

Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	M. J. Martin	NDS 122, 377 (2014)	1-Sep-2014

Q(β⁻)=-687 SY; S(n)=6212 5; S(p)=7050 SY; Q(α)=5161.73 25 [2012Wa38](#)

The systematics uncertainties are 71 and 100 keV for Q(β⁻) and S(p), respectively.

²⁴⁸Cm Levels

Cross Reference (XREF) Flags

A	²⁵² Cf α decay	D	²⁴⁸ Cm(α,α'),(d,d')
B	²⁴⁸ Bk ε decay	E	²⁴⁶ Cm(t,p)
C	Coulomb excitation		

E(level)&	J ^π ^a	T _{1/2} ^c	XREF	Comments
0.0 [†]	0 ⁺	3.48×10 ⁵ y 6	ABCDE	%α=91.61 16; %SF=8.39 16 T _{1/2} : recommended by 1989Ho24 from a weighted average of 3.52 4 (1969Me01), 3.60 4 (1971Ma32), and 3.40 3 (1971Mc19) In units of 10×10 ⁵ y. T _{1/2} (SF)=4.15×10 ⁶ 3 is recommended by 2000Ho27 from a weighted average of 4.22 12 (1969Me01), 4.20 5 (1971Ma32), and 4.11 3 (1971Mc19) In units of 10×10 ⁶ years. %α,%SF: from the adopted values for T _{1/2} and T _{1/2} (SF).
43.40 [†] 3	2 ⁺ ^b	122.5 ps 25	A CDE	J ^π : HF=3.4 In α decay. T _{1/2} : other: T _{1/2} =126 ps 10 In ²⁵² Cf α decay (1970To08).
143.80 [†] 21	4 ⁺ ^b	80 ps +14-19	A CD	J ^π : HF=62 30 In α decay.
298.9 [†] 3	6 ⁺ ^b	34 ps +11-3	A CD	
506.4 [†] 4	8 ⁺ ^b	16.0 ps +31-23	A CD	
762.8 [†] 4	10 ⁺ ^b	7.5 ps +7-6	C	
1050 [#] 2	(2 ⁺)	1.23 ps +18-16	CD	
1050 [‡] 2	1 ⁻		D	
1064.1 [†] 4	12 ⁺ ^b	3.71 ps +22-18	C	
1084 [@]	0 ⁺		C E	J ^π : L=0 in ²⁴⁸ Cm(t,p) reaction. From the strong population of the 0 ⁺ level in (t,p) reaction, 1977F106 proposed that the level is a two-particle two-hole-pair vibrational state.
1095 [‡] 2	3 ⁻		CD	B(E3)↑=0.41 10
1131 [@] 3	2 ⁺		CD	
1144 [#] 2	4 ⁺		CD	
1172 [‡] 3	5 ⁻		CD	
1222 [@] 3	4 ⁺		CD	
1236 2	(3 ⁻)		D	B(E3)↑≈0.15
1284.4 [#] 8	6 ⁺		C	
1295.1 [‡] 5	7 ⁻		C	
1305 3	(3 ⁻)		D	
1319 3			D	
1358 3			D	
1399 3			D	
1406.2 [†] 5	14 ⁺ ^b	1.75 ps +9-7	C	
1440 3			D	
1452.3 [#] 6	8 ⁺		C	

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Adopted Levels, Gammas (continued) ^{248}Cm Levels (continued)

E(level) &	$J^{\pi a}$	$T_{1/2}^c$	XREF	Comments
1465.9 † 5	9 ⁻		C	
1466.1 @ 4	8 ⁺		C	
1469 4			D	
1484 2	(3 ⁻)		D	B(E3)†≈0.10
1514 3			D	
1552 4			D	
1651 4			D	
1651.8 @ 5	10 ⁺		C	
1669.3 # 5	10 ⁺		C	
1682.4 † 5	11 ⁻		C	
1784.0 † 5	16 ^{+b}	1.43 ps +9-11	C	
1880.2 @ 5	12 ⁺		C	
1883 3			D	
1929.1 # 5	12 ⁺		C	
1938 4			D	
1942.1 † 5	13 ⁻		C	
1969 4			D	
2000 4			D	
2150.1 @ 5	14 ⁺		C	
2192.7 † 5	18 ^{+b}	0.87 ps +9-7	C	
2229.5 # 5	14 ⁺		C	
2242.1 † 5	15 ⁻		C	
2460.6 @ 6	16 ⁺		C	
2566.8 # 5	16 ⁺		C	
2578.2 † 5	17 ⁻		C	
2627.1 † 5	20 ^{+b}	0.76 ps +11-8	C	
2808.6 @ 8	18 ⁺		C	
2937.2 # 6	18 ⁺		C	
2947.2 † 6	19 ⁻		C	
3083.5 † 6	22 ^{+b}	0.44 ps 4	C	
3190.1 @ 9	20 ⁺		C	
3331.7 # 6	20 ⁺		C	
3347.2 † 7	21 ⁻		C	
3559.6 † 6	24 ^{+b}	0.41 ps +9-6	C	
3601.9 @ 11	22 ⁺		C	
3738.3 # 7	22 ⁺		C	
3775.2 † 8	23 ⁻		C	
4041.0 @ 12	24 ⁺		C	
4055.4 † 7	26 ^{+b}	0.32 ps +9-6	C	
4158.1 # 9	24 ⁺		C	
4229.6 † 9	25 ⁻		C	
4572.4 † 8	28 ^{+b}	0.27 ps +18-9	C	
4599.5 # 10	26 ⁺		C	
4709.5 † 10	27 ⁻		C	
5114.0 † 10	30 ⁺		C	
5216.1 † 12	29 ⁻		C	
5680.7? † 11	(32 ⁺)		C	

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Adopted Levels, Gammas (continued)

²⁴⁸Cm Levels (continued)

† Band(A): K^π=0⁺ g.s. band.

‡ Band(B): K^π=1⁻ octupole-vibrational band.

Band(C): K^π=2⁺ γ-vibrational band.

@ Band(D): K^π=0⁺ band.

& No decay from the lower members of the K^π=1⁻ octupole-vibrational band up to 5⁻, or from the K^π=2⁺ γ-vibrational and K^π=0⁺ bands up to 6⁺ has been observed. Also, the 6⁺ member of the K^π=0⁺ band has not been seen In any dataset.

^a From assignments to bands. Confirming arguments are given where available.

^b E2 γ to level with J=J-2.

^c Values for the excited levels are from B(E2) In Coulomb excitation.

γ(²⁴⁸Cm)

B(E2)(W.u.): the B(E2)(W.u.) values have been calculated directly from the B(E2) values As given In the Coulomb excitation dataset.

E _i (level)	J _i ^π	E _γ [†]	I _γ [‡]	E _f	J _f ^π	Mult. [#]	α&	Comments
43.40	2 ⁺	43.399 25		0.0	0 ⁺	E2	1000 15	B(E2)(W.u.)=324 4
143.80	4 ⁺	100.4 2		43.40	2 ⁺	E2	18.4 3	B(E2)(W.u.)=380 +120-50
298.9	6 ⁺	155.1 2		143.80	4 ⁺	E2	2.71 4	B(E2)(W.u.)=550 +40-140
506.4	8 ⁺	207.4 2		298.9	6 ⁺	E2	0.858 12	B(E2)(W.u.)=540 90
762.8	10 ⁺	256.4 2		506.4	8 ⁺	E2	0.401 6	B(E2)(W.u.)=530 50
1064.1	12 ⁺	301.3 2		762.8	10 ⁺	E2	0.236 4	B(E2)(W.u.)=540 30
1295.1	7 ⁻	789.0 5	@	506.4	8 ⁺			
		996.4 5	@	298.9	6 ⁺			
1406.2	14 ⁺	342.0 3		1064.1	12 ⁺	E2	0.1608 23	B(E2)(W.u.)=640 30
1452.3	8 ⁺	167.9 5	≤76	1284.4	6 ⁺			
		946.1 5	≤100	506.4	8 ⁺			
1465.9	9 ⁻	171.2 5	22 5	1295.1	7 ⁻			
		703.1 4	100 8	762.8	10 ⁺			
		959.0 5	5.1 47	506.4	8 ⁺			
1466.1	8 ⁺	1167.3 4		298.9	6 ⁺			
1651.8	10 ⁺	185.9 4	100 21	1466.1	8 ⁺			
		1145.4 4	44 19	506.4	8 ⁺			
1669.3	10 ⁺	217.1 5	<52	1452.3	8 ⁺			I _γ : the authors report I _γ :I _γ (907γ)=22 30:100 33.
		906.6 4	100 33	762.8	10 ⁺			
1682.4	11 ⁻	216.4 4	16 7	1466.1	8 ⁺			
		618.3 3	100 10	1064.1	12 ⁺			
		919.6 4	≤15	762.8	10 ⁺			
1784.0	16 ⁺	377.8 2		1406.2	14 ⁺	E2	0.1210 17	B(E2)(W.u.)=500 40
1880.2	12 ⁺	228.4 4	100 9	1651.8	10 ⁺			
		1117.4 5	10 5	762.8	10 ⁺			
1929.1	12 ⁺	259.9 4	47 12	1669.3	10 ⁺			
		865.2 4	100 14	1064.1	12 ⁺			
1942.1	13 ⁻	259.6 3	39 5	1682.4	11 ⁻			
		535.9 3	100 6	1406.2	14 ⁺			
		877.9 4	9 4	1064.1	12 ⁺			
2150.1	14 ⁺	270.0 5	100 3	1880.2	12 ⁺			
		1085.5 5	6.3 56	1064.1	12 ⁺			
2192.7	18 ⁺	408.6 2		1784.0	16 ⁺	E2	0.0978 14	B(E2)(W.u.)=560 50
2229.5	14 ⁺	300.8 4	100 60	1929.1	12 ⁺			
		822.9 4	93 15	1406.2	14 ⁺			

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Adopted Levels, Gammas (continued)

γ(²⁴⁸Cm) (continued)

<u>E_i(level)</u>	<u>J_i^π</u>	<u>E_γ[†]</u>	<u>I_γ[‡]</u>	<u>E_f</u>	<u>J_f^π</u>	<u>Mult.[#]</u>	<u>α^{&}</u>	<u>Comments</u>
2242.1	15 ⁻	300.0 3 458.1 3 835.9 4	89 24 100 7 7 3	1942.1 1784.0 1406.2	13 ⁻ 16 ⁺ 14 ⁺			
2460.6	16 ⁺	310.2 5 1054.7 5	100 12 <13	2150.1 1406.2	14 ⁺ 14 ⁺			
2566.8	16 ⁺	337.4 3 782.7 4	100 4 26.4 24	2229.5 1784.0	14 ⁺ 16 ⁺			
2578.2	17 ⁻	336.2 3 385.7 3 794.3 4	100 4 26.4 24 9.2 22	2242.1 2192.7 1784.0	15 ⁻ 18 ⁺ 16 ⁺			
2627.1	20 ⁺	434.4 2		2192.7	18 ⁺	E2	0.0834 12	B(E2)(W.u.)=480 60
2808.6	18 ⁺	348.0 5		2460.6	16 ⁺			
2937.2	18 ⁺	370.3 3 744.6 4	100 12 31 10	2566.8 2192.7	16 ⁺ 18 ⁺			
2947.2	19 ⁻	320.1 5 369.4 4 754.0 5	9 3 100 6 7 3	2627.1 2578.2 2192.7	20 ⁺ 17 ⁻ 18 ⁺			
3083.5	22 ⁺	456.4 2		2627.1	20 ⁺	E2	0.0735 11	B(E2)(W.u.)=660 +60-50
3190.1	20 ⁺	381.5 5		2808.6	18 ⁺			
3331.7	20 ⁺	394.6 4 704.5 5	100 20 ≤18	2937.2 2627.1	18 ⁺ 20 ⁺			
3347.2	21 ⁻	263.5 ^a 5 400.0 4 719.6 ^a 5	≤12 100 11 ≤10	3083.5 2947.2 2627.1	22 ⁺ 19 ⁻ 20 ⁺			
3559.6	24 ⁺	476.1 2		3083.5	22 ⁺	E2	0.0662 10	B(E2)(W.u.)=570 100
3601.9	22 ⁺	411.8 5		3190.1	20 ⁺			
3738.3	22 ⁺	406.6 4		3331.7	20 ⁺			
3775.2	23 ⁻	428.0 4		3347.2	21 ⁻			
4041.0	24 ⁺	439.1 5		3601.9	22 ⁺			
4055.4	26 ⁺	495.8 3		3559.6	24 ⁺	E2	0.0601 9	B(E2)(W.u.)=610 +140-130
4158.1	24 ⁺	419.8 5		3738.3	22 ⁺			
4229.6	25 ⁻	454.4 4		3775.2	23 ⁻			
4572.4	28 ⁺	517.0 4		4055.4	26 ⁺	E2	0.0544 8	B(E2)(W.u.)=580 +290-130
4599.5	26 ⁺	441.4 5		4158.1	24 ⁺			
4709.5	27 ⁻	479.9 5		4229.6	25 ⁻			
5114.0	30 ⁺	541.6 5		4572.4	28 ⁺			
5216.1	29 ⁻	506.6 5		4709.5	27 ⁻			
5680.7?	(32 ⁺)	566.7 ^a 5		5114.0	30 ⁺			

[†] E_γ for the levels up to 8⁺ are weighted averages of values from ²⁵²Cf α decay and Coulomb excitation. Values for the higher levels are from Coulomb excitation.

[‡] From branching ratios As given In Coulomb excitation.

[#] From Coulomb excitation.

[@] I_γ(789γ):I_γ(996γ)= ≤5.0 48:≤100 20.

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

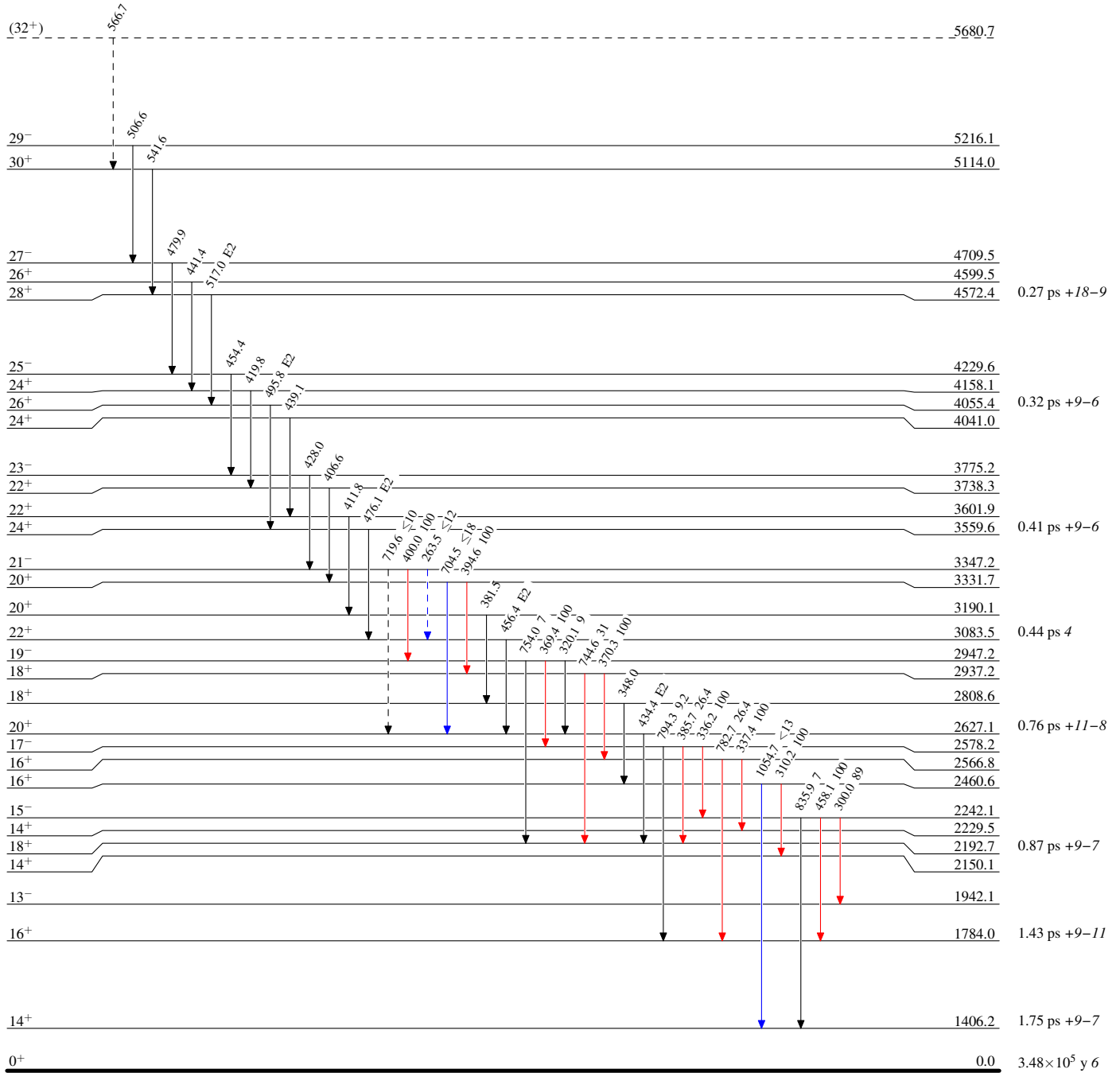
Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Type not specified

- ▶ $I_\gamma < 2\% \times I_\gamma^{max}$
- ▶ $I_\gamma < 10\% \times I_\gamma^{max}$
- ▶ $I_\gamma > 10\% \times I_\gamma^{max}$
- - -▶ γ Decay (Uncertain)



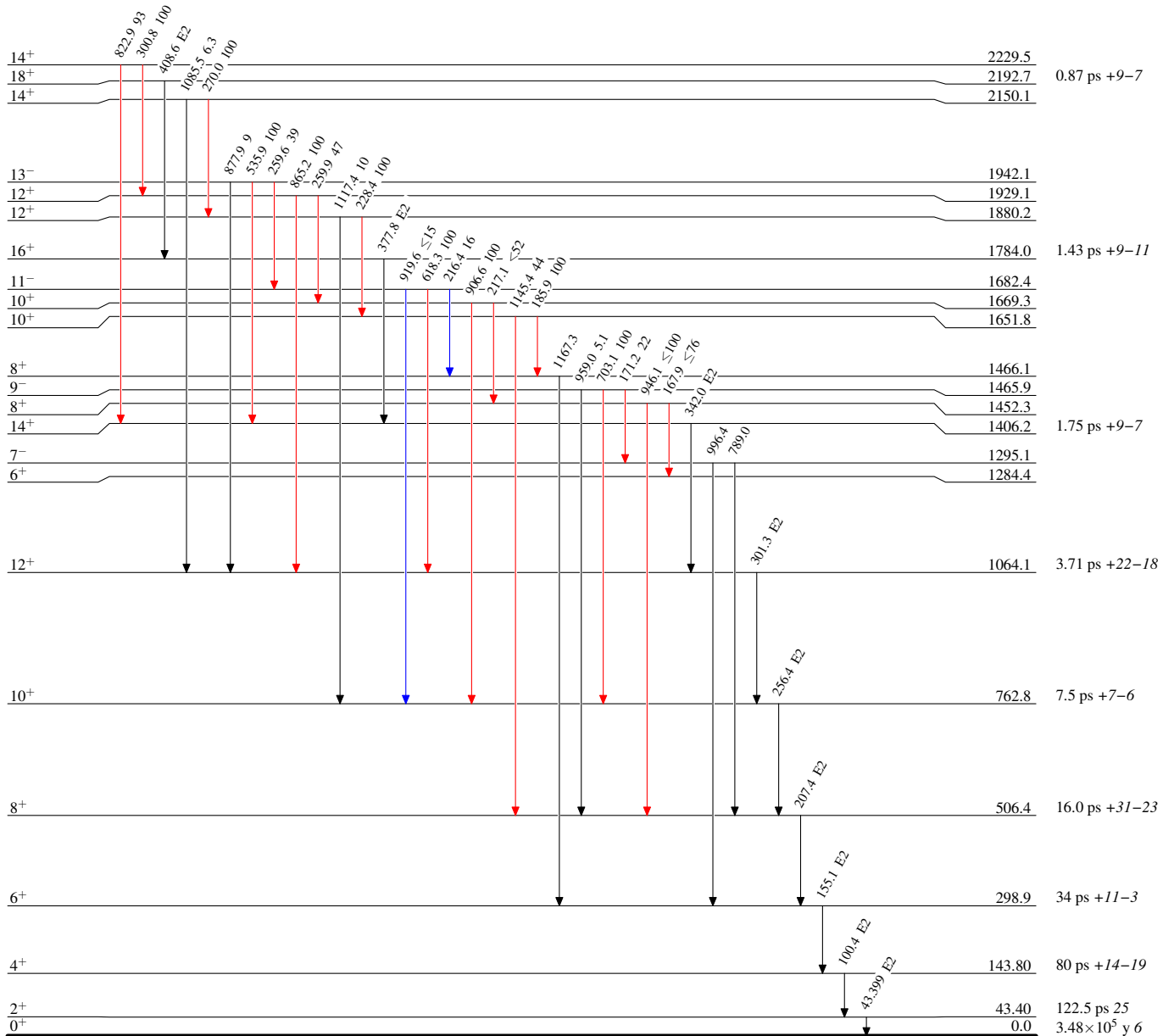
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified

Legend

- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$



²⁴⁸₉₆Cm₁₅₂

Adopted Levels, Gammas