

Adopted Levels, Gammas

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh, Alexander A. Rodionov And Yuri L. Khazov		NDS 109,517 (2008)	22-Jan-2008

$Q(\beta^-) = -2027.5$; $S(n) = 9496.22$; $S(p) = 4982.10$; $Q(\alpha) = -1010.11$ [2012Wa38](#)

Note: Current evaluation has used the following Q record -2026.5 [9503](#) 22 [4990](#) 10 -1016.11 [2003Au03](#).

Nuclear structure calculations: [1987Ai21](#) (levels, transition rates, magnetic moment, Q, IBF model), [1986Do17](#) and [1985Do05](#)

(levels, B(M1)), [1975Ku11](#) (B(E2) rates), [1974De54](#) (levels), [1971De49](#) (levels, magnetic moment, Q, transition rates), [1969Fr17](#)

(levels, magnetic moment, Q, transition rates).

[Additional information 1.](#)

 ^{135}La Levels

Cross Reference (XREF) Flags

- A** ^{135}Ce ε decay (17.7 h)
B $^{128}\text{Te}(^{11}\text{B}, 4n\gamma)$, $^{133}\text{Cs}(\alpha, 2n\gamma)$
C $^{134}\text{Ba}(p, p)$ IAR
D $^{134}\text{Ba}(^3\text{He}, d), (\alpha, t)$

E(level) [†]	J ^π [‡]	T _{1/2} [#]	XREF	Comments
0.0 [@]	5/2 ⁺	19.5 h 2	AB D	$\% \varepsilon + \% \beta^+ = 100$ $\mu = +3.70$ 9 (2003Ii03) $Q = -0.4$ 4 (2003Ii03) J^π : spin from atomic beam (1973In04); parity from $\log ft = 5.66$ to $3/2^+$ g.s. in ^{135}Ba . μ, Q : collinear laser spectroscopy on an ionic beam. Probable configuration = $d_{5/2}$. $T_{1/2}$: weighted average of 19.4 h 1 (1965Mo05) and 19.8 h 2 (1958Mi88). Others: 19.7 h (1960La07), 19.5 h (1948Ch03), 17.5 h 5 (1943We02), 1950Na09 .
119.533 ^{&} 14	7/2 ⁺	4.0 ns 1	AB D	J^π : M1+E2 γ to 5/2 ⁺ ; $\Delta J = 1$ γ from 9/2 ⁺ . Probable configuration = $g_{7/2}$.
206.503 10	5/2 ⁺	0.52 ns 3	A	J^π : M1+E2 γ to 7/2 ⁺ ; M1+E2 γ 's from 3/2 ⁺ .
265.546 10	3/2 ⁺	<0.08 ns	A	J^π : M1+E2 γ to 5/2 ⁺ ; M1(+E2) γ from 1/2 ⁺ .
300.052 10	1/2 ⁺	<0.08 ns	A	J^π : (572 γ)(300 γ)(θ) is isotropic; E2 γ to 5/2 ⁺ .
583.48 [@] 14	9/2 ⁺		AB	J^π : $\Delta J = 1$ γ to 7/2 ⁺ ; E1 γ from 11/2 ⁻ .
604.563 13	3/2 ⁺ , 5/2 ⁺		A	J^π : M1, E2 γ 's to 1/2 ⁺ and 7/2 ⁺ .
665.556 17	5/2 ⁺		A	J^π : M1(+E2) γ to 7/2 ⁺ ; M1+E2 γ from 3/2 ⁺ .
712.35? 9	(3/2 ⁻ , 5/2 ⁻)		A	J^π : (E1) γ from 3/2 ⁺ ; γ to 5/2 ⁺ .
715.9 ^{&} 2	(11/2 ⁺)		B	J^π : $\Delta J = (2)$ γ to 7/2 ⁺ .
783.600 11	3/2 ⁺		A	J^π : M1+E2 γ to 5/2 ⁺ ; M1(+E2) γ to 1/2 ⁺ .
785.7 ^a 2	11/2 ⁻	<20 ns	AB D	J^π : L=5 from $\sigma(\alpha, t)/\sigma(^3\text{He}, d)$; $\Delta J = 1$, E1 γ to 9/2 ⁺ . Probable configuration = $\pi h_{11/2}$. $T_{1/2}$: $\gamma(t)$ in $^{128}\text{Te}(^{11}\text{B}, 4n\gamma)$, $^{133}\text{Cs}(\alpha, 2n\gamma)$ (1973Le09).
828.373 13	3/2 ⁺		A	J^π : M1 γ to 1/2 ⁺ and M1(+E2) γ to 5/2 ⁺ .
872.312 13	(1/2 ⁺)		A	J^π : $\log ft = 6.1$ from 1/2 ⁽⁺⁾ ; E2 γ to 5/2 ⁺ ; (607 γ)(266 γ)(θ).
984.359 14	3/2 ⁺		A	J^π : $\log ft = 7.1$ from 1/2 ⁽⁺⁾ ; M1+E2 γ to 5/2 ⁺ .
993.43 6	1/2 ⁺ , 3/2 ⁺ , 5/2 ⁺		A	J^π : M1, E2 γ from 3/2 ⁺ and γ to 1/2 ⁺ .
1038.52 2	3/2 ⁺ , 5/2 ⁺		A	J^π : M1 γ to 5/2 ⁺ ; γ to 1/2 ⁺ .
1171.417 11	3/2 ⁺		A	J^π : M1(+E2) γ to 1/2 ⁺ ; (E2) γ to 7/2 ⁺ .
1377.7 ^a 3	(15/2 ⁻)		B	J^π : $\Delta J = (2)$ γ to 11/2 ⁻ .
1385.5 [@] 3	(13/2 ⁺)		B	J^π : $\Delta J = (2)$ γ to 9/2 ⁺ .
1437.2 ^b 3	(13/2 ⁻)		B	J^π : $\Delta J = 1$ γ to 11/2 ⁻ .

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Adopted Levels, Gammas (continued) ^{135}La Levels (continued)

E(level) [†]	J ^π [‡]	T _{1/2} [#]	XREF	Comments
1439.484 18	3/2 ⁺		A	J ^π : M1(+E2) γ's to 5/2 ⁺ ; M1(+E2) γ to 1/2 ⁺ .
1449.635 17	1/2 ⁺ , 3/2 ⁺		A	J ^π : log ft=6.7 from 1/2 ⁽⁺⁾ ; M1+E2 γ to 3/2 ⁺ .
1479.66 3	1/2 ⁺ , 3/2 ⁺		A	J ^π : log ft=7.5 from 1/2 ⁽⁺⁾ ; M1(+E2) γ to 3/2 ⁺ . Weak γ to 7/2 ⁺ disfavors 1/2 ⁺ .
1500.7& 2	(15/2 ⁺)		B	J ^π : ΔJ=(2) γ to (11/2 ⁺).
1568.9? 2			A	
1599.25 3	1/2 ⁺ , 3/2 ⁺		A	J ^π : log ft=7.3 from 1/2 ⁽⁺⁾ ; M1,E2 γ to 1/2 ⁺ .
1757.2 3	(15/2 ⁻)		B	J ^π : ΔJ=1 d+Q γ to (13/2 ⁻).
1766.976 20	3/2 ⁺		A	J ^π : log ft=6.4 from 1/2 ⁽⁺⁾ ; E2(+M1) γ to 1/2 ⁺ .
1797.14 7	1/2 ⁺ , 3/2		A	J ^π : log ft=7.5 from 1/2 ⁽⁺⁾ ; D,E2 γ to 5/2 ⁺ .
1850.73 15	1/2, 3/2		A	J ^π : log ft=7.2 from 1/2 ⁽⁺⁾ .
1988.0? 4			B	
2121.5 ^b 3	(17/2 ⁻)		B	
2132.4 3	(19/2 ⁻)		B	J ^π : ΔJ=(2) γ to (15/2 ⁻).
2232.6 ^a 3	(19/2 ⁻)		B	J ^π : ΔJ=(2) γ to (15/2 ⁻).
2265.8 4	(21/2 ⁻)	<20 ns	B	J ^π : ΔJ=1 γ to (19/2 ⁻). T _{1/2} : γ(t) in $^{128}\text{Te}(^{11}\text{B}, 4n\gamma)$, $^{133}\text{Cs}(\alpha, 2n\gamma)$ (1973Le09).
2304.0@ 4	(17/2 ⁺)		B	J ^π : γ to (13/2 ⁺).
2400.8& 4	(19/2 ⁺)		B	J ^π : ΔJ=(2) γ to (15/2 ⁺).
2494.2 ^c 3	(19/2 ⁺)		B	
2507.1 3	(19/2 ⁺)		B	
2626.3 ^c 4	(21/2 ⁺)		B	
2735.5 3	(23/2 ⁻)	25.9 ns 15	B	g=0.003 15 (1976Le29) T _{1/2} : γ(t) in $^{128}\text{Te}(^{11}\text{B}, 4n\gamma)$, $^{133}\text{Cs}(\alpha, 2n\gamma)$ (1990XuZW). J ^π : ΔJ=1 γ to (21/2 ⁻). 1973Le09 suggested 27/2 ⁺ , which seems unlikely from level scheme of 1977Ch23. μ: 1989Ra17 quote μ=0.04 20 from g=0.003 15 (1976Le29), assuming J=27/2 as suggested by 1973Le09.
2795.7 ^b 3	(21/2 ⁻)		B	
2811.3 ^c 4	(23/2 ⁺)		B	
2973.2 4	(25/2 ⁻)		B	
3079.3 ^c 4	(25/2 ⁺)		B	
3105.6 ^a 3	(23/2 ⁻)		B	
3170.0 4			B	
3181.0 4	(23/2 ⁻)		B	
3438.3 4	(27/2 ⁻)		B	
3500.0 ^b 3	(25/2 ⁻)		B	
3522.5 ^c 5	(27/2 ⁺)		B	
3638.6 ^d 4	(27/2 ⁻)		B	
3837.2 ^a 4	(27/2 ⁻)		B	
3890.5 ^c 5	(29/2 ⁺)		B	
3959.0 ^d 4	(29/2 ⁻)		B	
4262.6 4	(29/2 ⁻)		B	
4318.5 ^d 4	(31/2 ⁻)		B	
4552.7 4			B	
4695.2 ^a 4	(31/2 ⁻)		B	
4820.6 ^d 5	(33/2 ⁻)		B	
5001.2 5			B	
5209.4 ^e 4	(33/2 ⁻)		B	
5379.1 ^d 5	(35/2 ⁻)		B	
5461.4 ^e 4	(35/2 ⁻)		B	

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Adopted Levels, Gammas (continued) ^{135}La Levels (continued)

E(level) [†]	J ^π [‡]	XREF	Comments
5564?		B	
5772.4 ^e 5	(37/2 ⁻)	B	
6158.6 ^e 5	(39/2 ⁻)	B	
6630.6 ^e 6	(41/2 ⁻)	B	
7159.6 ^e 6	(43/2 ⁻)	B	
12815	(3/2 ⁺)	C	Γ=42 keV. J ^π : IAS of g.s., 3/2 ⁺ in ^{135}Ba .
13053	(1/2 ⁺)	C	Γ=53 keV. J ^π : IAS of 221, 1/2 ⁺ in ^{135}Ba .
14222	(7/2 ⁻)	C	Γ=48 keV. J ^π : IAS of 1446, 7/2 ⁻ in ^{135}Ba .
14360	(3/2 ⁻)	C	Γ=81 keV. J ^π : IAS of 1584, (3/2 ⁻) in ^{135}Ba .
14767	(1/2 ⁻)	C	Γ=87 keV. J ^π : IAS of 1997, (1/2 ⁻) in ^{135}Ba .
14936		C	J ^π : (5/2 ⁻ , 7/2 ⁻) from IAS of possible 2150, L(d,p)=(3) level in ^{135}Ba .
15514	(1/2 ⁻ , 3/2 ⁻)	C	J ^π : IAS of 2730, L(d,p)=1 level in ^{135}Ba .
15773		C	J ^π : (5/2 ⁻ , 7/2 ⁻) from IAS of possible 2949, L(d,p)=3 level in ^{135}Ba .

[†] From least-squares fit to Eγ's, normalized $\chi^2=0.91$.

[‡] For levels from $^{128}\text{Te}(^{11}\text{B}, 4n\gamma)$, $^{133}\text{Cs}(\alpha, 2n\gamma)$, above 2 MeV, the assignments are essentially from 1990XuZW, based on $\gamma\gamma(\theta)(\text{DCO})$ data and possible band assignments. In J^π arguments, ΔJ=(2) statement refers to stretched quadrupole transition and ΔJ=1 to stretched dipole (with possible quadrupole admixture) transition.

From $\gamma\gamma(t)$ in ^{135}Ce ε decay, unless otherwise stated.

@ Band(A): d_{5/2} band. VMI analysis: parameter Δ=10 keV.

& Band(B): g_{7/2} band. VMI analysis: parameter Δ=7 keV.

^a Band(C): h_{11/2} band, α=-1/2. VMI analysis: parameter Δ=69 keV, 119 keV for both signatures combined.

^b Band(D): h_{11/2} band, α=+1/2. VMI analysis: parameter Δ=1 keV.

^c Band(E): Band 1. VMI analysis: parameter Δ=77 keV.

^d Band(F): Band 2. VMI analysis: parameter Δ=54 keV.

^e Band(G): Band 3. VMI analysis: parameter Δ=67 keV.

Adopted Levels, Gammas (continued)

$E_i(\text{level})$	J_i^π	$\gamma(^{135}\text{La})$							Comments
		$E_\gamma^\dagger$	$I_\gamma^\dagger$	E_f	J_f^π	Mult. [‡]	$\delta^\#$	$\alpha^\&$	
119.533	7/2 ⁺	119.52 2	100	0.0	5/2 ⁺	M1+E2	0.22 1	0.670	B(M1)(W.u.)=0.00183 6; B(E2)(W.u.)=3.9 4 $\alpha(K)=0.563$ 8; $\alpha(L)=0.0845$ 15; $\alpha(M)=0.0177$ 3; $\alpha(N+..)=0.00454$ 8 $\alpha(N)=0.00388$ 7; $\alpha(O)=0.000619$ 11; $\alpha(P)=4.32\times 10^{-5}$ 6 E_γ : from ^{135}Ce ε decay.
206.503	5/2 ⁺	86.97 3	5.38 16	119.533	7/2 ⁺	M1+E2	0.53 3	1.98 5	B(M1)(W.u.)=0.0021 2; B(E2)(W.u.)=48 6 $\alpha(K)=1.476$ 23; $\alpha(L)=0.395$ 20; $\alpha(M)=0.086$ 5; $\alpha(N+..)=0.0212$ 11 $\alpha(N)=0.0184$ 9; $\alpha(O)=0.00274$ 13; $\alpha(P)=0.0001049$ 15 Penetration parameter $\lambda(M1)=14.5$ 55 (1975Mo12). B(M1)(W.u.)=0.0034 3; B(E2)(W.u.)=4.4 12 $\alpha(K)=0.1226$ 18; $\alpha(L)=0.0174$ 4; $\alpha(M)=0.00363$ 8; $\alpha(N+..)=0.000933$ 19 $\alpha(N)=0.000796$ 17; $\alpha(O)=0.0001280$ 25; $\alpha(P)=9.36\times 10^{-6}$ 14 B(M1)(W.u.)>0.0025; B(E2)(W.u.)>9 $\alpha(K)=4.24$ 6; $\alpha(L)=0.80$ 10; $\alpha(M)=0.169$ 22; $\alpha(N+..)=0.043$ 6 $\alpha(N)=0.037$ 5; $\alpha(O)=0.0057$ 7; $\alpha(P)=0.000327$ 5 B(E2)(W.u.)>4.7 $\alpha(K)=0.375$ 6; $\alpha(L)=0.1177$ 17; $\alpha(M)=0.0257$ 4; $\alpha(N+..)=0.00630$ 9 $\alpha(N)=0.00548$ 8; $\alpha(O)=0.000799$ 12; $\alpha(P)=2.19\times 10^{-5}$ 3 B(M1)(W.u.)>0.013; B(E2)(W.u.)>10 $\alpha(K)=0.0618$ 9; $\alpha(L)=0.00854$ 13; $\alpha(M)=0.00178$ 3; $\alpha(N+..)=0.000458$ 7 $\alpha(N)=0.000390$ 6; $\alpha(O)=6.30\times 10^{-5}$ 10; $\alpha(P)=4.72\times 10^{-6}$ 7 B(M1)(W.u.)>0.33; B(E2)(W.u.)>3.2 $\alpha(L)=2.81$ 6; $\alpha(M)=0.585$ 14; $\alpha(N+..)=0.151$ 4 $\alpha(N)=0.129$ 3; $\alpha(O)=0.0208$ 5; $\alpha(P)=0.001593$ 23 B(E2)(W.u.)>1.2 $\alpha(K)=1.483$ 21; $\alpha(L)=0.819$ 12; $\alpha(M)=0.181$ 3; $\alpha(N+..)=0.0440$ 7 $\alpha(N)=0.0384$ 6; $\alpha(O)=0.00545$ 8; $\alpha(P)=7.90\times 10^{-5}$ 11 B(E2)(W.u.)>52 $\alpha(K)=0.0379$ 6; $\alpha(L)=0.00710$ 10; $\alpha(M)=0.001512$ 22; $\alpha(N+..)=0.000379$ 6 $\alpha(N)=0.000327$ 5; $\alpha(O)=5.00\times 10^{-5}$ 7; $\alpha(P)=2.53\times 10^{-6}$ 4 E_γ, I_γ : from (HI,xn γ). E_γ, I_γ : from (HI,xn γ). $\alpha(K)=0.040$ 4; $\alpha(L)=0.0062$ 5; $\alpha(M)=0.00131$ 13; $\alpha(N+..)=0.00033$ 3 $\alpha(N)=0.000286$ 24; $\alpha(O)=4.51\times 10^{-5}$ 25; $\alpha(P)=2.9\times 10^{-6}$ 5
		206.50 2	100 3	0.0	5/2 ⁺	M1+E2	+0.30 4	0.1446	
265.546	3/2 ⁺	59.038 20	0.20 1	206.503	5/2 ⁺	M1+E2	0.19 4	5.25 16	
		145.97 4	≈ 0.2	119.533	7/2 ⁺	(E2)		0.525	
		265.56 2	100 3	0.0	5/2 ⁺	M1+E2	+0.32 3	0.0726	
300.052	1/2 ⁺	34.508 17	6.9 5	265.546	3/2 ⁺	M1(+E2)	0.013 13	3.55 8	
		93.5 [@]	0.007 3	206.503	5/2 ⁺	[E2]		2.53	
		300.07 2	100 2	0.0	5/2 ⁺	E2		0.0469	
583.48	9/2 ⁺	464.1 2	9.4 6	119.533	7/2 ⁺	D+Q			
		583.2 2	100	0.0	5/2 ⁺	(Q)			
604.563	3/2 ⁺ , 5/2 ⁺	304.58 4	2.24 15	300.052	1/2 ⁺	M1,E2		0.048 4	

Adopted Levels, Gammas (continued)

$\gamma(^{135}\text{La})$ (continued)									
$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\dagger$	E_f	J_f^π	Mult. [‡]	$\delta^\#$	$\alpha^\&$	Comments
604.563	3/2 ⁺ , 5/2 ⁺	339.1 @a 398.05 5	0.9 3 17.8 6	265.546 206.503	3/2 ⁺ 5/2 ⁺	M1(+E2)	<1.5	0.0235 20	$\alpha(\text{K})=0.0199$ 20; $\alpha(\text{L})=0.00280$ 7; $\alpha(\text{M})=0.000585$ 11; $\alpha(\text{N}+..)=0.000150$ 4 $\alpha(\text{N})=0.000128$ 3; $\alpha(\text{O})=2.06\times 10^{-5}$ 8; $\alpha(\text{P})=1.49\times 10^{-6}$ 19
		485.02 6	7.5 8	119.533	7/2 ⁺	M1,E2		0.0133 22	$\alpha(\text{K})=0.0113$ 20; $\alpha(\text{L})=0.00159$ 14; $\alpha(\text{M})=0.00033$ 3; $\alpha(\text{N}+..)=8.5\times 10^{-5}$ 8 $\alpha(\text{N})=7.2\times 10^{-5}$ 6; $\alpha(\text{O})=1.16\times 10^{-5}$ 12; $\alpha(\text{P})=8.4\times 10^{-7}$ 18
		604.56 3	100 5	0.0	5/2 ⁺	M1,E2		0.0076 14	$\alpha(\text{K})=0.0065$ 13; $\alpha(\text{L})=0.00088$ 12; $\alpha(\text{M})=0.000183$ 23; $\alpha(\text{N}+..)=4.7\times 10^{-5}$ 7 $\alpha(\text{N})=4.0\times 10^{-5}$ 5; $\alpha(\text{O})=6.5\times 10^{-6}$ 9; $\alpha(\text{P})=4.8\times 10^{-7}$ 11
665.556	5/2 ⁺	60.9 @ 365.3 @a 400.02 8	1.7 4 4.5 20 49 2	604.563 300.052 265.546	3/2 ⁺ , 5/2 ⁺ 1/2 ⁺ 3/2 ⁺	E2(+M1) E2(+M1)	>0.6 >1	9 3 0.0209 15	$\alpha(\text{K})=4.3$ 3; $\alpha(\text{L})=4.0$ 20; $\alpha(\text{M})=0.9$ 5; $\alpha(\text{N}+..)=0.21$ 11 $\alpha(\text{N})=0.19$ 10; $\alpha(\text{O})=0.026$ 13; $\alpha(\text{P})=0.000260$ 25
		459.08 4	18.0 19	206.503	5/2 ⁺	M1,E2		0.0154 24	$\alpha(\text{K})=0.0175$ 14; $\alpha(\text{L})=0.00270$ 6; $\alpha(\text{M})=0.000568$ 10; $\alpha(\text{N}+..)=0.000144$ 3 $\alpha(\text{N})=0.0001237$ 24; $\alpha(\text{O})=1.95\times 10^{-5}$ 6; $\alpha(\text{P})=1.25\times 10^{-6}$ 14
		546.00 3	100 4	119.533	7/2 ⁺	M1(+E2)	<0.35	0.01131 25	$\alpha(\text{K})=0.0131$ 22; $\alpha(\text{L})=0.00185$ 14; $\alpha(\text{M})=0.000386$ 25; $\alpha(\text{N}+..)=9.9\times 10^{-5}$ 8 $\alpha(\text{N})=8.4\times 10^{-5}$ 6; $\alpha(\text{O})=1.35\times 10^{-5}$ 12; $\alpha(\text{P})=9.7\times 10^{-7}$ 20
		665.6 @	32 6	0.0	5/2 ⁺	M1,E2		0.0060 11	$\alpha(\text{K})=0.00971$ 22; $\alpha(\text{L})=0.001265$ 23; $\alpha(\text{M})=0.000262$ 5; $\alpha(\text{N}+..)=6.77\times 10^{-5}$ 13 $\alpha(\text{N})=5.76\times 10^{-5}$ 11; $\alpha(\text{O})=9.39\times 10^{-6}$ 18; $\alpha(\text{P})=7.41\times 10^{-7}$ 18
712.35?	(3/2 ⁻ , 5/2 ⁻)	712.35 9	100	0.0	5/2 ⁺				$\alpha(\text{K})=0.0051$ 10; $\alpha(\text{L})=0.00069$ 10; $\alpha(\text{M})=0.000143$ 20; $\alpha(\text{N}+..)=3.7\times 10^{-5}$ 6 $\alpha(\text{N})=3.1\times 10^{-5}$ 5; $\alpha(\text{O})=5.1\times 10^{-6}$ 8; $\alpha(\text{P})=3.8\times 10^{-7}$ 9
715.9	(11/2 ⁺)	596.5 2	100	119.533	7/2 ⁺	(Q)			
783.600	3/2 ⁺	118.03 2	2.76 15	665.556	5/2 ⁺	M1+E2	0.27 5	0.704 15	$\alpha(\text{K})=0.587$ 10; $\alpha(\text{L})=0.093$ 6; $\alpha(\text{M})=0.0195$ 13; $\alpha(\text{N}+..)=0.0050$ 3 $\alpha(\text{N})=0.0042$ 3; $\alpha(\text{O})=0.00067$ 4; $\alpha(\text{P})=4.47\times 10^{-5}$ 7
		179.05 4	0.22 3	604.563	3/2 ⁺ , 5/2 ⁺	M1,E2		0.235 25	$\alpha(\text{K})=0.188$ 8; $\alpha(\text{L})=0.037$ 14; $\alpha(\text{M})=0.008$ 3; $\alpha(\text{N}+..)=0.0020$ 7 $\alpha(\text{N})=0.0017$ 7; $\alpha(\text{O})=0.00026$ 9; $\alpha(\text{P})=1.30\times 10^{-5}$ 11
		483.58 3	13.7 4	300.052	1/2 ⁺	M1(+E2)	<0.4	0.0153 4	$\alpha(\text{K})=0.0131$ 4; $\alpha(\text{L})=0.00172$ 3; $\alpha(\text{M})=0.000356$ 7;

Adopted Levels, Gammas (continued)

$\gamma(^{135}\text{La})$ (continued)

$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\dagger$	E_f	J_f^π	Mult. [‡]	$\delta^\#$	$\alpha^\&$	Comments
783.600	3/2 ⁺	518.05 2	100 4	265.546	3/2 ⁺	M1+E2	+0.46 3	0.01244 19	$\alpha(\text{N}+..)=9.20\times 10^{-5}$ 17 $\alpha(\text{N})=7.82\times 10^{-5}$ 14; $\alpha(\text{O})=1.274\times 10^{-5}$ 24; $\alpha(\text{P})=1.00\times 10^{-6}$ 3 $\alpha(\text{K})=0.01066$ 17; $\alpha(\text{L})=0.001413$ 21; $\alpha(\text{M})=0.000293$ 5; $\alpha(\text{N}+..)=7.56\times 10^{-5}$ 11 $\alpha(\text{N})=6.44\times 10^{-5}$ 10; $\alpha(\text{O})=1.046\times 10^{-5}$ 16; $\alpha(\text{P})=8.08\times 10^{-7}$ 13
		577.09 2	37.7 12	206.503	5/2 ⁺	M1+E2	-0.30 1	0.00978	$\alpha(\text{K})=0.00840$ 12; $\alpha(\text{L})=0.001094$ 16; $\alpha(\text{M})=0.000227$ 4; $\alpha(\text{N}+..)=5.86\times 10^{-5}$ 9
		663.8 2	0.64 15	119.533	7/2 ⁺	(E2)		0.00492	$\alpha(\text{N})=4.98\times 10^{-5}$ 7; $\alpha(\text{O})=8.12\times 10^{-6}$ 12; $\alpha(\text{P})=6.39\times 10^{-7}$ 9 $\alpha(\text{K})=0.00417$ 6; $\alpha(\text{L})=0.000595$ 9; $\alpha(\text{M})=0.0001243$ 18; $\alpha(\text{N}+..)=3.18\times 10^{-5}$ 5
		783.59 2	78 3	0.0	5/2 ⁺	M1(+E2)	<0.25	0.00474 8	$\alpha(\text{N})=2.71\times 10^{-5}$ 4; $\alpha(\text{O})=4.33\times 10^{-6}$ 6; $\alpha(\text{P})=3.01\times 10^{-7}$ 5 $\alpha(\text{K})=0.00408$ 7; $\alpha(\text{L})=0.000523$ 9; $\alpha(\text{M})=0.0001080$ 18; $\alpha(\text{N}+..)=2.80\times 10^{-5}$ 5
785.7	11/2 ⁻	202.1 2	100	583.48	9/2 ⁺	E1		0.0339	$\alpha(\text{N})=2.38\times 10^{-5}$ 4; $\alpha(\text{O})=3.88\times 10^{-6}$ 7; $\alpha(\text{P})=3.10\times 10^{-7}$ 6 B(E1)(W.u.)>1.5×10 ⁻⁶ $\alpha(\text{K})=0.0291$ 5; $\alpha(\text{L})=0.00382$ 6; $\alpha(\text{M})=0.000790$ 12; $\alpha(\text{N}+..)=0.000201$ 3
828.373	3/2 ⁺	115.7 ^a 2	0.42 6	712.35?	(3/2 ⁻ ,5/2 ⁻)	(E1)		0.1571	$\alpha(\text{N})=0.0001721$ 25; $\alpha(\text{O})=2.75\times 10^{-5}$ 4; $\alpha(\text{P})=1.93\times 10^{-6}$ 3 E _γ ,I _γ : from (HI,xny).
		162.5 2	0.49 8	665.556	5/2 ⁺	M1,E2		0.32 5	$\alpha(\text{K})=0.1342$ 20; $\alpha(\text{L})=0.0182$ 3; $\alpha(\text{M})=0.00377$ 6; $\alpha(\text{N}+..)=0.000953$ 15
		223.8 [@] 528.35 3	≈0.4 2.44 16	604.563 300.052	3/2 ⁺ ,5/2 ⁺ 1/2 ⁺	M1		0.01247	$\alpha(\text{N})=0.000816$ 13; $\alpha(\text{O})=0.0001284$ 19; $\alpha(\text{P})=8.36\times 10^{-6}$ 13 $\alpha(\text{K})=0.251$ 16; $\alpha(\text{L})=0.054$ 22; $\alpha(\text{M})=0.011$ 5; $\alpha(\text{N}+..)=0.0029$ 12
		562.79 4	2.9 3	265.546	3/2 ⁺	M1,E2		0.0091 16	$\alpha(\text{N})=0.0025$ 11; $\alpha(\text{O})=0.00038$ 14; $\alpha(\text{P})=1.71\times 10^{-5}$ 13 $\alpha(\text{K})=0.01072$ 15; $\alpha(\text{L})=0.001389$ 20; $\alpha(\text{M})=0.000287$ 4; $\alpha(\text{N}+..)=7.44\times 10^{-5}$ 11
		621.85 2	7.6 5	206.503	5/2 ⁺	M1(+E2)	<1.2	0.0076 8	$\alpha(\text{N})=6.32\times 10^{-5}$ 9; $\alpha(\text{O})=1.032\times 10^{-5}$ 15; $\alpha(\text{P})=8.20\times 10^{-7}$ 12 $\alpha(\text{K})=0.0077$ 15; $\alpha(\text{L})=0.00106$ 13; $\alpha(\text{M})=0.000221$ 25; $\alpha(\text{N}+..)=5.7\times 10^{-5}$ 7
		828.38 2	100 3	0.0	5/2 ⁺	M1(+E2)	<0.4	0.00410 11	$\alpha(\text{N})=4.8\times 10^{-5}$ 6; $\alpha(\text{O})=7.8\times 10^{-6}$ 11; $\alpha(\text{P})=5.8\times 10^{-7}$ 13 $\alpha(\text{K})=0.0065$ 7; $\alpha(\text{L})=0.00086$ 7; $\alpha(\text{M})=0.000179$ 13; $\alpha(\text{N}+..)=4.6\times 10^{-5}$ 4
									$\alpha(\text{N})=3.9\times 10^{-5}$ 3; $\alpha(\text{O})=6.4\times 10^{-6}$ 6; $\alpha(\text{P})=4.9\times 10^{-7}$ 6 $\alpha(\text{K})=0.00353$ 10; $\alpha(\text{L})=0.000452$ 11; $\alpha(\text{M})=9.35\times 10^{-5}$ 22;

Adopted Levels, Gammas (continued)

$\gamma(^{135}\text{La})$ (continued)

$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\dagger$	E_f	J_f^π	Mult. [‡]	$\delta^\#$	$\alpha^\&$	Comments
872.312	(1/2) ⁺	43.9 [@]	0.20 2	828.373	3/2 ⁺	M1+E2	0.13 3	12.2 4	$\alpha(\text{N}+..)=2.42\times 10^{-5}$ 6 $\alpha(\text{N})=2.06\times 10^{-5}$ 5; $\alpha(\text{O})=3.36\times 10^{-6}$ 8; $\alpha(\text{P})=2.68\times 10^{-7}$ 8 $\alpha(\text{K})=9.91$ 14; $\alpha(\text{L})=1.83$ 23; $\alpha(\text{M})=0.39$ 6; $\alpha(\text{N}+..)=0.098$ 13
									$\alpha(\text{N})=0.084$ 11; $\alpha(\text{O})=0.0131$ 15; $\alpha(\text{P})=0.000779$ 12 $\alpha(\text{K})=1.303$ 19; $\alpha(\text{L})=0.181$ 5; $\alpha(\text{M})=0.0377$ 11; $\alpha(\text{N}+..)=0.0097$ 3
		88.71 2	3.09 9	783.600	3/2 ⁺	M1+E2	0.07 3	1.531 23	$\alpha(\text{N})=0.00827$ 24; $\alpha(\text{O})=0.00134$ 4; $\alpha(\text{P})=0.0001014$ 15 $\alpha(\text{K})=0.0553$ 16; $\alpha(\text{L})=0.0102$ 5; $\alpha(\text{M})=0.00218$ 12; $\alpha(\text{N}+..)=0.00055$ 3
		267.76 3	3.3 2	604.563	3/2 ⁺ ,5/2 ⁺	E2(+M1)	>1.3	0.0683 12	$\alpha(\text{N})=0.000471$ 24; $\alpha(\text{O})=7.2\times 10^{-5}$ 3; $\alpha(\text{P})=3.76\times 10^{-6}$ 23 $\alpha(\text{K})=0.00880$ 13; $\alpha(\text{L})=0.001137$ 16; $\alpha(\text{M})=0.000235$ 4; $\alpha(\text{N}+..)=6.09\times 10^{-5}$ 9
		572.26 2	55 2	300.052	1/2 ⁺	M1		0.01024	$\alpha(\text{N})=5.18\times 10^{-5}$ 8; $\alpha(\text{O})=8.45\times 10^{-6}$ 12; $\alpha(\text{P})=6.72\times 10^{-7}$ 10 Mult.: ce data give $\delta(\text{E2/M1})<0.6$, but ΔJ^π requires M1.
		606.76 2	100 3	265.546	3/2 ⁺	M1+E2	-0.37 2	0.00854 13	$\alpha(\text{K})=0.00734$ 11; $\alpha(\text{L})=0.000957$ 14; $\alpha(\text{M})=0.000198$ 3; $\alpha(\text{N}+..)=5.12\times 10^{-5}$ 8
984.359	3/2 ⁺	665.79 6	16.0 11	206.503	5/2 ⁺	E2		0.00489	$\alpha(\text{N})=4.35\times 10^{-5}$ 7; $\alpha(\text{O})=7.09\times 10^{-6}$ 11; $\alpha(\text{P})=5.57\times 10^{-7}$ 9 $\alpha(\text{K})=0.00414$ 6; $\alpha(\text{L})=0.000591$ 9; $\alpha(\text{M})=0.0001233$ 18; $\alpha(\text{N}+..)=3.15\times 10^{-5}$ 5 $\alpha(\text{N})=2.69\times 10^{-5}$ 4; $\alpha(\text{O})=4.30\times 10^{-6}$ 6; $\alpha(\text{P})=2.99\times 10^{-7}$ 5
		112.0 [@] 156.0 [@]	0.6 2 ≈ 0.6	872.312	(1/2) ⁺	M1,E2		0.36 6	$\alpha(\text{K})=0.284$ 20; $\alpha(\text{L})=0.06$ 3; $\alpha(\text{M})=0.013$ 6; $\alpha(\text{N}+..)=0.0033$ 15
				828.373	3/2 ⁺				$\alpha(\text{N})=0.0029$ 13; $\alpha(\text{O})=0.00044$ 18; $\alpha(\text{P})=1.93\times 10^{-5}$ 14 $\alpha(\text{K})=0.1336$ 23; $\alpha(\text{L})=0.025$ 8; $\alpha(\text{M})=0.0053$ 17; $\alpha(\text{N}+..)=0.0013$ 4
		200.76 4	3.1 3	783.600	3/2 ⁺	(M1,E2)		0.165 11	$\alpha(\text{N})=0.0011$ 4; $\alpha(\text{O})=0.00018$ 5; $\alpha(\text{P})=9.3\times 10^{-6}$ 10
		318.82 8 379.79 3	2.2 3 100 3	665.556 604.563	5/2 ⁺ 3/2 ⁺ ,5/2 ⁺	M1(+E2)	<0.7	0.0277 11	$\alpha(\text{K})=0.0236$ 11; $\alpha(\text{L})=0.00321$ 5; $\alpha(\text{M})=0.000668$ 10; $\alpha(\text{N}+..)=0.000172$ 3
		684.33 3	25 2	300.052	1/2 ⁺	M1(+E2)	<1	0.0061 6	$\alpha(\text{N})=0.0001466$ 21; $\alpha(\text{O})=2.37\times 10^{-5}$ 4; $\alpha(\text{P})=1.79\times 10^{-6}$ 11 $\alpha(\text{K})=0.0052$ 5; $\alpha(\text{L})=0.00069$ 5; $\alpha(\text{M})=0.000142$ 10; $\alpha(\text{N}+..)=3.7\times 10^{-5}$ 3
		718.82 3	24 2	265.546	3/2 ⁺	M1+E2	+0.18 5	0.00582	$\alpha(\text{N})=3.12\times 10^{-5}$ 21; $\alpha(\text{O})=5.1\times 10^{-6}$ 4; $\alpha(\text{P})=4.0\times 10^{-7}$ 4 $\alpha(\text{K})=0.00501$ 8; $\alpha(\text{L})=0.000644$ 10; $\alpha(\text{M})=0.0001331$ 20; $\alpha(\text{N}+..)=3.44\times 10^{-5}$ 6
		777.89 3	23.5 14	206.503	5/2 ⁺	M1+E2	0.9 +13-6	0.0042 6	$\alpha(\text{N})=2.93\times 10^{-5}$ 5; $\alpha(\text{O})=4.78\times 10^{-6}$ 8; $\alpha(\text{P})=3.81\times 10^{-7}$ 6 $\alpha(\text{K})=0.0036$ 5; $\alpha(\text{L})=0.00047$ 6; $\alpha(\text{M})=9.8\times 10^{-5}$ 11;

Adopted Levels, Gammas (continued)

$\gamma(^{135}\text{La})$ (continued)									
$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\dagger$	E_f	J_f^π	Mult. [‡]	$\delta^\#$	$\alpha^\&$	Comments
984.359	3/2 ⁺	984.30 3	5.4 6	0.0	5/2 ⁺	E2(+M1)	>2.5	0.00203 7	$\alpha(\text{N}+..)=2.5\times 10^{-5}$ 3 $\alpha(\text{N})=2.15\times 10^{-5}$ 25; $\alpha(\text{O})=3.5\times 10^{-6}$ 5; $\alpha(\text{P})=2.7\times 10^{-7}$ 5 $\alpha(\text{K})=0.00174$ 6; $\alpha(\text{L})=0.000231$ 7; $\alpha(\text{M})=4.78\times 10^{-5}$ 14; $\alpha(\text{N}+..)=1.23\times 10^{-5}$ 4 $\alpha(\text{N})=1.05\times 10^{-5}$ 3; $\alpha(\text{O})=1.70\times 10^{-6}$ 5; $\alpha(\text{P})=1.28\times 10^{-7}$ 5
993.43	1/2 ⁺ , 3/2 ⁺ , 5/2 ⁺	281 @ ^a 693.4 @ 727.9 @	≈7 ≈13 ≈100	712.35? (3/2 ⁻ , 5/2 ⁻) 300.052 1/2 ⁺ 265.546 3/2 ⁺		(M1,E2)		0.0048 9	$\alpha(\text{K})=0.0041$ 8; $\alpha(\text{L})=0.00055$ 9; $\alpha(\text{M})=0.000114$ 17; $\alpha(\text{N}+..)=2.9\times 10^{-5}$ 5 $\alpha(\text{N})=2.5\times 10^{-5}$ 4; $\alpha(\text{O})=4.0\times 10^{-6}$ 7; $\alpha(\text{P})=3.1\times 10^{-7}$ 7
1038.52	3/2 ⁺ , 5/2 ⁺	993.4 @ 210.2 @ 326.2 @ 434.0 @ 738.46 6	≈20 ≈10 ≈10 ≈7 31 3	0.0 5/2 ⁺ 828.373 3/2 ⁺ 712.35? (3/2 ⁻ , 5/2 ⁻) 604.563 3/2 ⁺ , 5/2 ⁺ 300.052 1/2 ⁺		(M1,E2)		0.0047 9	$\alpha(\text{K})=0.0040$ 8; $\alpha(\text{L})=0.00053$ 8; $\alpha(\text{M})=0.000110$ 16; $\alpha(\text{N}+..)=2.8\times 10^{-5}$ 5 $\alpha(\text{N})=2.4\times 10^{-5}$ 4; $\alpha(\text{O})=3.9\times 10^{-6}$ 7; $\alpha(\text{P})=3.0\times 10^{-7}$ 7
		773.0 @	100 13	265.546 3/2 ⁺		(M1,E2)		0.0042 8	$\alpha(\text{K})=0.0036$ 7; $\alpha(\text{L})=0.00047$ 8; $\alpha(\text{M})=9.8\times 10^{-5}$ 15; $\alpha(\text{N}+..)=2.5\times 10^{-5}$ 4 $\alpha(\text{N})=2.2\times 10^{-5}$ 4; $\alpha(\text{O})=3.5\times 10^{-6}$ 6; $\alpha(\text{P})=2.7\times 10^{-7}$ 6
		832.1 @ 2 1038.48 4	29 10 39 7	206.503 5/2 ⁺ 0.0 5/2 ⁺		M1		0.00247	$\alpha(\text{K})=0.00213$ 3; $\alpha(\text{L})=0.000270$ 4; $\alpha(\text{M})=5.57\times 10^{-5}$ 8; $\alpha(\text{N}+..)=1.443\times 10^{-5}$ 21 $\alpha(\text{N})=1.226\times 10^{-5}$ 18; $\alpha(\text{O})=2.01\times 10^{-6}$ 3; $\alpha(\text{P})=1.611\times 10^{-7}$ 23
1171.417	3/2 ⁺	132.88 3	3.4 4	1038.52 3/2 ⁺ , 5/2 ⁺		M1		0.484	$\alpha(\text{K})=0.413$ 6; $\alpha(\text{L})=0.0558$ 8; $\alpha(\text{M})=0.01159$ 17; $\alpha(\text{N}+..)=0.00299$ 5 $\alpha(\text{N})=0.00255$ 4; $\alpha(\text{O})=0.000414$ 6; $\alpha(\text{P})=3.22\times 10^{-5}$ 5
		177.99 6	1.8 1	993.43 1/2 ⁺ , 3/2 ⁺ , 5/2 ⁺		M1,E2		0.24 3	$\alpha(\text{K})=0.191$ 8; $\alpha(\text{L})=0.038$ 14; $\alpha(\text{M})=0.008$ 3; $\alpha(\text{N}+..)=0.0021$ 8

Adopted Levels, Gammas (continued)

$\gamma(^{135}\text{La})$ (continued)								
$E_i(\text{level})$	$E_\gamma^\dagger$	$I_\gamma^\dagger$	E_f	J_f^π	Mult. [‡]	$\delta^\#$	$\alpha^\&$	Comments
1171.417	187.21 9	0.63 13	984.359	3/2 ⁺	M1,E2		0.205 18	$\alpha(\text{N})=0.0018$ 7; $\alpha(\text{O})=0.00027$ 9; $\alpha(\text{P})=1.32\times 10^{-5}$ 12 $\alpha(\text{K})=0.164$ 5; $\alpha(\text{L})=0.032$ 11; $\alpha(\text{M})=0.0068$ 24; $\alpha(\text{N}+..)=0.0017$ 6
	299.11 3	38 4	872.312	(1/2) ⁺	M1,E2		0.050 3	$\alpha(\text{N})=0.0015$ 5; $\alpha(\text{O})=0.00023$ 7; $\alpha(\text{P})=1.14\times 10^{-5}$ 11 $\alpha(\text{K})=0.042$ 4; $\alpha(\text{L})=0.0066$ 6; $\alpha(\text{M})=0.00139$ 14; $\alpha(\text{N}+..)=0.00035$ 3
	343.01 4	3.2 3	828.373	3/2 ⁺	M1(+E2)	<1.8	0.0348 25	$\alpha(\text{N})=0.00030$ 3; $\alpha(\text{O})=4.8\times 10^{-5}$ 3; $\alpha(\text{P})=3.0\times 10^{-6}$ 5 $\alpha(\text{K})=0.029$ 3; $\alpha(\text{L})=0.00430$ 11; $\alpha(\text{M})=0.00090$ 3; $\alpha(\text{N}+..)=0.000230$ 6
	387.81 3	18.3 4	783.600	3/2 ⁺	M1(+E2)	<0.3	0.0269 5	$\alpha(\text{N})=0.000197$ 6; $\alpha(\text{O})=3.14\times 10^{-5}$ 5; $\alpha(\text{P})=2.2\times 10^{-6}$ 3 $\alpha(\text{K})=0.0231$ 4; $\alpha(\text{L})=0.00305$ 5; $\alpha(\text{M})=0.000633$ 9; $\alpha(\text{N}+..)=0.0001634$ 23
	459.1 @ 505.92 8	≈ 0.4 1.59 13	712.35? (3/2 ⁻ ,5/2 ⁻) 665.556 5/2 ⁺		(M1)		0.01389	$\alpha(\text{N})=0.0001390$ 20; $\alpha(\text{O})=2.26\times 10^{-5}$ 4; $\alpha(\text{P})=1.77\times 10^{-6}$ 4
								$\alpha(\text{K})=0.01193$ 17; $\alpha(\text{L})=0.001549$ 22; $\alpha(\text{M})=0.000321$ 5; $\alpha(\text{N}+..)=8.29\times 10^{-5}$ 12
								$\alpha(\text{N})=7.05\times 10^{-5}$ 10; $\alpha(\text{O})=1.151\times 10^{-5}$ 17; $\alpha(\text{P})=9.13\times 10^{-7}$ 13
	566.87 2	18.4 8	604.563	3/2 ⁺ ,5/2 ⁺	M1(+E2)	<1	0.0097 8	$\alpha(\text{K})=0.0083$ 8; $\alpha(\text{L})=0.00110$ 7; $\alpha(\text{M})=0.000229$ 13; $\alpha(\text{N}+..)=5.9\times 10^{-5}$ 4
	871.35 2	100 4	300.052	1/2 ⁺	M1(+E2)	<1.3	0.0034 4	$\alpha(\text{N})=5.0\times 10^{-5}$ 3; $\alpha(\text{O})=8.2\times 10^{-6}$ 6; $\alpha(\text{P})=6.3\times 10^{-7}$ 7 $\alpha(\text{K})=0.0029$ 4; $\alpha(\text{L})=0.00037$ 4; $\alpha(\text{M})=7.7\times 10^{-5}$ 7; $\alpha(\text{N}+..)=2.00\times 10^{-5}$ 19
	905.87 2	38.5 13	265.546	3/2 ⁺	M1(+E2)	-0.04 2	0.00339	$\alpha(\text{N})=1.70\times 10^{-5}$ 16; $\alpha(\text{O})=2.8\times 10^{-6}$ 3; $\alpha(\text{P})=2.2\times 10^{-7}$ 3 $\alpha(\text{K})=0.00292$ 4; $\alpha(\text{L})=0.000372$ 6; $\alpha(\text{M})=7.69\times 10^{-5}$ 11; $\alpha(\text{N}+..)=1.99\times 10^{-5}$ 3
	964.89 3	7.9 4	206.503	5/2 ⁺	E2(+M1)	>2	0.00215 10	$\alpha(\text{N})=1.692\times 10^{-5}$ 24; $\alpha(\text{O})=2.77\times 10^{-6}$ 4; $\alpha(\text{P})=2.22\times 10^{-7}$ 4 $\alpha(\text{K})=0.00184$ 8; $\alpha(\text{L})=0.000244$ 10; $\alpha(\text{M})=5.06\times 10^{-5}$ 19; $\alpha(\text{N}+..)=1.30\times 10^{-5}$ 5
	1051.90 3	1.6 2	119.533	7/2 ⁺	(E2)		1.72×10 ⁻³	$\alpha(\text{N})=1.11\times 10^{-5}$ 5; $\alpha(\text{O})=1.80\times 10^{-6}$ 7; $\alpha(\text{P})=1.36\times 10^{-7}$ 7 $\alpha(\text{K})=0.001471$ 21; $\alpha(\text{L})=0.000194$ 3; $\alpha(\text{M})=4.01\times 10^{-5}$ 6; $\alpha(\text{N}+..)=1.033\times 10^{-5}$ 15
								$\alpha(\text{N})=8.80\times 10^{-6}$ 13; $\alpha(\text{O})=1.425\times 10^{-6}$ 20; $\alpha(\text{P})=1.077\times 10^{-7}$ 15
	1171.42 3	4.7 2	0.0	5/2 ⁺	M1,E2		0.0016 3	$\alpha(\text{K})=0.00140$ 22; $\alpha(\text{L})=0.00018$ 3; $\alpha(\text{M})=3.7\times 10^{-5}$ 6; $\alpha(\text{N}+..)=1.29\times 10^{-5}$ 14
								$\alpha(\text{N})=8.1\times 10^{-6}$ 12; $\alpha(\text{O})=1.32\times 10^{-6}$ 20; $\alpha(\text{P})=1.04\times 10^{-7}$ 18; $\alpha(\text{IPF})=3.36\times 10^{-6}$ 7

Adopted Levels, Gammas (continued)

$\gamma(^{135}\text{La})$ (continued)									
$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\dagger$	E_f	J_f^π	Mult. [‡]	$\delta^\#$	$\alpha^\&$	Comments
1377.7	(15/2 ⁻)	591.9 2	100	785.7	11/2 ⁻	(Q)			
1385.5	(13/2 ⁺)	802.0 2	100	583.48	9/2 ⁺	(Q)			
1437.2	(13/2 ⁻)	651.4 2	100	785.7	11/2 ⁻	D+Q			
1439.484	3/2 ⁺	401.0 @	≈4	1038.52	3/2 ⁺ , 5/2 ⁺	M1,E2		0.022 3	$\alpha(\text{K})=0.019$ 3; $\alpha(\text{L})=0.00272$ 9; $\alpha(\text{M})=0.000569$ 14; $\alpha(\text{N}+..)=0.000146$ 5 $\alpha(\text{N})=0.000124$ 4; $\alpha(\text{O})=1.99\times 10^{-5}$ 11; $\alpha(\text{P})=1.4\times 10^{-6}$ 3
		611.2 2	10 4	828.373	3/2 ⁺				
		655.9 @	≈2	783.600	3/2 ⁺				
		727.1 @	≈4	712.35?	(3/2 ⁻ , 5/2 ⁻)				
		773.9 @	100 12	665.556	5/2 ⁺	(M1,E2)		0.0042 8	$\alpha(\text{K})=0.0036$ 7; $\alpha(\text{L})=0.00047$ 8; $\alpha(\text{M})=9.8\times 10^{-5}$ 15; $\alpha(\text{N}+..)=2.5\times 10^{-5}$ 4 $\alpha(\text{N})=2.1\times 10^{-5}$ 4; $\alpha(\text{O})=3.5\times 10^{-6}$ 6; $\alpha(\text{P})=2.7\times 10^{-7}$ 6
		834.90 4	50 8	604.563	3/2 ⁺ , 5/2 ⁺				
		1139.43 3	40 4	300.052	1/2 ⁺	M1(+E2)	<1	0.00186 14	$\alpha(\text{K})=0.00160$ 12; $\alpha(\text{L})=0.000204$ 14; $\alpha(\text{M})=4.2\times 10^{-5}$ 3; $\alpha(\text{N}+..)=1.23\times 10^{-5}$ 8 $\alpha(\text{N})=9.3\times 10^{-6}$ 7; $\alpha(\text{O})=1.51\times 10^{-6}$ 11; $\alpha(\text{P})=1.20\times 10^{-7}$ 10; $\alpha(\text{IPF})=1.417\times 10^{-6}$ 23
		1173.92 3	85 6	265.546	3/2 ⁺	M1(+E2)	<1	0.00174 13	$\alpha(\text{K})=0.00150$ 12; $\alpha(\text{L})=0.000190$ 13; $\alpha(\text{M})=3.9\times 10^{-5}$ 3; $\alpha(\text{N}+..)=1.37\times 10^{-5}$ 7 $\alpha(\text{N})=8.6\times 10^{-6}$ 6; $\alpha(\text{O})=1.41\times 10^{-6}$ 10; $\alpha(\text{P})=1.13\times 10^{-7}$ 9; $\alpha(\text{IPF})=3.54\times 10^{-6}$ 6
		1232.98 3	44 4	206.503	5/2 ⁺	M1(+E2)	<1.5	0.00153 16	$\alpha(\text{K})=0.00131$ 14; $\alpha(\text{L})=0.000166$ 16; $\alpha(\text{M})=3.4\times 10^{-5}$ 4; $\alpha(\text{N}+..)=1.92\times 10^{-5}$ 8 $\alpha(\text{N})=7.5\times 10^{-6}$ 7; $\alpha(\text{O})=1.23\times 10^{-6}$ 12; $\alpha(\text{P})=9.8\times 10^{-8}$ 11; $\alpha(\text{IPF})=1.031\times 10^{-5}$ 17
		1439.57 8	27 2	0.0	5/2 ⁺	E2(+M1)	>1	0.00103 7	$\alpha(\text{K})=0.00084$ 6; $\alpha(\text{L})=0.000106$ 8; $\alpha(\text{M})=2.20\times 10^{-5}$ 15; $\alpha(\text{N}+..)=6.36\times 10^{-5}$ 10 $\alpha(\text{N})=4.8\times 10^{-6}$ 4; $\alpha(\text{O})=7.9\times 10^{-7}$ 6; $\alpha(\text{P})=6.2\times 10^{-8}$ 5; $\alpha(\text{IPF})=5.80\times 10^{-5}$ 9
1449.635	1/2 ⁺ , 3/2 ⁺	465.2 2	8.5 19	984.359	3/2 ⁺	E2(+M1)	>1.5	0.0133 8	$\alpha(\text{K})=0.0112$ 7; $\alpha(\text{L})=0.00169$ 5; $\alpha(\text{M})=0.000355$ 9; $\alpha(\text{N}+..)=9.0\times 10^{-5}$ 3 $\alpha(\text{N})=7.74\times 10^{-5}$ 21; $\alpha(\text{O})=1.22\times 10^{-5}$ 4; $\alpha(\text{P})=8.0\times 10^{-7}$ 6
		577.3 @a	4.6 20	872.312	(1/2) ⁺	M1,E2		0.0085 15	$\alpha(\text{K})=0.0073$ 14; $\alpha(\text{L})=0.00099$ 12; $\alpha(\text{M})=0.000207$ 24; $\alpha(\text{N}+..)=5.3\times 10^{-5}$ 7 $\alpha(\text{N})=4.5\times 10^{-5}$ 6; $\alpha(\text{O})=7.3\times 10^{-6}$ 10; $\alpha(\text{P})=5.4\times 10^{-7}$ 12
		666.0 @	≈4	783.600	3/2 ⁺				
		845.06 3	11.9 12	604.563	3/2 ⁺ , 5/2 ⁺	E2(+M1)	>0.8	0.0031 4	$\alpha(\text{K})=0.0027$ 4; $\alpha(\text{L})=0.00036$ 4; $\alpha(\text{M})=7.4\times 10^{-5}$ 8;

Adopted Levels, Gammas (continued)

$\gamma(^{135}\text{La})$ (continued)									Comments
$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\dagger$	E_f	J_f^π	Mult. [‡]	$\delta^\#$	$\alpha^\&$	
1449.635	$1/2^+, 3/2^+$	1149.58 2	62 3	300.052	$1/2^+$	M1(+E2)	<0.9	0.00184 13	$\alpha(\text{N}+..)=1.91\times 10^{-5}$ 20 $\alpha(\text{N})=1.63\times 10^{-5}$ 17; $\alpha(\text{O})=2.6\times 10^{-6}$ 3; $\alpha(\text{P})=2.0\times 10^{-7}$ 3 $\alpha(\text{K})=0.00158$ 11; $\alpha(\text{L})=0.000201$ 13; $\alpha(\text{M})=4.2\times 10^{-5}$ 3; $\alpha(\text{N}+..)=1.26\times 10^{-5}$ 7 $\alpha(\text{N})=9.1\times 10^{-6}$ 6; $\alpha(\text{O})=1.49\times 10^{-6}$ 10; $\alpha(\text{P})=1.19\times 10^{-7}$ 9; $\alpha(\text{IPF})=1.90\times 10^{-6}$ 3
		1184.09 3	100 4	265.546	$3/2^+$	M1+E2		0.00159 25	$\alpha(\text{K})=0.00136$ 22; $\alpha(\text{L})=0.000174$ 25; $\alpha(\text{M})=3.6\times 10^{-5}$ 6; $\alpha(\text{N}+..)=1.38\times 10^{-5}$ 13 $\alpha(\text{N})=7.9\times 10^{-6}$ 12; $\alpha(\text{O})=1.29\times 10^{-6}$ 19; $\alpha(\text{P})=1.02\times 10^{-7}$ 18; $\alpha(\text{IPF})=4.47\times 10^{-6}$ 9 δ : -0.12 3 if $J=1/2$ or +0.49 5 if $J=3/2$.
1479.66	$1/2^+, 3/2^+$	1243.1 @	≈ 0.4	206.503	$5/2^+$				
		1449.6 2	0.73 15	0.0	$5/2^+$				
		495.3 4	20 8	984.359	$3/2^+$				
		651.2 2	8.4 7	828.373	$3/2^+$				
		875.1 @	≈ 59	604.563	$3/2^+, 5/2^+$				
		1179.49 6	36 6	300.052	$1/2^+$				
1500.7	$(15/2^+)$	1214.13 3	100 13	265.546	$3/2^+$	M1(+E2)	<1	0.00162 12	$\alpha(\text{K})=0.00139$ 10; $\alpha(\text{L})=0.000176$ 12; $\alpha(\text{M})=3.64\times 10^{-5}$ 25; $\alpha(\text{N}+..)=1.72\times 10^{-5}$ 7 $\alpha(\text{N})=8.0\times 10^{-6}$ 6; $\alpha(\text{O})=1.31\times 10^{-6}$ 9; $\alpha(\text{P})=1.04\times 10^{-7}$ 9; $\alpha(\text{IPF})=7.78\times 10^{-6}$ 12
		1273.5 2	16 8	206.503	$5/2^+$				
		1361.0 9	36 20	119.533	$7/2^+$				
		1479.6 2	5.6 20	0.0	$5/2^+$				
		715.1 ^a	≤ 6	785.7	$11/2^-$				
		784.9 2	100 4	715.9	$(11/2^+)$	(Q)			
1568.9?		917.3 ^a	≤ 6	583.48	$9/2^+$				
1599.25	$1/2^+, 3/2^+$	696.6 2	100	872.312	$(1/2)^+$				
		560.7 @	≈ 12	1038.52	$3/2^+, 5/2^+$				
		727.0 @	≈ 18	872.312	$(1/2)^+$				
		771.4 2	59 18	828.373	$3/2^+$				
		815.56 6	45 8	783.600	$3/2^+$				
		933.76 6	47 12	665.556	$5/2^+$				
		994.7 @	≈ 12	604.563	$3/2^+, 5/2^+$				
		1299.18 3	100 12	300.052	$1/2^+$	M1,E2		0.00132 19	$\alpha(\text{K})=0.00112$ 17; $\alpha(\text{L})=0.000142$ 20; $\alpha(\text{M})=2.9\times 10^{-5}$ 4; $\alpha(\text{N}+..)=2.87\times 10^{-5}$ 10 $\alpha(\text{N})=6.4\times 10^{-6}$ 9; $\alpha(\text{O})=1.05\times 10^{-6}$ 15; $\alpha(\text{P})=8.3\times 10^{-8}$ 14; $\alpha(\text{IPF})=2.11\times 10^{-5}$ 4

Adopted Levels, Gammas (continued)

$\gamma(^{135}\text{La})$ (continued)									
$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\dagger$	E_f	J_f^π	Mult. [‡]	$\delta^\#$	$\alpha^\&$	Comments
1599.25	$1/2^+, 3/2^+$	1334.7 5	53 30	265.546	$3/2^+$				
		1392.8 4	13 3	206.503	$5/2^+$				
		1599.3 8	11 3	0.0	$5/2^+$				
1757.2	$(15/2^-)$	256.7 2	1.1 6	1500.7	$(15/2^+)$				
		319.9 2	9.4 19	1437.2	$(13/2^-)$	D+Q			
		379.7 2	100 1	1377.7	$(15/2^-)$	(D)			
1766.976	$3/2^+$	728.5 @	≈ 10	1038.52	$3/2^+, 5/2^+$				
		782.6 @	≈ 10	984.359	$3/2^+$				
		894.63 5	18.8 18	872.312	$(1/2)^+$				
		938.5 2	7.3 18	828.373	$3/2^+$				
		983.4 @	≈ 4	783.600	$3/2^+$				
		1101.45 8	11 2	665.556	$5/2^+$	M1,E2		0.0019 3	$\alpha(\text{K})=0.0016$ 3; $\alpha(\text{L})=0.00021$ 3; $\alpha(\text{M})=4.2\times 10^{-5}$ 7; $\alpha(\text{N}+..)=1.13\times 10^{-5}$ 17
		1466.90 3	100 6	300.052	$1/2^+$	E2(+M1)	>1	0.00100 7	$\alpha(\text{N})=9.3\times 10^{-6}$ 14; $\alpha(\text{O})=1.52\times 10^{-6}$ 24; $\alpha(\text{P})=1.19\times 10^{-7}$ 22; $\alpha(\text{IPF})=3.93\times 10^{-7}$ 9 $\alpha(\text{K})=0.00081$ 6; $\alpha(\text{L})=0.000102$ 7; $\alpha(\text{M})=2.11\times 10^{-5}$ 14; $\alpha(\text{N}+..)=7.22\times 10^{-5}$ 11 $\alpha(\text{N})=4.6\times 10^{-6}$ 3; $\alpha(\text{O})=7.6\times 10^{-7}$ 6; $\alpha(\text{P})=6.0\times 10^{-8}$ 5; $\alpha(\text{IPF})=6.68\times 10^{-5}$ 10
		1501.38 8	27 4	265.546	$3/2^+$	M1,E2		0.00103 12	$\alpha(\text{K})=0.00082$ 11; $\alpha(\text{L})=0.000104$ 13; $\alpha(\text{M})=2.1\times 10^{-5}$ 3; $\alpha(\text{N}+..)=8.41\times 10^{-5}$ 15 $\alpha(\text{N})=4.7\times 10^{-6}$ 6; $\alpha(\text{O})=7.7\times 10^{-7}$ 10; $\alpha(\text{P})=6.1\times 10^{-8}$ 9; $\alpha(\text{IPF})=7.86\times 10^{-5}$ 12
		1560.49 5	35 4	206.503	$5/2^+$	(E2)		8.75×10^{-4}	$\alpha(\text{K})=0.000668$ 10; $\alpha(\text{L})=8.46\times 10^{-5}$ 12; $\alpha(\text{M})=1.746\times 10^{-5}$ 25; $\alpha(\text{N}+..)=0.0001042$ 15 $\alpha(\text{N})=3.84\times 10^{-6}$ 6; $\alpha(\text{O})=6.25\times 10^{-7}$ 9; $\alpha(\text{P})=4.91\times 10^{-8}$ 7; $\alpha(\text{IPF})=9.97\times 10^{-5}$ 14
1797.14	$1/2^+, 3/2$	1767.00 4	57 6	0.0	$5/2^+$				
		1497.0 3	12 6	300.052	$1/2^+$				
		1531.58 7	100 10	265.546	$3/2^+$				
		1797.4 3	70 8	0.0	$5/2^+$	D,E2			
1850.73	$1/2, 3/2$	1066.9 3	29 7	783.600	$3/2^+$				
		1550.7 3	43 9	300.052	$1/2^+$				
		1585.3 2	100 9	265.546	$3/2^+$				
		1850 1	2.0 6	0.0	$5/2^+$				
1988.0?		550.8 @ 3	100	1437.2	$(13/2^-)$	D(+Q)			
2121.5	$(17/2^-)$	684.4 2	≤ 11	1437.2	$(13/2^-)$	(Q)			
		743.6 2	100 9	1377.7	$(15/2^-)$	D+Q			
2132.4	$(19/2^-)$	375.4 2	100	1757.2	$(15/2^-)$	(Q)			

Adopted Levels, Gammas (continued)

$\gamma(^{135}\text{La})$ (continued)							Comments
$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\dagger$	E_f	J_f^π	Mult. [‡]	
2232.6	(19/2 ⁻)	854.7 2	100	1377.7	(15/2 ⁻)	(Q)	
2265.8	(21/2 ⁻)	133.7 2	100	2132.4	(19/2 ⁻)	D	
2304.0	(17/2 ⁺)	918.5 2	100	1385.5	(13/2 ⁺)		
2400.8	(19/2 ⁺)	900.1 2	100	1500.7	(15/2 ⁺)	(Q)	
2494.2	(19/2 ⁺)	993.5 2	100	1500.7	(15/2 ⁺)	(Q)	
2507.1	(19/2 ⁺)	1006.5 2	100	1500.7	(15/2 ⁺)	(Q)	
2626.3	(21/2 ⁺)	119.3 2	57 38	2507.1	(19/2 ⁺)		
		132.0 2	100 29	2494.2	(19/2 ⁺)	(D)	
2735.5	(23/2 ⁻)	469.9 2	100	2265.8	(21/2 ⁻)	D(+Q)	
2795.7	(21/2 ⁻)	674.1 2	100	2121.5	(17/2 ⁻)	(Q)	
2811.3	(23/2 ⁺)	185.0 2	100	2626.3	(21/2 ⁺)	(D)	
2973.2	(25/2 ⁻)	237.9 2	100	2735.5	(23/2 ⁻)		
3079.3	(25/2 ⁺)	268.0 2	100	2811.3	(23/2 ⁺)	(D)	
3105.6	(23/2 ⁻)	872.9 2	100	2232.6	(19/2 ⁻)	(Q)	
3170.0		64.0 2	53 11	3105.6	(23/2 ⁻)		
		434.6 2	100 8	2735.5	(23/2 ⁻)		
3181.0	(23/2 ⁻)	948.4 2	100	2232.6	(19/2 ⁻)	(Q)	
3438.3	(27/2 ⁻)	465.0 2	59 5	2973.2	(25/2 ⁻)		
		703.0 2	100 3	2735.5	(23/2 ⁻)	(Q)	
3500.0	(25/2 ⁻)	329.7 2	100 2	3170.0			
		394.7 2	32 4	3105.6	(23/2 ⁻)	(D)	
		526.6 2	17 5	2973.2	(25/2 ⁻)		
		704.2 2		2795.7	(21/2 ⁻)		
		764.2 2	28 8	2735.5	(23/2 ⁻)		
3522.5	(27/2 ⁺)	443.2 2	100	3079.3	(25/2 ⁺)	(D)	
3638.6	(27/2 ⁻)	138.0 2	100 3	3500.0	(25/2 ⁻)	(D)	E_γ : level-energy difference=138.6.
		666.0 2	73 2	2973.2	(25/2 ⁻)	(Q)	E_γ : level-energy difference=665.4.
3837.2	(27/2 ⁻)	656.2 2	≤26	3181.0	(23/2 ⁻)		
		731.7 2	100 37	3105.6	(23/2 ⁻)	(Q)	
3890.5	(29/2 ⁺)	368.0 2	100	3522.5	(27/2 ⁺)		
3959.0	(29/2 ⁻)	320.5 2	100	3638.6	(27/2 ⁻)	D	
4262.6	(29/2 ⁻)	624.0 2	100	3638.6	(27/2 ⁻)	D	
4318.5	(31/2 ⁻)	359.6 2	100	3959.0	(29/2 ⁻)	D	
4552.7		1114.3 2	100	3438.3	(27/2 ⁻)		
4695.2	(31/2 ⁻)	858.0 2	100	3837.2	(27/2 ⁻)		
4820.6	(33/2 ⁻)	502.1 2	100	4318.5	(31/2 ⁻)	D	
5001.2		448.5 2	100	4552.7			
5209.4	(33/2 ⁻)	946.7 2	≤38	4262.6	(29/2 ⁻)		
		1250.3 2	100 62	3959.0	(29/2 ⁻)		
5379.1	(35/2 ⁻)	558.5 2	100	4820.6	(33/2 ⁻)	D	
5461.4	(35/2 ⁻)	251.9 2	100 11	5209.4	(33/2 ⁻)		
		1143.0 2	29 20	4318.5	(31/2 ⁻)	(Q)	

Adopted Levels, Gammas (continued)

$\gamma(^{135}\text{La})$ (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>
5564?		563 ^a		5001.2		
5772.4	(37/2 ⁻)	311.0	2	100	5461.4 (35/2 ⁻)	D
6158.6	(39/2 ⁻)	386.2	2	100	5772.4 (37/2 ⁻)	(D)
6630.6	(41/2 ⁻)	472.0	2	100	6158.6 (39/2 ⁻)	
7159.6	(43/2 ⁻)	529.0	2	100	6630.6 (41/2 ⁻)	

[†] From either ¹³⁵Ce ε decay or ¹²⁸Te(¹¹B,4n γ), ¹³³Cs(α ,2n γ). Most levels are populated independently in the two datasets, low spins in ε decay and high spins in (¹¹B,4n γ). Exceptions are noted.

[‡] For γ rays from low-spin levels, the assignments are from ce data in ¹³⁵Ce ε decay. The mult=Q and D are from DCO ratios in ¹²⁸Te(¹¹B,4n γ), ¹³³Cs(α ,2n γ), mult=Q corresponds to $\Delta J=2$, quadrupole and mult=D to $\Delta J=1$, dipole (with possible quadrupole admixture for $\Delta\pi=\text{no}$). The mult=Q most likely corresponds to E2 transition.

From ce data in ¹³⁵La ε decay.

@ From level energy difference.

& 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.

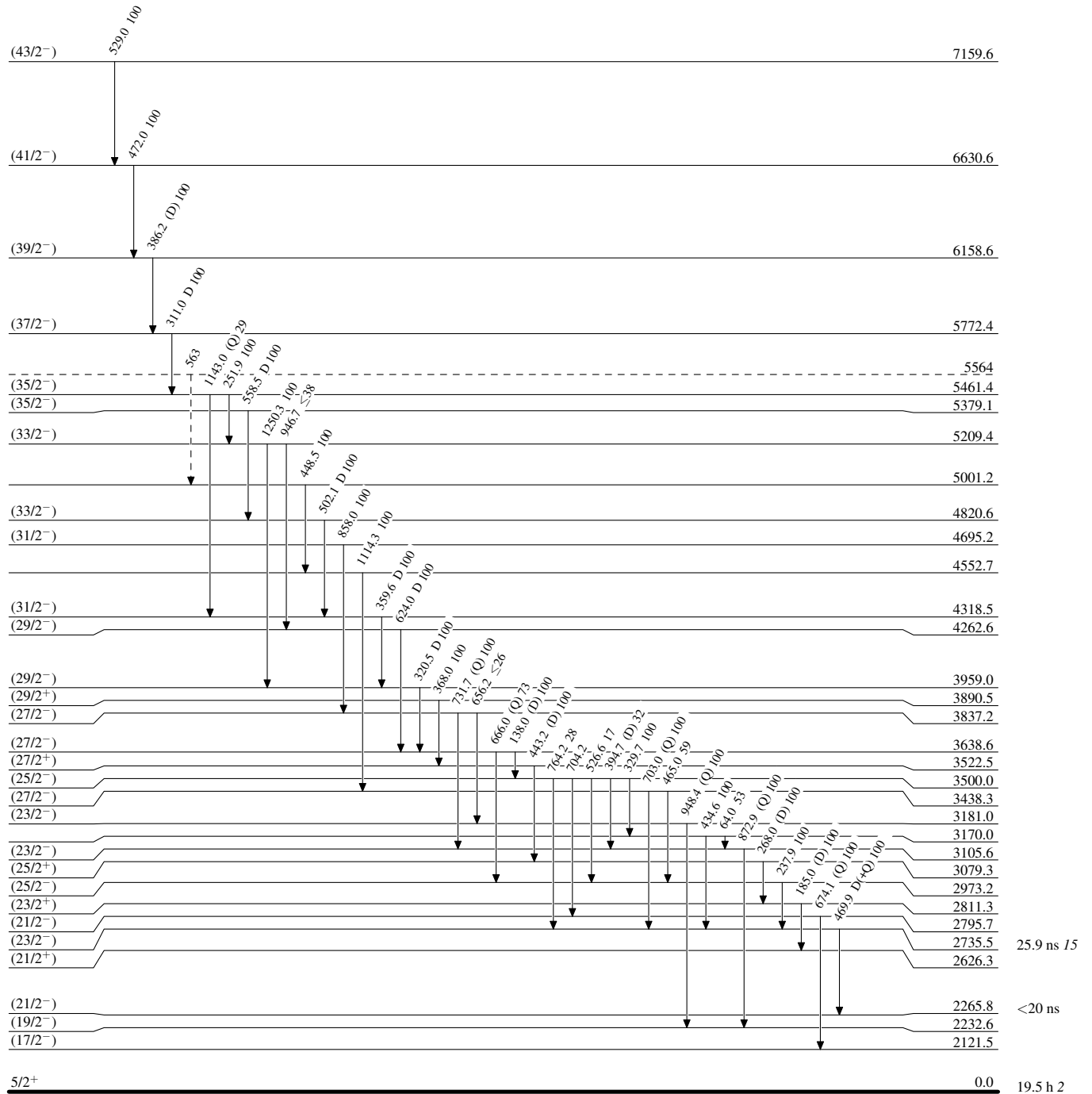
^a Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level

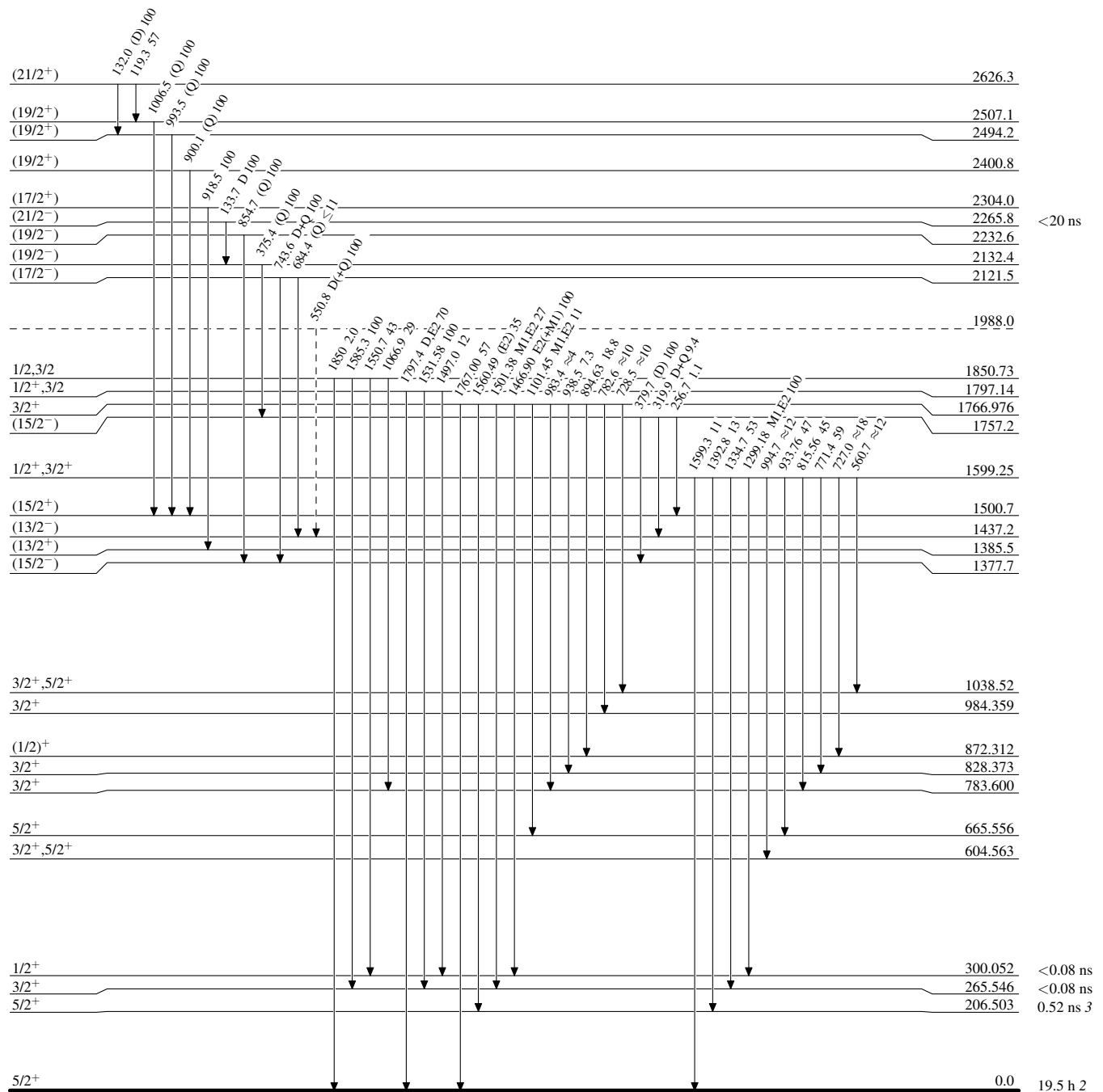
-----► γ Decay (Uncertain)

Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

-----> γ Decay (Uncertain) $^{135}_{57}\text{La}_{78}$

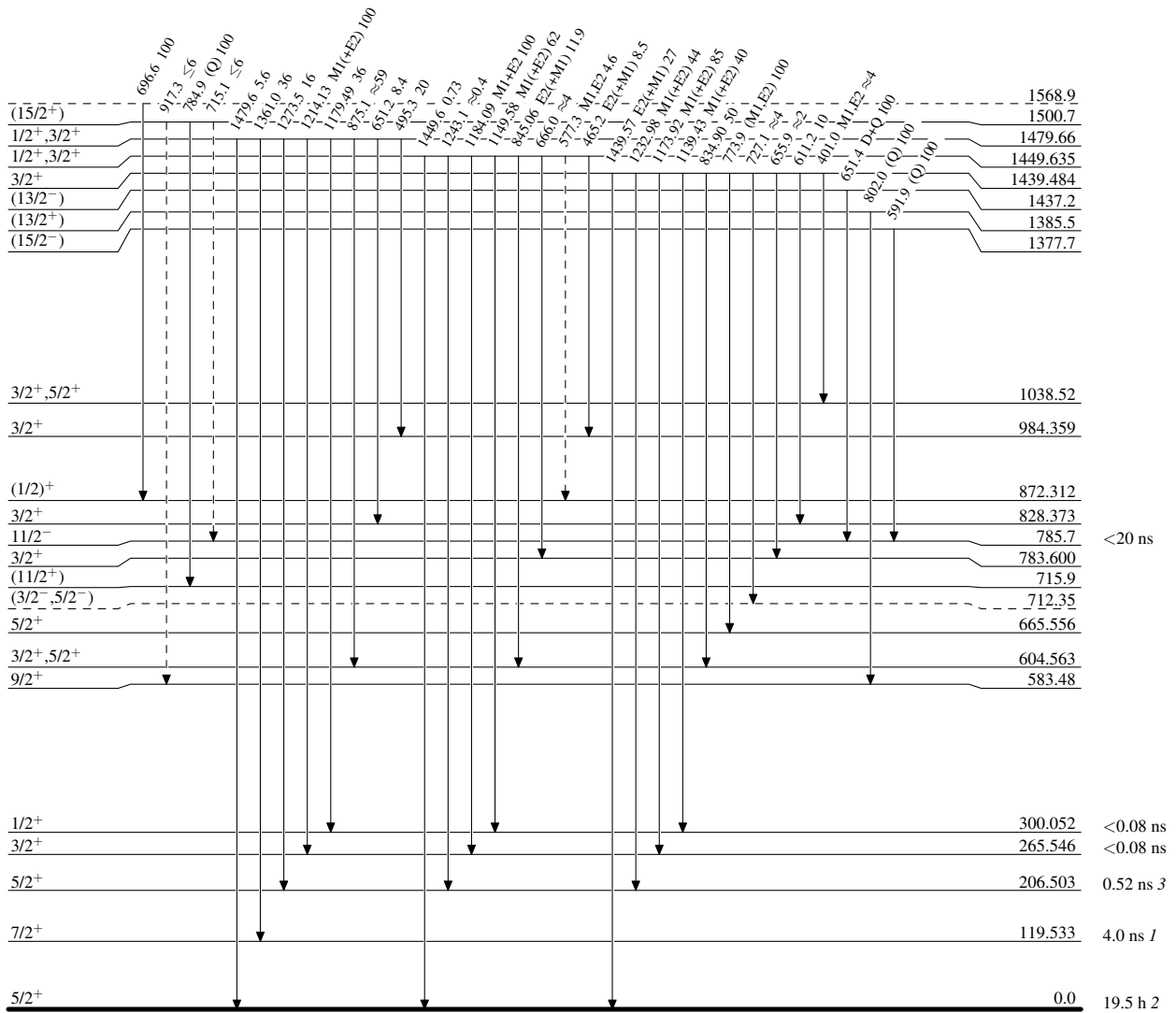
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

-----► γ Decay (Uncertain)



$^{135}_{57}\text{La}_{78}$

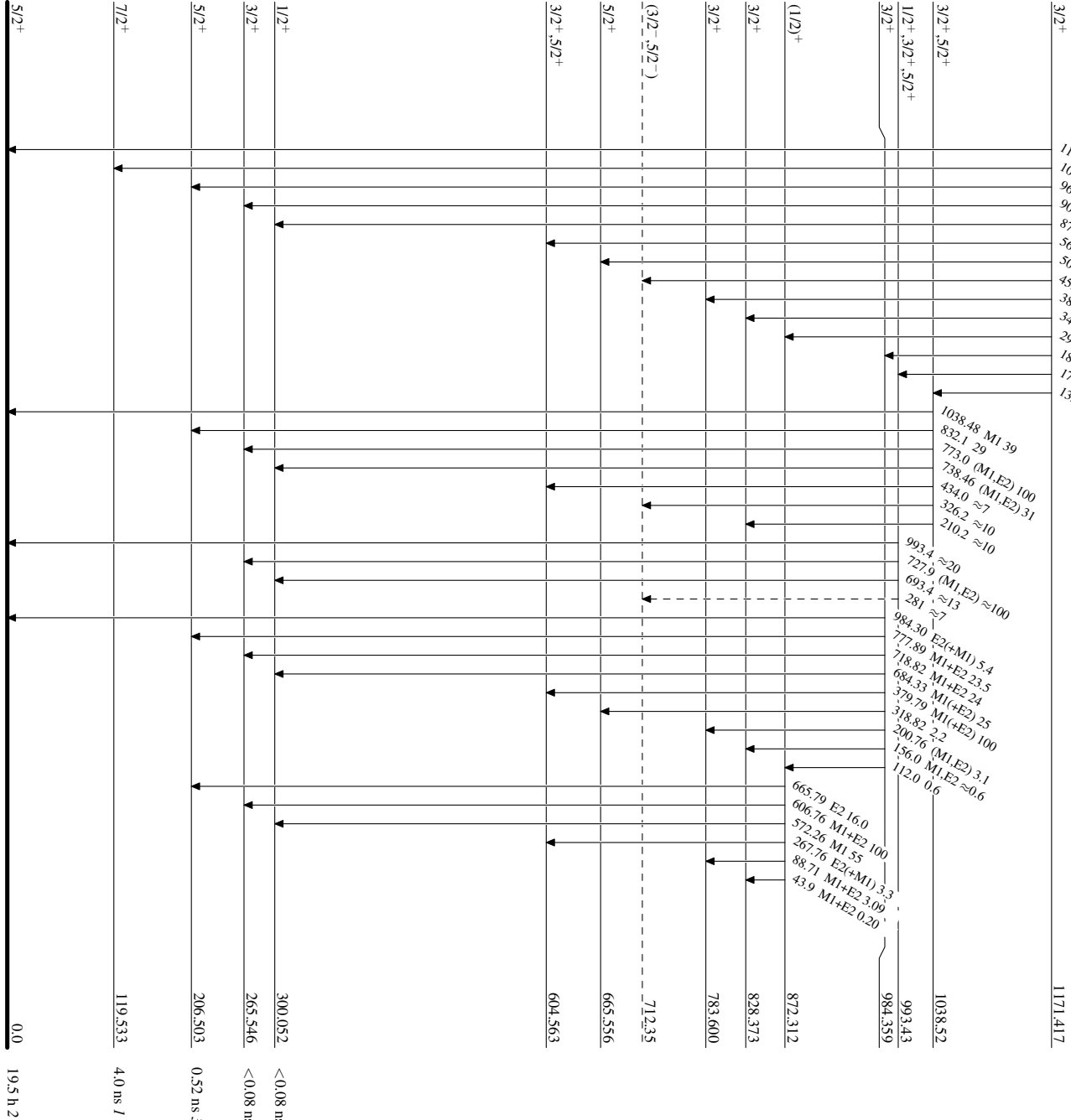
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

-----▶ γ Decay (Uncertain)



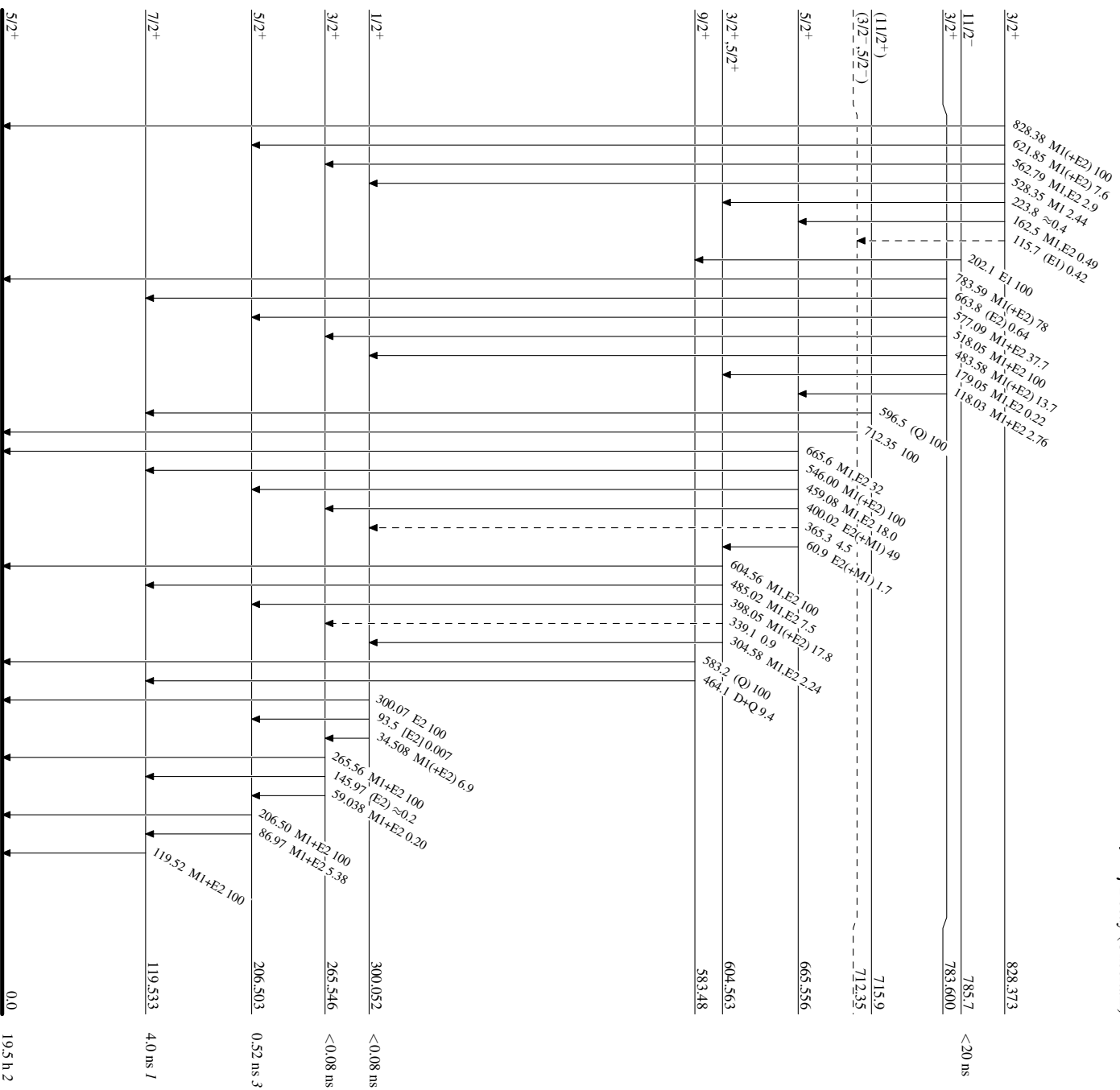
Adopted Levels, Gammas

Legend

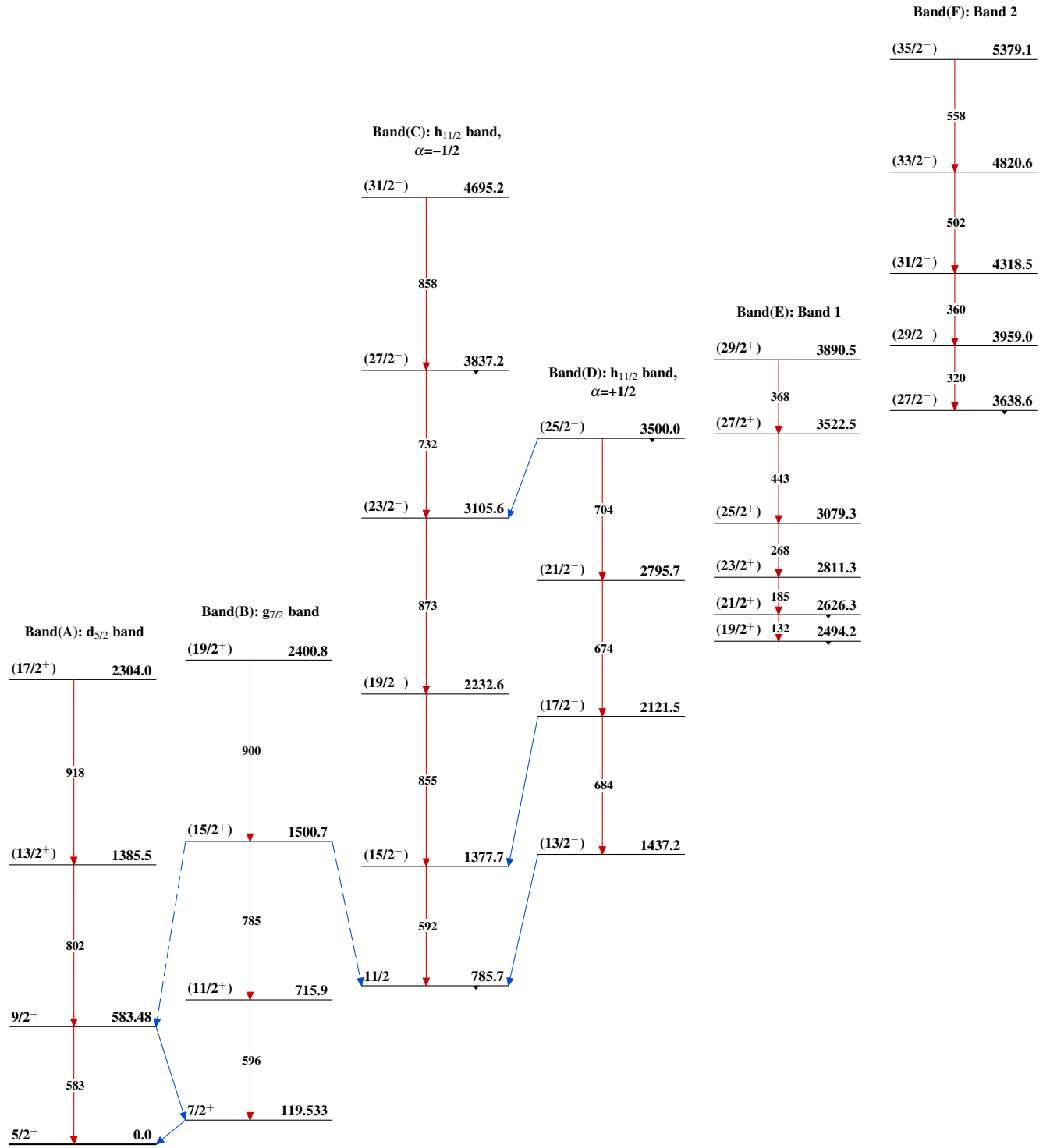
Level Scheme (continued)

Intensities: Relative photon branching from each level

-----▶ γ Decay (Uncertain)



¹³⁵₅₇La₇₈

Adopted Levels, Gammas $^{135}_{57}\text{La}_{78}$

Adopted Levels, Gammas (continued)

