Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	C. D. Nesaraja	NDS 125, 395 (2015)	31-Mar-2014

Q(β^-)=44 *7*; S(n)=5155 *4*; S(p)=6750 *SY*; Q(α)=5354 *3* 2012Wa38
ΔS(p)=18, ΔQ(α)=450 (syst, 2012Wa38).

Identification:
1954St33: ^{247}Cm produced by irradiating Pu samples with neutrons followed by chemical purification and mass separation. Half-life determined by 1971Fi01, 1968Fi03, 1963Fi08.

Theoretical studies:
2012Ni16: α decay $T_{1/2}$ for transitions from ground-state to favored rotational bands using Multichannel Cluster Model.
2011Ad15: Studied one-quasiparticle levels using the microscopic-macroscopic modified TCSM, QPM and the self-consistent SHFB approaches.
2011Zh36: Systematics and calculated partial half-life of α decay to members of favored band. Accurate expressions are proposed for the evaluation of partial half-lives of these transitions based on microscopic quantum tunneling theory.
2002Du16: Calculated half-lives and Q-values of spontaneous nuclear decay processes in the framework of the effective liquid drop model (ELDM).
1997Mo25: Calculated ground-state binding energy, proton and neutron pairing gaps, neutron and proton separation energies, Q values and partial half-lives for α and β decays.
1995Mo29: Calculated ground-state mass and deformations.
1993Bu09: Calculated partial α decay half-life, α branching, and nuclear radius using the cluster model predictions.
1981Mo24: Calculated electric multipole moments, Q2 and Q4 using macroscopic-microscopic model.
1980Ho32: Calculated ground-state mass excess using macroscopic-microscopic model.Fission-barrier heights, deformation and energy at saddle-point were also calculated.
1971Ga20: Calculated fission barriers, ground-state masses and particle separation energies.

Systematic studies:
2013Af01: Systematic study of pairing and rotational properties of actinides using the covariant density functional theory (CDFT) and the density functional theory framework, respectively.
2012Zh01: Comparison of the low lying one-quasineutron band for N=151 isotones between the experimental values and calculated values using the cranked shell model (CSM) with pairing correlations.
2011As03: Calculated ground-state deformation and energies of neutron one-quasiparticle states in the N=151 isotones using a macroscopic-microscopic model. Energy systematics discussed in terms of evolution of nuclear deformation.
2007Ma82: Comparison with experimental results of ^{245}Pu and systematics of neutron single-particle levels in N=151 isotones (^{247}Cm, ^{249}Cf, ^{251}Fm and ^{253}No).
2006Sh19: Calculated energy levels of ground-state rotational band in N=151 isotones.
2005Pa73: Calculated neutron one quasi-particle states of heaviest nuclei within a macroscopic-microscopic approach.
1977Ch27,1976Ch22: Extracted neutron single particle states with constant pairing elements.

^{247}Cm Levels

Cross Reference (XREF) Flags

A	^{251}Cf α decay
B	^{247}Am β^- decay
C	^{246}Cm(d,p), ^{248}Cm(d,t)
D	^{248}Cm(^{209}Bi,^{210}Biγ)

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Adopted Levels, Gammas (continued)

^{247}Cm Levels (continued)

E(level)[†]	J^π[‡]	$T_{1/2}$	XREF	Comments
0.0[#]	9/2⁻	1.56×10^7 y *5*	ABCD	%α=100 μ=0.36 *7* (1973Ab03,2011StZZ) μ: From electron paramagnetic resonance measurement (1973Ab03). Compiled by 2011StZZ. J^π: Spin measured by 1973Ab03 (electron paramagnetic resonance) and parity determined from the measured magnetic dipole moment and Nilsson diagram. $T_{1/2}$: Measured by 1971Fi01. This half-life is recommended by 1989Ho24. Earlier measurement: 1.64×10^7 y *24* (1963Fi08).
61.67[#] *4*	11/2⁻		ABCD	XREF: B(?).
134.66[#] *6*	13/2⁻		A CD	
219.02[#] *7*	15/2⁻		A CD	
227.38[@] *19*	5/2⁺	26.3 μs *3*	ABC	$T_{1/2}$: From ^{251}Cf α decay (2003Ah07). Other: 25 μs *3* (1968Ch03).
265.86[@] *4*	(7/2⁺)		A	
285.41[&] *5*	(7/2⁺)		ABC	
309 *3*			C	
314.7[#] *9*	17/2⁻		D	
318.31[@] *5*	9/2⁺		A C	
336 *5*			C	
345.89[&] *6*	(9/2⁺)		A C	
370? *5*			C	
381[@] *5*	(11/2⁺)		C	
398 *4*			C	J^π: 11/2⁺,7/2[624] state was tentatively suggested by 1971Br27 from (d,t) data.
404.90[a] *3*	1/2⁺	100.6 ns *6*	A C	J^π,$T_{1/2}$: From ^{251}Cf α decay (2003Ah07).
417? *6*			C	J^π: 3/2⁺,1/2[620] state was tentatively assigned by 1971Br27 from (d,t) data. This state was observed at 433 keV in ^{251}Cf α decay.
421.0[#] *9*	19/2⁻		D	
433[a] *2*	(3/2⁺)		A	
439 *3*			C	J^π: 9/2⁺,7/2[613] assignment was tentatively suggested by 1971Br27.
448[a] *2*	(5/2⁺)		A C	
506[b] *3*	(1/2⁺)		C	
516.68[a] *11*	(7/2⁺)		A C	
518.59[b] *7*	(3/2⁺)		A C	
539.8[#] *12*	21/2⁻		D	
550[a] *2*	(9/2⁺)		C	
581.67[b] *8*	(5/2⁺)		A C	
592 *2*			C	
604[b] *3*	(7/2⁺)		C	
667.9[#] *12*	23/2⁻		D	
668 *5*	(3/2⁺)		C	
687 *5*	(11/2⁺)		C	
699[b] *2*	(9/2⁺)		C	Level was assumed doublet in the (d,p),(d,t) reactions, and the other member was assigned to the 5/2⁺,3/2[622] state by 1971Br27.
749 *5*	(7/2⁺)		C	
784 *4*	(3/2⁻)		C	
803 *5*			C	
807.9[#] *12*	25/2⁻		D	
819 *4*	(7/2⁻)		C	
819 *4*	(9/2⁺)		C	
856 *5*			C	

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Adopted Levels, Gammas (continued)

^{247}Cm Levels (continued)

E(level)†	Jπ‡	XREF	E(level)†	Jπ‡	XREF	E(level)†	Jπ‡	XREF
897 *5*	(11/2−)	C	1182 *3*	(9/2+)	C	1512 *6*		C
947 *2*		C	1199? *4*		C	1655.9# *16*	35/2−	D
957c *2*	(1/2−)	C	1239 *5*		C	1853.9# *17*	37/2−	D
957.9# *13*	27/2−	D	1247 *5*		C	2056.9# *19*	39/2−	D
988 *5*		C	1271 *3*		C	2271.9# *20*	41/2−	D
1001c *2*	(3/2−,5/2−)	C	1283 *3*	(5/2−)	C	2487.9# *22*	43/2−	D
1044 *3*		C	1287.9# *15*	31/2−	D	2717.9# *22*	45/2−	D
1064 *3*		C	1317 *3*		C	2945.9# *24*	47/2−	D
1079 *3*	(5/2+)	C	1356? *3*		C	3187.9# *24*	49/2−	D
1091 *3*		C	1364 *4*		C	3427# *3*	51/2−	D
1118.9# *14*	29/2−	D	1372 *4*		C			
1159 *3*		C	1467.9# *16*	33/2−	D			

† From ^{251}Cf α decay, (d,p), (d,t) and ^{248}Cm(^{209}B,^{210}Biγ) data.
‡ From band assignments. Spin and parities for some of the bandheads are explained in comments for those levels. Arguments for band members are given with each band assignment. Nilsson state and band assignments were tentatively proposed to some levels above 600 keV by 1971Br27 from (d,p) and (d,t) data.
# Band(A): 9/2[734] band. A=5.6. Band assignment from alpha hindrance factors, γ decays, and (d,p), (d,t) data.
@ Band(B): 5/2[622] band. A=5.7. Band assignment from (d,p), (d,t) data and alpha hindrance factors.
& Band(C): 7/2[624] band. Band assignment from (d,p), (d,t) data and alpha hindrance factors.
a Band(D): 1/2[620] band. A=7.1 Band assignment from (d,p), (d,t) data and alpha hindrance factors.
b Band(E): 1/2[631] band. A=7.0. Band assignment from (d,t), (d,p) data.
c Band(F): 1/2[501] band. Band assignment from (d,t), (d,p) data.

γ(^{247}Cm)

E_i(level)	J^π_i	E_γ†	I_γ‡	E_f	J^π_f	Mult.#	δ#	α@	Comments
61.67	11/2−	61.67 *5*		0.0	9/2−	M1+E2	0.25 *3*	37.5 *23*	α(L)=27.8 *16*; α(M)=7.1 *5* α(N)=1.96 *13*; α(O)=0.49 *3*; α(P)=0.092 *5*; α(Q)=0.00493 *9*
134.66	13/2−	73.00 *8*	35 *8*	61.67	11/2−	[M1+E2]	0.7 *3*	39 *13*	α(L)=28 *9*; α(M)=8 *3* α(N)=2.1 *8*; α(O)=0.52 *18*; α(P)=0.09 *3*; α(Q)=0.0023 *5*
		134.65 *8*	100 *13*	0.0	9/2−	[E2]		4.94	α(K)=0.1531 *22*; α(L)=3.46 *5*; α(M)=0.976 *14* α(N)=0.272 *4*; α(O)=0.0659 *10*; α(P)=0.01104 *16*; α(Q)=6.08×10^{-5} *9*
219.02	15/2−	84.35 *8*	100 *13*	134.66	13/2−	[M1+E2]		26 *15*	α(L)=19 *11*; α(M)=5 *4* α(N)=1.5 *9*; α(O)=0.36 *22*; α(P)=0.06 *4*; α(Q)=0.0012 *9*
		157.35 *8*	50 *10*	61.67	11/2−	[E2]		2.56	α(K)=0.1741 *25*; α(L)=1.723 *25*; α(M)=0.485 *7* α(N)=0.1350 *20*; α(O)=0.0328 *5*; α(P)=0.00552 *8*; α(Q)=3.65×10^{-5} *6*
227.38	5/2+	165.70 *5*	1.76 *15*	61.67	11/2−	E3		30.4	B(E3)(W.u.)=5.5 *6* α(K)=0.235 *4*; α(L)=21.3 *3*;

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Adopted Levels, Gammas (continued)

γ(^{247}Cm) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[‡]	E_f	J^π_f	Mult.[#]	δ[#]	α[@]	Comments
									α(M)=6.47 *10* α(N)=1.83 *3*; α(O)=0.445 *7*; α(P)=0.0750 *11*; α(Q)=0.000469 *7*
227.38	5/2⁺	227.38 *2*	100 *4*	0.0	9/2⁻	M2+E3	0.52 *+9−8*	10.3 *4*	B(M2)(W.u.)=0.0033 *4*; B(E3)(W.u.)=7.3 *21* α(K)=6.0 *5*; α(L)=3.15 *9*; α(M)=0.87 *3* α(N)=0.242 *9*; α(O)=0.0609 *20*; α(P)=0.0113 *3*; α(Q)=0.00056 *4*
265.86	(7/2⁺)	38.48 *5*	8.8 *14*	227.38	5/2⁺	(M1+E2)	0.21 *5*	1.8×10^{2} *4*	α(L)=1.4×10^{2} *3*; α(M)=35 *8* α(N)=9.8 *21*; α(O)=2.4 *5*; α(P)=0.44 *8*; α(Q)=0.0202 *4*
		265.86 *8*	100 *7*	0.0	9/2⁻	[E1]		0.0565	α(K)=0.0442 *7*; α(L)=0.00927 *13*; α(M)=0.00226 *4* α(N)=0.000617 *9*; α(O)=0.0001540 *22*; α(P)=2.86×10^{-5} *4*; α(Q)=1.559×10^{-6} *22*
285.41	(7/2⁺)	58.03 *5*	2.1 *4*	227.38	5/2⁺	(M1+E2)	0.53 *11*	80 *16*	α(L)=59 *11*; α(M)=16 *4* α(N)=4.4 *9*; α(O)=1.08 *21*; α(P)=0.19 *4*; α(Q)=0.0052 *4*
		285.41 *8*	100 *8*	0.0	9/2⁻	[E1]		0.0484	α(K)=0.0380 *6*; α(L)=0.00787 *11*; α(M)=0.00192 *3* α(N)=0.000523 *8*; α(O)=0.0001308 *19*; α(P)=2.44×10^{-5} *4*; α(Q)=1.350×10^{-6} *19*
314.7	17/2⁻	180 *1*		134.66	13/2⁻				
318.31	9/2⁺	52.45 *5*	37 *4*	265.86	(7/2⁺)	(M1+E2)	0.27 *6*	70 *11*	α(L)=51 *8*; α(M)=13.3 *23* α(N)=3.7 *7*; α(O)=0.92 *15*; α(P)=0.169 *24*; α(Q)=0.00792 *21*
		256.65 *8*	100 *8*	61.67	11/2⁻	[E1]		0.0611	α(K)=0.0477 *7*; α(L)=0.01007 *15*; α(M)=0.00246 *4* α(N)=0.000670 *10*; α(O)=0.0001672 *24*; α(P)=3.10×10^{-5} *5*; α(Q)=1.675×10^{-6} *24*
		318.3 *1*	38 *4*	0.0	9/2⁻	[E1]		0.0384	α(K)=0.0302 *5*; α(L)=0.00614 *9*; α(M)=0.001495 *21* α(N)=0.000408 *6*; α(O)=0.0001021 *15*; α(P)=1.91×10^{-5} *3*; α(Q)=1.086×10^{-6} *16*
345.89	(9/2⁺)	60.5 *1*	8.3 *25*	285.41	(7/2⁺)	(M1+E2)	0.48 *16*	62 *18*	α(L)=46 *13*; α(M)=12 *4* α(N)=3.4 *11*; α(O)=0.83 *25*; α(P)=0.15 *4*; α(Q)=0.0047 *5*
		284.2 *1*	100 *8*	61.67	11/2⁻	[E1]		0.0489	α(K)=0.0383 *6*; α(L)=0.00794 *12*; α(M)=0.00194 *3* α(N)=0.000528 *8*; α(O)=0.0001320 *19*; α(P)=2.46×10^{-5} *4*; α(Q)=1.362×10^{-6} *19*
		345.9 *1*	36 *3*	0.0	9/2⁻	[E1]		0.0322	α(K)=0.0254 *4*; α(L)=0.00510

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Adopted Levels, Gammas (continued)

$\gamma(^{247}Cm)$ (continued)

E_i(level)	J_i^π	E_γ †	I_γ ‡	E_f	J_f^π	Mult.#	α@	Comments
								8; α(M)=0.001240 *18* α(N)=0.000338 *5*; α(O)=8.48×10^{-5} *12*; α(P)=1.593×10^{-5} *23*; α(Q)=9.22×10^{-7} *13*
404.90	1/2$^+$	177.52 *2*		227.38	5/2$^+$	E2	1.567	α(K)=0.1643 *23*; α(L)=1.015 *15*; α(M)=0.285 *4* α(N)=0.0794 *12*; α(O)=0.0193 *3*; α(P)=0.00327 *5*; α(Q)=2.52×10^{-5} *4* B(E2)(W.u.)=0.1350 *14*
421.0	19/2$^-$	202 *1*		219.02	15/2$^-$			
516.68	(7/2$^+$)	289.3 *1*		227.38	5/2$^+$	[M1+E2]	0.9 *7*	α(K)=0.7 *6*; α(L)=0.19 *6*; α(M)=0.049 *13* α(N)=0.014 *4*; α(O)=0.0034 *9*; α(P)=0.00064 *21*; α(Q)=3.E−5 *3*
518.59	(3/2$^+$)	113.7 *1*	8.0 *17*	404.90	1/2$^+$	[M1+E2]	8 *3*	α(L)=5.5 *20*; α(M)=1.5 *7* α(N)=0.41 *18*; α(O)=0.10 *4*; α(P)=0.018 *6*; α(Q)=0.0005 *4*
		291.20 *8*	100 *10*	227.38	5/2$^+$	[M1+E2]	0.9 *7*	α(K)=0.7 *6*; α(L)=0.19 *6*; α(M)=0.048 *13* α(N)=0.013 *4*; α(O)=0.0033 *9*; α(P)=0.00063 *21*; α(Q)=3.E−5 *3*
539.8	21/2$^-$	225 *1*		314.7	17/2$^-$			
581.67	(5/2$^+$)	315.8 *1*	100 *13*	265.86	(7/2$^+$)	[M1+E2]	0.7 *6*	α(K)=0.5 *5*; α(L)=0.15 *6*; α(M)=0.037 *12* α(N)=0.010 *3*; α(O)=0.0026 *8*; α(P)=0.00049 *18*; α(Q)=2.6×10^{-5} *21*
		354.3 *1*	54 *8*	227.38	5/2$^+$	[M1+E2]	0.5 *4*	α(K)=0.4 *4*; α(L)=0.10 *5*; α(M)=0.026 *10* α(N)=0.0072 *25*; α(O)=0.0018 *7*; α(P)=0.00034 *14*; α(Q)=1.9×10^{-5} *16*
667.9	23/2$^-$	247 *1*		421.0	19/2$^-$			
807.9	25/2$^-$	140 *1*		667.9	23/2$^-$			
		268 *1*		539.8	21/2$^-$			
957.9	27/2$^-$	150		807.9	25/2$^-$			
		290		667.9	23/2$^-$			
1118.9	29/2$^-$	161		957.9	27/2$^-$			
		311		807.9	25/2$^-$			
1287.9	31/2$^-$	169		1118.9	29/2$^-$			
		330		957.9	27/2$^-$			
1467.9	33/2$^-$	180&		1287.9	31/2$^-$			
		349		1118.9	29/2$^-$			
1655.9	35/2$^-$	188		1467.9	33/2$^-$			
		368		1287.9	31/2$^-$			
1853.9	37/2$^-$	198		1655.9	35/2$^-$			
		386		1467.9	33/2$^-$			
2056.9	39/2$^-$	401		1655.9	35/2$^-$			
2271.9	41/2$^-$	418		1853.9	37/2$^-$			
2487.9	43/2$^-$	431		2056.9	39/2$^-$			
2717.9	45/2$^-$	446		2271.9	41/2$^-$			
2945.9	47/2$^-$	458		2487.9	43/2$^-$			
3187.9	49/2$^-$	470		2717.9	45/2$^-$			
3427	51/2$^-$	481		2945.9	47/2$^-$			

† From ^{251}Cf α decay and ^{248}Cm(^{209}B,^{210}Biγ) data.

‡ Relative photon intensities de-exciting each level, adopted from ^{251}Cf α decay.

\# Determined in ^{251}Cf α decay and ^{247}Am β^- decay. The multipolarities in square brackets are from the level scheme; they have not been determined experimentally.

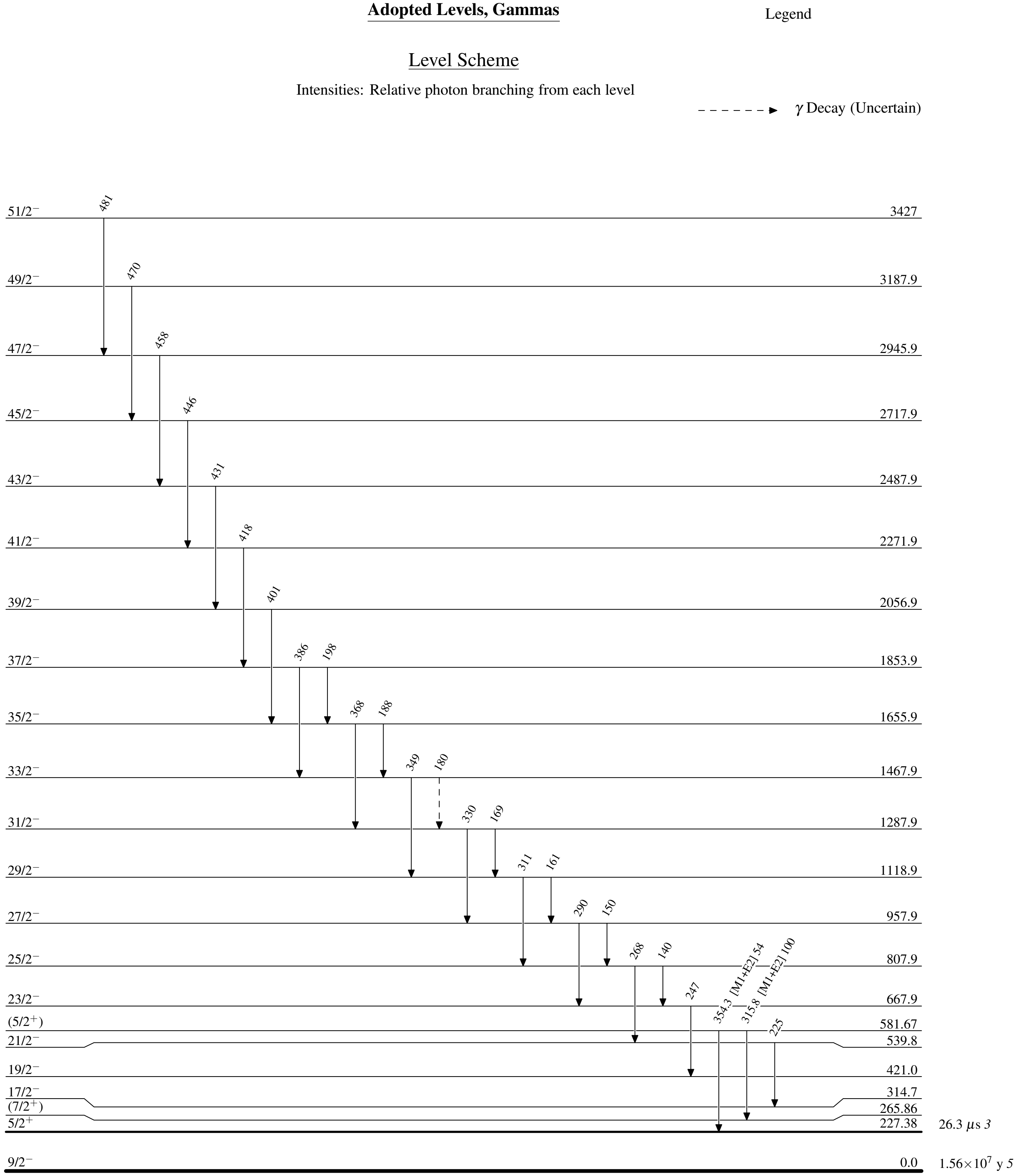
@ Additional information 1.

& Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level

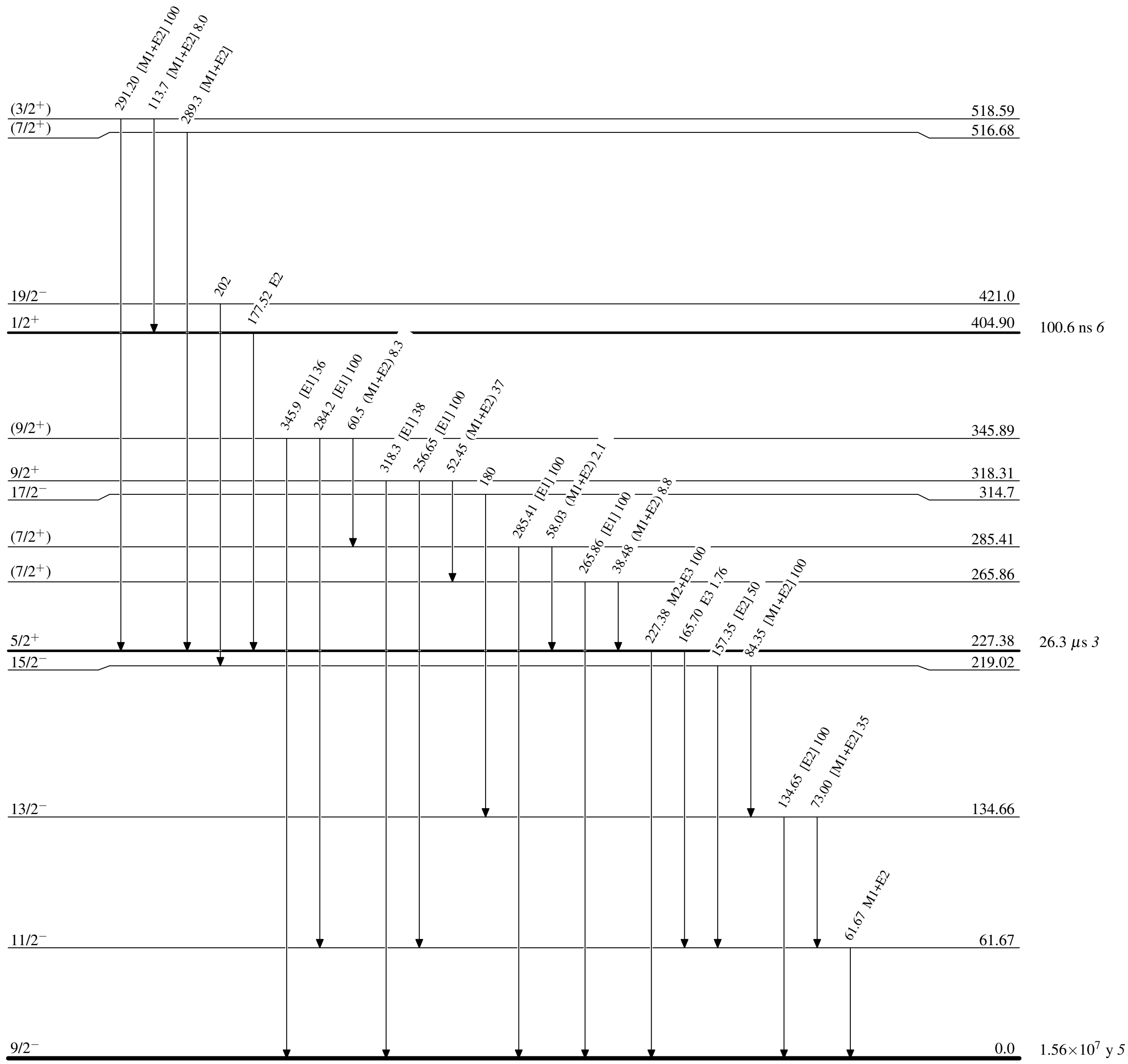


$^{247}_{96}Cm_{151}$

Adopted Levels, Gammas

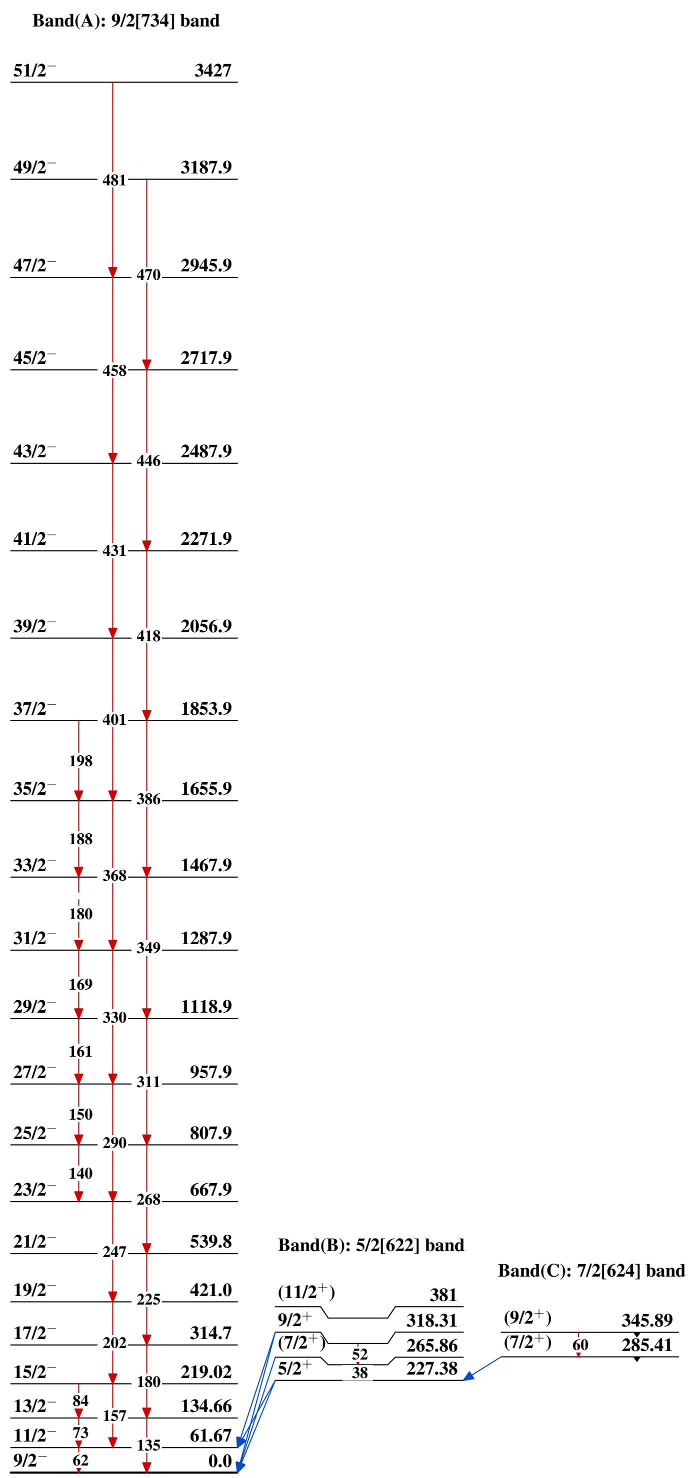
Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{247}_{96}Cm_{151}$

Adopted Levels, Gammas



$^{247}_{96}Cm_{151}$

Adopted Levels, Gammas (continued)