+)			
		652.8 *4*	100 *50*	2973.8	(21−)			
3900.6	(25−)	341.6 *3*	32 *14*	3559.0	24+			
		479.5 *3*	100 *68*	3421.1	(23−)	Q[d]		
4063.5	(24+)	436.9 *5*		3626.6	(22+)			
4086.3	26+	185.7 *3*	11 *6*	3900.6	(25−)			
		527.2 *3*	100 *17*	3559.0	24+	(Q)[d]		
4410.8	(27−)	324.5 *3*		4086.3	26+			
		510.2 *3*	100 *74*	3900.6	(25−)	Q[d]		
4530.9	(26+)	467.4 *5*		4063.5	(24+)			
4639.4	28+	228.6 *4*	27 *15*	4410.8	(27−)			
		553.1 *3*	100 *35*	4086.3	26+			
4950.0	(29−)	310.6[j] *4*		4639.4	28+			

Adopted Levels, Gammas (continued)

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

E_i(level)	J_i^π	E_γ ‡	I_γ †	E_f	J_f^π	Mult.#	δ	α h	$I_{(\gamma+ce)}$	Comments
4950.0	(29^-)	539.2 *3*	100 *69*	4410.8	(27^-)					
5030.0	(28^+)	499.1 *5*		4530.9	(26^+)					
5220.3	30^+	270.3 *4*		4950.0	(29^-)					
		580.9 *3*	100 *37*	4639.4	28^+					
5512.2	(31^-)	562.2 *3*	100	4950.0	(29^-)					
5559.2	(30^+)	529.2 *5*		5030.0	(28^+)					
5819.3	32^+	599.0 *3*	100	5220.3	30^+					
6096.3?	(33^-)	584.1 j *4*		5512.2	(31^-)					
20.1+x	(2^+)	(20.1)		x	(0^+)	[E2]		2.3×10^4 *3*		α(L)=1.31×10^4 *18*; α(M)=7.5×10^3 *10*; α(N+..)=2.6×10^3 *4* α(N)=2.0×10^3 *3*; α(O)=4.8×10^2 *7*; α(P)=74 *10*; α(Q)=0.108 *13* Additional information 2.
66.8+x	(4^+)	46.72 *9*	100	20.1+x	(2^+)	(E2)		593 *10*		α(L)=431 *8*; α(M)=120.3 *21*; α(N+..)=42.0 *7* α(N)=33.0 *6*; α(O)=7.76 *13*; α(P)=1.215 *21*; α(Q)=0.00267 *5*
139.9+x	(6^+)	73.12 *12*	100	66.8+x	(4^+)	(E2)		68.9		α(L)=50.0 *8*; α(M)=14.00 *23*; α(N+..)=4.90 *8* α(N)=3.85 *7*; α(O)=0.906 *15*; α(P)=0.1430 *23*; α(Q)=0.000399 *7*
239.2+x	(8^+)	99.35 *13*	100	139.9+x	(6^+)	(E2)		16.27		α(L)=11.81 *18*; α(M)=3.31 *5*; α(N+..)=1.158 *18* α(N)=0.909 *14*; α(O)=0.214 *4*; α(P)=0.0341 *6*; α(Q)=0.0001200 *18*
364.5+x?	(10^+)	126 j		239.2+x	(8^+)					
554.7+x	(1^-)	534.6	100	20.1+x	(2^+)					
		554.7	<750	x	(0^+)					I_γ: for triplet.
589.7+x	(3^-)	569.6	100	20.1+x	(2^+)					

Adopted Levels, Gammas (continued)

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

E_i(level)	J_i^π	E_γ ‡	I_γ †	E_f	J_f^π	Mult. #

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Adopted Levels, Gammas (continued)

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

E_i(level)	J^π_i	E_γ‡	I_γ†	E_f	J^π_f	Mult.#

Adopted Levels, Gammas (continued)

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

E_i(level)	J^π_i	E_γ[‡]	I_γ[†]	E_f	J^π_f	Mult.[#]
769.9+x	(0+)	769.9 *10*		x	(0+)	(E0)
806.2+x	(2−)	216.5 *5*	1.9	589.7+x	(3−)	
		786.1 *1*	100.0 *25*	20.1+x	(2+)	E1
825.6+x	(3−)	(19.4)		806.2+x	(2−)	
		805.4 *2*	100 *13*	20.1+x	(2+)	
836.0+x	(1−)	816 *1*	100 *18*	20.1+x	(2+)	
		836 *1*	29 *17*	x	(0+)	
846.8+x	(2−)	826.7 *3*	100	20.1+x	(2+)	
851.1+x	(4−)	(25.5)		825.6+x	(3−)	
		44.8		806.2+x	(2−)	(E2)
866.0+x	(3−)	799 *1*	100 *22*	66.8+x	(4+)	
		846 *1*	67 *33*	20.1+x	(2+)	
882.8+x	(5−)	31.7		851.1+x	(4−)	(E2)
		57.2		825.6+x	(3−)	(E2)
891.2+x	(4−)	824.4 *3*	100	66.8+x	(4+)	
918.8+x	(5−)	778.9 *3*	100 *25*	139.9+x	(6+)	
		852.0 *5*	42 *17*	66.8+x	(4+)	
920.7+x	(6−)	(37.9)		882.8+x	(5−)	
		(69.6)		851.1+x	(4−)	
		936.4[j]	<10	x	(0+)	
952.5+x?	(2−)	932.4[j]	100	20.1+x	(2+)	
960.7+x	(6−)	820.8 *2*	100	139.9+x	(6+)	
966.5+x	(7−)	(45.8)		920.7+x	(6−)	
		(83.7)		882.8+x	(5−)	
970.6+x?	(3−)	904.1[j]	100	66.8+x	(4+)	
		858.7 *3*	100 *40*	139.9+x	(6+)	
1012.2+x?	(4−)	945.4[j]	100	66.8+x	(4+)	
1044.0+x?	(5−)	904.1[j]	100	139.9+x	(6+)	
1054.9+x	(8−)	815.7 *3*	100	239.2+x	(8+)	
1109.0+x?	(6−)	969.1[j]	100	139.9+x	(6+)	
1161.5+x?	(7−)	922.3[j]	100	239.2+x	(8+)	
1230.4+x?	(8−)	991.2[j]	100	239.2+x	(8+)	
		1226.5[i,j]		20.1+x	(2+)	
		1246.5[i,j]		x	(0+)	
1261.0+x?	(2−)	414.2[j]		846.8+x	(2−)	(E0)
		1241.0[j]	25	20.1+x	(2+)	
1287.0+x?	(3−)	420[j]		866.0+x	(3−)	(E0)
		1220.0[j]	100	66.8+x	(4+)	
1300.9+x?	(9−)	936.4[j]	100	364.5+x?	(10+)	
1322.0+x?	(4−)	403[j]	17	918.8+x	(5−)	
		1255[j]	100	66.8+x	(4+)	
1344.5+x?	(1−)	98[j]		1246.5+x?	(1−)	

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Adopted Levels, Gammas (continued)

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

E_i(level)	J^π_i	E_γ[‡]	I_γ[†]	E_f	J^π_f	Mult.[#]
		408.1[j]		936.4+x?	(1^-)	(E0)
		508.4	100	836.0+x	(1^-)	(E0)
		1324.5[i,j]	<16	20.1+x	(2^+)	
1360.9+x	(2^-)	408.4		952.5+x?	(2^-)	(E0)
		514.8 *15*	67	846.8+x	(2^-)	(E0)
		525	42	836.0+x	(1^-)	
		535.2 *2*	100 *25*	825.6+x	(3^-)	
		1341	<115	20.1+x	(2^+)	
		1226.5[i,j]	<500	139.9+x	(6^+)	
1382.9+x?	(10^-)	1018.4[j]	100	364.5+x?	(10^+)	
1386.6+x	(3^-)	415.7[j]		970.6+x?	(3^-)	(E0)
		520.4 *14*	<44	866.0+x	(3^-)	(E0)
		535.5 *3*	61 *17*	851.1+x	(4^-)	
		1319.9	26	66.8+x	(4^+)	
1421.0+x?	(6^-)	1281[j]	100	139.9+x	(6^+)	
1421.4+x	(4^-)	409.2[j]		1012.2+x?	(4^-)	(E0)
		529.0 *12*		891.2+x	(4^-)	(E0)
		538.6 *2*	<43[b]	882.8+x	(5^-)	
		1355	23	66.8+x	(4^+)	
1461.8+x?	(11^-)	944.9[j]	100	516.9+x?	(12^+)	
1465.7+x	(5^-)	543.6[f] *1*	2	918.8+x	(5^-)	(E0)
		545 *1*	64	920.7+x	(6^-)	
		1324.5[i,j]	<22	139.9+x	(6^+)	
1485.5+x?	(7^-)	1246.5[i,j]	100	239.2+x	(8^+)	
1518.7+x	(6^-)	409.7[j]		1109.0+x?	(6^-)	(E0)
		554.3 *4*	<340[e]	966.5+x	(7^-)	
		556.5 *1*	2	960.7+x	(6^-)	(E0)
		1379.5	17	139.9+x	(6^+)	
1559.0+x?	(8^-)	1320[j]	100	239.2+x	(8^+)	
1580.5+x	(7^-)	418.6[j]		1161.5+x?	(7^-)	(E0)
		581.8 *12*		998.3+x	(7^-)	(E0)
		1341.3[j]	<115	239.2+x	(8^+)	
1641.5+x?	(9^-)	1276[j]	100	364.5+x?	(10^+)	
1654.7+x?	(8^-)	595.1[j] *18*				(E0)
		600.0[j]		1054.9+x	(8^-)	(E0)
		1414.3[j]	40	239.2+x	(8^+)	
1732+x?	(9^-)	628.3[j] *13*		1104+x?	(9^-)	(E0)
		1369[j]	30	364.5+x?	(10^+)	
1733.5+x?	(10^-)	1369[j]	100	364.5+x?	(10^+)	
		1454.0[j]		364.5+x?	(10^+)	
1835.0+x?	(11^-)	1318[j]	100	516.9+x?	(12^+)	

Adopted Levels, Gammas (continued)

γ(^{240}Pu) (continued)

E_i(level)	J_i^{π}	E_{γ}[‡]	I_{γ}[†]	E_f	J_f^{π}	Mult.[#]
		1393[j]		516.9+x?	(12$^+$)	
2011.0+x?	(12$^-$)	1494.0[j]	100	516.9+x?	(12$^+$)	

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

[†] Relative photon intensity, normalized to 100 for the strongest γ deexciting each level.

[‡] From ^{240}Np β^- decay (7.22 min), unless otherwise noted. For γ rays from levels in the second minimum, all values are from (α,2nγ).

[#] For transitions from levels in the second-potential well, E0 multipolarities are mixed with M1 and E2 components, except for the 769.9 transition from 0^+ to 0^+, which has to be E0.

[@] From ^{244}Cm α decay.

[&] From ^{240}Np β^- decay (61.9 min).

[a] From ^{240}Am ε decay.

[b] 538γ and 538.6γ are unresolved and intensities are undivided.

[c] From ^{240}Np β^- decay (7.22 min).

[d] From ΔJ=2, quadrupole (most likely E2) or ΔJ=1, dipole (most likely E1) from $\gamma(\theta)$ data in Coulomb excitation (2007WaZV).

[e] For doublet.

[f] Poor fit in the level scheme. Level-energy difference=546.9 *7*. 545.3 is quoted in 2001Th16.

[g] Placement from 1177 level proposed by the evaluators. 1982Pa23, in ^{240}Np β^- decay (61.9 min), proposed placement from only the 1309 keV level. The ΔK=4 involved for a transition from 1309-keV level to 1161-keV level suggests placement by 1982Pa23 is less likely.

[h] 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.

[i] Multiply placed.

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

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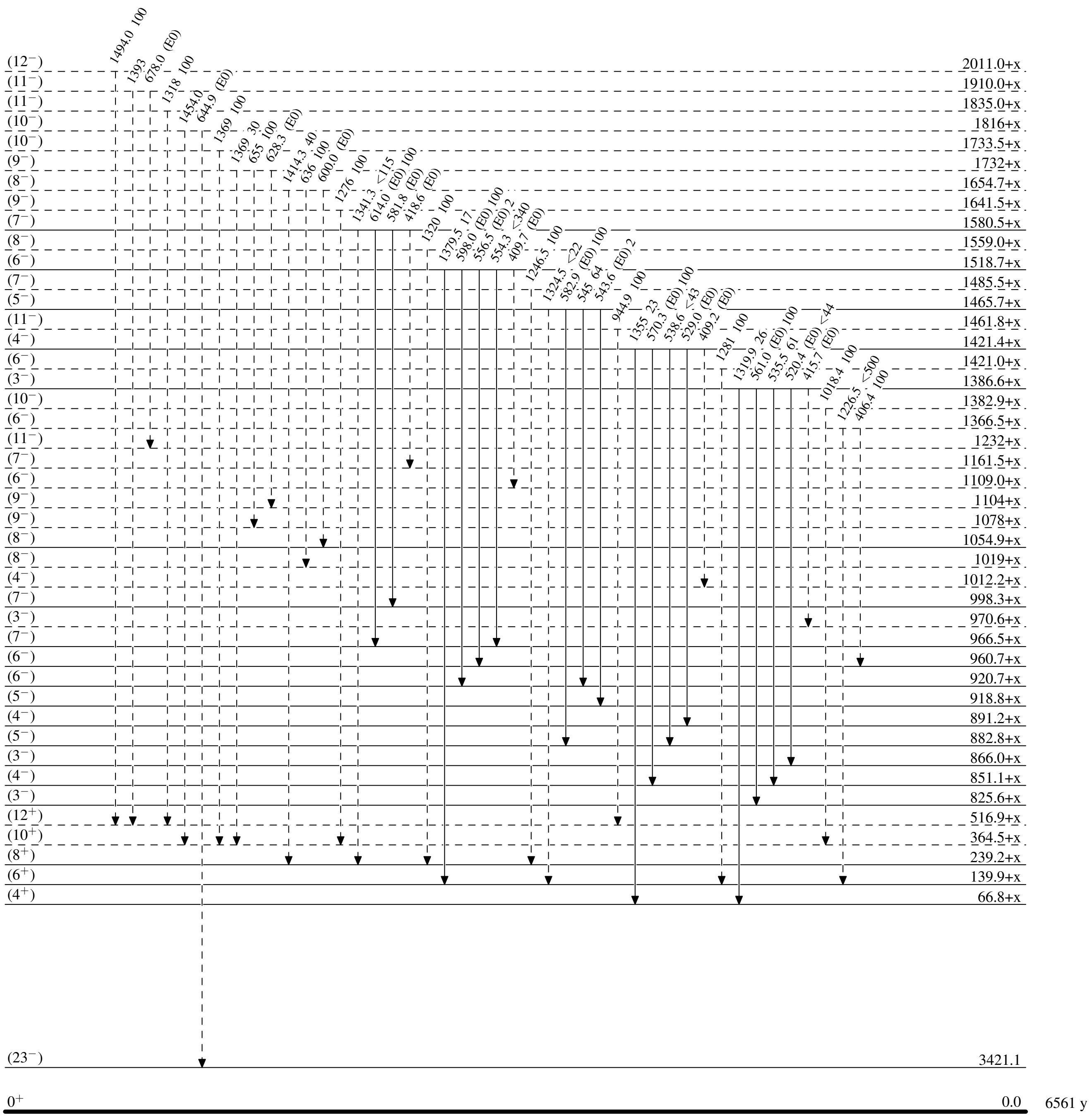
Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level

Legend

γ Decay (Uncertain)



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

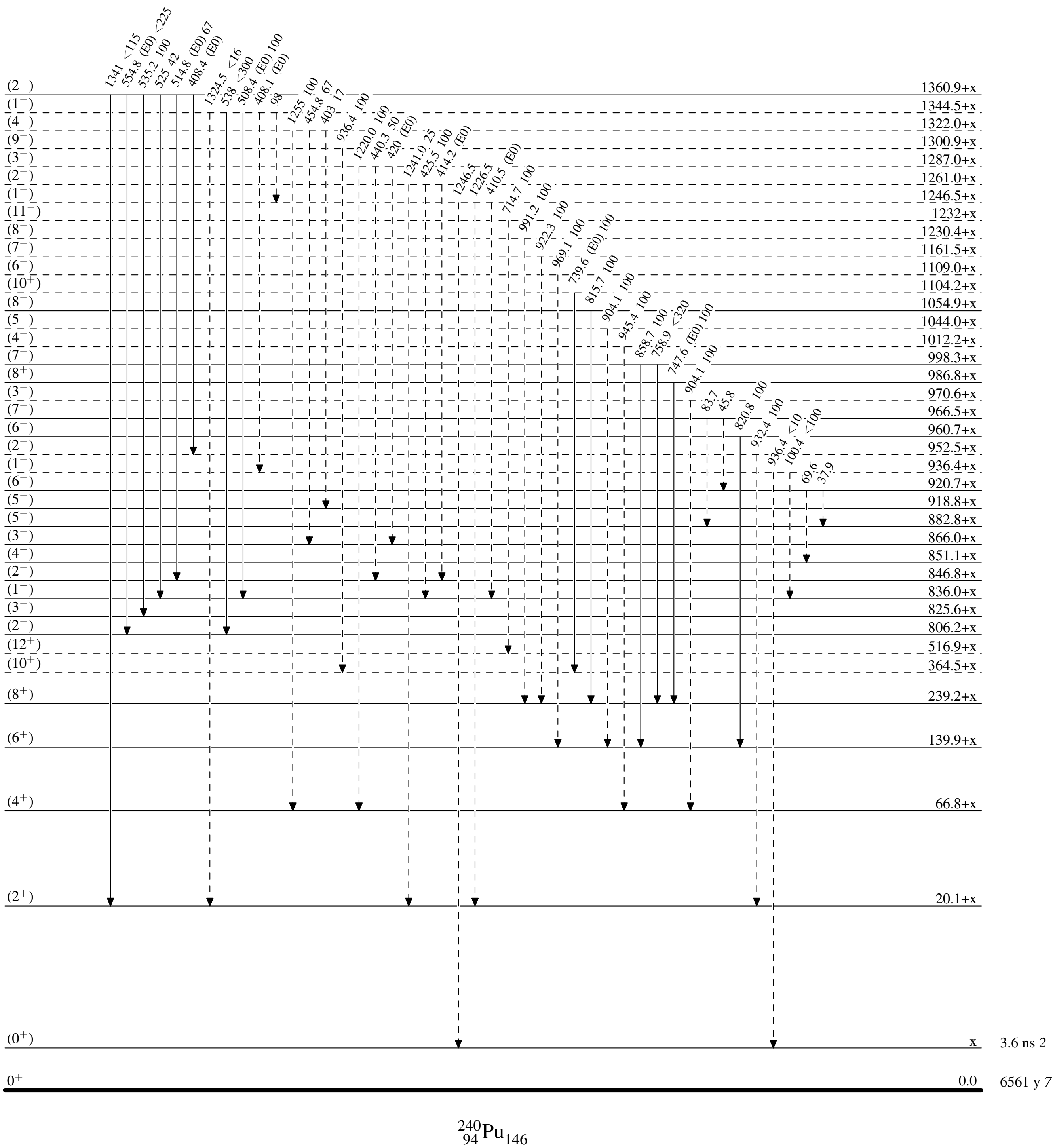
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

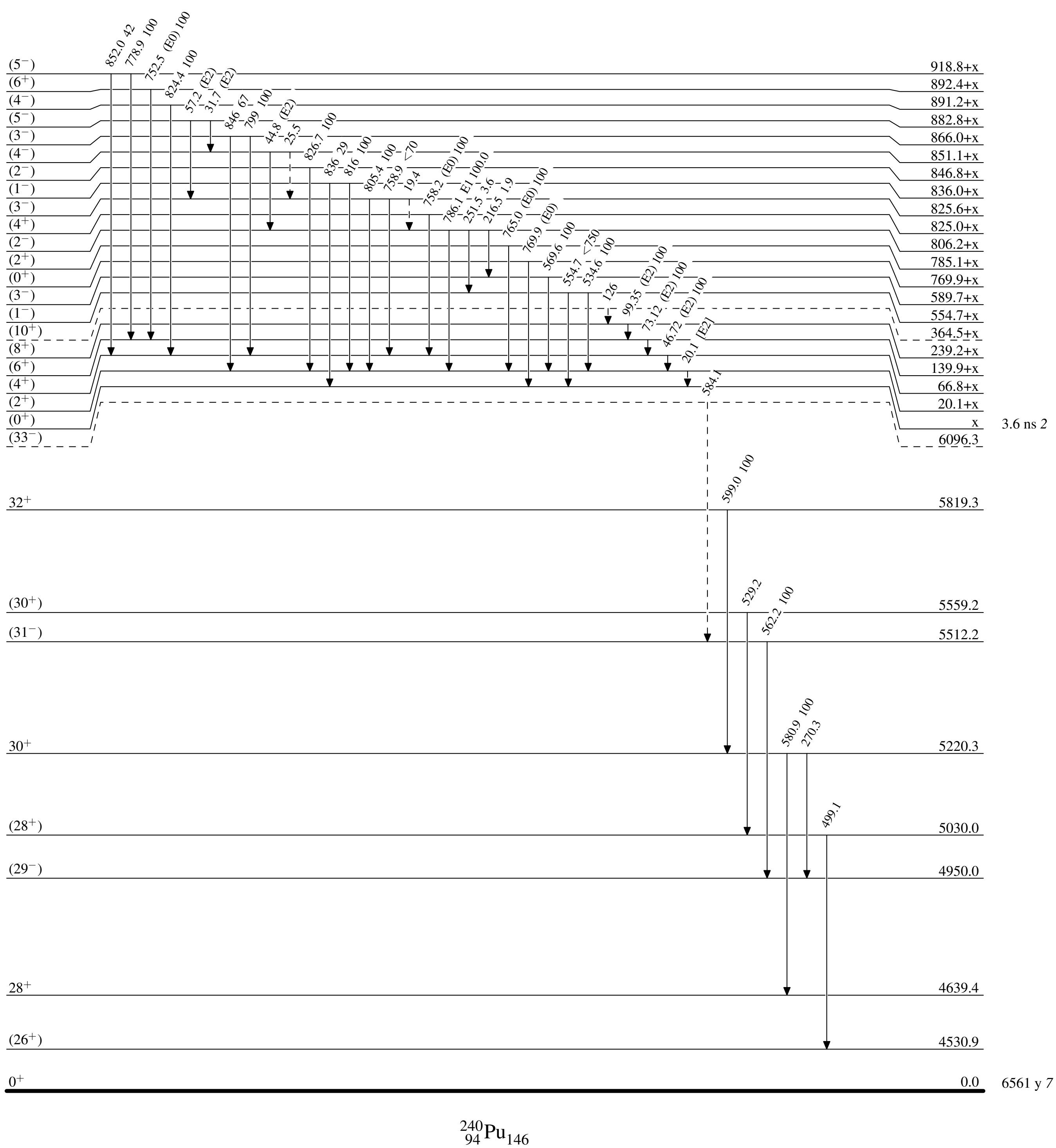
γ Decay (Uncertain)



Adopted Levels, Gammas

Level Scheme (continued)

Intentsities: Relative photon branching from each level



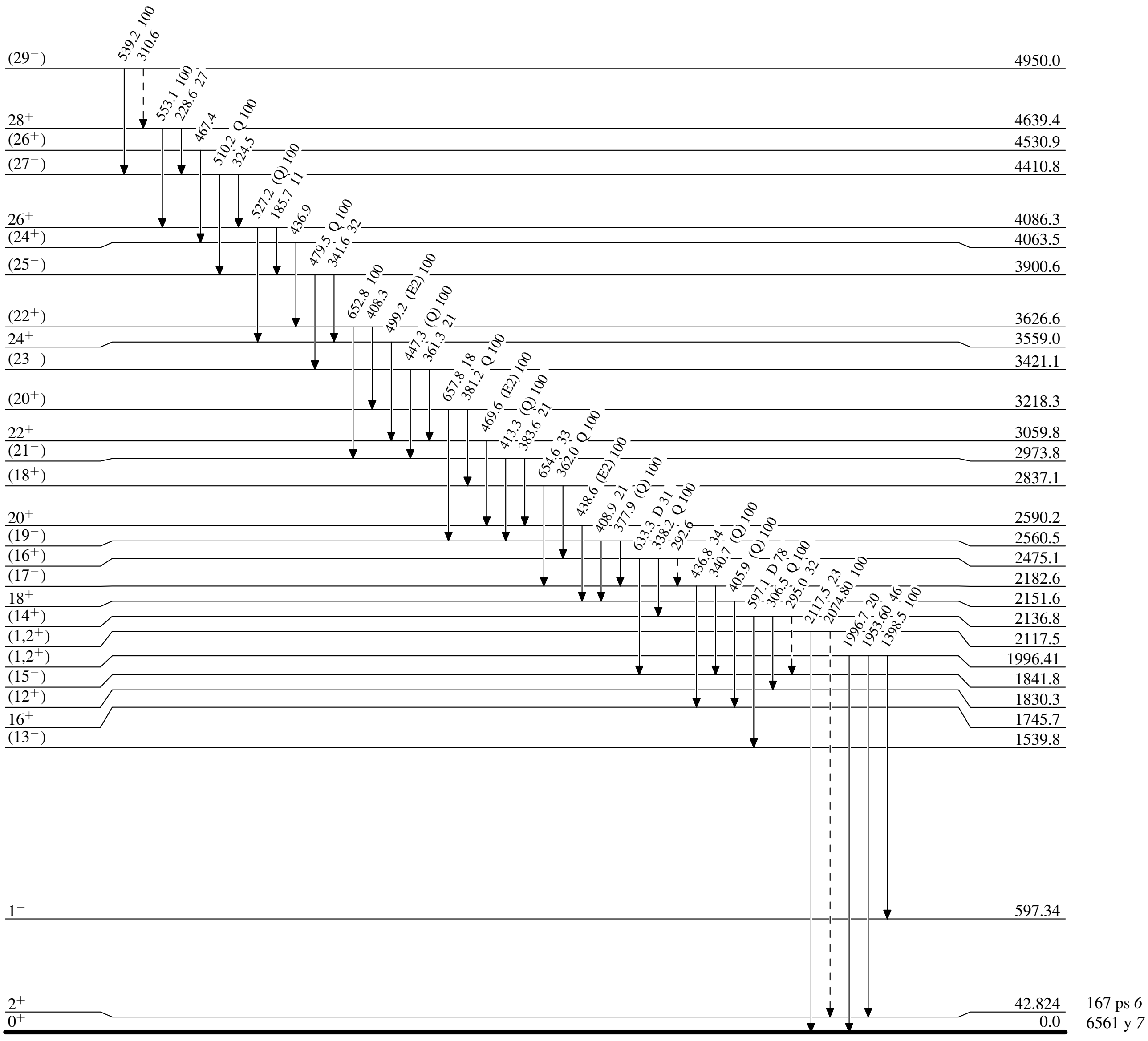
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

γ Decay (Uncertain)



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

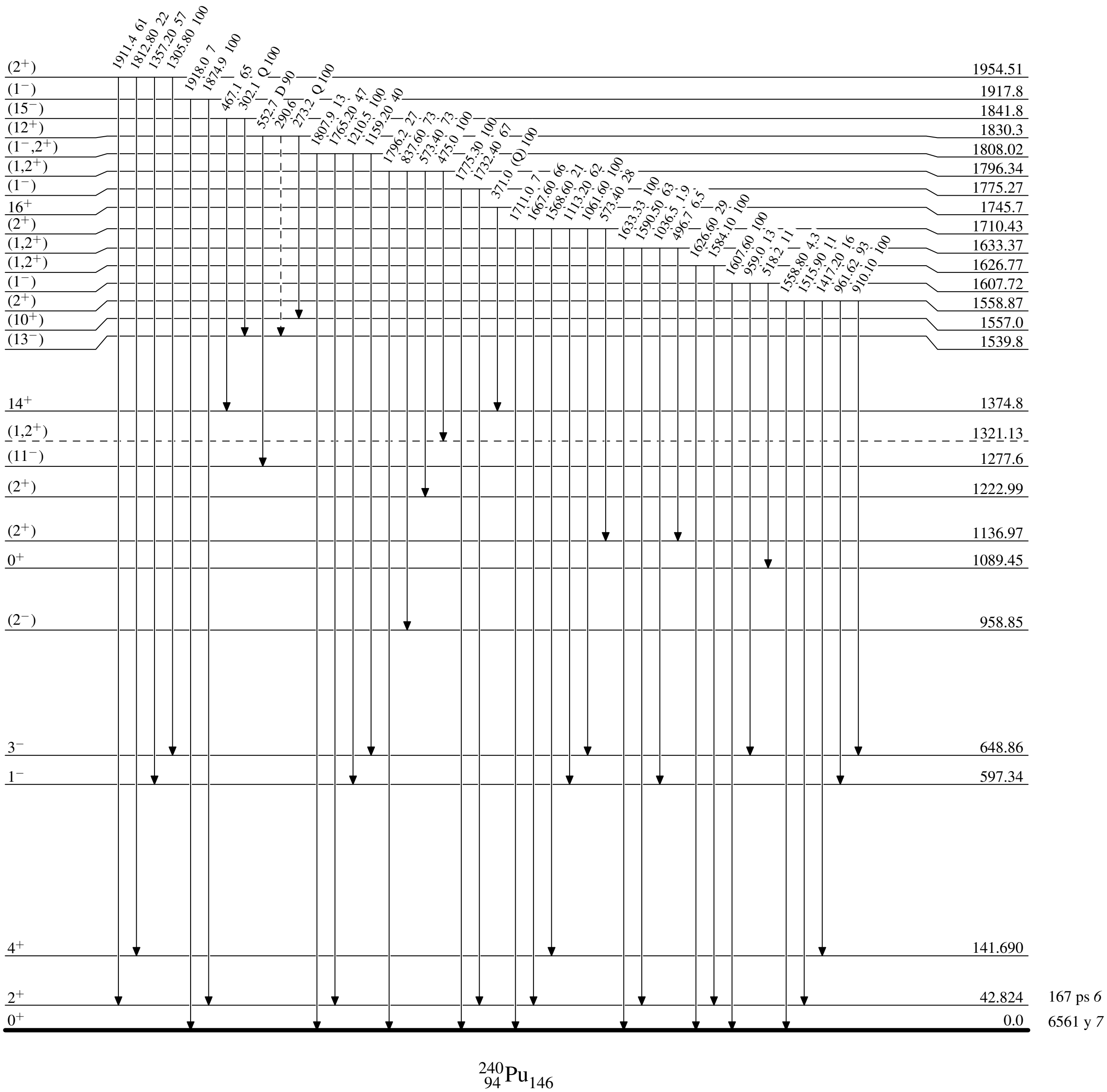
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

γ Decay (Uncertain)



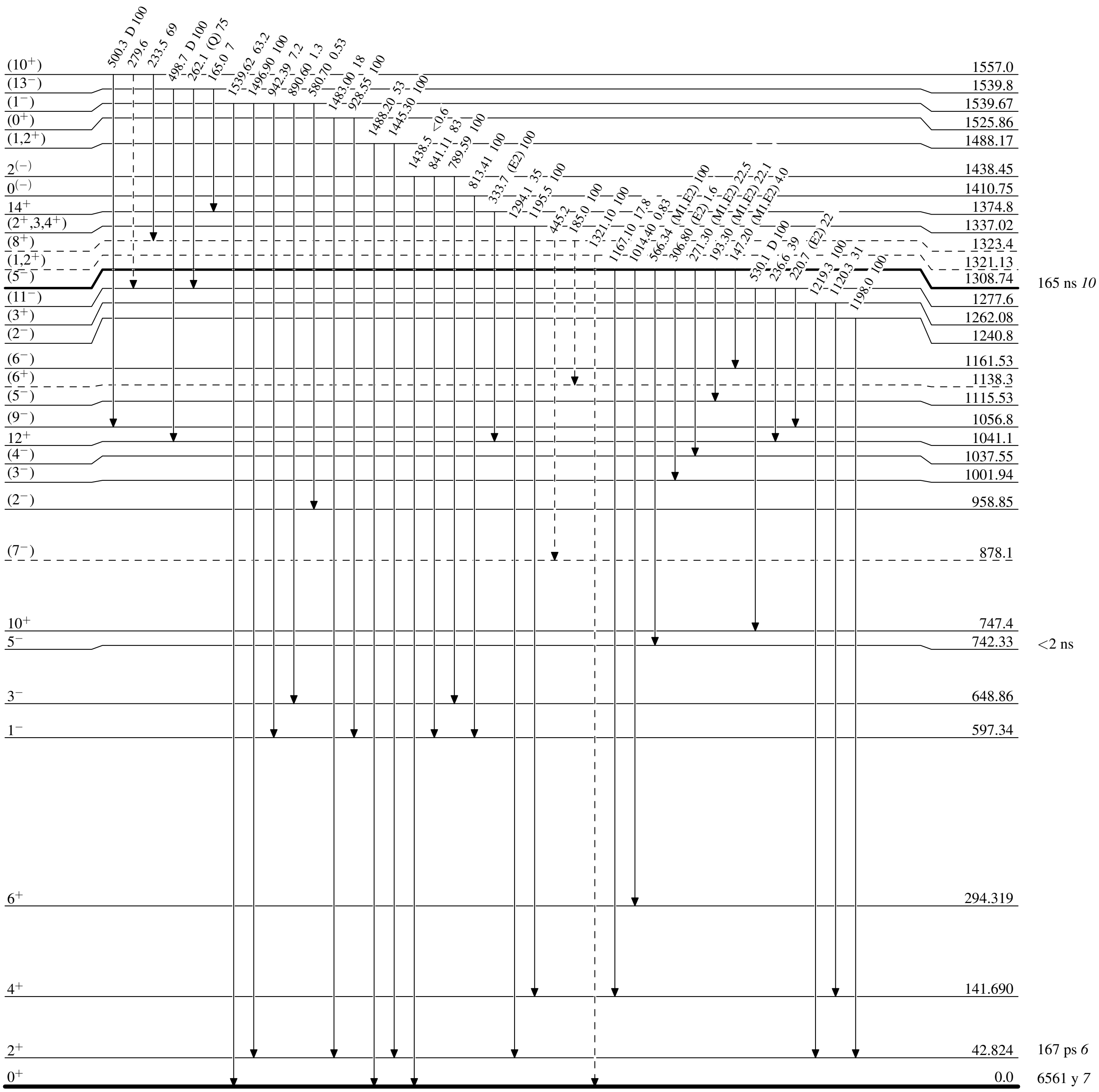
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

γ Decay (Uncertain)

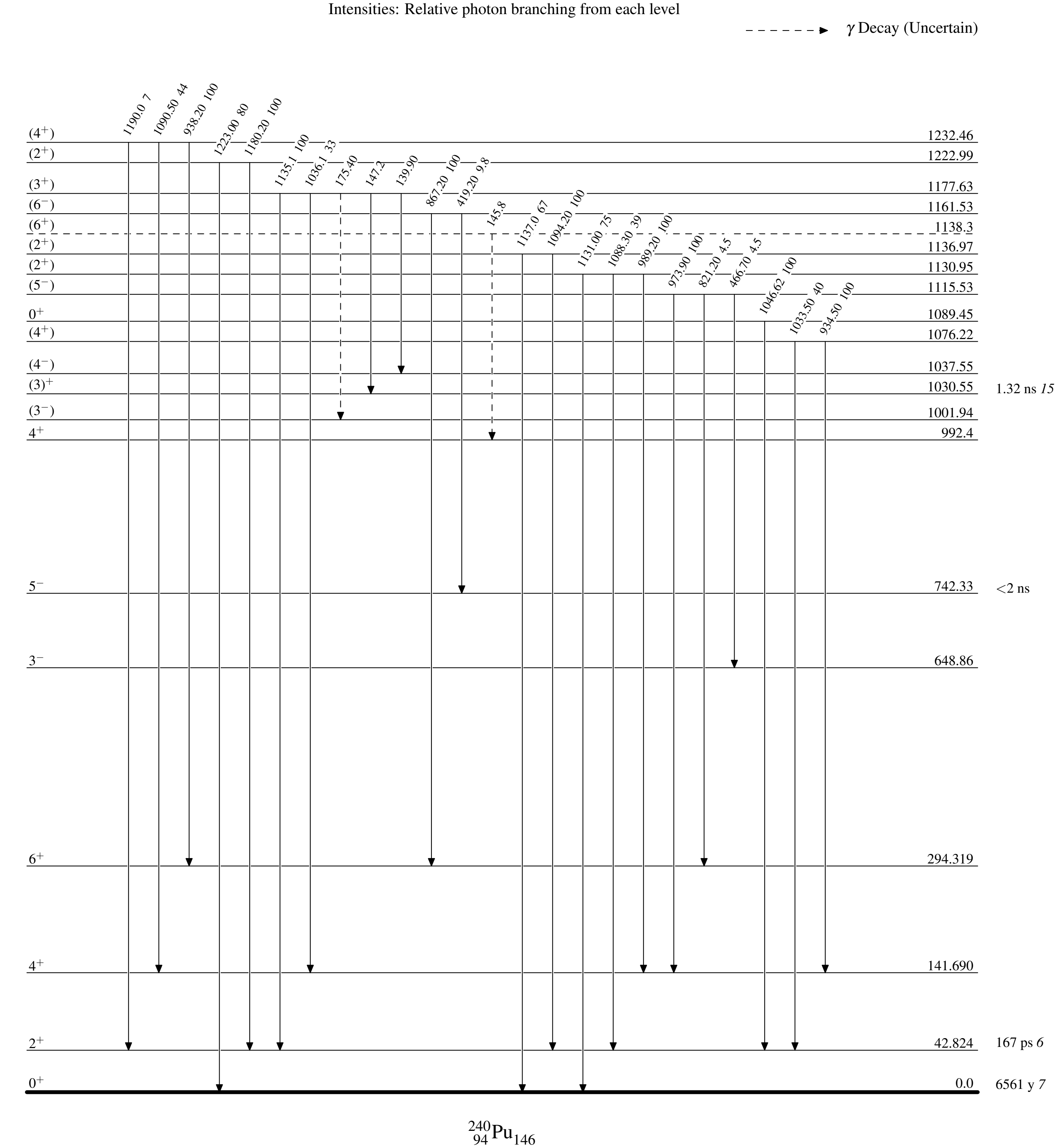


$^{240}_{94}Pu_{146}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

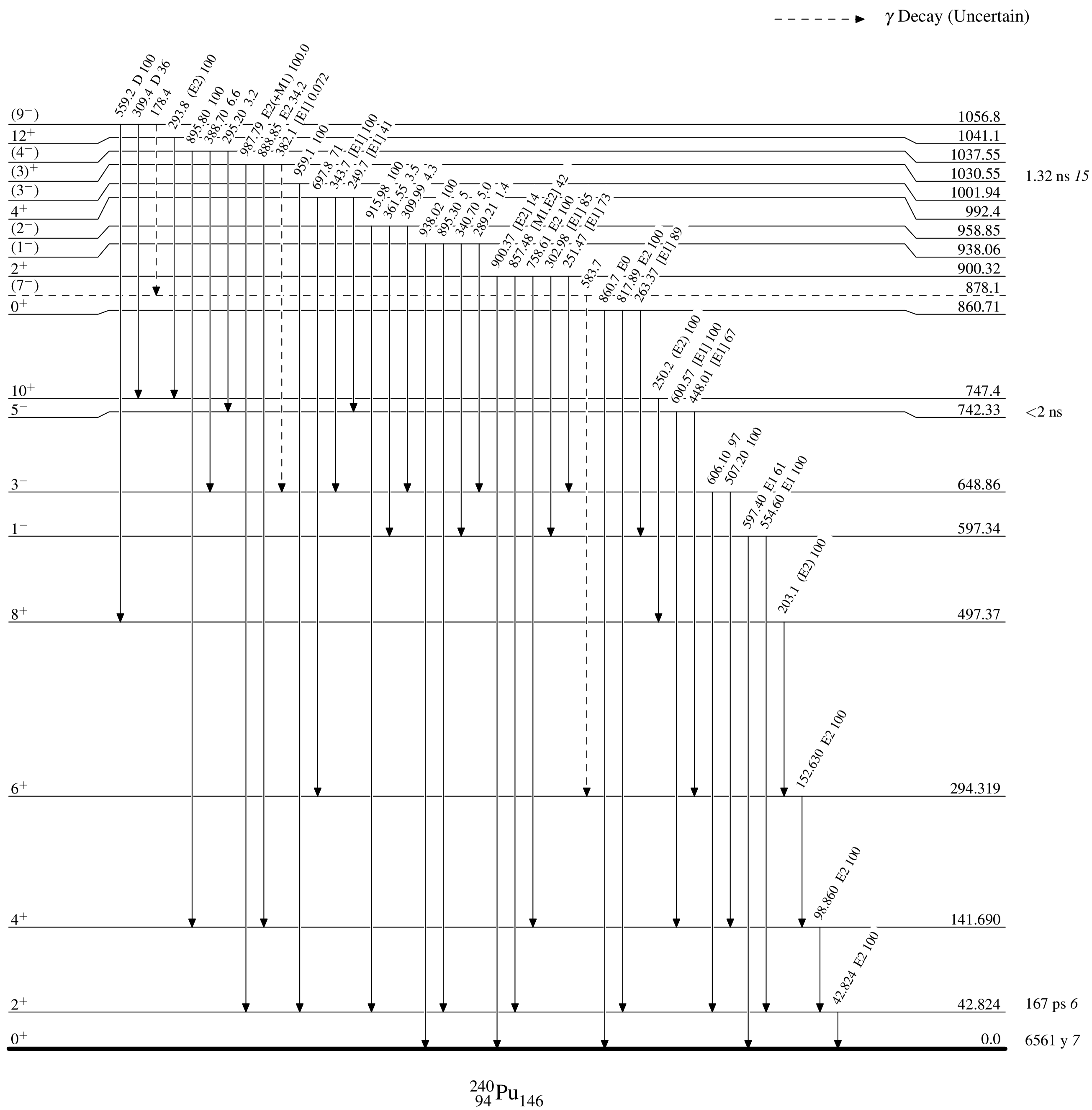


Adopted Levels, Gammas

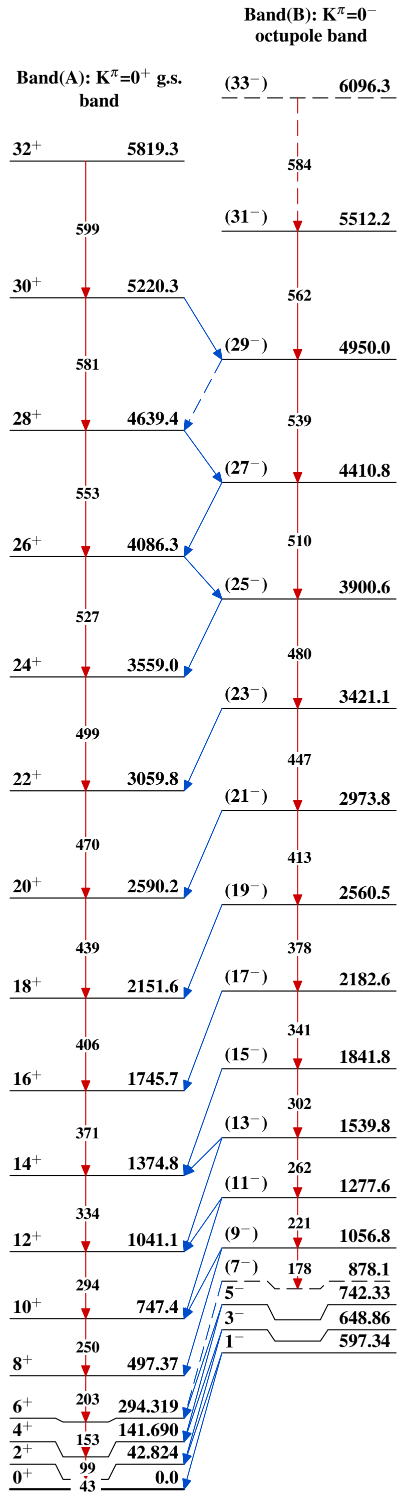
Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

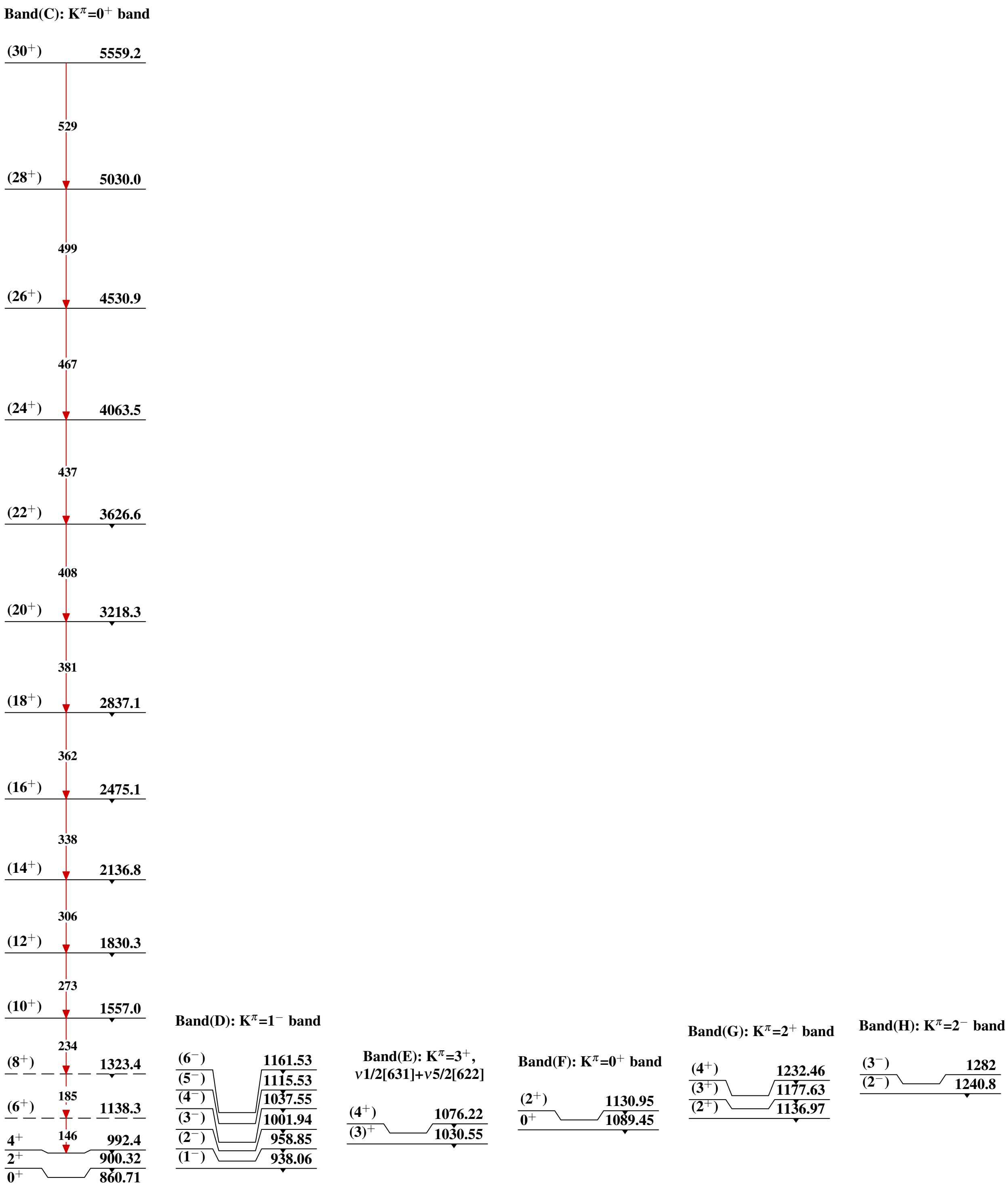


Adopted Levels, Gammas



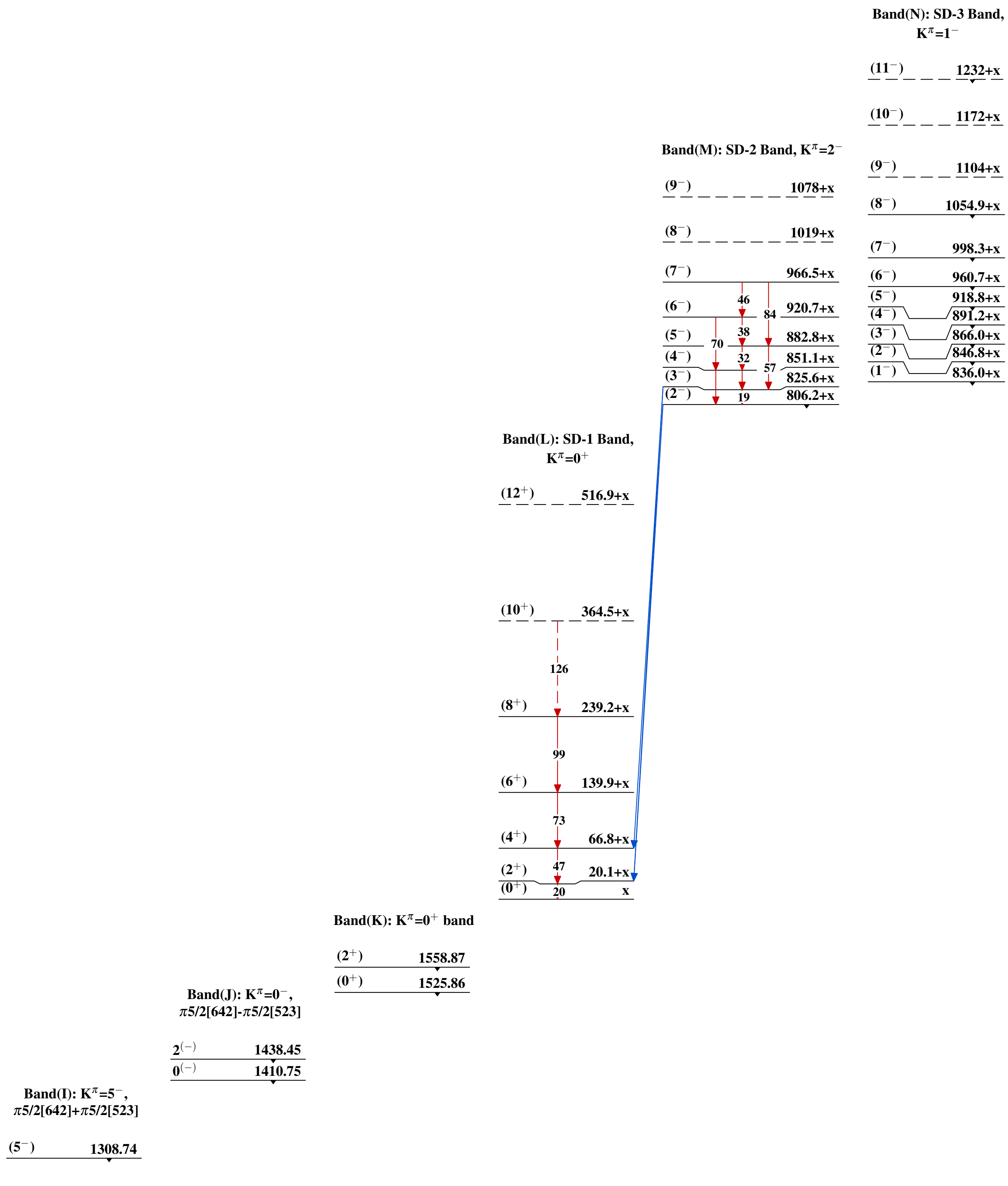
$^{240}_{94}Pu_{146}$

Adopted Levels, Gammas (continued)



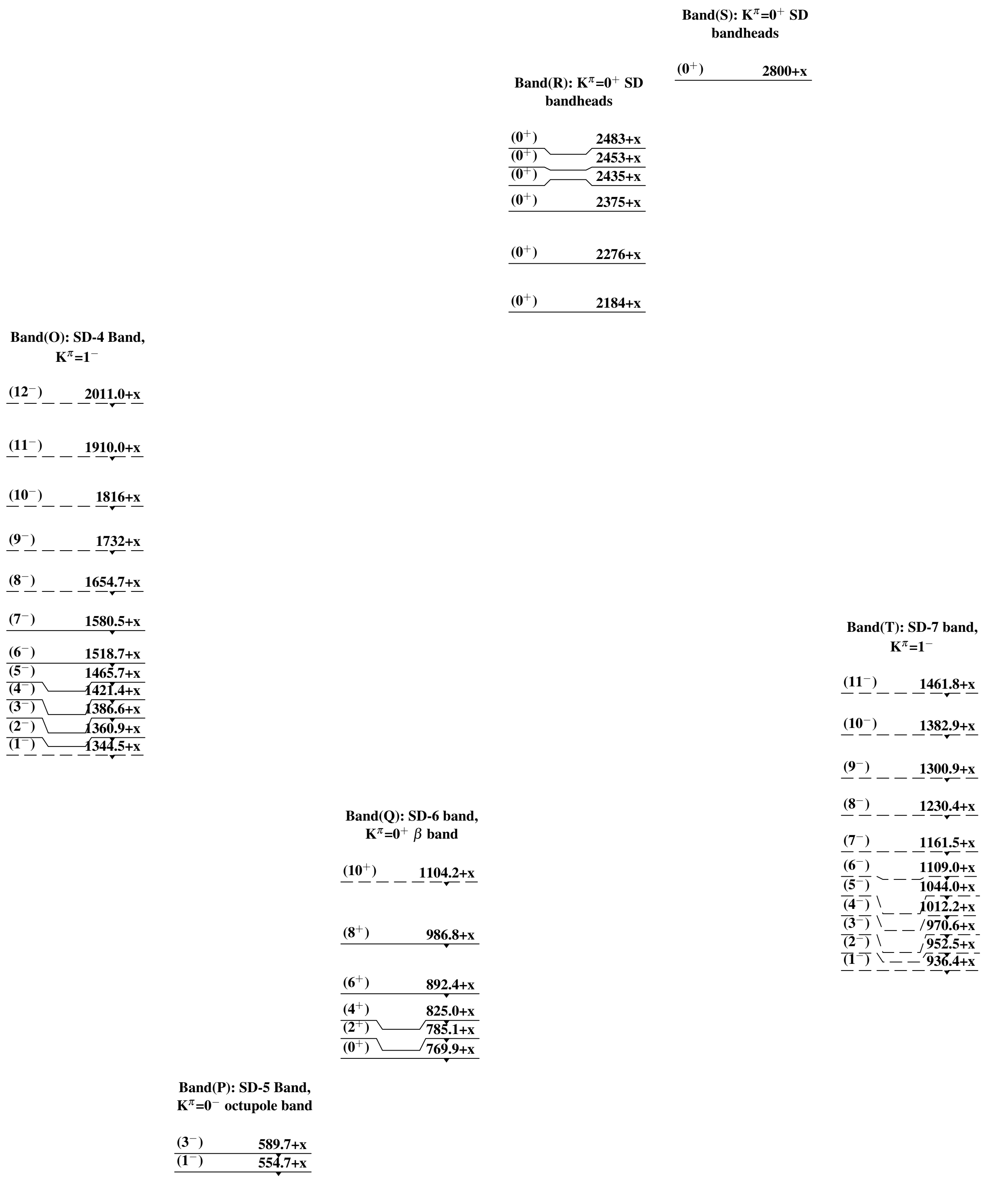
$^{240}_{94}Pu_{146}$

Adopted Levels, Gammas (continued)



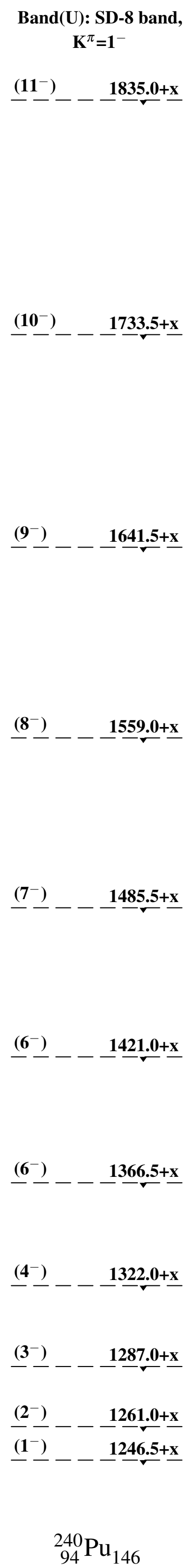
$^{240}_{94}Pu_{146}$

Adopted Levels, Gammas (continued)



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

Adopted Levels, Gammas (continued)



Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	M. J. Martin, C. D. Nesaraja	NDS 186, 261 (2022)	31-Dec-2021

Q(β^-)=−751.1 *7*; S(n)=6309.6 *7*; S(p)=6.89×10^3 *10*; Q(α)=4984.2 *10* 2021Wa16
S(2n)=11551.1 *7*, S(2p)=12576.6 *27* (2021Wa16).

For references on theoretical studies refer to the NSR file at the Web site given in the abstract.

^{242}Pu Levels

Cross Reference (XREF) Flags

A	^{246}Cm α decay	E	Coulomb excitation	I	^{241}Pu(n,γ) E=th:primary γ's
B	^{242}Np β^- decay (2.2 min)	F	^{242}Pu(d,d′)	J	^{241}Pu(n,γ) E=th:secondary γ's
C	^{242}Np β^- decay (5.5 min)	G	^{244}Pu(p,t)		
D	^{242}Am ε decay (16.01 h)	H	^{244}Pu(^{208}Pb,^{210}Pbγ)		

E(level)[b]	J$^{\pi}$[c]	T$_{1/2}$	XREF	Comments
0.0[†]	0$^+$	3.73×10^5 y *2*	ABCDEFGHIJ	%α=100; %SF=5.53×10^{-4} *5* %SF: From the adopted values for T$_{1/2}$(α) and T$_{1/2}$(SF). T$_{1/2}$: Based on the following set of measurements. Standards used by the authors are given in parens and their half-lives have been corrected by the evaluators for newer values of the standards as follows: T$_{1/2}$=87.7 y *1* for ^{238}Pu, 6561 y *7* for ^{240}Pu, and 24110 y *30* for ^{239}Pu. The following values are in units of 10^5 y. T$_{1/2}$=3.65 *5* (^{238}Pu) (1956Bu64), 3.79 *5* (specific activity) (1956Bu92), 3.87 *10* (^{240}Pu) (1956Me37), 3.82 *3* (^{239}Pu) (1969Be06), 3.67 *7* (^{238}Pu) (1970Du02), 3.702 *7* (absolute 4π $\alpha\gamma$ coin and radiometry) (1976Bu23), 3.764 *9* (low-temperature heat capacity) (1976Os05), 3.708 *25* (^{239}Pu) (1978MeZL), 3.742 *24* (^{239}Pu) (1979Ag03), 3.766 *25* (^{238}Pu) (1979Ag03). The value of 1976Os05 was recalculated by the evaluators using E(α)=4984.2 *10*. The authors used 4982.3 *12*. The value given by 1969Be06, 3.823 *16*, has been revised by 1976Bu23. These data give a weighted average of 3.730×10^5 y *12*. The evaluators adopt 3.73×10^5 y *2* with the uncertainty increased to overlap the two values quoted to the highest precision. Others:1950Th54, 1956Hu96. T$_{1/2}$(SF) is based on the following set of measurements, given in units of 10^{10} y. The evaluators have applied the same corrections for the T$_{1/2}$ standards as given in the comment on T$_{1/2}$(α): 6.65 *10* (1956Bu64), 6.79 *9* (1956Me37 as revised by 2000Ho27), 6.74 *5* (1978MeZL), 6.86 *26* (1988SeZY), 6.79 *9* (2005ChZU) 6.74 *9* (2013Sa65), 6.72 *8* (2017Ma07), and 6.77 *5* (2018Be29). The values given for 1956Me37 and 2017Ma07 are based on the adopted value for T$_{1/2}$(α) and the authors′ values of T$_{1/2}$(α)/T$_{1/2}$(SF)= 1.819×10^5 *18* and 1.802×10^5 *18* respectively, These data give a weighted average of 6.748 *28*. The evaluators adopt T$_{1/2}$(SF)=6.75×10^{10} *5* with the uncertainty increased to the smallest of the input values. Others: 6.7 *7* (quoted in 1956Me37), 6.5 *7* (1961Dr04), and 7.45 *17* (1963Ma50). See also recommended value: 6.766 ×10^{10} y *37* (2021Cr02). The intrinsic quadrupole and hexadecapole moments were deduced by 1986Zu01 as Q(0)=11.901 *63* and H(0)=2.08 (12) from measured muonic X-ray data (muons were stopped on a ^{242}Pu target.) From Coulomb excitation, 1973Be44 deduced Q(0)=11.64 *9* and H(0)=1.75 *+71−87*. From the intrinsic quadrupole and hexadecapole moments, the quadrupole and hexadecapole deformation parameters were obtained by 1986Zu01 as β(2)=0.2766 *15* and

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{242}Pu Levels (continued)

E(level)[b]	J^{π}[c]	$T_{1/2}$	XREF	Comments
				$\beta(4)$=0.0498 *52*. The relative isotope shifts between ^{242}Pu and ^{240}Pu, and between ^{242}Pu and ^{244}Pu were measured by 1985Ge08 to be 1.0 and 1.03 *2*, respectively. See also 1989Ru07. Energy distribution and yields of long range alpha particles emitted during spontaneous fission were measured by 1998Se17. Cold fission (without neutron emission) in ^{242}Pu spontaneous fission was observed by 1996Da16. Energy and mass distributions of fission fragments were measured by 1982Al13, 1984Th01, 1989Wa29 and 1997De11. Energy and mass distribution of muon-induced fission fragments were measured by 1987Da22; time distribution of fission fragments from muonic ^{242}Pu was measured by 1980Wi06; energy distribution of fission fragments induced by (t,p) reaction was measured by 1974Ba28, and fission probability was deduced. The prompt gamma-ray spectrum for spontaneous fission was measured by 2018Ch34 and 2016Ob01. The prompt gamma-ray spectrum for neutron-induced fission was measured by 2018Ch34. Fission fragments mass distribution was measured by 2017Hi10 populated in the excitation-energy range from 10 to 60 MeV by multinucleon transfer channels in the reaction ^{18}O + ^{238}U. σ and σ(E) for photo fission were measured by 2000So02. The absolute cross section for neutron-induced fission from 1 to 2.5 MeV was measured by 2017Ma07.
44.545[†] *9*	2^+	160 ps *3*	ABCDEFGHIJ	J^{π}: E2 γ to 0^+. $T_{1/2}$: From B(E2) in Coulomb excitation.
147.4[†] *1*	4^+		ABC EFGHIJ	B(E4)↑=0.55 *+53−41*
306.4[†] *2*	6^+		C EF H J	
518.1[†] *5*	8^+		EF H	
778.6[†] *8*	10^+		E H	
780.45[‡] *5*	1^-		B EF J	J^{π}: From systematics of octupole-vibrational state energies. A ratio of reduced-transition rates of gammas to the g.s. band: B(E1,735.93γ)/B(E1,780.44γ)=2.25 observed in β^- decay agrees with 2.0 from the Alaga rule.
832.3[‡] *3*	3^-		B EF IJ	B(E3)↑=0.42 *7* J^{π}: From excit in Coulomb excitation; gammas to 2^+ and 4^+ levels.
865			F	
927[‡]	5^-[d]		EF	
956[@]	0^+		E G	J^{π}: L(p,t)=0.
992.5[@] *3*	(2^+)		B EFG	J^{π}: Spacing of 36 keV above the 956 0^+ state in (p,t) is suggestive of a rotational band. See 1970Ma29.
1019.5[#] *8*	3^-		EF IJ	B(E3)↑=0.45 *7* J^{π}: From excit in Coulomb excitation.
1039.2 *3*	$(1,2^+)$		B I	J^{π}: Fed from 2^+,3^+ by primary in (n,γ). Possible γ to 0^+.
1064.0 *9*	(4^-)		IJ	J^{π}: Fed from 2^+,3^+ by primary in (n,γ). γ to 4^+. No γ's to 0^+ or 2^+.
1070.8?[‡]	7^-		E	
1084.0[†] *4*	12^+		E H	
1092.1 *2*	(6^+)		C	J^{π}: gammas to 4^+,6^+. 1981Fr07 proposed $J^{\pi}=6^+$ and configuration=(ν5/2[622],ν7/2[624]) similar to the 1040.3-keV level in ^{244}Cm.
1102 *4*	2^+[d]		EFG	B(E2)↑=0.157 *18*
1122[#]	5^-[d]		EF	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{242}Pu Levels (continued)

E(level)[b]	Jπ[c]	$T_{1/2}$	XREF	Comments
1152.5 *13*	(2⁻)		IJ	Jπ: Fed from 2⁺,3⁺ by primary γ in (n,γ). γ to 2⁺; no γ's to 0⁺ or 4⁺.
1154.5 *2*	(2⁺,3⁻)		B	Jπ: γ's to 2⁺ and 4⁺. log*ft*=7.5, log$f^{1u}t$=8.3 from (1⁺).
1181.6 *2*	(2⁺)		B	Jπ: γ's to 0⁺ and 4⁺.
1186.3?[&] *6*	(7⁻)		E	
1204			F	
1242.8[‡] *4*	9⁻		E	
1259			F	
1277.1[#] *4*	7⁻		E	
1357.2? *3*			C	Jπ: by analogy to the 1308.7-keV level in ^{240}Pu, 1981Fr07 proposed a two-proton configuration of 5−(π5/2[642],π5/2[523]). Although this configuration is consistent with a beta branch from a 6+(π5/2[642],ν7/2[624]) parent state, the gamma transition to a 6+(ν5/2[622],ν7/2[624]) state is not. Admixture with two-proton states with large amplitudes would be expected.
1358.7[&] *5*	(9⁻)		E	
1401.0? *2*	(0,1⁺)		B	Jπ: Log*ft*=7.0 from (1⁺) suggests Jπ=0, 1, 2. No γ to 3⁻ implies Jπ=0, 1⁺.
1428.0 *4*	(2⁻)		B	Jπ: log *ft*=7.3 from (1⁺). γ to 2⁺. No γ's to 0⁺. Analogy with 1438.5 level in ^{240}Pu (1979Ha26).
1431.7[†] *16*	14⁺		E H	
1466.8[‡] *4*	11⁻		E	
1478.5[#] *4*	9⁻		E	
1501			F	
1517.6 *1*	(1⁻)		B	Jπ: γ's to 0⁺,2⁺. The ratio of reduced transition intensities of 1517.6 and 1473.1 gammas is in agreement with the Alaga rule for K=0, Jπ=1⁻.
1577.9[&] *4*	(11⁻)		E	
1613			F	
1638			F	
1650	(3⁻)		F	Jπ: Proposed by 1972El08 from (d,d′) data. Assignment is uncertain. B(E3)=0.36 *6* was extracted by 1972El08 from the (d,d′) cross section.
1683			F	
1701			F	
1724.9[#] *4*	11⁻		E	
1733.4[‡] *4*	13⁻		E	
1745.3 *18*			I	
1776			F	
1817.4[†] *4*	16⁺		E H	
1825.8 *10*	(4⁺)		F IJ	Jπ: Fed from 2⁺,3⁺ by primary in (n,γ). γ to 6⁺.
1842.2[&] *4*	(13⁻)		E	
1871.4 *3*			B	
1874.1 *2*			B	
1885.9[@] *4*	(12⁺)		E	
1903.6 *3*			B	
1949.8 *2*	(1,2⁺)		B	Jπ: γ's to 0⁺ and 2⁺.
1969.9 *2*	(1,2⁺)		B	Jπ: γ's to 0⁺ and 2⁺.
1995.7[a] *4*			E	
2000 *CA*		3.5 ns *6*		%SF=? %SF: Only SF decay observed. Assignment: ^{242}Pu(d,pn) excit 1974MeYP. $T_{1/2}$: From 1974MeYP. See 1975Me28 for a review and systematics of fission isomer half-lives. $T_{1/2}$ for SF isomer was calculated by 1972We09 (3.7 ns), 1971Ba30 (30 ns). 1992Bh03 (3.5 ns). $T_{1/2}$ for γ emission was calculated by 1972We09 (3.4 μs). See also

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{242}Pu Levels (continued)

E(level)[b]	J$^{\pi}$[c]	T$_{1/2}$	XREF	Comments
				1974Ba28. E(level): Level energy has not been experimentally determined. The calculated energy of E≈2000 is given here as the level's expected approximate location. Energy of the lowest level in the second minimum of the double-humped nuclear potential was calculated by several authors using various methods: E=2.2 MeV (1970AlZT), 2.2 MeV (1971Ba30), 2.6 MeV (1971Pa33), 2.0 MeV (1972Ma11), 2.0 MeV (1972We09), 2.1 MeV (1992Bh03).
≈2000+x		28 ns		%SF=? %SF: Only SF decay observed. T$_{1/2}$: T$_{1/2}$=50 ns *30* was measured by 1969La14 in ^{241}Pu(13-MeV d,p) reaction. This value was reevaluated by 1970Po01 as T$_{1/2}$=28 ns. E(level): From T$_{1/2}$-systematics of SF isomers in even Pu isotopes, 1975Me28 suggested that this isomer is a level lying higher than the 3.5-ns isomer in the second minimum of the double-humped nuclear potential.
2013.4[#] *4*	13^{-}		E	
2040.6[‡] *4*	15^{-}		E	
2091.8 *20*			IJ	
2147.7[&] *5*	(15^{-})		E	
2170.8[@] *4*	(14^{+})		E	
2237.5[†] *4*	18^{+}		E H	
2246.0 *4*	(1,2^{+})		B	J$^{\pi}$: γ's to 0^{+},2^{+}.
2289.5[a] *4*			E	
2331.3 *2*	(2^{+})		B	J$^{\pi}$: Log*ft*=4.9 for β^{-} feeding from (1^{+}) gives J^{π}=(0^{+},1^{+},2^{+}). 1979Ha26 proposed a 2^{+} two-proton state with configuration (π 5/2[642],π 9/2[624]).
2339.5[#] *4*	15^{-}		E	
2386.9[‡] *4*	17^{-}		E	
2437.5 *21*			I	
2483.6[@] *4*	(16^{+})		E	
2494.7[&] *5*	(17^{-})		E	
2616.8[a] *5*			E	
2688.6[†] *5*	20^{+}		E H	
2707.1[#] *5*	17^{-}		E	
2769.3[‡] *5*	19^{-}		E	
2806.8[@] *4*	(18^{+})		E	
2879.2[&] *5*	(19^{-})		E	
2979.4[a] *5*			E	
3106.5[#] *5*	19^{-}		E	
3142.1[@] *4*	(20^{+})		E	
3167.2[†] *5*	22^{+}		E H	
3185.1[‡] *5*	21^{-}		E	
3297.5[&] *6*	(21^{-})		E	
3374.3[a] *6*			E	
3509.5[@] *5*	(22^{+})		E	
3538.5[#] *5*	21^{-}		E	
3631.0[‡] *5*	23^{-}		E	
3667.7[†] *5*	24^{+}		E H	
3747.2[&] *7*	(23^{-})		E	
3799.6?[a] *8*			E	
3915.0[@] *5*	(24^{+})		E	

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Adopted Levels, Gammas (continued)

^{242}Pu Levels (continued)

E(level)[b]	J^{π}[c]	XREF	E(level)[b]	J^{π}[c]	XREF	E(level)[b]	J^{π}[c]	XREF
4000.5[#] *7*	23^-	E	4368.0[@] *6*	(26^+)	E	5201.2[†] *11*	30^+	E
4103.6[‡] *5*	25^-	E	4599.4[‡] *7*	27^-	E	5648.4[‡] *9*	31^-	E
4180.2[†] *6*	26^+	E H	4691.2[†] *8*	28^+	E	5723.9[†] *11*	32^+	E
4221.5[&] *8*	(25^-)	E	5117.0[‡] *8*	29^-	E			

[†] Band(A): $K^{\pi}=0^+$ g.s. band.
[‡] Band(B): $K^{\pi}=0^-$ Octupole-vibrational band.
[#] Band(C): $K^{\pi}=3^-$ band.
[@] Seq.(F): $K^{\pi}=0^+$ band.
[&] Band(D): K^{π}=? band.
[a] Band(E): K^{π}=? band.
[b] From a least-squares fit to the adopted gamma energies except where noted otherwise as indicated by the XREF column.
[c] Except where noted otherwise, the assignments come from Coulomb excitation based on assigned band structure. The gs, $K^{\pi}=0^-$, $K^{\pi}=3^-$, and $K^{\pi}=0^+$ bands have well-established intra-band Q transitions and several inter-band D transitions. The two K^{π}=? side bands are tentative since transitions connecting them to possible bandheads are not seen. Assignments for the gs band up to $J^{\pi}=26^+$ are confirmed by 1983Sp03 from the systematic impact-parameter dependence of the Iγ yields, particle-γ directional correlation, and from γ multiplicity measurements,
[d] From (d,d′) based on intensity patterns and ratios of cross sections at θ=90° and θ=125°.

$\gamma(^{242}Pu)$

E_i(level)	J_i^{π}	E_{γ}[‡]	I_{γ}[‡#]	E_f	J_f^{π}	Mult.	α[†]	Comments
44.545	2^+	44.545 *9*	100	0.0	0^+	E2	748 *10*	B(E2)(W.u.)=301 *14* α(L)=543 *8*; α(M)=151.5 *21* α(N)=41.6 *6*; α(O)=9.78 *14*; α(P)=1.529 *21*; α(Q)=0.00328 *5* Mult.: From ce data in 16.01-h ^{242}Am ε decay.
147.4	4^+	102.8 *1*	100	44.545	2^+	(E2)[@]	13.88 *20*	α(L)=10.07 *15*; α(M)=2.82 *4* α(N)=0.775 *11*; α(O)=0.1827 *27*; α(P)=0.0291 *4*; α(Q)=0.0001056 *15*
306.4	6^+	159.1 *1*	100	147.4	4^+	(E2)[@]	2.098 *30*	α(K)=0.1921 *27*; α(L)=1.384 *20*; α(M)=0.386 *6* α(N)=0.1062 *15*; α(O)=0.0251 *4*; α(P)=0.00406 *6*; α(Q)=2.430×10^{-5} *34*
518.1	8^+	211.3 *2*	100	306.4	6^+	(E2)[@]	0.696 *10*	α(K)=0.1388 *20*; α(L)=0.406 *6*; α(M)=0.1125 *16* α(N)=0.0309 *5*; α(O)=0.00732 *11*; α(P)=0.001201 *17*; α(Q)=1.077×10^{-5} *15*
778.6	10^+	260.7 *2*	100	518.1	8^+	(E2)[@]	0.333 *5*	α(K)=0.0987 *14*; α(L)=0.1706 *24*; α(M)=0.0470 *7* α(N)=0.01290 *19*; α(O)=0.00307 *4*; α(P)=0.000509 *7*; α(Q)=6.24×10^{-6} *9*
780.45	1^-	735.93 *7*	100	44.545	2^+			
		780.44 *5*	53 *1*	0.0	0^+			
832.3	3^-	685.0 *1*	100 *14*	147.4	4^+			
		787.8	113 *CA*	44.545	2^+			E_{γ}: From (n,γ). Transition is obscured in 2.2-min ^{242}Np β- decay.
992.5	(2^+)	948.0 *2*	100	44.545	2^+			

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Adopted Levels, Gammas (continued)

$\gamma(^{242}Pu)$ (continued)

E_i(level)	J^π_i	E_γ[‡]	I_γ[‡#]	E_f	J^π_f	Mult.	α[†]	Comments
1019.5	3^-	974.9	100	44.545	2^+			
1039.2	$(1,2^+)$	1039.2[ef] *3*	100[e]	0.0	0^+			E_γ: $E\gamma$=1039.9 *14* from (n,γ): E=primary. I_γ: The 1871.4 level, the parent of the alternate placement, is not populated in (n,γ).
1064.0	(4^-)	915.7	100	147.4	4^+			
1070.8?	7^-	143.8 *10*	100	927	5^-			
		553.7 *2*	100	518.1	8^+			
		765.0 *2*	100 *14*	306.4	6^+			
1084.0	12^+	306.2 *2*	100	778.6	10^+	(E2)[@]	0.1985 *28*	α(K)=0.0745 *10*; α(L)=0.0906 *13*; α(M)=0.02476 *35* α(N)=0.00680 *10*; α(O)=0.001619 *23*; α(P)=0.000272 *4*; α(Q)=4.21×10^{-6} *6*
1092.1	(6^+)	785.7 *1*	100	306.4	6^+			
		944.8 *1*	63 *3*	147.4	4^+			
1152.5	(2^-)	1105.6	100	44.545	2^+			
1154.5	$(2^+,3^-)$	1007.3 *2*	43 *8*	147.4	4^+			
		1110.0 *2*	100 *15*	44.545	2^+			
1181.6	(2^+)	1034.2 *2*	22 *4*	147.4	4^+			
		1137.1 *1*	100 *4*	44.545	2^+			I_γ: 1979Ha26 in 2.2-min β decay point out that $I\gamma$ relative to the other intensities deexciting the 1181.6 level is much higher than expected based on the Alaga rule. They suggest that the 1137.1γ might be a doublet with a second and stronger component as yet unplaced.
		1181.6 *2*	12 *2*	0.0	0^+			
1186.3?	(7^-)	880.5[f] *5*	100	306.4	6^+			
1242.8	9^-	172.0[f] *5*	38 *32*	1070.8?	7^-			
		465.0 *5*	77 *42*	778.6	10^+			
		725.7 *2*	100 *24*	518.1	8^+	(E1)[&]	0.00714 *10*	α(K)=0.00578 *8*; α(L)=0.001026 *14*; α(M)=0.0002455 *34* α(N)=6.64×10^{-5} *9*; α(O)=1.640×10^{-5} *23*; α(P)=3.05×10^{-6} *4*; α(Q)=1.856×10^{-7} *26*
1277.1	7^-	760.0 *5*	<510	518.1	8^+			
		971.3 *5*	100 *34*	306.4	6^+	(E1)[&]	0.00426 *6*	α(K)=0.00347 *5*; α(L)=0.000599 *8*; α(M)=0.0001429 *20* α(N)=3.86×10^{-5} *5*; α(O)=9.57×10^{-6} *13*; α(P)=1.794×10^{-6} *25*; α(Q)=1.129×10^{-7} *16*
1357.2?		265.1 *1*	100	1092.1	(6^+)			
1358.7	(9^-)	172.4 *4*	92 *62*	1186.3?	(7^-)			
		841.6 *5*	100 *46*	518.1	8^+	(D)[&]		
1401.0?	$(0,1^+)$	620.6 *1*	100	780.45	1^-			
1428.0	(2^-)	647.4 *3*	100 *10*	780.45	1^-			
		1383.6 *4*	45 *19*	44.545	2^+			
1431.7	14^+	347.7 *2*	100	1084.0	12^+	(E2)[@]	0.1360 *19*	α(K)=0.0593 *8*; α(L)=0.0561 *8*; α(M)=0.01523 *22* α(N)=0.00418 *6*; α(O)=0.000998 *14*; α(P)=0.0001691 *24*; α(Q)=3.13×10^{-6} *4*
1466.8	11^-	224.0 *3*	39 *26*	1242.8	9^-	(E2)[@]	0.563 *8*	α(K)=0.1269 *18*; α(L)=0.318 *5*;

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Adopted Levels, Gammas (continued)

$\gamma(^{242}Pu)$ (continued)

E_i(level)	J^π_i	E_γ[‡]	I_γ[‡#]	E_f	J^π_f	Mult.	α[†]	Comments
								α(M)=0.0879 *13* α(N)=0.0242 *4*; α(O)=0.00573 *9*; α(P)=0.000942 *14*; α(Q)=9.21×10^{-6} *13*
1466.8	11$^-$	382.8 *2*	26 *21*	1084.0	12$^+$			
		689.0 *2*	100 *19*	778.6	10$^+$	(E1)[&]	0.00785 *11*	α(K)=0.00635 *9*; α(L)=0.001133 *16*; α(M)=0.000271 *4* α(N)=7.34×10^{-5} *10*; α(O)=1.811×10^{-5} *25*; α(P)=3.37×10^{-6} *5*; α(Q)=2.032×10^{-7} *28*
1478.5	9$^-$	201.4 *3*	30 *11*	1277.1	7$^-$	(E2)[@]	0.832 *13*	α(K)=0.1489 *21*; α(L)=0.497 *8*; α(M)=0.1380 *21* α(N)=0.0379 *6*; α(O)=0.00898 *14*; α(P)=0.001470 *23*; α(Q)=1.228×10^{-5} *18*
		700.7 *4*	100 *91*	778.6	10$^+$			
		961.4 *4*	44 *13*	518.1	8$^+$	(E1)[&]	0.00434 *6*	α(K)=0.00353 *5*; α(L)=0.000610 *9*; α(M)=0.0001456 *20* α(N)=3.94×10^{-5} *6*; α(O)=9.75×10^{-6} *14*; α(P)=1.827×10^{-6} *26*; α(Q)=1.148×10^{-7} *16*
1517.6	(1$^-$)	1473.1 *1*	100 *3*	44.545	2$^+$			
		1517.6 *1*	53 *3*	0.0	0$^+$			
1577.9	(11$^-$)	219.2 *3*	100 *37*	1358.7	(9$^-$)	(E2)[@]	0.609 *9*	α(K)=0.1313 *19*; α(L)=0.348 *5*; α(M)=0.0963 *15* α(N)=0.0265 *4*; α(O)=0.00627 *10*; α(P)=0.001031 *16*; α(Q)=9.76×10^{-6} *14*
		800.1 *2*	84 *16*	778.6	10$^+$			
1724.9	11$^-$	246.4 *2*	20 *8*	1478.5	9$^-$	(E2)[@]	0.403 *6*	α(K)=0.1086 *15*; α(L)=0.2144 *31*; α(M)=0.0592 *9* α(N)=0.01625 *23*; α(O)=0.00386 *6*; α(P)=0.000638 *9*; α(Q)=7.19×10^{-6} *10*
		640.9 *3*	100 *70*	1084.0	12$^+$	(E1)[&]	0.00897 *13*	α(K)=0.00725 *10*; α(L)=0.001303 *18*; α(M)=0.000312 *4* α(N)=8.44×10^{-5} *12*; α(O)=2.083×10^{-5} *29*; α(P)=3.87×10^{-6} *5*; α(Q)=2.309×10^{-7} *32*
		947.1 *2*	49 *12*	778.6	10$^+$	(E1)[&]	0.00445 *6*	α(K)=0.00362 *5*; α(L)=0.000627 *9*; α(M)=0.0001496 *21* α(N)=4.05×10^{-5} *6*; α(O)=1.001×10^{-5} *14*; α(P)=1.877×10^{-6} *26*; α(Q)=1.177×10^{-7} *16*
1733.4	13$^-$	266.6 *2*	100 *46*	1466.8	11$^-$	(E2)[@]	0.309 *4*	α(K)=0.0950 *13*; α(L)=0.1560 *22*; α(M)=0.0429 *6* α(N)=0.01178 *17*; α(O)=0.00280 *4*; α(P)=0.000466 *7*; α(Q)=5.90×10^{-6} *8*
		301.7 *2*	30 *20*	1431.7	14$^+$			
		649.4 *2*	93 *16*	1084.0	12$^+$	(E1)[&]	0.00876 *12*	α(K)=0.00708 *10*; α(L)=0.001270 *18*; α(M)=0.000304 *4* α(N)=8.23×10^{-5} *12*; α(O)=2.030×10^{-5} *28*; α(P)=3.77×10^{-6} *5*; α(Q)=2.255×10^{-7} *32*
1817.4	16$^+$	385.7 *2*	100	1431.7	14$^+$	(E2)[@]	0.1017 *14*	α(K)=0.0492 *7*; α(L)=0.0385 *5*; α(M)=0.01039 *15* α(N)=0.00285 *4*; α(O)=0.000682 *10*; α(P)=0.0001165 *16*; α(Q)=2.474×10^{-6} *35*
1825.8	(4$^+$)	1518.6	100	306.4	6$^+$			
1842.2	(13$^-$)	264.3 *3*	100 *62*	1577.9	(11$^-$)	(E2)[@]	0.318 *5*	α(K)=0.0964 *14*; α(L)=0.1615 *24*; α(M)=0.0444 *7*

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Adopted Levels, Gammas (continued)

$\gamma(^{242}Pu)$ (continued)

E_i(level)	J^π_i	E_γ[‡]	I_γ[‡#]	E_f	J^π_f	Mult.	α[†]	Comments
								α(N)=0.01220 *18*; α(O)=0.00290 *4*; α(P)=0.000482 *7*; α(Q)=6.03×10^{-6} *9*
1842.2	(13^-)	758.2 *3*	65 *16*	1084.0	12^+			
1871.4		1039.2[e] *3*	≤96[e]	832.3	3^-			
		1826.9 *3*	100 *22*	44.545	2^+			
1874.1		1093.5 *1*	100 *9*	780.45	1^-			
		1874.5 *3*	22 *5*	0.0	0^+			
1885.9	(12^+)	801.9 *2*	100 *34*	1084.0	12^+			
		1108.1 *4*	67 *25*	778.6	10^+			
1903.6		1123.1 *2*	45 *9*	780.45	1^-			
		1859.2 *3*	100 *5*	44.545	2^+			
1949.8	($1,2^+$)	1905.1 *2*	37 *4*	44.545	2^+			
		1949.9 *2*	100 *4*	0.0	0^+			
1969.9	($1,2^+$)	1925.4 *2*	43 *5*	44.545	2^+			
		1969.9 *2*	100 *5*	0.0	0^+			
1995.7		911.7 *3*		1084.0	12^+			
		1217.9 *3*		778.6	10^+			
2013.4	13^-	288.5 *2*	32 *30*	1724.9	11^-	(E2)[@b]	0.2392 *34*	α(K)=0.0828 *12*; α(L)=0.1141 *16*; α(M)=0.0313 *4* α(N)=0.00859 *12*; α(O)=0.002044 *29*; α(P)=0.000342 *5*; α(Q)=4.86×10^{-6} *7*
		929.4 *2*	100 *18*	1084.0	12^+	(E1)[&]	0.00460 *6*	α(K)=0.00374 *5*; α(L)=0.000649 *9*; α(M)=0.0001548 *22* α(N)=4.19×10^{-5} *6*; α(O)=1.036×10^{-5} *15*; α(P)=1.942×10^{-6} *27*; α(Q)=1.215×10^{-7} *17*
2040.6	15^-	223.2 *4*	8.3 *47*	1817.4	16^+			
		307.2 *2*	100 *34*	1733.4	13^-	(E2)[@]	0.1965 *28*	α(K)=0.0740 *10*; α(L)=0.0895 *13*; α(M)=0.02445 *35* α(N)=0.00671 *10*; α(O)=0.001599 *23*; α(P)=0.000268 *4*; α(Q)=4.18×10^{-6} *6*
		608.9 *2*	36 *6*	1431.7	14^+	(E1)[&]	0.00987 *14*	α(K)=0.00797 *11*; α(L)=0.001440 *20*; α(M)=0.000345 *5* α(N)=9.34×10^{-5} *13*; α(O)=2.303×10^{-5} *32*; α(P)=4.27×10^{-6} *6*; α(Q)=2.530×10^{-7} *35*
2091.8		941.1[f]	100	1152.5	(2^-)			
2147.7	(15^-)	305.35 *3*	<580	1842.2	(13^-)			
		716.0 *4*	100 *29*	1431.7	14^+			
2170.8	(14^+)	284.9 *3*	100 *54*	1885.9	(12^+)	(E2)[@]	0.249 *4*	α(K)=0.0846 *12*; α(L)=0.1199 *18*; α(M)=0.0329 *5* α(N)=0.00903 *13*; α(O)=0.002148 *31*; α(P)=0.000359 *5*; α(Q)=5.01×10^{-6} *7*
		739.1 *2*	67 *20*	1431.7	14^+	(M1+E2)[ac]	0.06 *4*	α(K)=0.049 *33*; α(L)=0.011 *5*; α(M)=0.0026 *13* α(N)=7.0×10^{-4} *35*; α(O)=1.7×10^{-4} *9*;

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Adopted Levels, Gammas (continued)

$\gamma(^{242}Pu)$ (continued)

E_i(level)	J^π_i	E_γ‡	I_γ‡#	E_f	J^π_f	Mult.	α†	Comments
								α(P)=3.3×10^{-5} *17*; α(Q)=1.9×10^{-6} *13*
2170.8	(14$^+$)	1086.8 *2*	80 *27*	1084.0	12$^+$	(E2)@b	0.01056 *15*	α(K)=0.00795 *11*; α(L)=0.001947 *27*; α(M)=0.000486 *7* α(N)=0.0001322 *19*; α(O)=3.25×10^{-5} *5*; α(P)=5.98×10^{-6} *8*; α(Q)=3.08×10^{-7} *4*
2237.5	18$^+$	420.1 *2*	100	1817.4	16$^+$	(E2)@	0.0811 *11*	α(K)=0.0422 *6*; α(L)=0.0286 *4*; α(M)=0.00766 *11* α(N)=0.002098 *30*; α(O)=0.000503 *7*; α(P)=8.66×10^{-5} *12*; α(Q)=2.048×10^{-6} *29*
2246.0	(1,2$^+$)	2201.6 *5*	100 *25*	44.545	2$^+$			
		2246.0 *5*	75 *25*	0.0	0$^+$			
2289.5		293.8 *3*		1995.7				
		1205.5 *3*		1084.0	12$^+$			
2331.3	(2$^+$)	813.6 *1*	100 *9*	1517.6	(1$^-$)			
		1550.9 *1*	29 *5*	780.45	1$^-$			
2339.5	15$^-$	326.1 *2*	71 *43*	2013.4	13$^-$	(E2)@b	0.1640 *23*	α(K)=0.0665 *9*; α(L)=0.0713 *10*; α(M)=0.01942 *28* α(N)=0.00533 *8*; α(O)=0.001271 *18*; α(P)=0.0002143 *30*; α(Q)=3.63×10^{-6} *5*
		907.8 *3*	100 *24*	1431.7	14$^+$	(E1)&d	0.00479 *7*	α(K)=0.00390 *5*; α(L)=0.000677 *9*; α(M)=0.0001616 *23* α(N)=4.37×10^{-5} *6*; α(O)=1.082×10^{-5} *15*; α(P)=2.025×10^{-6} *28*; α(Q)=1.265×10^{-7} *18*
2386.9	17$^-$	149.4 *4*	<3.0	2237.5	18$^+$			
		346.3 *2*	100 *50*	2040.6	15$^-$	(E2)@	0.1376 *19*	α(K)=0.0597 *8*; α(L)=0.0569 *8*; α(M)=0.01546 *22* α(N)=0.00424 *6*; α(O)=0.001013 *14*; α(P)=0.0001716 *24*; α(Q)=3.16×10^{-6} *4*
		569.5 *2*	28 *10*	1817.4	16$^+$	(E1)&	0.01121 *16*	α(K)=0.00903 *13*; α(L)=0.001644 *23*; α(M)=0.000395 *6* α(N)=0.0001068 *15*; α(O)=2.63×10^{-5} *4*; α(P)=4.86×10^{-6} *7*; α(Q)=2.85×10^{-7} *4*
2483.6	(16$^+$)	312.8 *3*	84 *37*	2170.8	(14$^+$)	(E2)@b	0.1860 *27*	α(K)=0.0717 *10*; α(L)=0.0835 *12*; α(M)=0.02280 *33* α(N)=0.00626 *9*; α(O)=0.001491 *22*; α(P)=0.000251 *4*; α(Q)=4.00×10^{-6} *6*
		666.2 *4*	47 *16*	1817.4	16$^+$			
		1051.9 *2*	100 *21*	1431.7	14$^+$	(E2)@	0.01122 *16*	α(K)=0.00841 *12*; α(L)=0.002101 *29*; α(M)=0.000525 *7* α(N)=0.0001430 *20*; α(O)=3.51×10^{-5} *5*; α(P)=6.45×10^{-6} *9*; α(Q)=3.27×10^{-7} *5*
2494.7	(17$^-$)	347.0 *3*	<1143	2147.7	(15$^-$)			
		677.3 *5*	100 *43*	1817.4	16$^+$			
2616.8		327.3 *3*		2289.5				
		1185.1 *4*		1431.7	14$^+$			
2688.6	20$^+$	451.1 *2*	100	2237.5	18$^+$	(E2)@	0.0676 *9*	α(K)=0.0371 *5*; α(L)=0.02243 *32*; α(M)=0.00598 *8* α(N)=0.001639 *23*; α(O)=0.000394 *6*; α(P)=6.81×10^{-5} *10*; α(Q)=1.755×10^{-6} *25*
2707.1	17$^-$	367.6 *2*	100 *44*	2339.5	15$^-$			

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Adopted Levels, Gammas (continued)

$\gamma(^{242}Pu)$ (continued)

E_i(level)	J^π_i	E_γ[‡]	I_γ[‡#]	E_f	J^π_f	Mult.	α[†]	Comments
2707.1	17^-	889.7 *4*	37 *10*	1817.4	16^+			
2769.3	19^-	382.4 *3*	100 *29*	2386.9	17^-	(E2)[@]	0.1041 *15*	α(K)=0.0499 *7*; α(L)=0.0397 *6*; α(M)=0.01072 *15* α(N)=0.00294 *4*; α(O)=0.000703 *10*; α(P)=0.0001201 *17*; α(Q)=2.52×10^{-6} *4*
		531.8 *2*	55 *9*	2237.5	18^+	(E1)[&]	0.01278 *18*	α(K)=0.01028 *14*; α(L)=0.001887 *26*; α(M)=0.000454 *6* α(N)=0.0001226 *17*; α(O)=3.02×10^{-5} *4*; α(P)=5.57×10^{-6} *8*; α(Q)=3.23×10^{-7} *5*
2806.8	(18^+)	323.2 *2*	83 *29*	2483.6	(16^+)	(E2)[@b]	0.1685 *24*	α(K)=0.0676 *9*; α(L)=0.0737 *10*; α(M)=0.02010 *29* α(N)=0.00551 *8*; α(O)=0.001315 *19*; α(P)=0.0002216 *31*; α(Q)=3.71×10^{-6} *5*
		569.3 *3*		2237.5	18^+			
		989.4 *2*	100 *21*	1817.4	16^+			
2879.2	(19^-)	384.5 *3*		2494.7	(17^-)			
		641.7 *5*		2237.5	18^+			
2979.4		362.6 *3*		2616.8				
		1162.0 *4*		1817.4	16^+			
3106.5	19^-	399.4 *3*		2707.1	17^-			
		869.0 *4*		2237.5	18^+			
3142.1	(20^+)	335.3 *2*	46 *26*	2806.8	(18^+)	(E2)[@b]	0.1511 *21*	α(K)=0.0633 *9*; α(L)=0.0642 *9*; α(M)=0.01747 *25* α(N)=0.00479 *7*; α(O)=0.001144 *16*; α(P)=0.0001933 *27*; α(Q)=3.40×10^{-6} *5*
		453.5 *3*		2688.6	20^+			
		904.6 *2*	100 *23*	2237.5	18^+			
3167.2	22^+	478.6 *2*	100	2688.6	20^+	(E2)[@]	0.0584 *8*	α(K)=0.0334 *5*; α(L)=0.01844 *26*; α(M)=0.00490 *7* α(N)=0.001341 *19*; α(O)=0.000323 *5*; α(P)=5.61×10^{-5} *8*; α(Q)=1.547×10^{-6} *22*
3185.1	21^-	415.8 *2*	100 *42*	2769.3	19^-	(E2)[@]	0.0833 *12*	α(K)=0.0429 *6*; α(L)=0.0296 *4*; α(M)=0.00794 *11* α(N)=0.002176 *31*; α(O)=0.000522 *7*; α(P)=8.97×10^{-5} *13*; α(Q)=2.095×10^{-6} *29*
		496.5 *2*	28 *5*	2688.6	20^+	(E1)[&]	0.01460 *20*	α(K)=0.01173 *16*; α(L)=0.002172 *30*; α(M)=0.000523 *7* α(N)=0.0001413 *20*; α(O)=3.47×10^{-5} *5*; α(P)=6.40×10^{-6} *9*; α(Q)=3.67×10^{-7} *5*
3297.5	(21^-)	418.3 *3*	100	2879.2	(19^-)			
3374.3		394.9 *4*	100	2979.4				
3509.5	(22^+)	367.4 *2*		3142.1	(20^+)			
		820.9 *3*		2688.6	20^+			
3538.5	21^-	432.0 *3*		3106.5	19^-			
		849.9 *4*		2688.6	20^+			
3631.0	23^-	445.9 *2*	100 *50*	3185.1	21^-	(E2)[@]	0.0696 *10*	α(K)=0.0379 *5*; α(L)=0.02332 *33*; α(M)=0.00623 *9* α(N)=0.001705 *24*; α(O)=0.000410 *6*; α(P)=7.08×10^{-5} *10*; α(Q)=1.800×10^{-6} *25*
		463.8 *3*	14 *5*	3167.2	22^+			
3667.7	24^+	500.5 *2*	100	3167.2	22^+	(E2)[@]	0.0525 *7*	α(K)=0.0308 *4*; α(L)=0.01596 *22*; α(M)=0.00422 *6* α(N)=0.001156 *16*; α(O)=0.000279 *4*; α(P)=4.86×10^{-5} *7*; α(Q)=1.408×10^{-6} *20*

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Adopted Levels, Gammas (continued)

$\gamma(^{242}Pu)$ (continued)

E_i(level)	J_i^π	E_γ ‡	I_γ ‡#	E_f	J_f^π	Mult.	α †	Comments
3747.2	(23⁻)	449.7 *4*	100	3297.5	(21⁻)			
3799.6?		425.3[f] *4*	100	3374.3				
3915.0	(24⁺)	405.5 *3*		3509.5	(22⁺)			
		747.8 *3*		3167.2	22⁺			
4000.5	23⁻	462.0 *4*	100	3538.5	21⁻			
4103.6	25⁻	435.9 *3*	5.0 *25*	3667.7	24⁺			
		472.6 *3*	100 *63*	3631.0	23⁻	(E2)[@]	0.0603 *8*	α(K)=0.0341 *5*; α(L)=0.01922 *27*; α(M)=0.00511 *7* α(N)=0.001399 *20*; α(O)=0.000337 *5*; α(P)=5.85×10^{-5} *8*; α(Q)=1.589×10^{-6} *22*
4180.2	26⁺	512.5 *3*	100	3667.7	24⁺			
4221.5	(25⁻)	474.3 *4*	100	3747.2	(23⁻)			
4368.0	(26⁺)	453.0 *3*	100	3915.0	(24⁺)			
4599.4	27⁻	495.8 *4*	100	4103.6	25⁻			
4691.2	28⁺	511.0 *5*	100	4180.2	26⁺			
5117.0	29⁻	517.6 *4*	100	4599.4	27⁻			
5201.2	30⁺	510.0 *7*	100	4691.2	28⁺			
5648.4	31⁻	531.4 *4*	100	5117.0	29⁻			
5723.9	32⁺	522.7 *4*	100	5201.2	30⁺			

† Additional information 1.

‡ $E\gamma$ and branching ratios are mainly from Coulomb excitation and ^{242}Np β^- decay. $E\gamma$=44.545 *9* is from ^{246}Cm α decay and $E\gamma$'s without uncertainties are from $^{241}Pu(n,\gamma)$.

Relative branching ratios normalized to 100 for the strongest transition from each level.

@ From mult=Q in Coulomb excitation from angular distribution measurements and placement in the level scheme.

& From mult=D in Coulomb excitation from angular distribution measurements and placement in the level scheme.

a From mult=D+Q in Coulomb excitation from angular distribution measurements and placement in the level scheme.

b The assignment as Q in Coulomb excitation is tentative.

c The assignment as D+Q in Coulomb excitation is tentative.

d The assignment as D in Coulomb excitation is tentative.

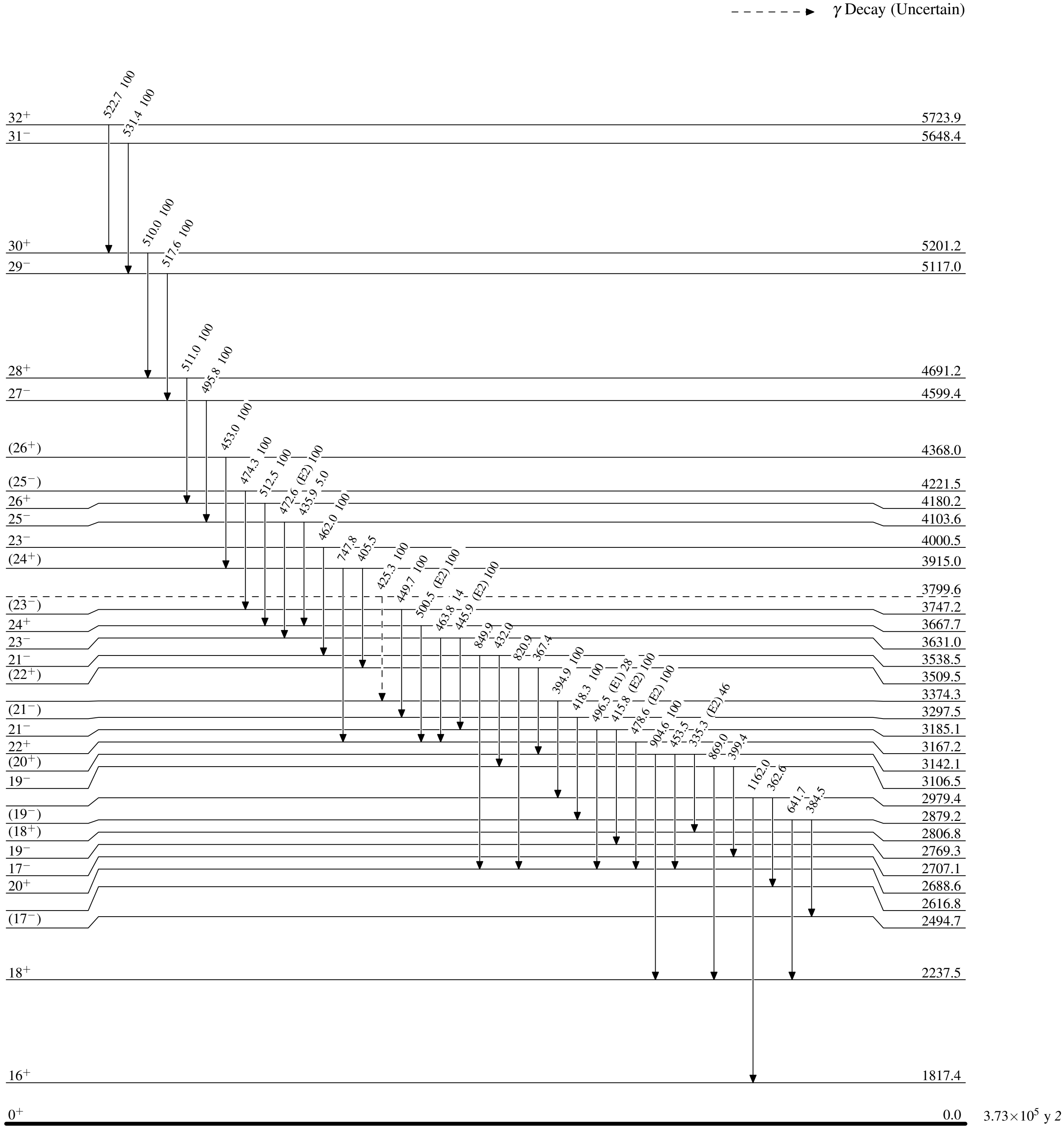
e Multiply placed with undivided intensity.

f Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level



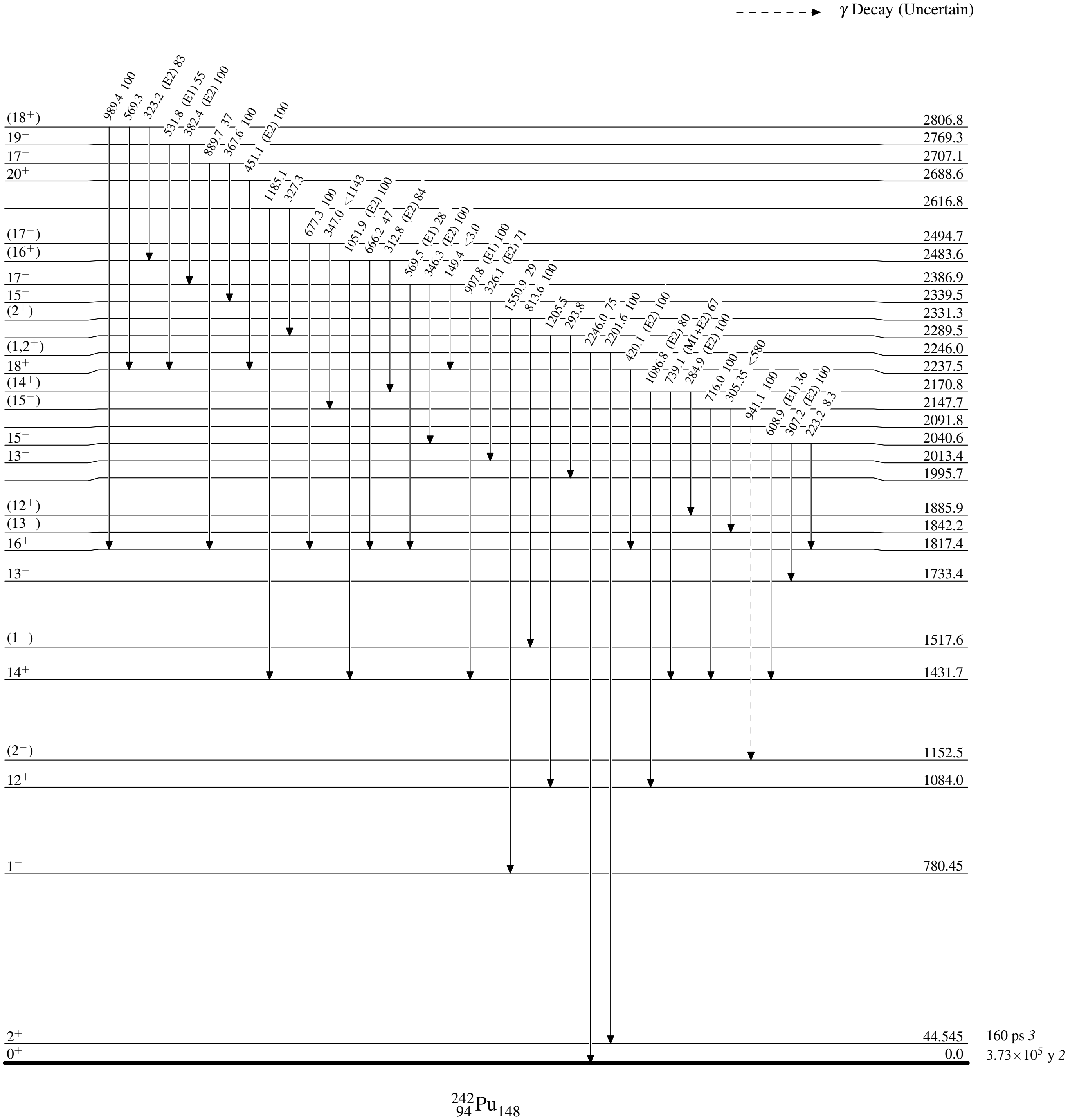
$^{242}_{94}Pu_{148}$

Adopted Levels, Gammas

Legend

Level Scheme (continued)

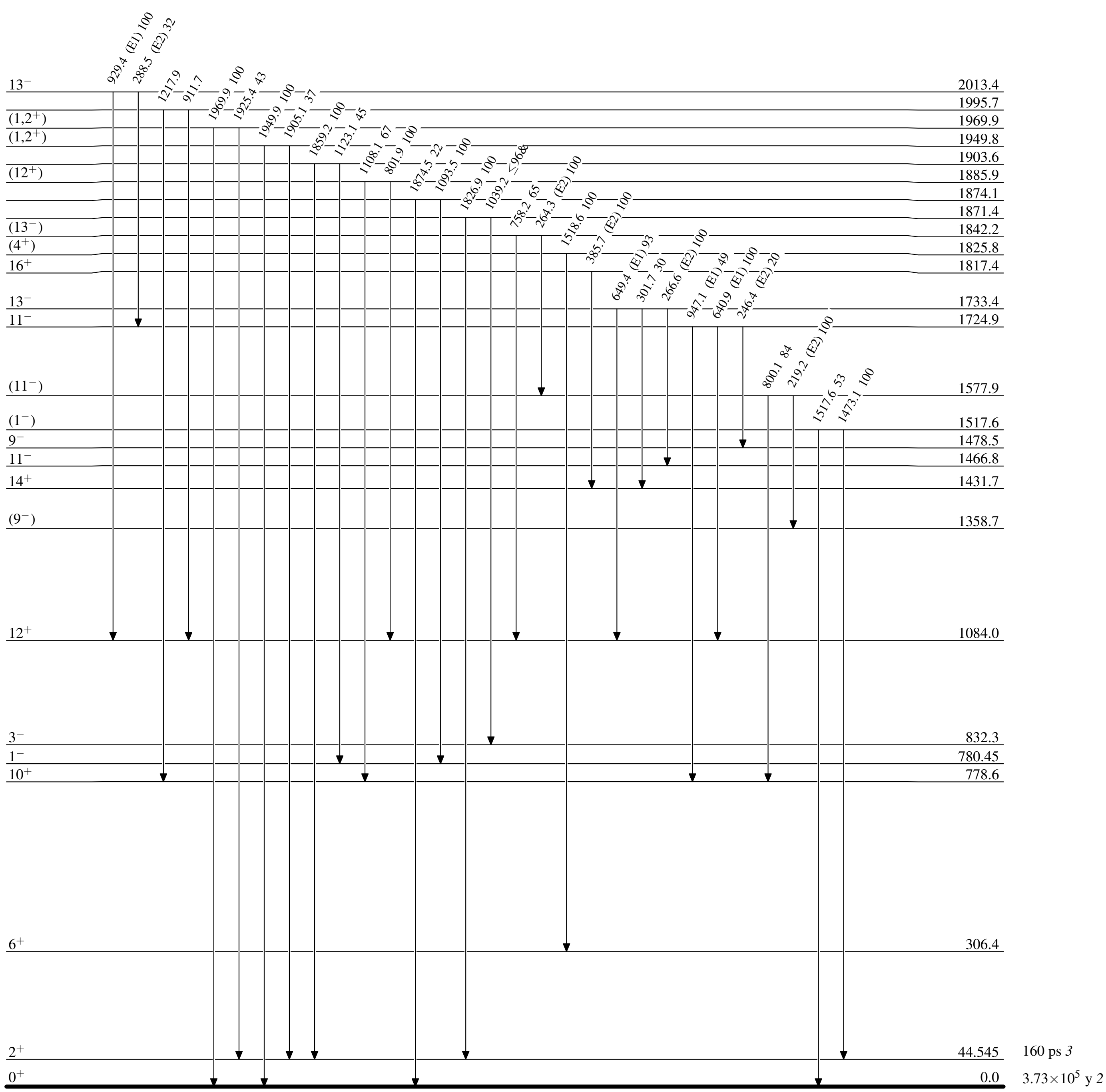
Intensities: Relative photon branching from each level



Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given



$^{242}_{94}Pu_{148}$

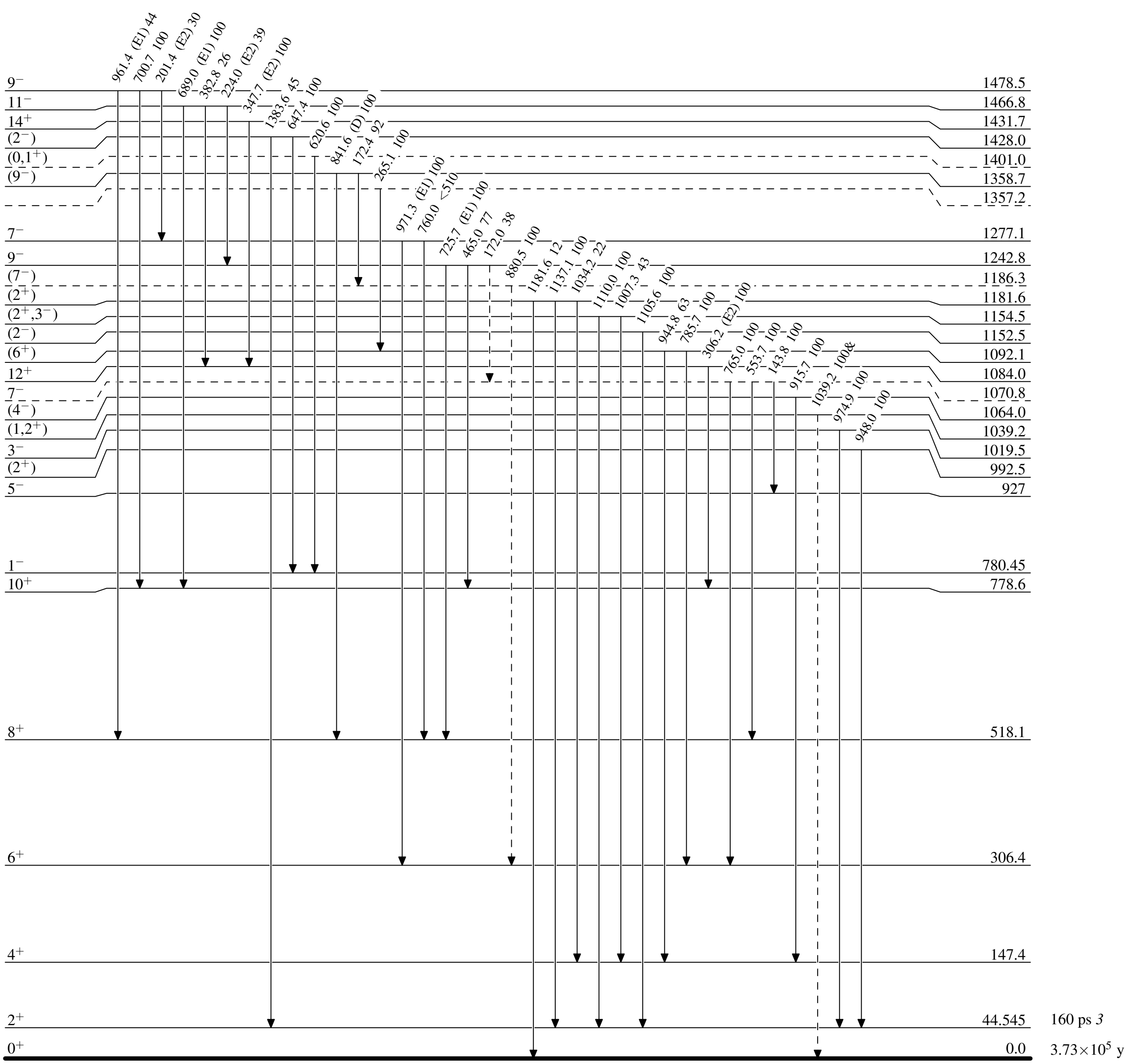
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given

γ Decay (Uncertain)

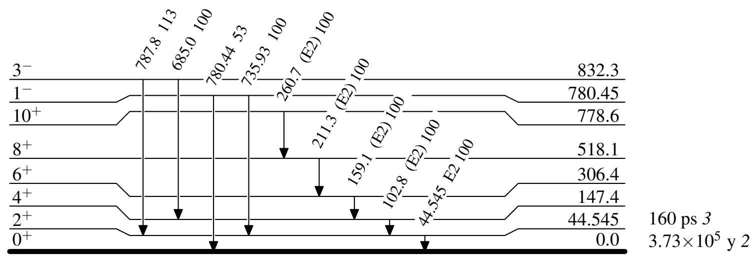


$^{242}_{94}Pu_{148}$

Adopted Levels, Gammas

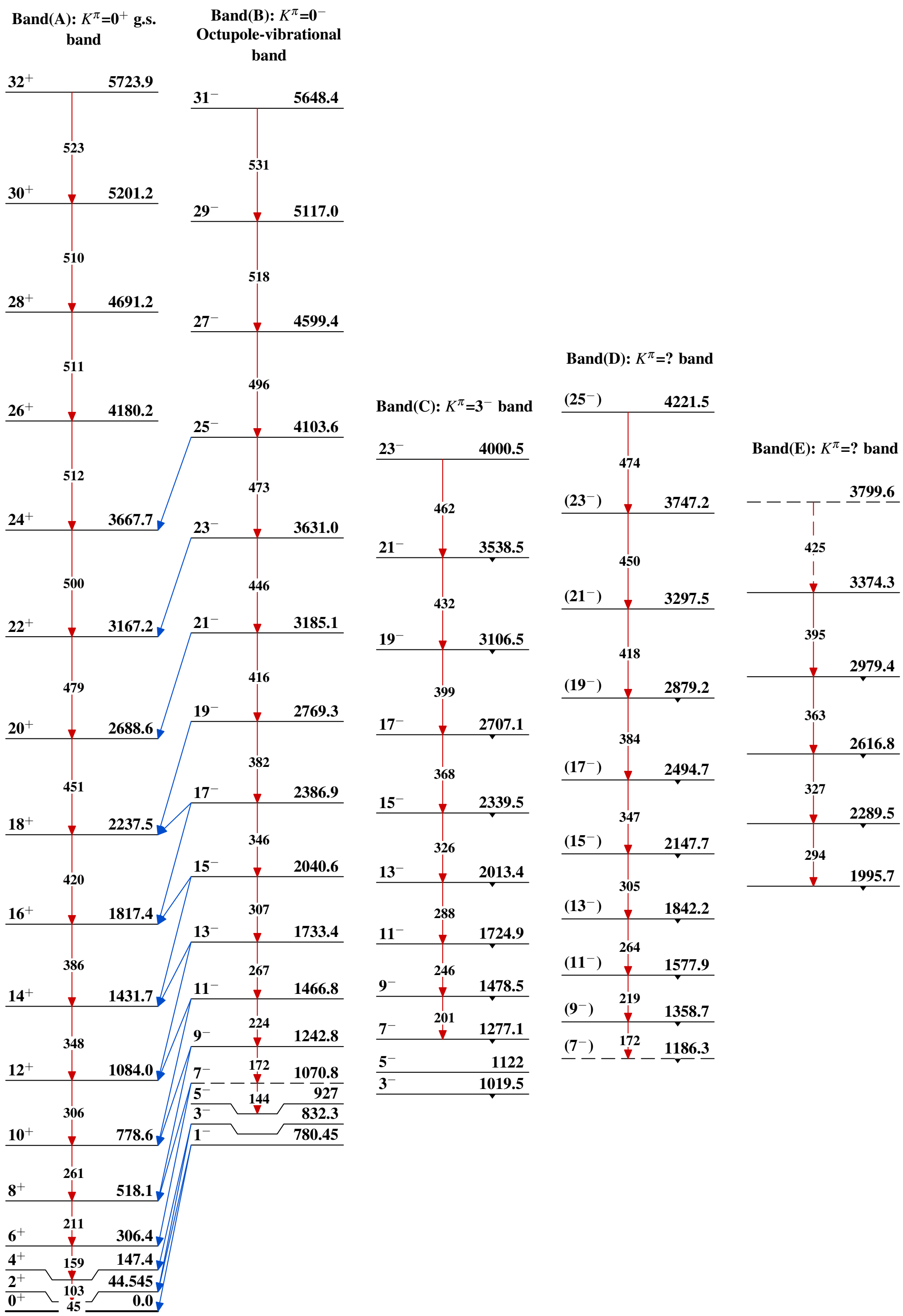
Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given



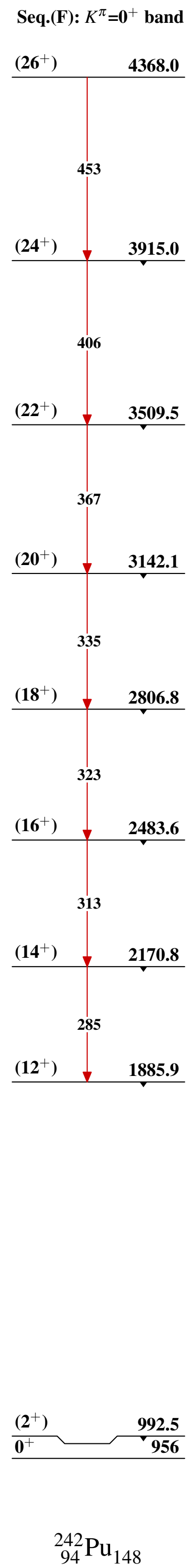
$^{242}_{94}Pu_{148}$

Adopted Levels, Gammas



$^{242}_{94}Pu_{148}$

Adopted Levels, Gammas (continued)



Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	C. D. Nesaraja	NDS 146, 387 (2017)	31-Aug-2017

Q(β^-)=−73.2 *27*; S(n)=6019.9 *29*; S(p)=7.36×10^3 *SY*; Q(α)=4665.5 *10* 2017Wa10
ΔS(p)=30 (syst, 2017Wa10).

Identification:
1954St98: ^{244}Pu produced from ^{243}Pu(n,γ) reaction and possibly by electron capture of ^{244}Am. The reaction were studied via a multiple order neutron capture of ^{239}Pu in the pile irradiated plutonium experiment at the Material Testing Reactor at Argonne National Laboratory with integrated flux of ×10^4 neutrons. Plutonium was chemically separated and analyzed in a 12 inch, 60 ° mass spectrometer.

Systematic studies/Compilation/Evaluation:
2017He08: Review of properties of spontaneous fission.
2017Pr04: Systematics of B(E2) revisited using elemental data fit parameters.
2016Pr01: Compilation, evaluation for B(E2), $T_{1/2}$ and deformation parameter.
2011Ch65: Recommended $T_{1/2}$ of ^{244}Pu based on measurements published till 2010.
2000Ho27: Recommended $T_{1/2}$ SF based on measurement till April 1998.
1989Ho24: Recommended total $T_{1/2}$ and $T_{1/2}$(SF).
1975Me28, 1974VaYN: Properties of fission isomer.

Theoretical calculations:
2017Ph01, 2017Zh03, 2016Sa16, 2016Su09, 2014De43, 2014Is03, 2013Ra05, 2013Se17, 2013Is13, 2012Is08, 2011Qi06, 2011Qi12, 2011Zh36, 2009De32, 2009Ni06, 2008Xu06, 2007Pe30, 2006De05, 2005Sh42, 1996De19, 1979Po23: Calculated α decay half-life.
2015Ba24, 2015Sa15, 2010Sa09, 2008Xu06, 2005Re16, 2005Sh42, 2005Xu01, 2004Ro01, 1992Bh03, 1992Gr16, 1990Bh02, 1976Ra02, 1972Mo27, 1972We09: Calculated spontaneous fission half-lives.
1978Po01: Calculated properties of the SF isomer, its moment of inertia, pairing energy gap, and magnetic moment.
2000Se09: Description of long-range α emission during spontaneous fission.
2014Re05, 2002Hi06: Calculated $T_{1/2}(\beta\beta)$.
2014De43, 1998Bu18: Calculated energy levels and transition strengths.
2013De12, 1995Mo29, 1984Eg01, 1983Bo15, 1982Du16: Calculated deformation parameters.
2014Ji14, 2014Lu01, 2014Ro09, 2014Sh13, 2013Bo29, 2012Ja08, 2001YaZU, 1992Bh03, 1992Gr16, 1990Bh02, 1984Ro23, 1980Bj02, 1972Ma11, 1976Iw02, 2017Ba02, 1974MoYC, 1972We09, 1971Pa33: Calculated fission barriers heights.
2013Li30, 2010Wa34: Calculated two-quasiparticle high K-state with $\nu7/2^+[624]\otimes\nu9/2^-[734]$ configuration. Predicted the octupole deformed high K-isomeric state at 1.022 MeV in 2013Li30.
2010Wa23, 2010Wa31: Calculated relative intensities of α decay to rotational states.
2002Re31: Calculated g.s properties.
2012Zh14, 2005Al40, 2001Fa07, 1988ShZR, 1985Bo20, 1984Eg01, 1982Du16: Analysis of yrast states, backbending and alignment.
1983Bo15: Calculated equilibrium deformations and static electric moment.
2014Af04, 2013Af01, 1980Du07: Calculated moment of inertia.
2011Ne09, 2006Sh19, 2002Pr01, 1982L01, 1982Du16, 1971Ko31, 1970Ne08: Calculated octupole-vibrational states.
1969Wy02: Calculated nuclear mass parameter, an important characteristic of the collective motion of the nucleus.
1992Bh03, 1974MoYC, 1972Mo27, 1971Pa33: Calculated isomeric state energy.
1977VaYN: Review of properties of spontaneously fissioning isomers.
2014Mi26: Analyzed the influence of octupole mode on nuclear high K-isomer properties.

Adopted Levels, Gammas (continued)

^{244}Pu Levels

Cross Reference (XREF) Flags

A	^{248}Cm α decay	D	^{244}Pu(d,d′)
B	^{244}Np β^- decay	E	^{244}Pu(^{47}Ti,^{47}Ti′γ)
C	Coulomb excitation	F	^{244}Pu(^{208}Pb,^{208}Pb′γ)

E(level)[†]	Jπ[a]	$T_{1/2}$	XREF	Comments
0.0[‡]	0+	8.13×10^7 y *3*	ABCD F	%SF=0.123 *6*; %α=99.877 *6* %SF is deduced from the adopted $T_{1/2}$=8.13 ×10^7 y *3* and $T_{1/2}$(SF)=6.6 ×10^{10} y *3*. $T_{1/2}$: From revised value of 8.12 ×10^7 y *3* (2006Ag15). Relative activity using thermal ionization mass spectrometry and α spectrometry was used in the 2006Ag15 measurement. The method was an improvement from previous measurements due to better isotope fraction as well as more accurate determination of alpha activity ratios using ^{240}Pu and ^{242}Pu as reference nuclides. The evaluator has however, revised the value given originally by 2006Ag15 using values of $T_{1/2}$(^{242}Pu)= 3.73 ×10^7 y *3* (from email reply of M. Martin on 14 May 2017), $T_{1/2}$(^{240}Pu)= 6561 y *7* (2008Si25), $T_{1/2}$(^{239}Pu)= 24110 y *29* (2014Br18), and $T_{1/2}$(^{241}Pu) α decay = 5.87 ×10^5 y *5* (deduced from $T_{1/2}$(^{241}Pu)= 14.329 y *29* (2015Ne16), and %α=2.44 ×10^{-3} *2* (2008BeZV). Other $T_{1/2}$: 2011Ch65: 8.00 ×10^7 y *12* (recommended half-life based on measurements published from 1956-2006). 1989Ho24: 8.00 ×10^7 y *9* (weighted average of several compiled and revised values till 1969). 1969Be06: 8.28 ×10^7 y *10* (specific activity relative to ^{239}Pu, measured with Si-Au surface barrier detector), 1966Fi07: 8.18 ×10^7 y *26* (specific activity relative to ^{240}Pu and ^{242}Pu, measured with Si surface barrier detector), 1956Bu92: 7.6 ×10^7 y *20* (specific activity of decay to ^{240}U and ^{240}Np, measured using end window Geiger Muller counter and proportional counter), 1956Di09: 7.6 ×10^7 y *20* (activity of ^{240} Np decay, measured using Geiger-Mueller counters in anticoincidence with proportional counter). $T_{1/2}$(SF)=6.6 ×10^{10} y *3* from the weighted average of: 6.56 ×^{10} y *30* (1983Mo02), 6.8 ×10^{10}y *8* (1977Go03), and 6.67 ×10^{10} y *32* (revised value of 1966Fi07 by 1989Ho24). Other $T_{1/2}$(SF): 2000Ho27: Recommended half-life 6.6 ×10^{10} y *2*. 1980Kh05: 7.32 ×10^{10} y. 1955Fi36: 2.5 ×10^{10} y *8*. $T_{1/2}$(2 β- decay) ≥ 1.1 ×10^{18} y (1992Mo25: detection of ^{244}Cm alpha activity with ≤ 0.24 counts per day. %(2 β-decay) ≤ 7 ×10^{-9} deduced from $T_{1/2}$(2 β-decay) ≥ 1.1 ×10^{18} y and total half-life of $T_{1/2}$=8.13 ×10^7 y *3*. 1998Se17, 1994Ve03: Observed emission of long-range alpha particles during spontaneous fission. The ratio of long-range alpha to fission rate was measured to be 2.62 ×10^{-3} *25*, from which the light particle emission to binary fission probability ratio was deduced as 2.96 ×10^{-3} *31* by 1994Ve03. Energy distribution and yields were measured by 1998Se17. 1985Ge08: Measured isotope shift relative to ^{242}Pu as 1.03 *2*.
44.2[‡] *4*	2+	158 ps *11*	ABCD F	Additional information 1. E(level): Level energy is calculated from Eα=5034.89 keV to 2+ state, observed in ^{248}Cm alpha decay.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{244}Pu Levels (continued)

E(level)[†]	Jπ[a]	$T_{1/2}$	XREF	Comments
				$T_{1/2}$: Calculated from B(E2)=13.61 *18*, measured in Coulomb excitation with α=7.8×10^2 *4* (α calculated from BrICC).
149.9[‡] *6*	4$^+$		ABCDEF	B(E4)↑=0.09 *+55−9* Additional information 2. E(level): Level energy is calculated from Eα=4930.37 keV to 4$^+$ state, observed in ^{248}Cm alpha decay. B(E4) was deduced in Coulomb excitation. J$^\pi$: From Coulomb excitation and (d,d′) data.
313.0[‡] *5*	6$^+$[b]		ABCDEF	
530.2[‡] *7*	8$^+$[b]		BCDEF	
708 *4*	(2$^+$,3$^-$)		C	J$^\pi$: from Coulomb excitation. B(E2)=0.045 *13* if J$^\pi$=2$^+$; B(E3)=0.30 *10* if J$^\pi$=3$^-$ (1974Mc15).
797.8[‡] *8*	10$^+$[b]		C F	
957[#] *2*	3$^-$[f]		CD	
1015 *2*	(2$^+$)[c]		CD	
1068[#] *4*	(5$^-$)[f]		D	E(level): 1068-keV level was doublet in (d,d′) spectrum; 1975Th11 suggested that one level of the doublet may be the 5$^-$ member of a K=2$^-$ octupole-vibrational band.
1068			D	
1108 *2*	(3$^-$)[e]		CD	
1111.4[‡] *9*	12$^+$[b]		C F	
1194 *3*	(5$^-$)[e]		D	
1201.5[#] *8*	7$^-$		C EF	
1210 *3*			D	
1211.2[@] *8*	8$^-$	1.75 s *12*	B EF	J$^\pi$: From measurements of in-band M1/E2 branching ratios in ^{244}Pu(^{208}Pb,^{208}Pb′γ) deep inelastic reaction that was used to extract g_K-g_R/Q_0 values that verifies the assignment. In addition, systematics show a similar excitation energy and decay pattern of N=150 isotones with even Z for ^{246}Cm (2008Ro21), ^{248}Cf (2014Ma86),^{250}Fm (2008Gr17) and ^{252}No (2008Ro21). $T_{1/2}$: From decay curve measurements in ^{244}Pu(^{47}Ti,^{47}Ti′γ) (2016Ho13).
1321.1[&] *18*	9$^-$[d]		F	
1353 *4*			D	
1378 *3*			D	
1390.5[#] *8*	9$^-$		C F	
1434 *3*			D	
1442.2[@] *13*	10$^-$[d]		F	
1466.7[‡] *10*	14$^+$[b]		C F	
1575.1[&] *15*	11$^-$[d]		F	
1613 *3*	(3$^-$)[g]		D	
1623.3[#] *9*	11$^-$		C F	
1718.3[@] *15*	12$^-$[d]		F	
1783 *3*			D	
1805 *3*			D	
1847 *3*			D	
1859.2[‡] *10*	16$^+$[b]		C F	
1873.0[&] *16*	13$^-$[d]		F	
1896 *3*			D	
1898.9[#] *9*	13$^-$		C F	
2037.7[@] *16*	14$^-$[d]		F	
2213.8[&] *17*	15$^-$[d]		F	

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Adopted Levels, Gammas (continued)

^{244}Pu Levels (continued)

E(level)[†]	J^{π}[a]	$T_{1/2}$	XREF	Comments
2214.9[#] *10*	15⁻		C F	
2284.5[‡] *11*	18⁺[b]		C F	
2398.8[@] *18*	16⁻[d]		F	
≈2400		380 ps *80*		%SF≤100 E(level): The shape isomer′s energy was deduced as 2.43 MeV *+30−26* by 1971Au06 from intermediate structure observed in neutron-induced fission cross sections. Calculations of 1971Pa33, 1972Mo27, and 1992Bh03, 2013Gi06, yield E(level)= 3.2, 3.5, ≈ 2.4 MeV, and 2.47 respectively. $T_{1/2}$: Measured from decay of fission isomer observed in ^{244}Pu(d,pn). Theoretical calculations: $T_{1/2}$(SF)=137 ps (2005Re16). 1974MeYP. See 1975Me28 for systematics of SF isomer half-lives. 1974Ba28: Fission probability distributions were measured following ^{242}Pu(15-MeV t,pF) reaction, and the heights and curvatures of the two peaks in the fission barrier were deduced.
2567.8[#] *10*	17⁻		C F	
2594.8[&] *18*	17⁻[d]		F	
2737.9[‡] *12*	20⁺[b]		C F	
2799.8[@] *19*	18⁻[d]		F	
2952.2[#] *12*	19⁻		C F	
3013.8[&] *19*	19⁻[d]		F	
3211.0[‡] *13*	22⁺		C F	
3236.8[@] *20*	20⁻[d]		F	
3360.0[#] *13*	21⁻		C F	
3467.8[&] *21*	21⁻[d]		F	
3686.3[‡] *14*	24⁺		C F	
3705.8[@] *22*	22⁻[d]		F	
3784.0[#] *15*	23⁻		C F	
3948.8[&] *23*	23⁻[d]		F	
4145.2[‡] *15*	26⁺[b]		C F	
4191.8[@] *24*	24⁻[d]		F	
4227.2[#] *17*	25⁻		C F	
4606.1[‡] *17*	28⁺		C	
4690.2[#] *20*	27⁻		C	
5085.7[‡] *20*	30⁺		C	
5589.6[‡] *22*	32⁺		C	
6119.7[‡] *24*	34⁺		C	

[†] From least-squares fit to Eγ data by the evaluator, except as noted. E=44.2 keV, and 149.9 keV have been held fixed during the the least-squares fit. ΔE=1 keV for gammas without uncertainty is assumed.
[‡] Band(A): K=0⁺ Ground-state band.
[#] Band(B): Octupole-vibrational band.
[@] Band(C): K=8⁻,(ν9/2[734]⊗ν7/2[624]), α=0.
[&] Band(D): K=8⁻,(ν9/2[734]⊗ν7/2[624]), α=1.
[a] Except as noted, assignments are based on band structure.
[b] In addition to the band structure arguments, J^{π} for levels observed in Coulomb Excitation by 1983Sp03 are from systematic impact-parameter dependence of the γ-ray yields, the particle-γ directional correlation, and the γ-multiplicity measurements.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{244}Pu Levels (continued)

[c] In the (d,d′) measurement, 1975Th11 noted that J^π could also be a 3^-. However a comparison of the reduced transition probability B(E2)↑=0.30 *10* (1970Th11) that was extracted by normalizing the (d,d′) cross section with values from Coulomb Excitation measurement (1974Mc15): B(E3)=1.16 12 if $J^\pi=3^-$; B(E2)=0.195 *18*, if $J^\pi=2^+$ makes it a possible 2^+ rather than a 3^-.

[d] Assignments for the (^{244}Pu,^{244}Pu′γ) deep inelastic reaction are based on the band members built on the K isomer at 1211 keV except as noted.

[e] K=0^- or 1^- ? This assignment was suggested in 1975Th11 from (d,d′) data. The authors of 1975Th11 suggested also that the doublet at 1068 may contain the expected 1^- member of the band.

[f] K=2^- ? This assignment was suggested in 1975Th11 from (d,d′) data with $J^\pi=3^-$ at 957 level and that the doublet at 1068 may contain the expected 5^- member of the band.

[g] Based on the cross section pattern from the (d,d′) measurements

γ(^{244}Pu)

E_i(level)	J^π_i	E_γ[†]	I_γ	E_f	J^π_f	Mult.	α[a]	Comments
44.2	2^+	(44.2[&] *4*)		0.0	0^+	[E2]	7.8×10^2 *4*	α(L)=5.6×10^2 *3*; α(M)=157 *8* α(N)=43.2 *21*; α(O)=10.2 *5*; α(P)=1.59 *8*; α(Q)=0.00340 *15* B(E2)(W.u.)=3.0×10^2 *3*
149.9	4^+	(105.7[&] *7*)		44.2	2^+	[E2]	12.2 *5*	α(L)=8.9 *3*; α(M)=2.48 *9* α(N)=0.681 *24*; α(O)=0.161 *6*; α(P)=0.0256 *9*; α(Q)=9.5×10^{-5} *3* E_γ: 110.8γ was observed by 1987Mo29 but was considered questionable by the evalutor due to its indistinct peak and its close proximity to the Pu K-Xray line as shown in Fig.1 in 1987Mo29.
313.0	6^+	163.1[‡] *5*	100	149.9	4^+	[E2]	1.90 *4*	α(K)=0.189 *3*; α(L)=1.240 *25*; α(M)=0.346 *7* α(N)=0.0951 *19*; α(O)=0.0225 *5*; α(P)=0.00364 *7*; α(Q)=2.25×10^{-5} *4*
530.2	8^+	217.2[‡‡] *5*	100	313.0	6^+	[E2]	0.630 *11*	α(K)=0.1332 *20*; α(L)=0.361 *7*; α(M)=0.1001 *17* α(N)=0.0275 *5*; α(O)=0.00652 *12*; α(P)=0.001071 *19*; α(Q)=1.000×10^{-5} *16*
797.8	10^+	267.4[‡] *5*	100	530.2	8^+			
1111.4	12^+	313.5[‡] *5*	100	797.8	10^+			
1201.5	7^-	671.3 *5*		530.2	8^+			
1211.2	8^-	(10[&] *1*)		1201.5	7^-			
		681.0[@] *1*		530.2	8^+	[E1]	0.00802	α(K)=0.00649 *9*; α(L)=0.001158 *17*; α(M)=0.000277 *4* α(N)=7.50×10^{-5} *11*; α(O)=1.85×10^{-5} *3*; α(P)=3.44×10^{-6} *5*; α(Q)=2.07×10^{-7} *3*
1321.1	9^-	(110[&] *2*)		1211.2	8^-			
1390.5	9^-	189.0 *5*		1201.5	7^-			
		592.9 *5*		797.8	10^+			
		860.5 *5*		530.2	8^+			
1442.2	10^-	(121[&] *2*)		1321.1	9^-			
		231[#]		1211.2	8^-			
1466.7	14^+	355.1[‡] *5*		1111.4	12^+			
1575.1	11^-	133[#]		1442.2	10^-			
		254[#]		1321.1	9^-			
1623.3	11^-	233.1 *5*		1390.5	9^-			
		511.8 *5*		1111.4	12^+			
		825.4 *5*		797.8	10^+			

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Adopted Levels, Gammas (continued)

$\gamma(^{244}Pu)$ (continued)

E_i(level)	J^π_i	E_γ †	I_γ	E_f	J^π_f
1718.3	12⁻	143#		1575.1	11⁻
		276#		1442.2	10⁻
1859.2	16⁺	392.5‡ 5		1466.7	14⁺
1873.0	13⁻	155#	68 7	1718.3	12⁻
		298#	100 9	1575.1	11⁻
1898.9	13⁻	275.6 5		1623.3	11⁻
		432.1 5		1466.7	14⁺
		787.7 5		1111.4	12⁺
2037.7	14⁻	165#	65 8	1873.0	13⁻
		319#	100 9	1718.3	12⁻
2213.8	15⁻	176#	45 4	2037.7	14⁻
		341#	100 8	1873.0	13⁻
2214.9	15⁻	316.1 5		1898.9	13⁻
		355.9 5		1859.2	16⁺
		747.9 5		1466.7	14⁺
2284.5	18⁺	425.3‡ 5		1859.2	16⁺
2398.8	16⁻	185#	49 5	2213.8	15⁻
		361#	100 7	2037.7	14⁻
2567.8	17⁻	283.3 5		2284.5	18⁺
		353.1 5		2214.9	15⁻
		708.6 5		1859.2	16⁺
2594.8	17⁻	196#	41 5	2398.8	16⁻
		381#	100 11	2213.8	15⁻
2737.9	20⁺	453.4‡ 5		2284.5	18⁺

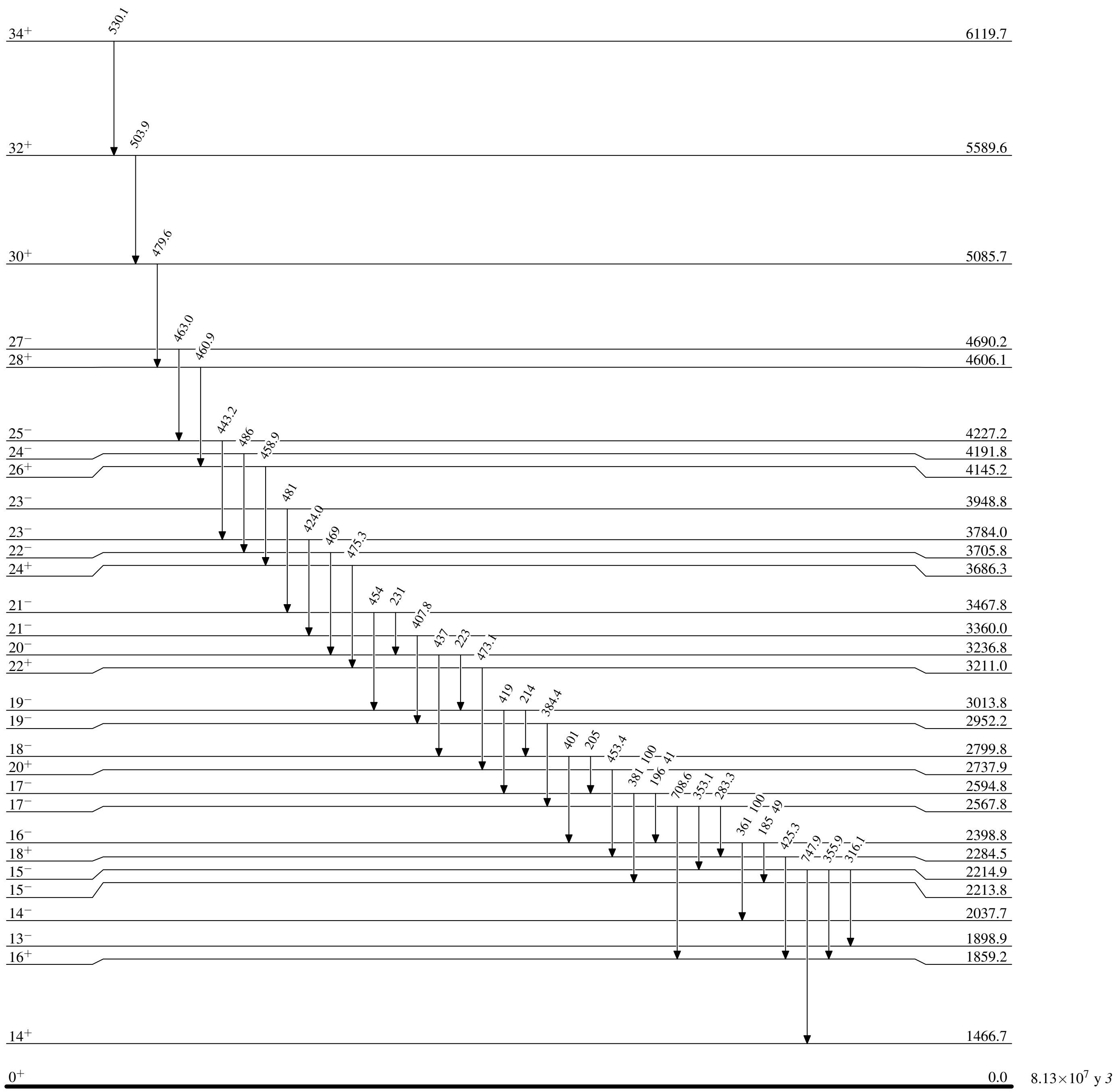
E_i(level)	J^π_i	E_γ †	E_f	J^π_f
2799.8	18⁻	205#	2594.8	17⁻
		401#	2398.8	16⁻
2952.2	19⁻	384.4 5	2567.8	17⁻
3013.8	19⁻	214#	2799.8	18⁻
		419#	2594.8	17⁻
3211.0	22⁺	473.1 5	2737.9	20⁺
3236.8	20⁻	223#	3013.8	19⁻
		437#	2799.8	18⁻
3360.0	21⁻	407.8 5	2952.2	19⁻
3467.8	21⁻	231#	3236.8	20⁻
		454#	3013.8	19⁻
3686.3	24⁺	475.3 5	3211.0	22⁺
3705.8	22⁻	469	3236.8	20⁻
3784.0	23⁻	424.0 8	3360.0	21⁻
3948.8	23⁻	481#	3467.8	21⁻
4145.2	26⁺	458.9‡ 5	3686.3	24⁺
4191.8	24⁻	486#	3705.8	22⁻
4227.2	25⁻	443.2 8	3784.0	23⁻
4606.1	28⁺	460.9 8	4145.2	26⁺
4690.2	27⁻	463.0 10	4227.2	25⁻
5085.7	30⁺	479.6 10	4606.1	28⁺
5589.6	32⁺	503.9 10	5085.7	30⁺
6119.7	34⁺	530.1	5589.6	32⁺

† From Coulomb Excitation (2016JaZZ, 1999Wi11), except as noted.
‡ From Coulomb Excitation that have also been measured by 1983Sp03.
\# From $^{244}Pu(^{208}Pb,^{208}Pb'\gamma)$ deep inelastic data.
@ From ^{244}Np β- decay.
& Gamma has not been observed. Its energy is from level energy difference.
[a] Additional information 3.

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level

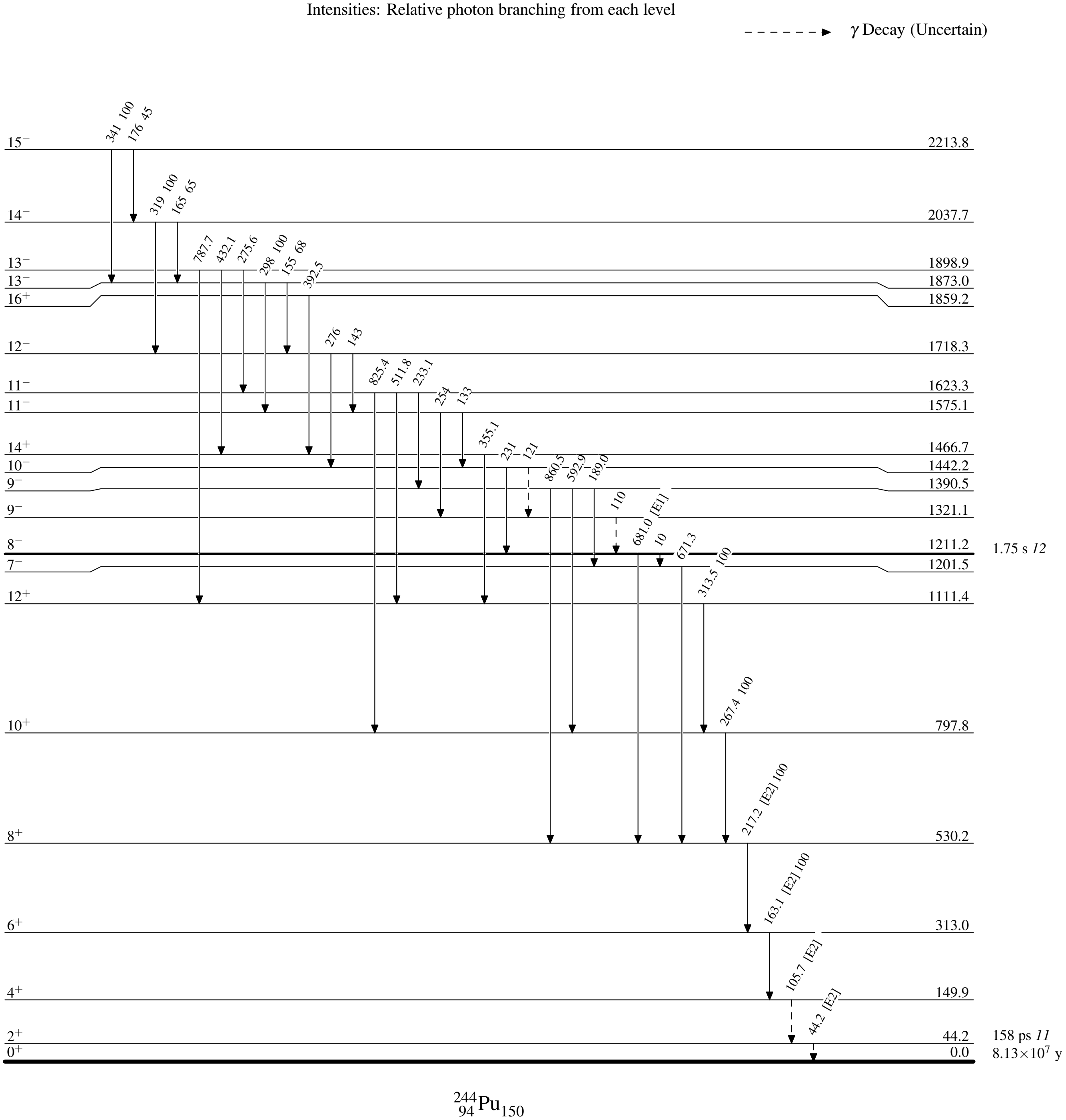


$^{244}_{94}Pu_{150}$

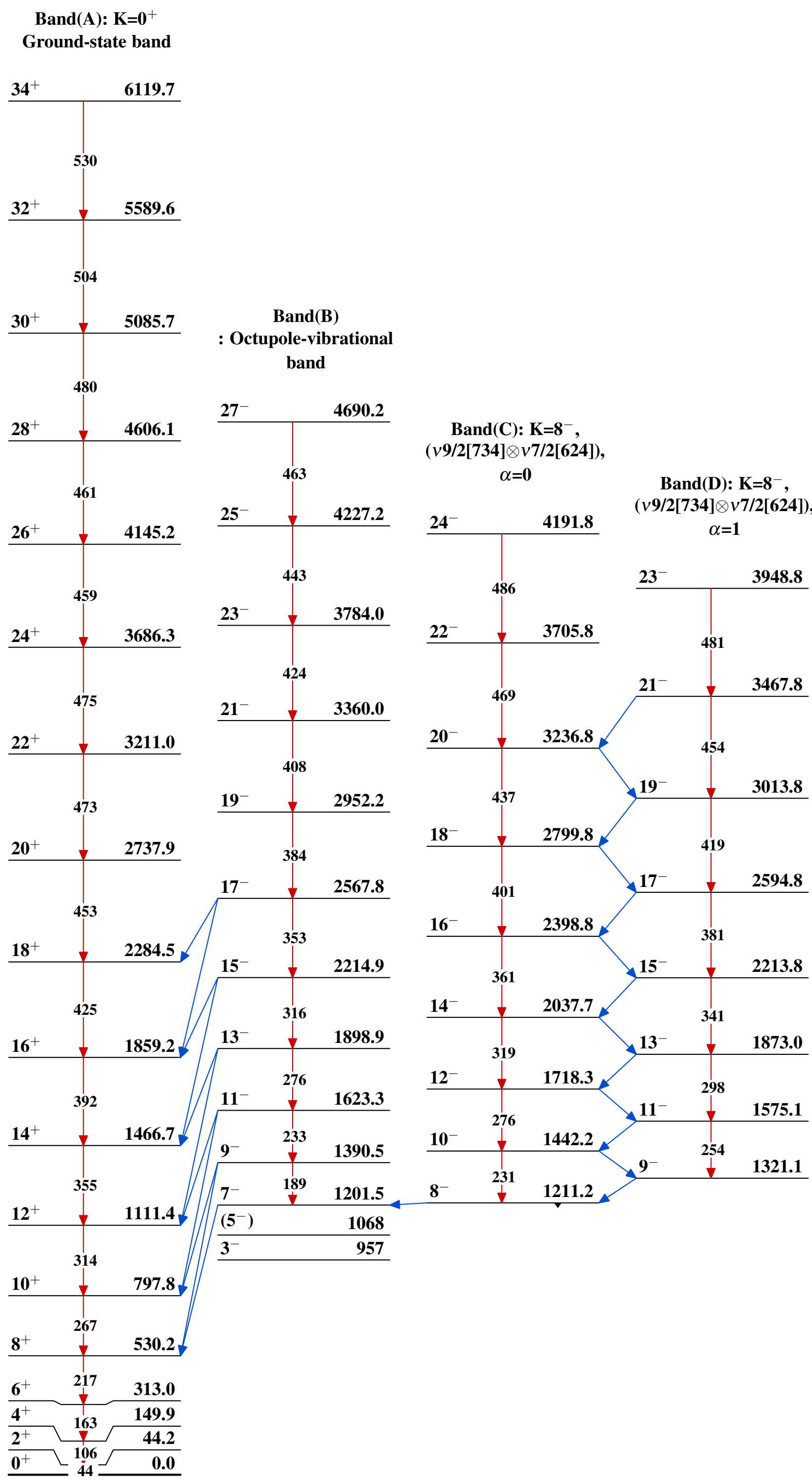
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



Adopted Levels, Gammas



$^{244}_{94}Pu_{150}$