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, $T_{1/2}(\gamma)$=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	

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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^π_i	E_γ[†]	I_γ[#]	E_f	J^π_f	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*		

γ(^{238}Pu) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[#]	E_f	J_f^π	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^+					

$^{238}_{94}Pu_{144}$-6

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⁺				

From ENSDF

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

Adopted Levels, Gammas (continued)

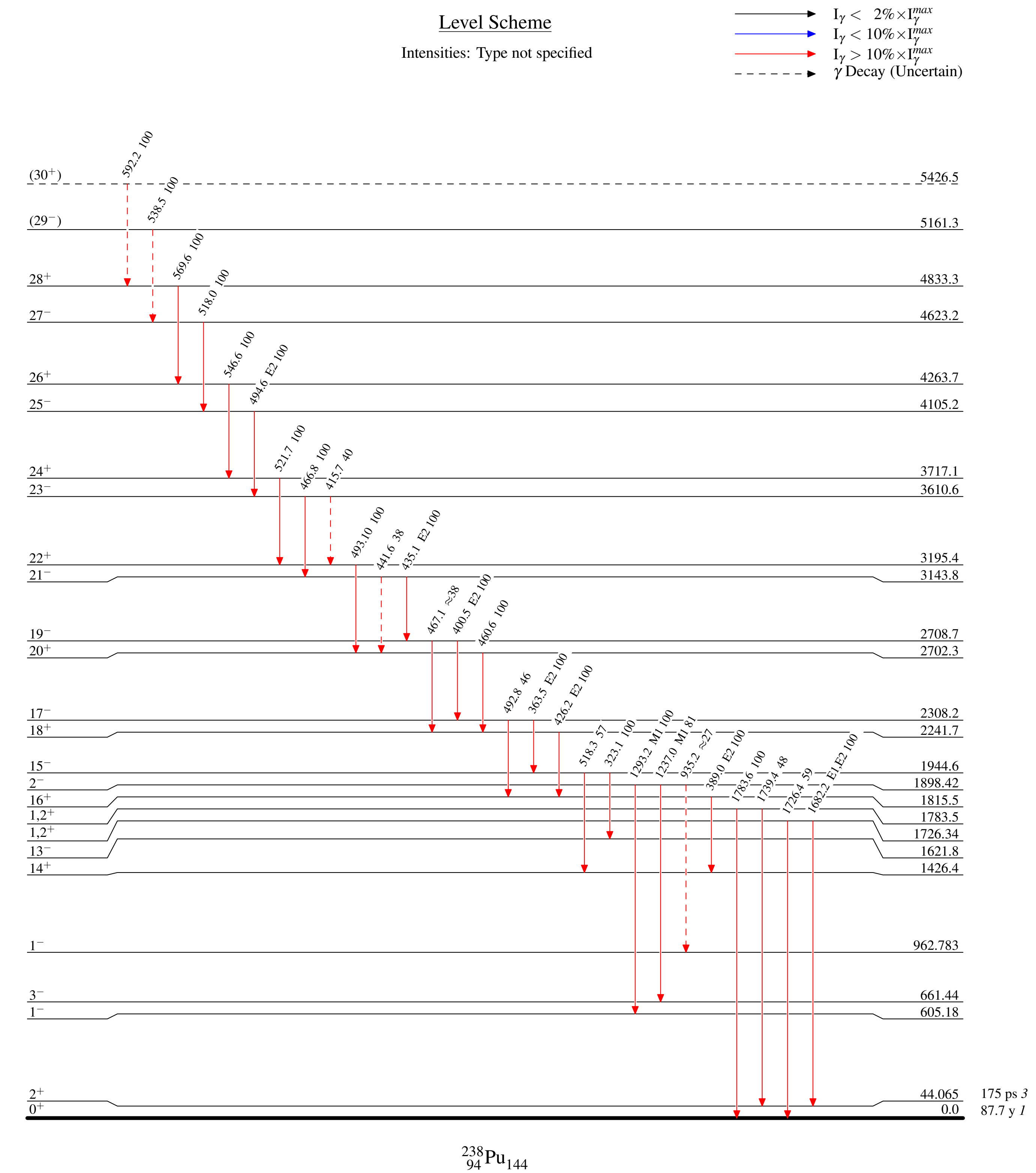
$\gamma(^{238}Pu)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[#]	E_f	J_f^π	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 $^{239}Pu(^{207}Pb,^{208}Pb\gamma)$.
[#] Branching ratios are from β^- decay, α decay, and ε decay.
[@] From ce data in β^-, ε decay, and $\gamma(\theta)$ in $^{239}Pu(^{207}Pb,^{208}Pb\gamma)$.
[&] 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.

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

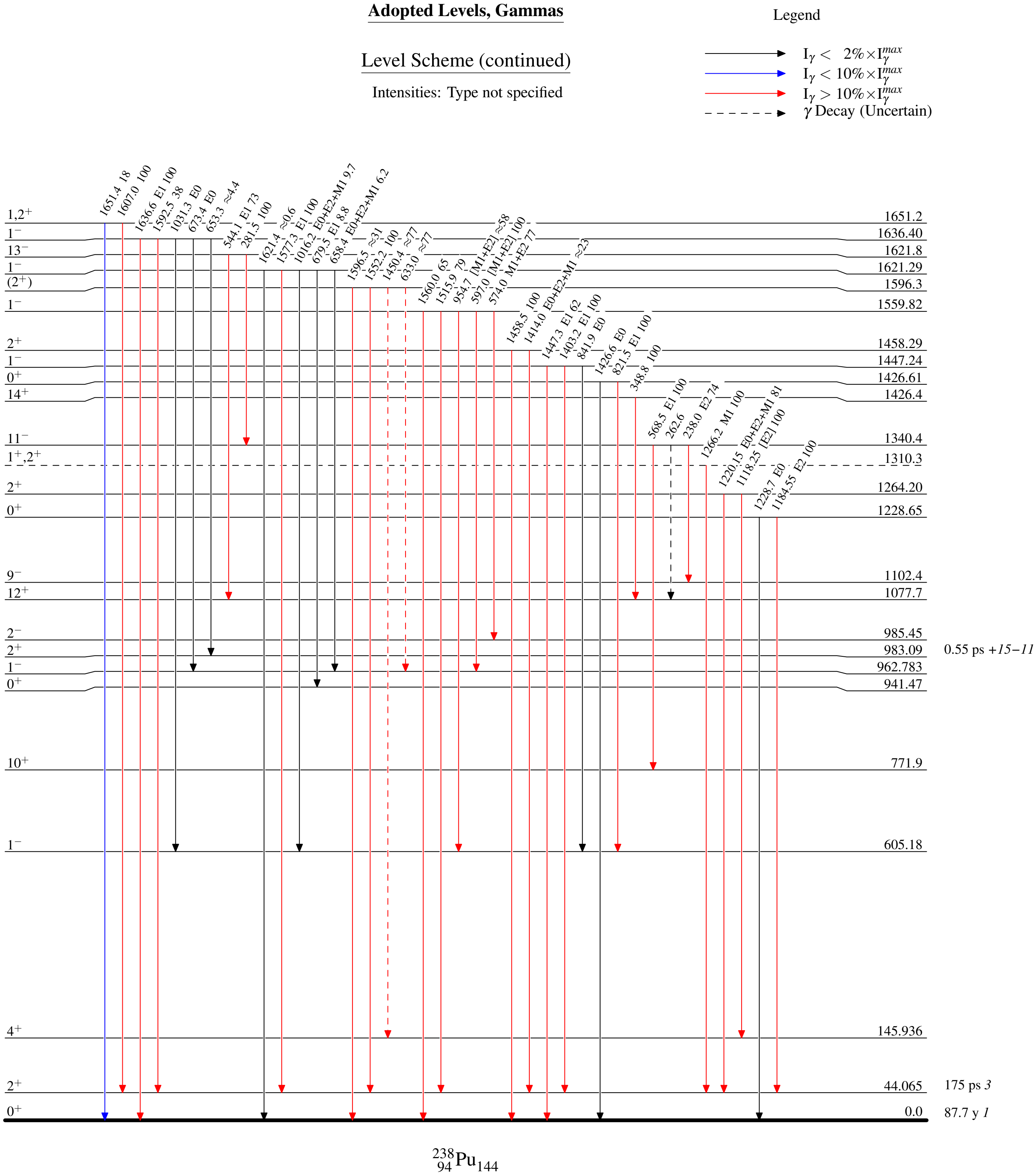
Adopted Levels, Gammas



Adopted Levels, Gammas

Level Scheme (continued)

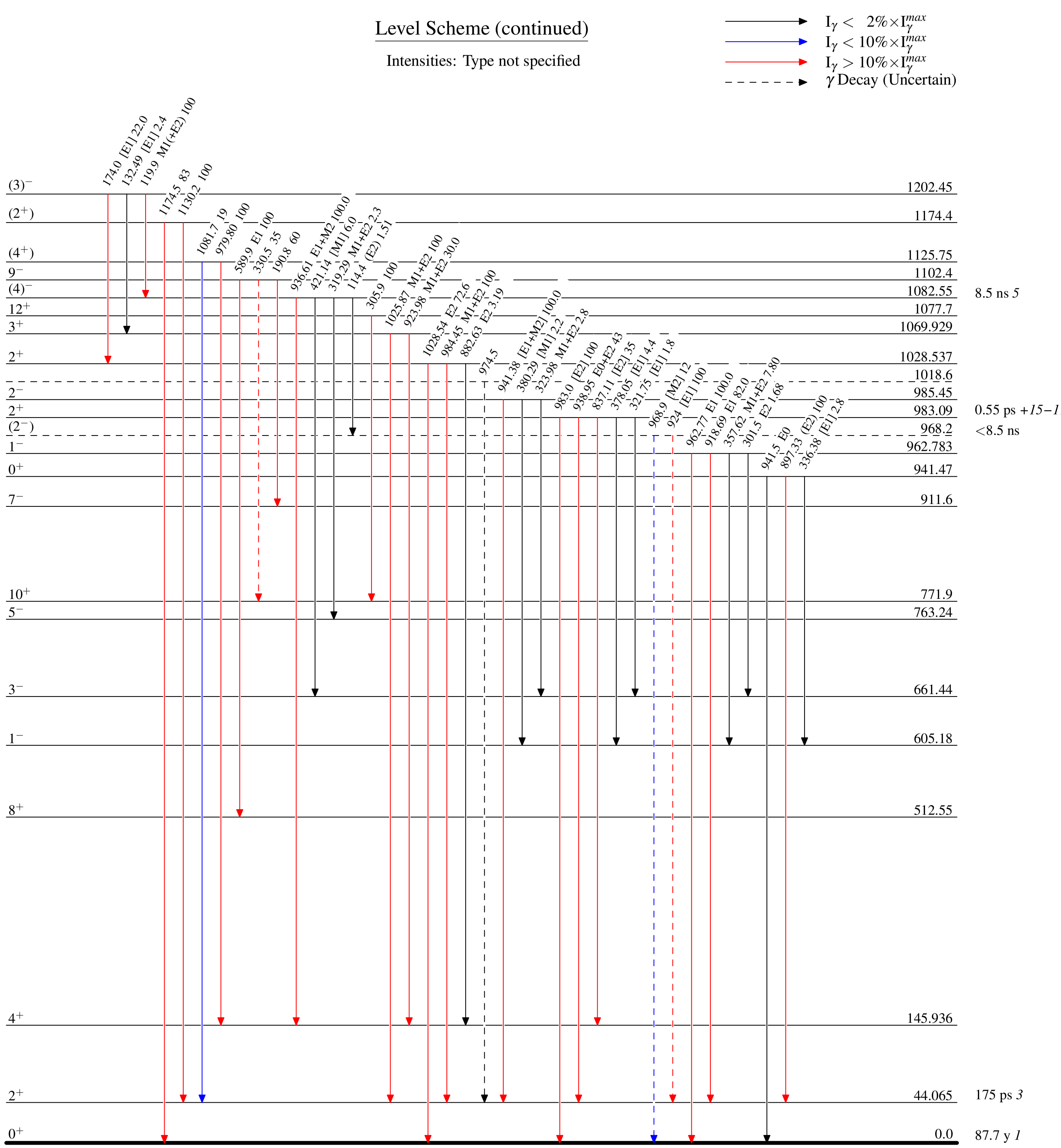
Intensities: Type not specified



Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified

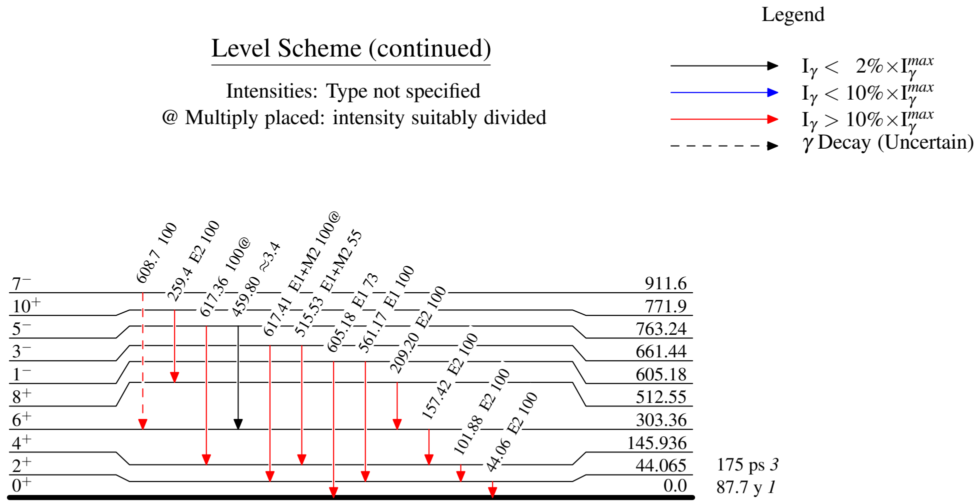


$^{238}_{94}Pu_{144}$

Adopted Levels, Gammas

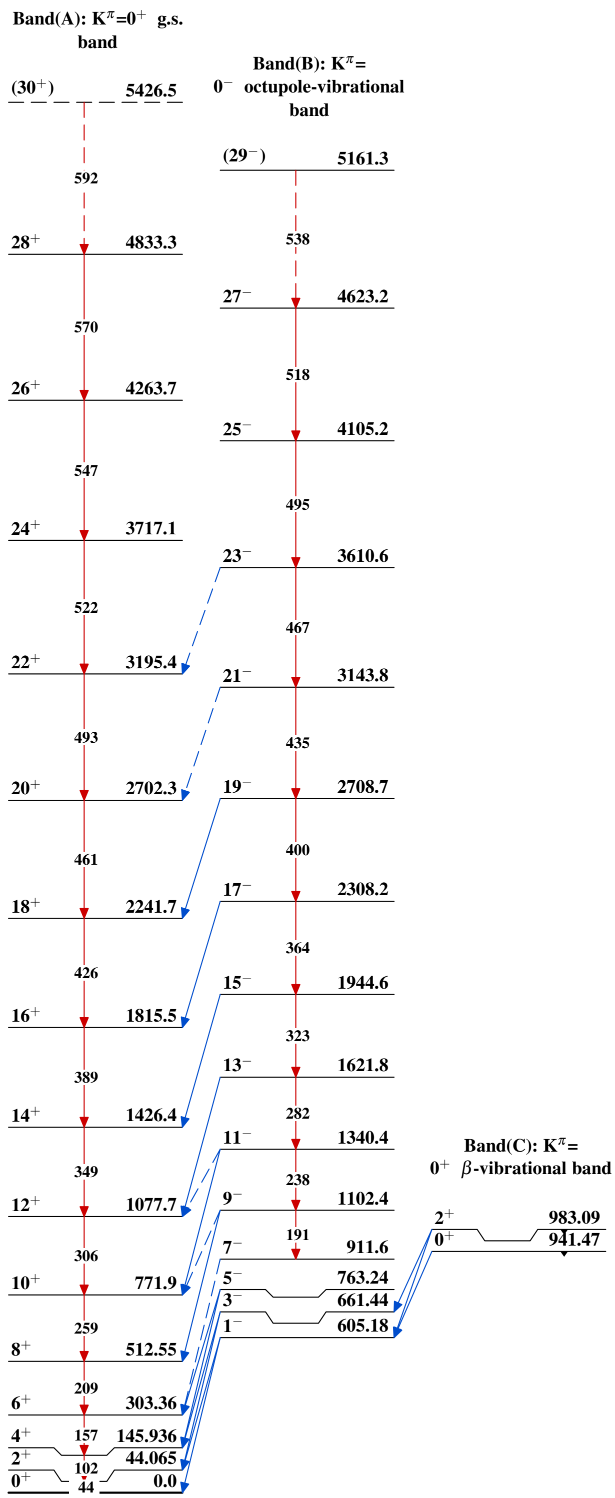
Level Scheme (continued)

Intensities: Type not specified
@ Multiply placed: intensity suitably divided



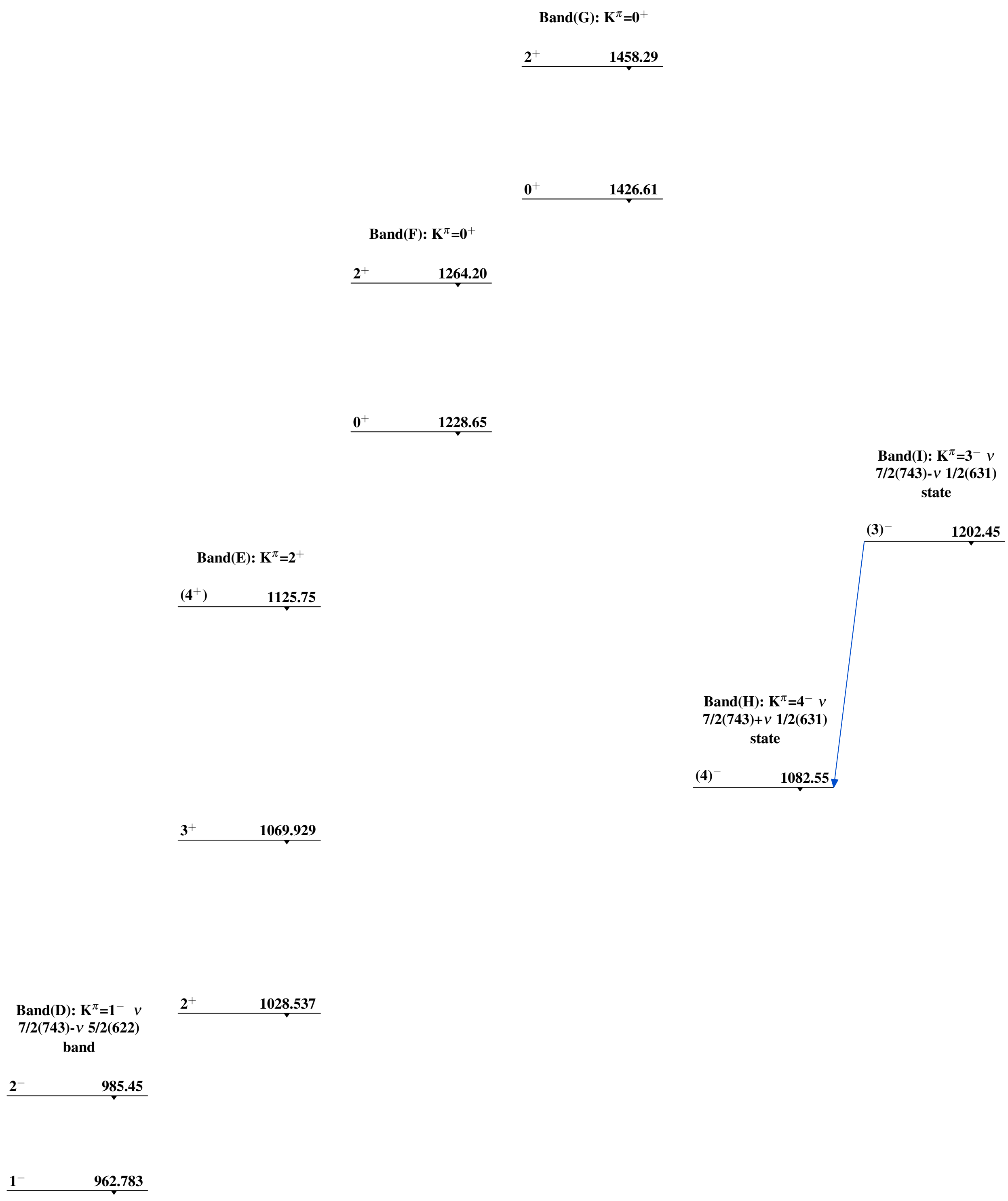
$^{238}_{94}Pu_{144}$

Adopted Levels, Gammas



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

Adopted Levels, Gammas (continued)



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