

Adopted Levels, Gammas

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	E. A. Mccutchan, S. K. Rathi, S. Garg		NDS 147, 382 (2018)	1-Dec-2017

Q(β^-)=-2814 13; S(n)=5473 11; S(p)=4370 8; Q(α)=9161 6 2017Wa10
 S(2n)=12787 10; S(2p)=7520 10 (2017Wa10).

²¹⁷Ra evaluated by E.A. McCutchan, S.K. Rathi, and S. Garg.

α : Additional information 1.

²¹⁷Ra Levels

Configurations given here as as assigned by 1984Ro20 and 1984Su10 and constitute the main component of the state.

Cross Reference (XREF) Flags

- A ²²¹Th α decay
- B (HL,xn γ)

E(level) [†]	J π	T _{1/2} [#]	XREF	Comments
0.0 [@]	(9/2 ⁺)	1.6 μ s 2	AB	% α ≈100 Only α decay observed. Other decay modes are expected to be small. Assumption of log ft>5.1 for possible ε decays to known levels in ²¹⁷ Fr yields % ε <1×10 ⁻⁶ . Theoretical calculations by 1997Mo25 give T _{1/2} (β)/T _{1/2} (α)= >100 s/2.3 s. J ^π : favored α decay to (9/2 ⁺) ²¹³ Rn g.s. T _{1/2} : from 1970Va13. Others: 4 μ s 2 (1970To07), 1.7 μ s 3 (1990An19), 1.7 us 1 (1990AnZU), 1.9 μ s 1 (1993AnZS).
209? [‡] 11			A	
330.79 ^{&} 18	(11/2 ⁺)		AB	J ^π : M1+E2 331 γ to (9/2 ⁺).
539.61 [@] 18	(13/2 ⁺)		B	J ^π : (E2) 539.6 γ to (9/2 ⁺).
666.21 ^a 23	(15/2 ⁻)		B	J ^π : E1 127 γ to (13/2 ⁺).
754 [‡] 6	(7/2 ⁺)		A	J ^π : favored α decay from (7/2 ⁺) ²²¹ Th g.s.
931.08 ^{&} 24	(15/2 ⁺)		B	J ^π : (E2) 600 γ to (11/2 ⁺).
1001.91 [@] 23	(17/2 ⁺)		B	J ^π : (E2) 462 γ to (13/2 ⁺), band assignment.
1050.2 4			B	
1173.0 ^a 3	(19/2 ⁻)		B	J ^π : (E2) 507 γ to (15/2 ⁻), band assignment.
1337.5 ^{&} 3	(19/2 ⁺)		B	J ^π : (E2) 406 γ to (15/2 ⁺), band assignment.
1454.4 [@] 3	(21/2 ⁺)		B	J ^π : (E2) 452 γ to (17/2 ⁺), band assignment.
1611.2 ^a 4	(23/2 ⁻)		B	J ^π : (E2) 438 γ to (19/2 ⁻), band assignment.
1667.5 ^{&} 3	(23/2 ⁺)		B	J ^π : E2 330 γ to (19/2 ⁺), band assignment.
1896.4 ^{&} 4	(27/2 ⁺)	0.29 ns 14	B	J ^π : E2 229 γ to (23/2 ⁺), band assignment.
1971.3? 11			B	
2029.7 ^a 5	(27/2 ⁻)		B	J ^π : (E2) 418.5 γ to (23/2 ⁻), band assignment.
2301.1 ^b 4	(29/2 ⁺)	0.30 ns 14	B	J ^π : E2(+M1) 405 γ to (27/2 ⁺).
2304.7? 11			B	
2393.5 ^b 6	(33/2 ⁺)	4.62 ns 6	B	J ^π : E2 92.5 γ to (29/2 ⁺), band assignment.
2521.3 ^a 6	(31/2 ⁻)		B	J ^π : 492 γ to (27/2 ⁻), band assignment.
2830.1? 8			B	
2831.9? 12	(37/2 ⁺)		B	J ^π : 438.4 γ to (33/2 ⁺).

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Adopted Levels, Gammas (continued)

²¹⁷Ra Levels (continued)

E(level) [†]	J ^π	T _{1/2} [#]	XREF	Comments
2894.8? 8	(37/2 ⁺)		B	J ^π : (E2) 501γ to (33/2 ⁺).
3132.2 7	(35/2)		B	J ^π : 739γ to (33/2 ⁺), 125γ from (37/2 ⁺).
3257.5 6	(37/2 ⁺) ^c		B	J ^π : (E2) 864γ to (33/2 ⁺).
3506.1 7	(39/2)		B	J ^π : (E2) 374γ to (35/2).
3628.8 7	(41/2 ⁺) ^c		B	J ^π : (E2) 371.3γ to (37/2 ⁺); band assignment.
3825.4 8	(45/2 ⁺) ^c	1.49 ns 7	B	J ^π : (E2) 197γ to (41/2 ⁺); band assignment.
4185.5 9	(47/2)		B	J ^π : D 360γ to (45/2 ⁺).
4327.2? 13			B	
4344.4? 13			B	
4822.6? 14			B	
4999.3? 15			B	

[†] From a least-squares fit to E_γ, by evaluators, except where noted.

[‡] From ²²¹Th α decay.

[#] From γ(t) in (HI,xnγ), except where noted.

@ Seq.(A): Configuration=(ν g_{9/2})⁺³.

& Seq.(B): Configuration=((ν g_{9/2})⁺²(ν i_{11/2})).

^a Seq.(C): Configuration=((ν g_{9/2})⁺²(ν j_{15/2})).

^b Seq.(D): Configuration=((ν i_{11/2})⁺²(ν g_{9/2})).

^c These states were proposed to have two ν j_{15/2} and/or some proton excitations by 1984Ro20. In addition, the isomeric state is suggested to include large amount of “((ν i_{11/2})⁺²)₁₀+(ν g_{9/2})_{29/2}⁺ coupled to 2⁺ state of ²¹⁴Ra” configuration. No definite assignment could be made.

γ(²¹⁷Ra)

E _i (level)	J _i ^π	E _γ [†]	I _γ [†]	E _f	J _f ^π	Mult. [‡]	α	Comments
330.79	(11/2 ⁺)	330.8 2	100	0.0	(9/2 ⁺)	M1+E2	0.33 22	α(K)=0.25 19; α(L)=0.061 20; α(M)=0.0150 41; α(N)=0.0040 11; α(O)=8.9×10 ⁻⁴ 26 α(P)=1.48×10 ⁻⁴ 52; α(Q)=9.0×10 ⁻⁶ 68
539.61	(13/2 ⁺)	208.6 ^{&} 539.6 2		330.79 0.0	(11/2 ⁺) (9/2 ⁺)	(E2) [#]	0.0324	α(K)=0.0218 3; α(L)=0.00792 12; α(M)=0.00202 3; α(N)=0.000534 8; α(O)=0.0001175 17 α(P)=1.88×10 ⁻⁵ 3; α(Q)=7.89×10 ⁻⁷ 11
666.21	(15/2 ⁻)	126.6 2	100	539.61	(13/2 ⁺)	E1	0.272	α(K)=0.212 3; α(L)=0.0450 7; α(M)=0.01082 16; α(N)=0.00282 5; α(O)=0.000618 9 α(P)=9.84×10 ⁻⁵ 15; α(Q)=5.24×10 ⁻⁶ 8
931.08	(15/2 ⁺)	391.2 600.3 2		539.61 330.79	(13/2 ⁺) (11/2 ⁺)	(E2) [#]	0.0255	α(K)=0.01775 25; α(L)=0.00577 9; α(M)=0.001462 21; α(N)=0.000386 6; α(O)=8.53×10 ⁻⁵ 12 α(P)=1.380×10 ⁻⁵ 20; α(Q)=6.36×10 ⁻⁷ 9
1001.91	(17/2 ⁺)	335.7 2	100	666.21	(15/2 ⁻)	E1	0.0274	α(K)=0.0221 4; α(L)=0.00399 6; α(M)=0.000948 14; α(N)=0.000248 4; α(O)=5.56×10 ⁻⁵ 8 α(P)=9.32×10 ⁻⁶ 14; α(Q)=6.16×10 ⁻⁷ 9 Mult.: D from γ(θ) in (HI,xnγ), Δπ=yes from level scheme.
		462.3 2	74	539.61	(13/2 ⁺)	(E2) [#]	0.0467	α(K)=0.0294 5; α(L)=0.01289 19; α(M)=0.00333 5; α(N)=0.000879 13; α(O)=0.000193 3 α(P)=3.04×10 ⁻⁵ 5; α(Q)=1.089×10 ⁻⁶ 16

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Adopted Levels, Gammas (continued)

$\gamma(^{217}\text{Ra})$ (continued)								
$E_i(\text{level})$	J_i^π	E_γ^\dagger	I_γ^\dagger	E_f	J_f^π	Mult. [‡]	α	Comments
1050.2		119.1 5	100	931.08	(15/2 ⁺)			
1173.0	(19/2 ⁻)	171.1 5	39	1001.91	(17/2 ⁺)	E1	0.1311 21	$\alpha(\text{K})=0.1039$ 17; $\alpha(\text{L})=0.0206$ 4; $\alpha(\text{M})=0.00495$ 8; $\alpha(\text{N})=0.001291$ 21; $\alpha(\text{O})=0.000285$ 5 $\alpha(\text{P})=4.63\times 10^{-5}$ 8; $\alpha(\text{Q})=2.66\times 10^{-6}$ 5
		506.8 2	100	666.21	(15/2 ⁻)	(E2) [#]	0.0375	$\alpha(\text{K})=0.0246$ 4; $\alpha(\text{L})=0.00961$ 14; $\alpha(\text{M})=0.00247$ 4; $\alpha(\text{N})=0.000651$ 10; $\alpha(\text{O})=0.0001430$ 21 $\alpha(\text{P})=2.28\times 10^{-5}$ 4; $\alpha(\text{Q})=8.99\times 10^{-7}$ 13
1337.5	(19/2 ⁺)	287.3 5	8	1050.2				
		335.6 5	19	1001.91	(17/2 ⁺)	(M1)	0.521	$\alpha(\text{K})=0.420$ 7; $\alpha(\text{L})=0.0769$ 12; $\alpha(\text{M})=0.0183$ 3; $\alpha(\text{N})=0.00484$ 7; $\alpha(\text{O})=0.001104$ 17 $\alpha(\text{P})=0.000192$ 3; $\alpha(\text{Q})=1.508\times 10^{-5}$ 22 Mult.: D from $\gamma(\theta)$ in (HI,xn γ), $\Delta\pi$ =no from level scheme.
		406.4 2	100	931.08	(15/2 ⁺)	(E2) [#]	0.0648	$\alpha(\text{K})=0.0380$ 6; $\alpha(\text{L})=0.0198$ 3; $\alpha(\text{M})=0.00517$ 8; $\alpha(\text{N})=0.001366$ 20; $\alpha(\text{O})=0.000298$ 5 $\alpha(\text{P})=4.65\times 10^{-5}$ 7; $\alpha(\text{Q})=1.434\times 10^{-6}$ 21
1454.4	(21/2 ⁺)	281.4 2	100	1173.0	(19/2 ⁻)	E1	0.0407	$\alpha(\text{K})=0.0327$ 5; $\alpha(\text{L})=0.00603$ 9; $\alpha(\text{M})=0.001437$ 21; $\alpha(\text{N})=0.000376$ 6; $\alpha(\text{O})=8.39\times 10^{-5}$ 12 $\alpha(\text{P})=1.397\times 10^{-5}$ 20; $\alpha(\text{Q})=8.93\times 10^{-7}$ 13
		452.5 [@] 2	97	1001.91	(17/2 ⁺)	(E2) [#]	0.0493	$\alpha(\text{K})=0.0307$ 5; $\alpha(\text{L})=0.01383$ 20; $\alpha(\text{M})=0.00358$ 5; $\alpha(\text{N})=0.000944$ 14; $\alpha(\text{O})=0.000207$ 3 $\alpha(\text{P})=3.26\times 10^{-5}$ 5; $\alpha(\text{Q})=1.140\times 10^{-6}$ 16
1611.2	(23/2 ⁻)	156.8 5	35	1454.4	(21/2 ⁺)	E1	0.162 3	$\alpha(\text{K})=0.1278$ 21; $\alpha(\text{L})=0.0258$ 5; $\alpha(\text{M})=0.00619$ 10; $\alpha(\text{N})=0.00161$ 3; $\alpha(\text{O})=0.000356$ 6 $\alpha(\text{P})=5.76\times 10^{-5}$ 10; $\alpha(\text{Q})=3.24\times 10^{-6}$ 5 Mult.: D from $\gamma(\theta)$ in (HI,xn γ), $\Delta\pi$ =yes from level scheme.
		438.2 [@] 5	100	1173.0	(19/2 ⁻)	(E2) [#]	0.0534	$\alpha(\text{K})=0.0327$ 5; $\alpha(\text{L})=0.01538$ 23; $\alpha(\text{M})=0.00399$ 6; $\alpha(\text{N})=0.001053$ 16; $\alpha(\text{O})=0.000230$ 4 $\alpha(\text{P})=3.62\times 10^{-5}$ 6; $\alpha(\text{Q})=1.220\times 10^{-6}$ 18
1667.5	(23/2 ⁺)	213.0 5	37	1454.4	(21/2 ⁺)	M1	1.83	$\alpha(\text{K})=1.475$ 23; $\alpha(\text{L})=0.272$ 5; $\alpha(\text{M})=0.0650$ 10; $\alpha(\text{N})=0.0172$ 3; $\alpha(\text{O})=0.00391$ 6 $\alpha(\text{P})=0.000682$ 11; $\alpha(\text{Q})=5.35\times 10^{-5}$ 9
		330.0 2	100	1337.5	(19/2 ⁺)	(E2)	0.1148	$\alpha(\text{K})=0.0582$ 9; $\alpha(\text{L})=0.0419$ 6; $\alpha(\text{M})=0.01106$ 16; $\alpha(\text{N})=0.00292$ 5; $\alpha(\text{O})=0.000633$ 9 $\alpha(\text{P})=9.71\times 10^{-5}$ 14; $\alpha(\text{Q})=2.27\times 10^{-6}$ 4
1896.4	(27/2 ⁺)	228.9 2	100	1667.5	(23/2 ⁺)	E2	0.364	$\alpha(\text{K})=0.1238$ 18; $\alpha(\text{L})=0.177$ 3; $\alpha(\text{M})=0.0475$ 7; $\alpha(\text{N})=0.01255$ 19; $\alpha(\text{O})=0.00270$ 4 $\alpha(\text{P})=0.000403$ 6; $\alpha(\text{Q})=5.34\times 10^{-6}$ 8 B(E2)(W.u.)=29 15
1971.3?		360.1 ^{@&}	100	1611.2	(23/2 ⁻)			
2029.7	(27/2 ⁻)	418.5 5	100	1611.2	(23/2 ⁻)	(E2) [#]	0.0600	$\alpha(\text{K})=0.0359$ 5; $\alpha(\text{L})=0.0180$ 3; $\alpha(\text{M})=0.00467$ 7; $\alpha(\text{N})=0.001233$ 18; $\alpha(\text{O})=0.000269$ 4 $\alpha(\text{P})=4.22\times 10^{-5}$ 7; $\alpha(\text{Q})=1.346\times 10^{-6}$ 20
2301.1	(29/2 ⁺)	271.3		2029.7	(27/2 ⁻)			

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Adopted Levels, Gammas (continued) $\gamma(^{217}\text{Ra})$ (continued)

$E_i(\text{level})$	J_i^π	E_γ^\dagger	I_γ^\dagger	E_f	J_f^π	Mult. [‡]	α	Comments
2301.1	(29/2 ⁺)	404.7 2		1896.4	(27/2 ⁺)	E2(+M1)	0.19 13	$\alpha(\text{K})=0.15$ 11; $\alpha(\text{L})=0.033$ 13; $\alpha(\text{M})=0.0081$ 29; $\alpha(\text{N})=0.00214$ 76; $\alpha(\text{O})=4.8\times 10^{-4}$ 18 $\alpha(\text{P})=8.1\times 10^{-5}$ 34; $\alpha(\text{Q})=5.2\times 10^{-6}$ 38
2304.7?		275&	100	2029.7	(27/2 ⁻)			
2393.5	(33/2 ⁺)	92.5 5	100	2301.1	(29/2 ⁺)	E2	13.7 4	$\alpha(\text{L})=10.1$ 3; $\alpha(\text{M})=2.75$ 8; $\alpha(\text{N})=0.725$ 22; $\alpha(\text{O})=0.154$ 5; $\alpha(\text{P})=0.0223$ 7; $\alpha(\text{Q})=7.26\times 10^{-5}$ 18 B(E2)(W.u.)=15.9 7
2521.3	(31/2 ⁻)	220.2& 491.6 5		2301.1	(29/2 ⁺)			
				2029.7	(27/2 ⁻)			
2830.1?		437& 528.6&		2393.5	(33/2 ⁺)			
				2301.1	(29/2 ⁺)			
2831.9?	(37/2 ⁺)	438.4&	100	2393.5	(33/2 ⁺)			
2894.8?	(37/2 ⁺)	501.3& 5	100	2393.5	(33/2 ⁺)	(E2) [#]	0.0384	$\alpha(\text{K})=0.0251$ 4; $\alpha(\text{L})=0.00994$ 15; $\alpha(\text{M})=0.00255$ 4; $\alpha(\text{N})=0.000674$ 10; $\alpha(\text{O})=0.0001481$ 22 $\alpha(\text{P})=2.36\times 10^{-5}$ 4; $\alpha(\text{Q})=9.19\times 10^{-7}$ 13
3132.2	(35/2)	738.8 5	100	2393.5	(33/2 ⁺)			
3257.5	(37/2 ⁺)	125.4 5 864.0 2		3132.2	(35/2)			
				2393.5	(33/2 ⁺)	(E2) [#]	0.0119 6	$\alpha(\text{K})=0.00906$ 13; $\alpha(\text{L})=0.00219$ 3; $\alpha(\text{M})=0.000539$ 8; $\alpha(\text{N})=0.0001421$ 20; $\alpha(\text{O})=3.18\times 10^{-5}$ 5 $\alpha(\text{P})=5.30\times 10^{-6}$ 8; $\alpha(\text{Q})=3.12\times 10^{-7}$ 5
3506.1	(39/2)	248.6 5 374.0 5	100 25	3257.5	(37/2 ⁺)	D		
				3132.2	(35/2)	(E2) [#]	0.0808	$\alpha(\text{K})=0.0450$ 7; $\alpha(\text{L})=0.0265$ 4; $\alpha(\text{M})=0.00696$ 11; $\alpha(\text{N})=0.00184$ 3; $\alpha(\text{O})=0.000400$ 6 $\alpha(\text{P})=6.20\times 10^{-5}$ 10; $\alpha(\text{Q})=1.719\times 10^{-6}$ 25
3628.8	(41/2 ⁺)	122.7 5 371.3 2	28 100	3506.1	(39/2)			
				3257.5	(37/2 ⁺)	(E2) [#]	0.0824	$\alpha(\text{K})=0.0457$ 7; $\alpha(\text{L})=0.0272$ 4; $\alpha(\text{M})=0.00714$ 10; $\alpha(\text{N})=0.00189$ 3; $\alpha(\text{O})=0.000410$ 6 $\alpha(\text{P})=6.36\times 10^{-5}$ 9; $\alpha(\text{Q})=1.746\times 10^{-6}$ 25
3825.4	(45/2 ⁺)	196.6 5	100	3628.8	(41/2 ⁺)	(E2) [#]	0.622 11	$\alpha(\text{K})=0.1671$ 25; $\alpha(\text{L})=0.335$ 6; $\alpha(\text{M})=0.0905$ 17; $\alpha(\text{N})=0.0239$ 5; $\alpha(\text{O})=0.00512$ 10 $\alpha(\text{P})=0.000759$ 14; $\alpha(\text{Q})=7.78\times 10^{-6}$ 12 B(E2)(W.u.)=10.3 5
4185.5	(47/2)	360.1 2	100	3825.4	(45/2 ⁺)	D		
4327.2?		141.7&	100	4185.5	(47/2)			
4344.4?		519.0&	100	3825.4	(45/2 ⁺)			
4822.6?		495.4 5	100	4327.2?				
4999.3?		176.7 5	100	4822.6?				

† From (HI,xn γ).‡ From $\gamma(\theta)$ and conversion electron measurements in (HI,xn γ), except where noted.# Q from $\gamma(\theta)$ in (HI,xn γ), E2 from assumed band structure or RUL.

@ Multiply placed.

& Placement of transition in the level scheme is uncertain.

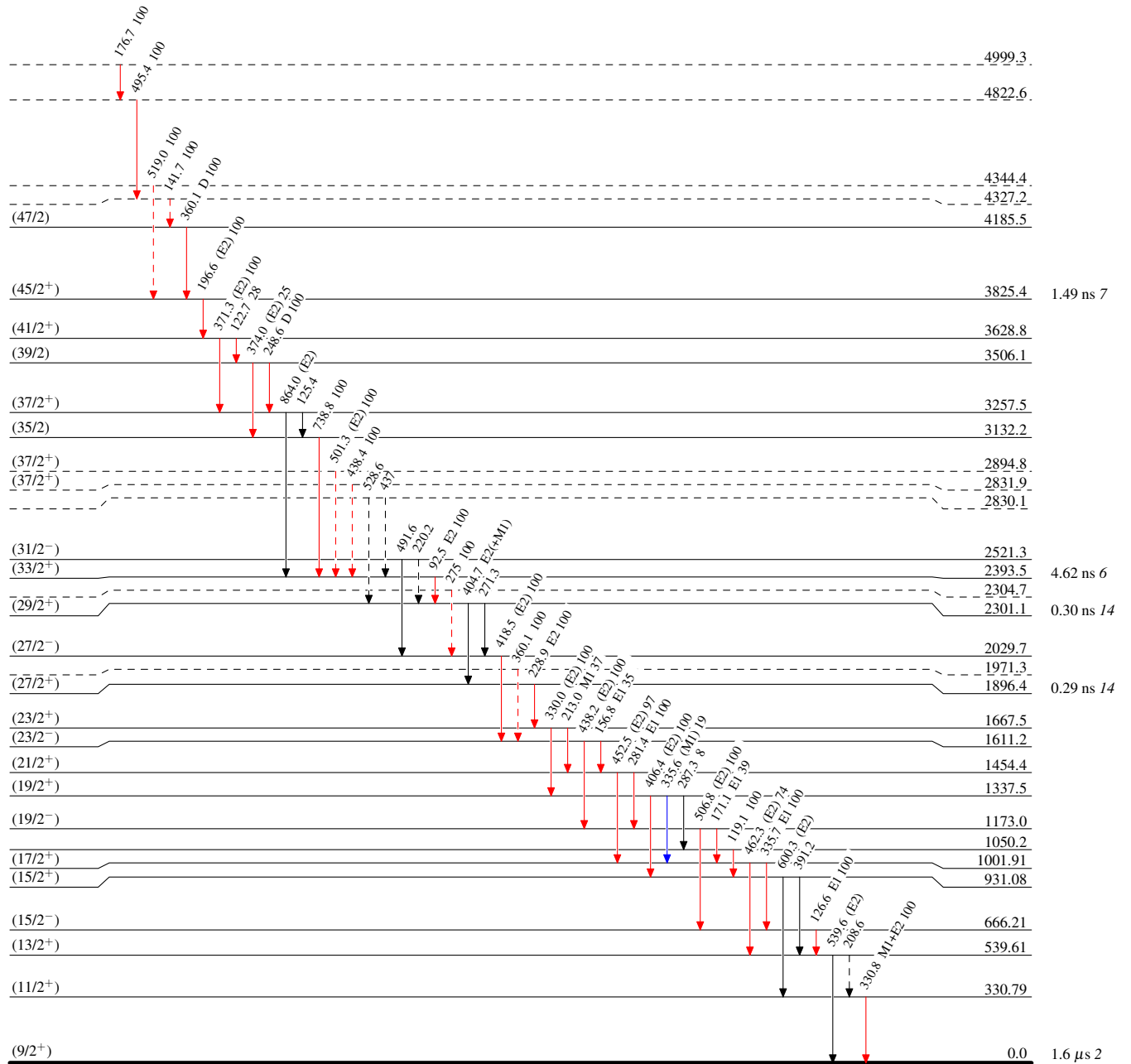
Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Type not specified

- ▶ I_γ < 2% × I_γ^{max}
- ▶ I_γ < 10% × I_γ^{max}
- ▶ I_γ > 10% × I_γ^{max}
- - -▶ γ Decay (Uncertain)



²¹⁷₈₈Ra₁₂₉

Adopted Levels, Gammas