

Adopted Levels, Gammas

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	Yu. Khazov, I. Mitropolsky, A. Rodionov		NDS 107, 2715 (2006)	17-Jul-2006

$Q(\beta^-) = -2.91 \times 10^3$ 3; $S(n) = 7493.5$ 3; $S(p) = 7073$ 9; $Q(\alpha) = -787$ 5 [2012Wa38](#)

Note: Current evaluation has used the following Q record.

$Q(\beta^-) = -2915$ 28; $S(n) = 7493.50$ 30; $S(p) = 7072$ 9; $Q(\alpha) = -788$ 5 [2003Au03](#)

Isotope shift is measured by [1977No04](#), [1978No09](#), [1983Mu12](#).

Charge radii are measured by [1977No04](#), [1978No09](#), [1983Mu12](#).

In the comments for each rotational band the mean-squared deviation Δ of the energy values calculated with use of Variable Moment of Inertia model from the experimental ones is presented.

 ^{131}Ba Levels

Neutron resonance parameters: see [1981MuZQ](#), [2004BrZU](#).

Cross Reference (XREF) Flags

- A** ^{131}Ba IT decay (14.6 min)
B ^{131}La ε decay
C $^{122}\text{Sn}(^{13}\text{C}, 4n\gamma), (^{12}\text{C}, 3n\gamma)$
D $^{130}\text{Ba}(d, p)$

E(level) [†]	J ^π	T _{1/2}	XREF	Comments
0.0 ^c	1/2 ⁺	11.50 d 6	ABCD	$\% \varepsilon + \% \beta^+ = 100$ $\mu = 0.708113$ 15 μ : from trapped ion spectroscopy (2001STZZ , 1987Kn10). Other: -0.709 16 from Collinear LASER spectroscopy (1983Mu12). J ^π : L=0 in (d,p). T _{1/2} : from 1991Bo34 . Others: 11.8 d 2 (1953Co24), 11.52 d 8 (1956Be12), 12.0 d 1 (1963Ly02). J ^π : L=2 in (d,p); M1+E2 γ to 1/2 ⁺ . T _{1/2} : from ^{131}La ε decay. %IT=100 μ, Q : from Collinear LASER Spectroscopy (1983Mu12). J ^π : E3 γ to 3/2 ⁺ . T _{1/2} : from 1963Ho05 . J ^π : L=2 in (d,p); M1+E2 γ from 1/2 ⁺ .
108.077 ^c 5	3/2 ⁺	0.35 ns 5	ABCD	J ^π : L=2 in (d,p); M1+E2 γ to 1/2 ⁺ . T _{1/2} : from ^{131}La ε decay.
187.995 ^e 9	9/2 ⁻	14.6 min 2	A CD	J ^π : L=2 in (d,p); M1+E2 γ to 1/2 ⁺ . T _{1/2} : from ^{131}La ε decay. %IT=100 μ, Q : from Collinear LASER Spectroscopy (1983Mu12). J ^π : E3 γ to 3/2 ⁺ . T _{1/2} : from 1963Ho05 . J ^π : L=2 in (d,p); M1+E2 γ from 1/2 ⁺ .
285.251 5	3/2 ⁺		BCD	J ^π : L=2 in (d,p); M1+E2 γ from 1/2 ⁺ .
287.52 ^e 20	11/2 ⁻ $\frac{7}{2}^+$		C	
316.585 ^c 7	5/2 ⁺ $\frac{7}{2}^+$		BCD	
365.165 5	1/2 ⁺		B D	J ^π : L=0 in (d,p).
525.850 6	(3/2) ⁺		BCD	J ^π : M1(+E2) γ to 1/2 ⁺ ; L=(2) in (d,p).
542.89 ^c 14	7/2 ⁺ $\frac{7}{2}^+$		BC	
561.725 15	3/2 ⁺ , 5/2 ⁺		B D	J ^π : L=2 in (d,p).
706.45 ^e 17	13/2 ⁻ $\frac{7}{2}^+$		C	
718.779 10	3/2 ⁺ , 5/2 ⁺			J ^π : M1, E2 γ to 7/2 ⁺ , γ to 1/2 ⁺ .
719.494 15	1/2 ⁺ , 3/2 ⁺		B	J ^π : from M1, E2 γ 's to 1/2 ⁺ , 3/2 ⁺ states, $\varepsilon + \beta^+$ decay from 3/2 ⁺ parent.
757 10	5/2 ⁻ , 7/2 ⁻		D	J ^π : L=3 in (d,p).
783? 10			D	
803.41 ^c 24	9/2 ⁺ $\frac{7}{2}^+$		C	
839? 10			D	
879.333 17	1/2 ⁺ , 3/2 ⁺ , 5/2 ⁺		B	J ^π : from M1, E2 γ 's to 3/2 ⁺ states, γ to 1/2 ⁺ g.s. $\varepsilon + \beta^+$ decay from 3/2 ⁺

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Adopted Levels, Gammas (continued) ^{131}Ba Levels (continued)

E(level) [†]	J ^π	XREF	Comments
895 10	(1/2 ⁺)	D	parent.
898.72 ^e 17	15/2 ⁻ [‡]	C	J ^π : L=(0) in (d,p).
949.94 3	3/2 ⁺ , 5/2 ⁺	B D	J ^π : L=2 in (d,p).
974.211 15	3/2 ⁺ , 5/2 ⁺	B D	J ^π : L=2 in (d,p).
1030.6 6	(13/2 ⁻)	C	J ^π : (E2) γ to 9/2 ⁻ , (M1,E2) γ to 11/2 ⁻ .
1100 10	1/2 ⁻ , 3/2 ⁻	D	J ^π : L=1 in (d,p).
1118.91 ^c 22	11/2 ⁺ [‡]	C	
1135? 10		D	
1154.262 24	1/2 ⁺ , 3/2 ⁺ , 5/2 ⁺	B	J ^π : from M1 γ to (3/2 ⁺) state, γ to 1/2 ⁺ g.s. ε+β+ decay from 3/2 ⁺ parent.
1162 10	5/2 ⁻ , 7/2 ⁻	D	J ^π : L=3 in (d,p).
1202? 10		D	
1243 10	(5/2 ⁻ , 7/2 ⁻)	D	J ^π : L=(3) in (d,p).
1243.96 7	1/2, 3/2, 5/2 ⁽⁺⁾ @	B	
1291.63 5	1/2, 3/2, 5/2 ⁽⁺⁾ @	B D	
1317 10	1/2 ⁻ , 3/2 ⁻	D	J ^π : L=1 in (d,p).
1349.77 ^h 22	(15/2 ⁻)	C	J ^π : M1+E2 γ to 13/2 ⁻ .
1417.92 ^c 23	13/2 ⁺ [‡]	C	
1437 10	(1/2 ⁺)	D	J ^π : L=(0) in (d,p).
1458.67 ^e 16	17/2 ⁻ [‡]	C	
1475.72 10	1/2 ⁺	B D	J ^π : L=0 in (d,p).
1494.65 4	1/2, 3/2, 5/2 ⁽⁺⁾ @	B	
1565 10	5/2 ⁻ , 7/2 ⁻	D	J ^π : L=3 in (d,p).
1605 10		D	
1669 10	3/2 ⁺ , 5/2 ⁺	D	J ^π : L=2 in (d,p).
1683.01 ^e 16	19/2 ⁻ [‡]	C	
1713.2 6	(17/2 ⁻) &	C	
1747 10	(1/2 ⁺)	D	J ^π : L=(0) in (d,p).
1785 10		D	
1796.68 ^c 23	15/2 ⁺ [‡]	C	
1820 10	1/2 ⁺	D	J ^π : L=0 in (d,p).
1908 10	(1/2 ⁺)	D	J ^π : L=(0) in (d,p).
1943 10	(1/2 ⁺)	D	J ^π : L=(0) in (d,p).
1965? 10		C	
1981.82 13	1/2, 3/2, 5/2	B D	J ^π : log ft=7.2 from 3/2 ⁺ parent.
2045.24 ^h 17	(19/2 ⁻) #	C	
2051 15	(5/2 ⁻ , 7/2 ⁻)	D	J ^π : L=(3) in (d,p).
2064.81 11	1/2, 3/2, 5/2 ⁽⁺⁾ @	B	
2100? 15		D	
2109.4 ^d 4	(15/2 ⁺)	C	J ^π : stretched (E1) γ to 13/2 ⁻ .
2122.06 ^c 21	17/2 ⁺ [‡]	C	
2163.16 8	1/2, 3/2, 5/2	B	J ^π : log ft=7.0 from 3/2 ⁺ parent.
2195.23 10	1/2, 3/2, 5/2 ⁽⁺⁾ @	B	
2271.17 9	1/2, 3/2, 5/2 ⁽⁺⁾ @	B	
2310 15	5/2 ⁻ , 7/2 ⁻	D	J ^π : L=3 in (d,p).
2320.10 ^d 19	(17/2 ⁺)	C	J ^π : stretched (E1) to 15/2 ⁻ .
2347 15	(5/2 ⁻ , 7/2 ⁻)	D	J ^π : L=(3) in (d,p).
2358.10 ^f 17	21/2 ⁻ [‡]	C	
2385.17 9	1/2, 3/2, 5/2	B D	J ^π : log ft=6.4 from 3/2 ⁺ parent.
2401 15		D	
2433? 15		D	

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Adopted Levels, Gammas (continued) ^{131}Ba Levels (continued)

E(level) [†]	J ^π	XREF	Comments
2460.7 ^l 3	(19/2) ^{&}	C	
2487 15	5/2 ⁻ , 7/2 ⁻	D	J ^π : L=3 in (d,p).
2519.36 22	(21/2 ⁻) ^{&}	C	
2524 15	3/2 ⁺ , 5/2 ⁺	D	J ^π : L=2 in (d,p).
2533.9 ^c 3	19/2 ⁺ [‡]	C	
2561.28 ^d 18	(19/2 ⁺)	C	J ^π : stretched (E2) γ to 15/2 ⁺ .
2592 15	(5/2 ⁻ , 7/2 ⁻)	D	J ^π : L=(3) in (d,p).
2611.53 ^e 24	23/2 ⁻ [‡]	C	
2616 15	(5/2 ⁻ , 7/2 ⁻)	D	J ^π : L=(3) in (d,p).
2656 15	(5/2 ⁻ , 7/2 ⁻)	D	J ^π : L=(3) in (d,p).
2725.38 ⁱ 25	(21/2 ⁺)	C	J ^π : stretched (E2) γ to 17/2 ⁺ .
2795.43 ^{bd} 22	(21/2 ⁺) [‡]	C	Additional information 1.
2795.51 ^{bh} 24	(23/2 ⁻) [#]	C	Additional information 2.
2862.6 ^c 4	21/2 ⁺ [‡]	C	
2868.6 ^k 4		C	
2884.4 ^l 4	(23/2) [#]	C	
3009.9 ^k 5		C	
3057.40 ^d 20	(23/2 ⁺) [‡]	C	
3119.3 ^j 7		C	
3138.9 8	(23/2 ⁻) ^{&}	C	
3255.0 3	(25/2 ⁻) ^{&}	C	
3256.9 ^k 6		C	
3272.6 ^d 4	(25/2 ⁺) [‡]	C	
3303.6 ⁱ 4	(25/2 ⁺) [#]	C	
3401.1 ^e 3	25/2 ⁻ [‡]	C	
3431.4 ^j 8		C	
3477.1 ^h 4	(27/2 ⁻)	C	J ^π : stretched (E2) γ to 23/2 ⁻ .
3510.6 5	(27/2) [#]	C	
3556.1 ^d 4	(27/2 ⁺) [‡]	C	
3585.2 ^k 7		C	
3653.1 ^g 4	(27/2 ⁻)	C	J ^π : stretched (E2) γ to 23/2 ⁻ .
3657.3 ^l 5	(27/2) [#]	C	
3717.7 ^e 4	27/2 ⁻ [‡]	C	
3808.4 ^j 13		C	
3902.4 ^f 4	(25/2 ⁻)	C	J ^π : ΔJ=2 (E2) γ to 21/2 ⁻ , ΔJ=0 D γ to 25/2 ⁻ .
3940.9 ^d 5	(29/2 ⁺) [‡]	C	
3949.7 ^k 7		C	
4046.6 ^f 4	(27/2 ⁻)	C	J ^π : ΔJ=2 (E2) γ to 23/2 ⁻ , ΔJ=0 D γ to 27/2 ⁻ .
4072.0 ⁱ 5	(29/2 ⁺) [#]	C	
4205.4 ^j 17		C	
4278.6 ^d 5	(31/2 ⁺) [‡]	C	
4307.9 ^f 5	(29/2 ⁻) [‡]	C	
4338.8 ^h 5	(31/2 ⁻) [#]	C	
4410.3 ^k 13		C	
4501.9 ^g 5	(31/2 ⁻) [#]	C	
4512.4 ^l 5	(31/2) [#]	C	

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Adopted Levels, Gammas (continued) ^{131}Ba Levels (continued)

E(level) [†]	J ^π	XREF	E(level) [†]	J ^π	XREF	E(level) [†]	J ^π	XREF
4633.3 ^f 5	(31/2 ⁻) [‡]	C	5351.3 ^h 6	(35/2 ⁻) [#]	C	6174.4? ^d 10	(39/2 ⁺) ^a	C
4670.0? ^j 20		C	5387.9 ^g 6	(35/2 ⁻) [#]	C	6235.6? ⁱ 12	(37/2 ⁺) ^a	C
4750.3 ^d 6	(33/2 ⁺) [‡]	C	5404.5 ^f 7	(35/2 ⁻) [‡]	C	6365.0? ^f 10	(39/2 ⁻) ^a	C
4975.2 ^f 6	(33/2 ⁻) [‡]	C	5489.4 ^l 12	(35/2) [#]	C	6440.9? ^g 12	(39/2 ⁻) ^a	C
5042.0 ⁱ 6	(33/2 ⁺) [#]	C	5687.2 ^d 9	(37/2 ⁺) [‡]	C			
5163.2 ^d 6	(35/2 ⁺) [‡]	C	5856.4 ^f 7	(37/2 ⁻) [‡]	C			

[†] From least-squares fit to $E\gamma$'s, resulted normalized $\chi^2=0.6$.

[‡] M1+E2 or M1,E2, stretched E2 γ cascades to bandhead.

[#] Stretched E2 γ cascade to bandhead.

@ $\log ft=6.4-7.5$ from $3/2^+$ parent; γ to $1/2^+$.

& From decay pattern.

^a From assignment to band.

^b The levels 1795.51, $23/2^-$ and 2795.43, $21/2^+$ are very close; during least square fitting at first the level energies were fixed by turns, at final stage both energies were fixed.

^c Band(A): $\Delta J=1$ band, probable Configuration= $(\nu s_{1/2})$; ($\Delta=40$ keV).

^d Band(B): band on Configuration= $(N, H11/2)(\pi g_{7/2})(\pi h_{11/2})$; ($\Delta=63$ keV).

^e Band(C): yrast band, Configuration= $(\nu h_{11/2})$; ($\Delta=149$ keV).

^f Band(D): band on Configuration= $(N, H11/2)(\pi h_{11/2})^2$; ($\Delta=80$ keV).

^g Band(E): $\Delta J=2$ band, candidate for Configuration= $(\nu h_{11/2})^3$ (GAMMA=-40 DEG); ($\Delta=15$ keV).

^h Band(F): $\Delta J=2$ band, candidate for Configuration= $(\nu h_{11/2})^3$, ($\gamma=-80^\circ$); $\Delta=51$ keV.

ⁱ Band(G): $\Delta J=2$ band, Configuration= $(N, S1/2)(\nu h_{11/2})^2$; ($\Delta=82$ keV).

^j Band(H): Possible rotational level sequence.

^k Band(I): Possible rotational level sequence.

^l Band(J): Possible rotational level sequence with $\Delta J=2$; ($\Delta=96$ keV).

Adopted Levels, Gammas (continued)

$\gamma(^{131}\text{Ba})$

E _i (level)	J ^π _i	E _γ [†]	I _γ ^{†‡}	E _f	J ^π _f	Mult. ^a	δ ^b	α ^c	Comments
108.077	3/2 ⁺	108.081 5	100	0.0	1/2 ⁺	M1+E2	0.127 14	0.812 3	B(M1)(W.u.)=0.027 4; B(E2)(W.u.)=24 7
187.995	9/2 ⁻	79.918 7	100	108.077	3/2 ⁺	E3		80.1	B(E3)(W.u.)=0.00087 3
285.251	3/2 ⁺	177.186 16	1.23 [#] 12	108.077	3/2 ⁺	M1,E2		0.23 3	
		285.246 7	100.0 [#] 23	0.0	1/2 ⁺	M1,E2		0.0547 14	α(K)exp=0.043 4
287.52	11/2 ⁻	99.7 3	100	187.995	9/2 ⁻	M1(+E2)	-0.01 4	1.01	
316.585	5/2 ⁺	208.509 8	100.0 [#] 25	108.077	3/2 ⁺	M1+E2	-0.21 3	0.130	α(K)exp=0.108 7
		316.575 14	28.8 [#] 13	0.0	1/2 ⁺	E2		0.0383	
365.165	1/2 ⁺	79.918 7	4.74 9	285.251	3/2 ⁺	M1+E2	0.21 2	2.01 2	
		257.087 9	20.3 4	108.077	3/2 ⁺	M1,E2		0.0742 6	α(K)exp=0.058 6
		365.162 8	100.0 19	0.0	1/2 ⁺	M1		0.0294	
525.850	(3/2) ⁺	160.687 7	10.0 3	365.165	1/2 ⁺	M1(+E2)	<0.4	0.270 8	
		209.269 27	1.78 18	316.585	5/2 ⁺	M1,E2		0.138 11	α(K)exp=0.111 8
		240.593 7	7.66 19	285.251	3/2 ⁺	M1(+E2)	<0.2	0.088	
		417.783 15	100.0 [#] 23	108.077	3/2 ⁺	M1,E2		0.0187 23	
		525.851 16	48.6 [#] 10	0.0	1/2 ⁺	M1,E2		0.0103 16	
542.89	7/2 ⁺	226.6 5	15.4	316.585	5/2 ⁺	M1+E2	-0.23 8	0.103	E _γ : average of 227.2 ((¹³ C,4nγ)) and 226.3 (ε decay).
		435.3 5	100	108.077	3/2 ⁺	E2		0.0145	E _γ : average of 435.7 ((¹³ C,4nγ)) and 434.83 (ε decay).
561.725	3/2 ⁺ ,5/2 ⁺	245.10 4	5.3 9	316.585	5/2 ⁺	M1,E2		0.086 2	α(K)exp=0.070 8
		276.5 3	0.5 3	285.251	3/2 ⁺				
		453.659 15	100.0 22	108.077	3/2 ⁺	M1,E2		0.015 2	α(K)exp=0.0161 9
		561.785 ^d 16	18.7 5	0.0	1/2 ⁺	M1,E2			α(K)exp=0.0079 20
									E _γ : poor fit, energy level difference is equal to 561.752 11.
706.45	13/2 ⁻	419.0 3	100	287.52	11/2 ⁻	M1+E2	-0.32 7	0.0203 2	
		518.6 3	9.7	187.995	9/2 ⁻	E2			
718.779	3/2 ⁺ ,5/2 ⁺	176.04 16	22 15	542.89	7/2 ⁺	M1,E2		0.24 4	E _γ : poor fit, energy level difference is equal to 175.63 13.
		192.929 8	100 19	525.850	(3/2) ⁺				
		718.5 3	12 5	0.0	1/2 ⁺				
719.494	1/2 ⁺ ,3/2 ⁺	157.82 8	7.8 6	561.725	3/2 ⁺ ,5/2 ⁺				
		176.6 ^d		542.89	7/2 ⁺				
		193.5 ^d		525.850	(3/2) ⁺				
		402.90 4	100 15	316.585	5/2 ⁺	M1,E2		0.0206 23	
		434.33 10	75 3	285.251	3/2 ⁺	M1(+E2)	≤0.64	0.0183 7	
		611.407 18	89 3	108.077	3/2 ⁺	M1,E2			
		719.53 4	19.7 7	0.0	1/2 ⁺	M1,E2			
803.41	9/2 ⁺	260 1	<100 ^{&}	542.89	7/2 ⁺				
		486.8 3	33.3	316.585	5/2 ⁺	E2		0.0106	

Adopted Levels, Gammas (continued)

$\gamma(^{131}\text{Ba})$ (continued)

$E_i(\text{level})$	J_i^π	E_γ [†]	I_γ ^{†‡}	E_f	J_f^π	Mult. ^a	δ ^b	α ^c	Comments
879.333	1/2 ⁺ , 3/2 ⁺ , 5/2 ⁺	159.90 9	5.4 11	719.494	1/2 ⁺ , 3/2 ⁺				
		336.4 ^d		542.89	7/2 ⁺				
		353.479 24	65 5	525.850	(3/2) ⁺	M1,E2		0.030 3	
		594.080 22	100 3	285.251	3/2 ⁺	M1,E2			
		771.19 23	3.1 9	108.077	3/2 ⁺				
		879.20 ^d 4	12.2 5	0.0	1/2 ⁺				
898.72	15/2 ⁻	192.3 3	14.9	706.45	13/2 ⁻	M1+E2	-0.24 12	0.163 2	
		611.3 3	100	287.52	11/2 ⁻	E2			
949.94	3/2 ⁺ , 5/2 ⁺	230.4 ^d		719.494	1/2 ⁺ , 3/2 ⁺				
		584.81 5	28 3	365.165	1/2 ⁺	M1,E2			
		664.63 5	63.3 25	285.251	3/2 ⁺				
		841.86 4	100 4	108.077	3/2 ⁺	M1,E2			$\alpha(\text{K})\text{exp}=0.0025$ 6
974.211	3/2 ⁺ , 5/2 ⁺	94.9 ^d		879.333	1/2 ⁺ , 3/2 ⁺ , 5/2 ⁺				
		254.7 ^d		719.494	1/2 ⁺ , 3/2 ⁺				
		413.30 ^d 23	22 5	561.725	3/2 ⁺ , 5/2 ⁺	M1,E2		0.0192 23	
		431.3 ^d		542.89	7/2 ⁺				
		657.630 23	24.4 7	316.585	5/2 ⁺	M1,E2			$\alpha(\text{K})\text{exp}=0.067$ 14
		866.138 26	100 3	108.077	3/2 ⁺	M1,E2			$\alpha(\text{K})\text{exp}=0.0029$ 16
		974.204 26	61.1 15	0.0	1/2 ⁺	M1,E2			
1030.6	(13/2 ⁻)	743 1		287.52	11/2 ⁻	(M1,E2)			
		843 1		187.995	9/2 ⁻	(E2)			
1118.91	11/2 ⁺	316 1	<11	803.41	9/2 ⁺	D			
		575.8 3	100	542.89	7/2 ⁺	E2			
1154.262	1/2 ⁺ , 3/2 ⁺ , 5/2 ⁺	204.3 ^d		949.94	3/2 ⁺ , 5/2 ⁺				
		628.402 24	100 3	525.850	(3/2) ⁺	M1			$\alpha(\text{K})\text{exp}=0.0072$ 8
		837.86 11	26 5	316.585	5/2 ⁺				
		1154.23 20	20 3	0.0	1/2 ⁺				
1243.96	1/2, 3/2, 5/2 ⁽⁺⁾	524.4 ^d		719.494	1/2 ⁺ , 3/2 ⁺				
		927.40 13	40 5	316.585	5/2 ⁺				
		958.89 14	32 7	285.251	3/2 ⁺				
		1135.85 12	100 6	108.077	3/2 ⁺				
		1243.72 16	26 6	0.0	1/2 ⁺				
1291.63	1/2, 3/2, 5/2 ⁽⁺⁾	317.50 6	100 9	974.211	3/2 ⁺ , 5/2 ⁺				
		729.19 ^d 27	2.9 18	561.725	3/2 ⁺ , 5/2 ⁺				
		1291.54 6	37.1 19	0.0	1/2 ⁺				
1349.77	(15/2 ⁻)	451.0 3	<9.4	898.72	15/2 ⁻				
		643.5 3	100	706.45	13/2 ⁻	M1+E2	-0.32 9		
1417.92	13/2 ⁺	299.0 3	23.6	1118.91	11/2 ⁺	M1+E2	-0.19 10	0.0493 2	
		614.4 3	100	803.41	9/2 ⁺	E2			
1458.67	17/2 ⁻	560.0 3	100	898.72	15/2 ⁻	M1+E2	-0.42 9		
		752.2 3	<69	706.45	13/2 ⁻	E2			

Adopted Levels, Gammas (continued)

$\gamma(^{131}\text{Ba})$ (continued)								
$E_i(\text{level})$	J_i^π	$E_\gamma^{\ddagger}$	$I_\gamma^{\ddagger\ddagger}$	E_f	J_f^π	Mult. ^a	δ^b	α^c
1475.72	1/2 ⁺	231.8 ^d		1243.96	1/2,3/2,5/2 ⁽⁺⁾			
		1158.0 ^d 5	20 6	316.585	5/2 ⁺			
		1367.47 12	100 16	108.077	3/2 ⁺			
		1475.98 15	73 27	0.0	1/2 ⁺			
1494.65	1/2,3/2,5/2 ⁽⁺⁾	544.7 ^d		949.94	3/2 ⁺ ,5/2 ⁺			
		933.03 8	15.0 24	561.725	3/2 ⁺ ,5/2 ⁺			
		969.72 ^d 30	11.0 18	525.850	(3/2) ⁺			
		1178.03 4	100 5	316.585	5/2 ⁺			
		1209.45 15	9.5 23	285.251	3/2 ⁺			
		1386.05 28	18 4	108.077	3/2 ⁺			
		1494.65 8	22.8 23	0.0	1/2 ⁺			
1683.01	19/2 ⁻	224.2 3	6.1	1458.67	17/2 ⁻	M1+E2	-0.19 10	0.107
		784.4 3	100	898.72	15/2 ⁻	E2		
1713.2	(17/2 ⁻)	683 1	100	1030.6	(13/2 ⁻)			
1796.68	15/2 ⁺	379 1	<14	1417.92	13/2 ⁺	D		
		677.6 3	100	1118.91	11/2 ⁺	E2		
1981.82	1/2,3/2,5/2	1420.7 5	56 28	561.725	3/2 ⁺ ,5/2 ⁺			
		1696.56 22	99 13	285.251	3/2 ⁺			
		1873.65 17	100 15	108.077	3/2 ⁺			
2045.24	(19/2 ⁻)	332 1	<15	1713.2	(17/2 ⁻)			
		363 1	<15	1683.01	19/2 ⁻			
		586.8 3	100	1458.67	17/2 ⁻	M1+E2	-0.32 7	
		695.6 3	83	1349.77	(15/2 ⁻)	E2		
2064.81	1/2,3/2,5/2 ⁽⁺⁾	570.3 ^d		1494.65	1/2,3/2,5/2 ⁽⁺⁾			
		1699.60 15	100 40	365.165	1/2 ⁺			
		1779.40 26	17 5	285.251	3/2 ⁺			
		1957.16 ^d 13	52 6	108.077	3/2 ⁺			
		2064.94 20	10 3	0.0	1/2 ⁺			
2109.4	(15/2 ⁺)	1403.0 3	100	706.45	13/2 ⁻	(E1+M2)	-0.03 6	
2122.06	17/2 ⁺	325 1	<27	1796.68	15/2 ⁺			
		704.0 [@] 3	100	1417.92	13/2 ⁺	E2		
2163.16	1/2,3/2,5/2	1212.85 22	45 15	949.94	3/2 ⁺ ,5/2 ⁺			
		1443.66 11	100 7	719.494	1/2 ⁺ ,3/2 ⁺			
		1601.53 17	15 4	561.725	3/2 ⁺ ,5/2 ⁺			
		2055.24 22	34 7	108.077	3/2 ⁺			
2195.23	1/2,3/2,5/2 ⁽⁺⁾	700.38 15	72 15	1494.65	1/2,3/2,5/2 ⁽⁺⁾			
		1315.80 17	22 9	879.333	1/2 ⁺ ,3/2 ⁺ ,5/2 ⁺			
		2087.44 20	100 27	108.077	3/2 ⁺			
		2195.58 30	43 14	0.0	1/2 ⁺			
2271.17	1/2,3/2,5/2 ⁽⁺⁾	1296.81 17	66 10	974.211	3/2 ⁺ ,5/2 ⁺			
		1906.40 24	62 18	365.165	1/2 ⁺			

Adopted Levels, Gammas (continued)

γ(¹³¹Ba) (continued)

E _i (level)	J _i ^π	E _γ [‡]	I _γ ^{‡‡}	E _f	J _f ^π	Mult. ^a	δ ^b	α ^c
2271.17	1/2,3/2,5/2 ⁽⁺⁾	1954.48 15	100 13	316.585	5/2 ⁺			
		2271.23 20	45 9	0.0	1/2 ⁺			
2320.10	(17/2 ⁺)	211 1	<54	2109.4	(15/2 ⁺)			
		1421.4 3	100	898.72	15/2 ⁻	(E1+M2)	-0.05 5	
2358.10	21/2 ⁻	675.0 3	95	1683.01	19/2 ⁻	M1+E2	-0.49 14	
		899.5 @ 3	100	1458.67	17/2 ⁻	E2		
2385.17	1/2,3/2,5/2	1823.41 10	100 9	561.725	3/2 ⁺ ,5/2 ⁺			
		1859.08 21	13 5	525.850	(3/2 ⁺)			
		2067.6 d 4	2.6 9	316.585	5/2 ⁺			
		2100.30 23	14 4	285.251	3/2 ⁺			
2460.7	(19/2)	415 1	<31	2045.24	(19/2 ⁻)			
		748 1	<31	1713.2	(17/2 ⁻)			
		777.7 3	100	1683.01	19/2 ⁻	(D)		
		1002 1	<31	1458.67	17/2 ⁻			
2519.36	(21/2 ⁻)	474.0 3	100	2045.24	(19/2 ⁻)	M1,E2		0.0133 19
		806 1	<36	1713.2	(17/2 ⁻)			
2533.9	19/2 ⁺	412 d 1	<24	2122.06	17/2 ⁺			
		737.2 3	100	1796.68	15/2 ⁺	E2		
		1075 1	<24	1458.67	17/2 ⁻	E1		
2561.28	(19/2 ⁺)	241.3 3	45	2320.10	(17/2 ⁺)	D		
		764.5 3	63	1796.68	15/2 ⁺	(E2)		
		1102.5 3	100	1458.67	17/2 ⁻	(E1+M2)	+0.04 12	
2611.53	23/2 ⁻	253 1	<11	2358.10	21/2 ⁻	M1,E2		0.078 1
		928.5 3	100	1683.01	19/2 ⁻	E2		
2725.38	(21/2 ⁺)	603.0 3	83	2122.06	17/2 ⁺	(E2)		
		680.5 3	100	2045.24	(19/2 ⁻)	(E1)		
		1042 1	<35	1683.01	19/2 ⁻			
2795.43	(21/2 ⁺)	234.1 3	19.1	2561.28	(19/2 ⁺)	M1+E2	-0.22 4	0.095
		261 1	<100 &	2533.9	19/2 ⁺			
		475.2 3	<7	2320.10	(17/2 ⁺)			
		673.5 3	<7	2122.06	17/2 ⁺	(E2)		
		750 1		2045.24	(19/2 ⁻)			
		1112.5 @ 3	43.5	1683.01	19/2 ⁻	D		
2795.51	(23/2 ⁻)	276.0 3	<29	2519.36	(21/2 ⁻)	M1,E2		0.0602 9
		437.3 3	60	2358.10	21/2 ⁻	D		
		750.5 3	100	2045.24	(19/2 ⁻)	E2		
		1111.5 @ d 3	<31	1683.01	19/2 ⁻			
2862.6	21/2 ⁺	328 d 1	<65	2533.9	19/2 ⁺			
		740.5 3	100	2122.06	17/2 ⁺	E2		
2868.6		549 1	100	2320.10	(17/2 ⁺)			
		1185.5 3	<90	1683.01	19/2 ⁻			

Adopted Levels, Gammas (continued)

$\gamma(^{131}\text{Ba})$ (continued)

$E_i(\text{level})$	J_i^π	$E_\gamma^{\ddagger}$	$I_\gamma^{\ddagger\ddagger}$	E_f	J_f^π	Mult. ^a	δ^b	α^c
2884.4	(23/2)	365 1	<22	2519.36	(21/2 ⁻)			
		423.7 3	100	2460.7	(19/2)	E2		0.0158
3009.9		141.3 3	100	2868.6				
3057.40	(23/2 ⁺)	195 1	<7.4	2862.6	21/2 ⁺	D		
		261.8 3	<100 ^{&}	2795.43	(21/2 ⁺)	M1,E2		0.0703 1
		496 1	<7.4	2561.28	(19/2 ⁺)			
		523.5 3	<7.4	2533.9	19/2 ⁺	(E2)		
		699.4 3	20.4	2358.10	21/2 ⁻	(E1)		
3119.3		324 1	<100	2795.43	(21/2 ⁺)			
		761 1	<100	2358.10	21/2 ⁻			
3138.9	(23/2 ⁻)	1094 1	100	2045.24	(19/2 ⁻)			
3255.0	(25/2 ⁻)	459.5 3	100	2795.51	(23/2 ⁻)	M1,E2		0.0145 20
		736 1	<59	2519.36	(21/2 ⁻)			
		897 1	<59	2358.10	21/2 ⁻			
3256.9		247.0 3	100	3009.9		(M1,E2)		0.084 2
3272.6	(25/2 ⁺)	215.1 3	100	3057.40	(23/2 ⁺)	M1+E2	-0.12 5	0.119
		477 1	<7.7	2795.43	(21/2 ⁺)			
		662 1	<7.7	2611.53	23/2 ⁻			
3303.6	(25/2 ⁺)	578.2 3	100	2725.38	(21/2 ⁺)	E2		
3401.1	25/2 ⁻	789.5 [@] 3	100	2611.53	23/2 ⁻	M1+E2	-0.56 13	
		1043.0 3	61	2358.10	21/2 ⁻	E2		
3431.4		312 1	100	3119.3		D		
		636 1	<30	2795.43	(21/2 ⁺)			
		820 ^d 1	<30	2611.53	23/2 ⁻			
3477.1	(27/2 ⁻)	222 1	<37	3255.0	(25/2 ⁻)			
		682 1	100	2795.51	(23/2 ⁻)	E2		
		865.5 3	95	2611.53	23/2 ⁻	(E2)		
3510.6	(27/2)	626.1 3	100	2884.4	(23/2)	E2		
3556.1	(27/2 ⁺)	283.5 3	100	3272.6	(25/2 ⁺)	M1+E2	-0.07 4	0.0569
		499 1	<8.0	3057.40	(23/2 ⁺)			
3585.2		328.3 3	100	3256.9				
3653.1	(27/2 ⁻)	858 1	<37	2795.51	(23/2 ⁻)			
		1041.5 3	100	2611.53	23/2 ⁻	(E2)		
3657.3	(27/2)	772.9 3	100	2884.4	(23/2)	E2		
3717.7	27/2 ⁻	316 [@] 1	<56	3401.1	25/2 ⁻			
		1106.2 3	100	2611.53	23/2 ⁻	E2		
3808.4		377 1	100	3431.4		D		
3902.4	(25/2 ⁻)	501.2 3	100	3401.1	25/2 ⁻	D		
		1545 1	<69	2358.10	21/2 ⁻	(E2)		
3940.9	(29/2 ⁺)	384.7 3	100	3556.1	(27/2 ⁺)	M1+E2	-0.34 5	0.0253 1
		668 1	<30	3272.6	(25/2 ⁺)			
3949.7		364.5 3	100	3585.2				

Adopted Levels, Gammas (continued) $\gamma(^{131}\text{Ba})$ (continued)

$E_i(\text{level})$	J_i^π	$E_\gamma^{\ddagger}$	$I_\gamma^{\ddagger\ddagger}$	E_f	J_f^π	Mult. ^a	δ^b	α^c
4046.6	(27/2 ⁻)	144.2 3	100	3902.4	(25/2 ⁻)	M1+E2	-0.39 6	0.379 7
		328.9 3	<91	3717.7	27/2 ⁻	D		
		908 1	<91	3138.9	(23/2 ⁻)			
		1251 1	<91	2795.51	(23/2 ⁻)	(E2)		
		1435 1	<91	2611.53	23/2 ⁻	(E2)		
4072.0	(29/2 ⁺)	768.4 3	100	3303.6	(25/2 ⁺)	E2		
4205.4		397 1	100	3808.4		D		
4278.6	(31/2 ⁺)	337.7 3	100	3940.9	(29/2 ⁺)	M1+E2	-0.12 12	0.0360 2
		722.6 3	58	3556.1	(27/2 ⁺)	E2		
4307.9	(29/2 ⁻)	261.3 3	100 ^{&}	4046.6	(27/2 ⁻)	M1,E2		0.0707 2
4338.8	(31/2 ⁻)	861.7 3	100	3477.1	(27/2 ⁻)	E2		
4410.3?		461 ^d 1	100	3949.7				
4501.9	(31/2 ⁻)	848.8 3	100	3653.1	(27/2 ⁻)	E2		
4512.4	(31/2)	855.2 3	<30	3657.3	(27/2)	E2		
		1001.8 3	100	3510.6	(27/2)	E2		
4633.3	(31/2 ⁻)	325.4 3	<100	4307.9	(29/2 ⁻)	D		
		587 1	<100	4046.6	(27/2 ⁻)			
4670.0?		465 ^d 1	100	4205.4				
4750.3	(33/2 ⁺)	471.7 3	100	4278.6	(31/2 ⁺)	M1,E2		0.0135 19
		809 1	<50	3940.9	(29/2 ⁺)			
4975.2	(33/2 ⁻)	341.9 3	100	4633.3	(31/2 ⁻)	M1+E2	-0.10 3	0.0348
		667 1	<54	4307.9	(29/2 ⁻)			
5042.0	(33/2 ⁺)	970.0 3	100	4072.0	(29/2 ⁺)	E2		
5163.2	(35/2 ⁺)	412.8 3	100	4750.3	(33/2 ⁺)	M1,E2		0.0193 23
		885 1	<51	4278.6	(31/2 ⁺)			
5351.3	(35/2 ⁻)	1012.5 3	100	4338.8	(31/2 ⁻)	E2		
5387.9	(35/2 ⁻)	886.0 3	100	4501.9	(31/2 ⁻)	E2		
5404.5	(35/2 ⁻)	429.3 3	100	4975.2	(33/2 ⁻)	D		
		771 1	<80	4633.3	(31/2 ⁻)			
5489.4	(35/2)	977 1	100	4512.4	(31/2)	E2		
5687.2	(37/2 ⁺)	524 1	100	5163.2	(35/2 ⁺)	M1,E2		0.0103 16
		937 1	<61	4750.3	(33/2 ⁺)			
5856.4	(37/2 ⁻)	452.0 3	100	5404.5	(35/2 ⁻)	M1+E2	-0.17 3	0.0170 1
		881 1	<71	4975.2	(33/2 ⁻)			
6174.4?	(39/2 ⁺)	487 ^d 1	<100	5687.2	(37/2 ⁺)			
		1012 ^d 1	<100	5163.2	(35/2 ⁺)			
6235.6?	(37/2 ⁺)	1194 ^d 1	100	5042.0	(33/2 ⁺)			
6365.0?	(39/2 ⁻)	509 ^d 1	<100	5856.4	(37/2 ⁻)			
		961 ^d 1	<100	5404.5	(35/2 ⁻)			
6440.9?	(39/2 ⁻)	1053 1	100	5387.9	(35/2 ⁻)			

Adopted Levels, Gammas (continued) $\gamma(^{131}\text{Ba})$ (continued)

[†] Relative photon branching from each level.

[‡] Weighted average of all available data.

Data from ε decay adopted: branching ratios from ε decay and ($^{13}\text{C},4n\gamma$) and ($^{12}\text{C},3n\gamma$) are discrepant. See these data sets for details.

@ Doublet with a transition in ^{132}Ba .

& Multiplet.

^a From $\alpha(\text{exp})$, $\gamma(\theta)$ and DCO measurements, except as noted. E2 is assumed for quadrupole transitions, and M1+E2 is assumed for D+Q transitions within a band.

^b From ce and $\gamma\gamma(\theta)$ data.

^c 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.

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

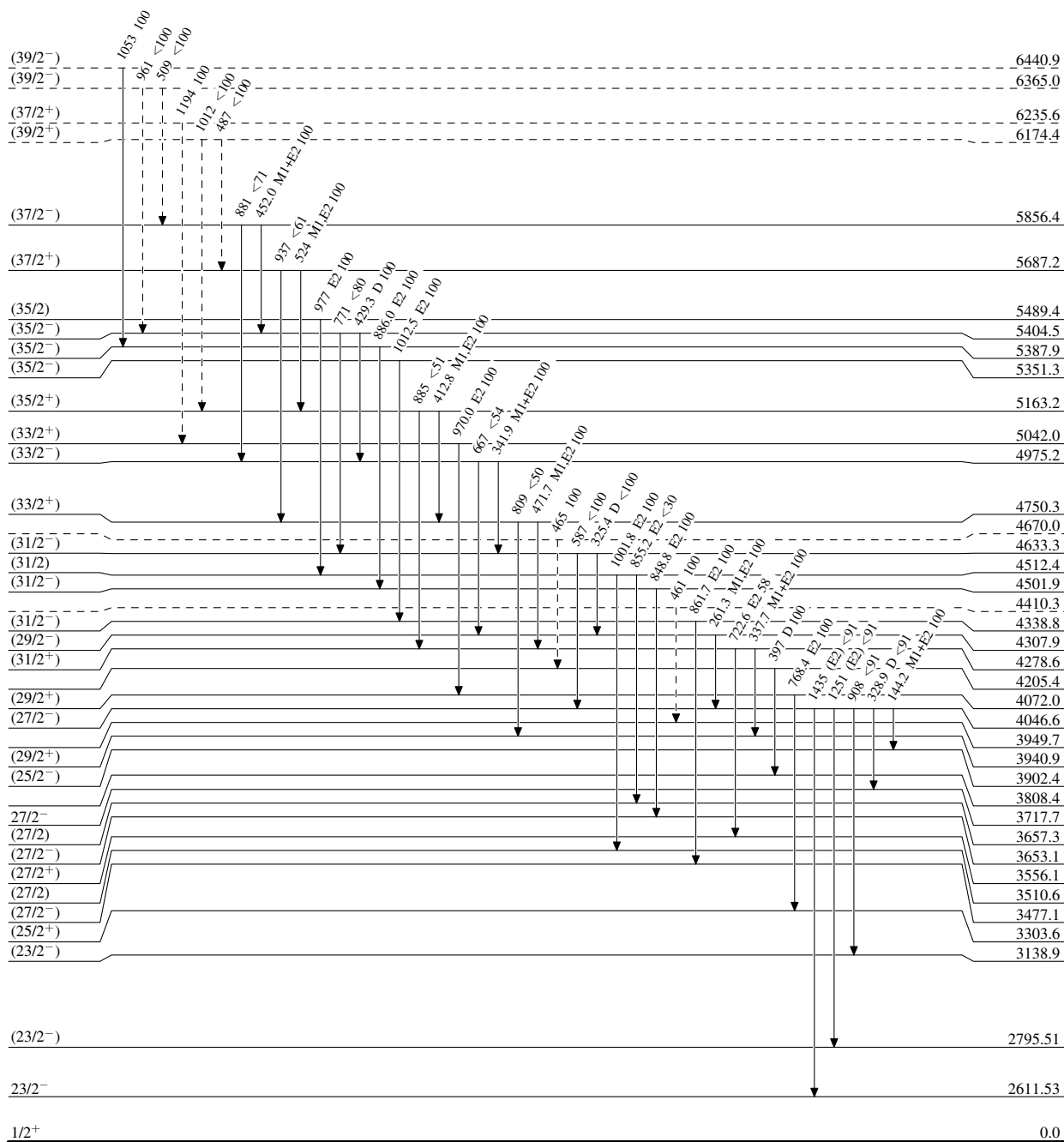
Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level

-----► γ Decay (Uncertain)

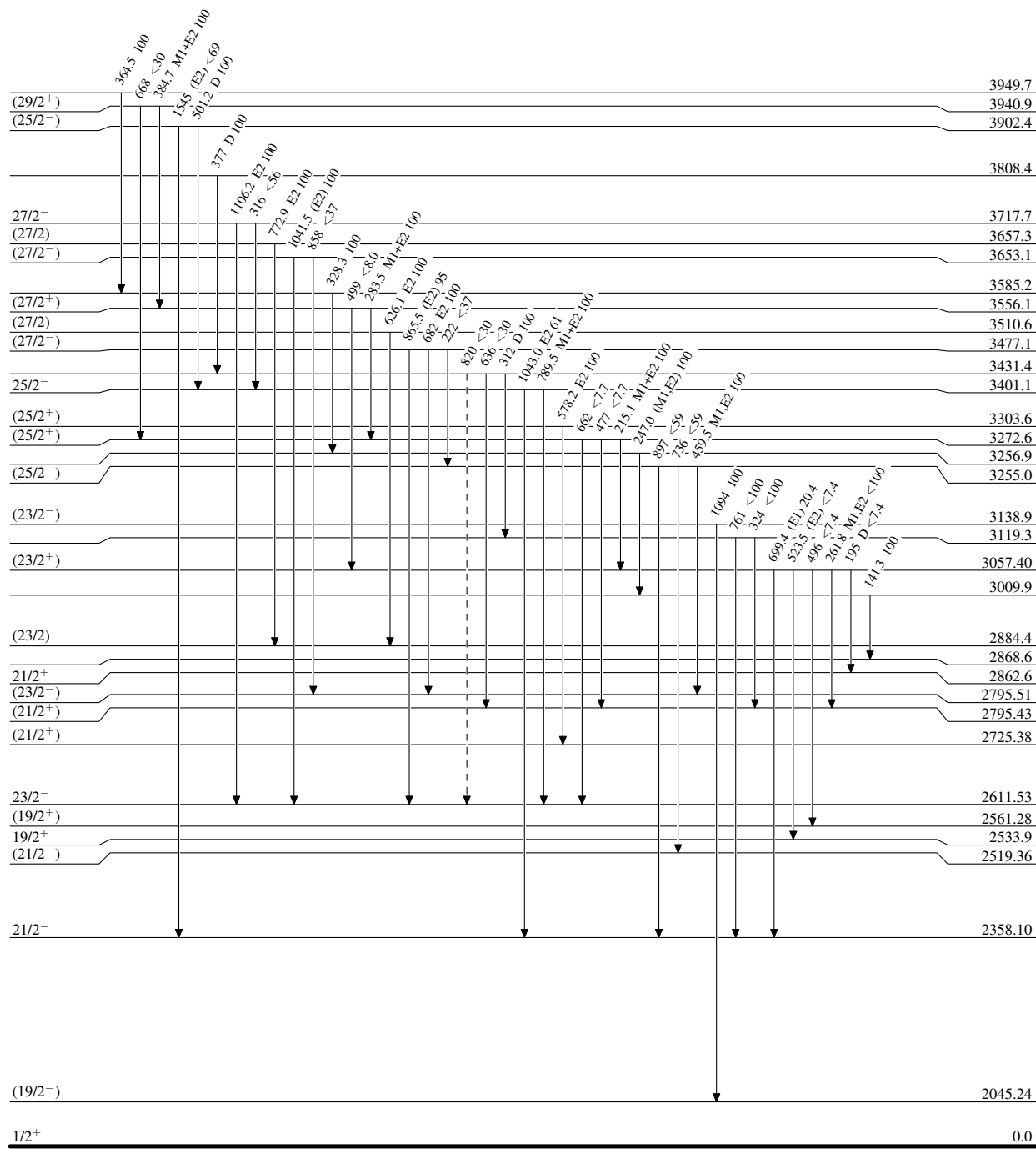


Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

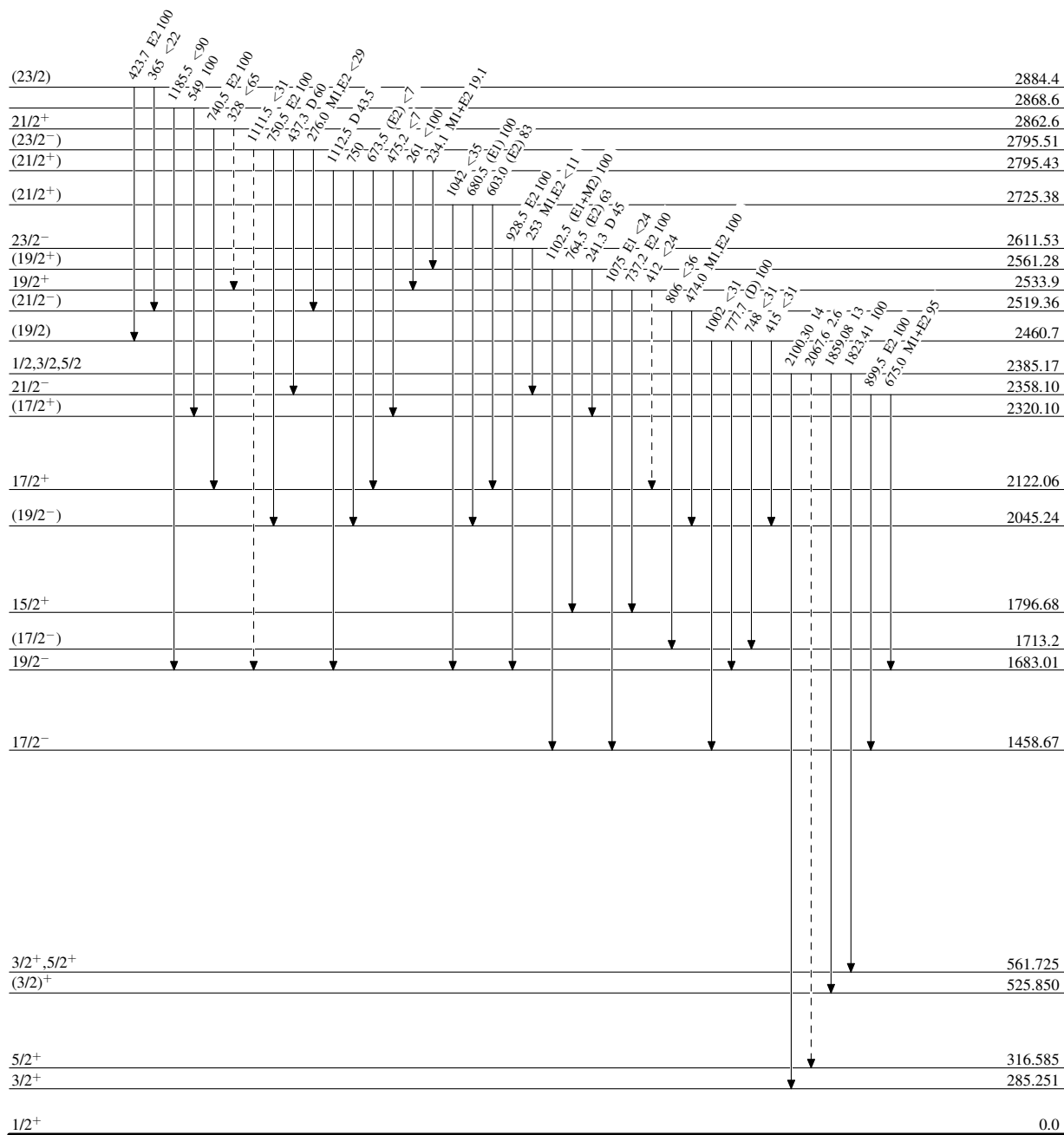
-----► γ Decay (Uncertain)

Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

-----► γ Decay (Uncertain)


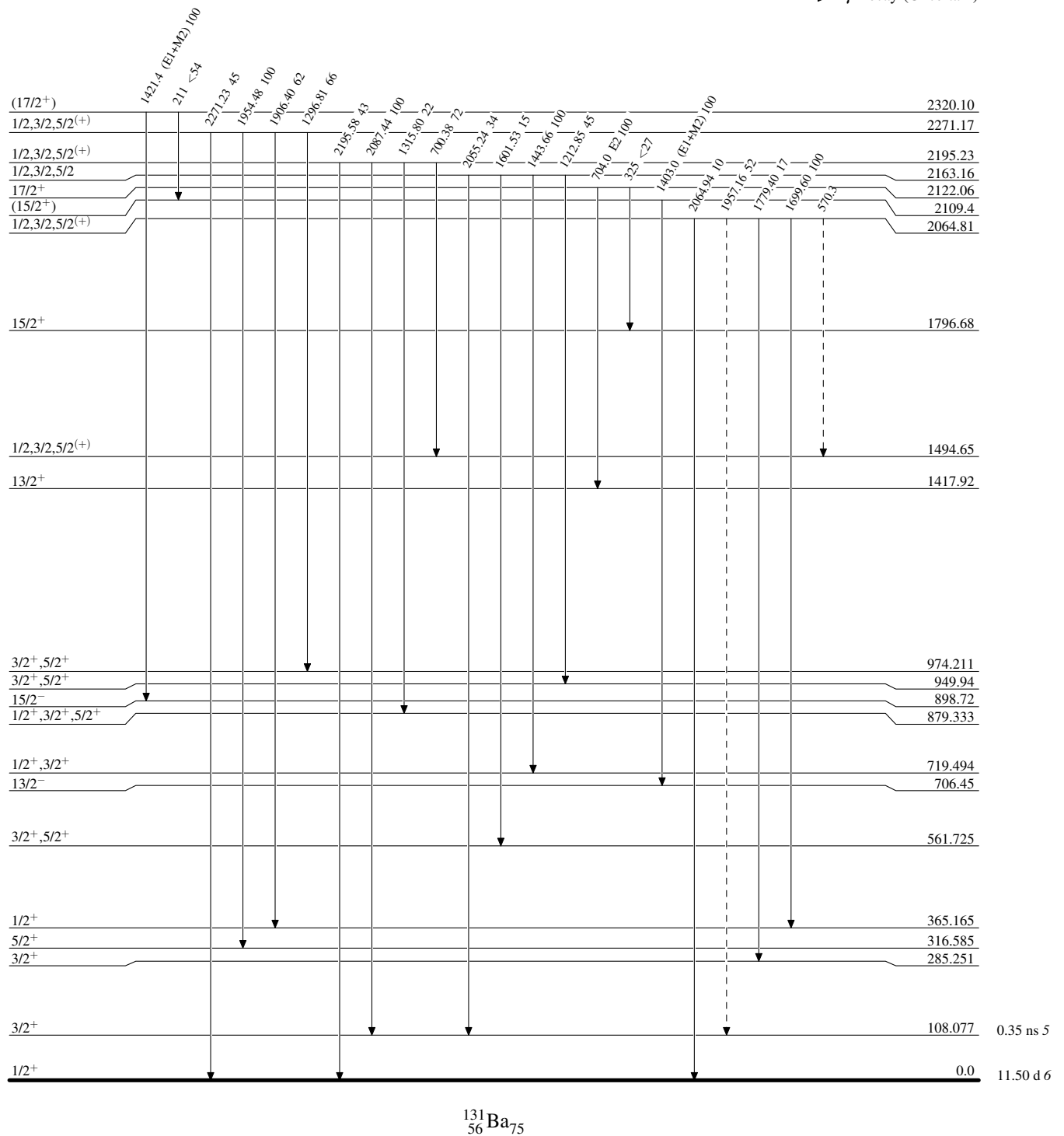
11.50 d 6

Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

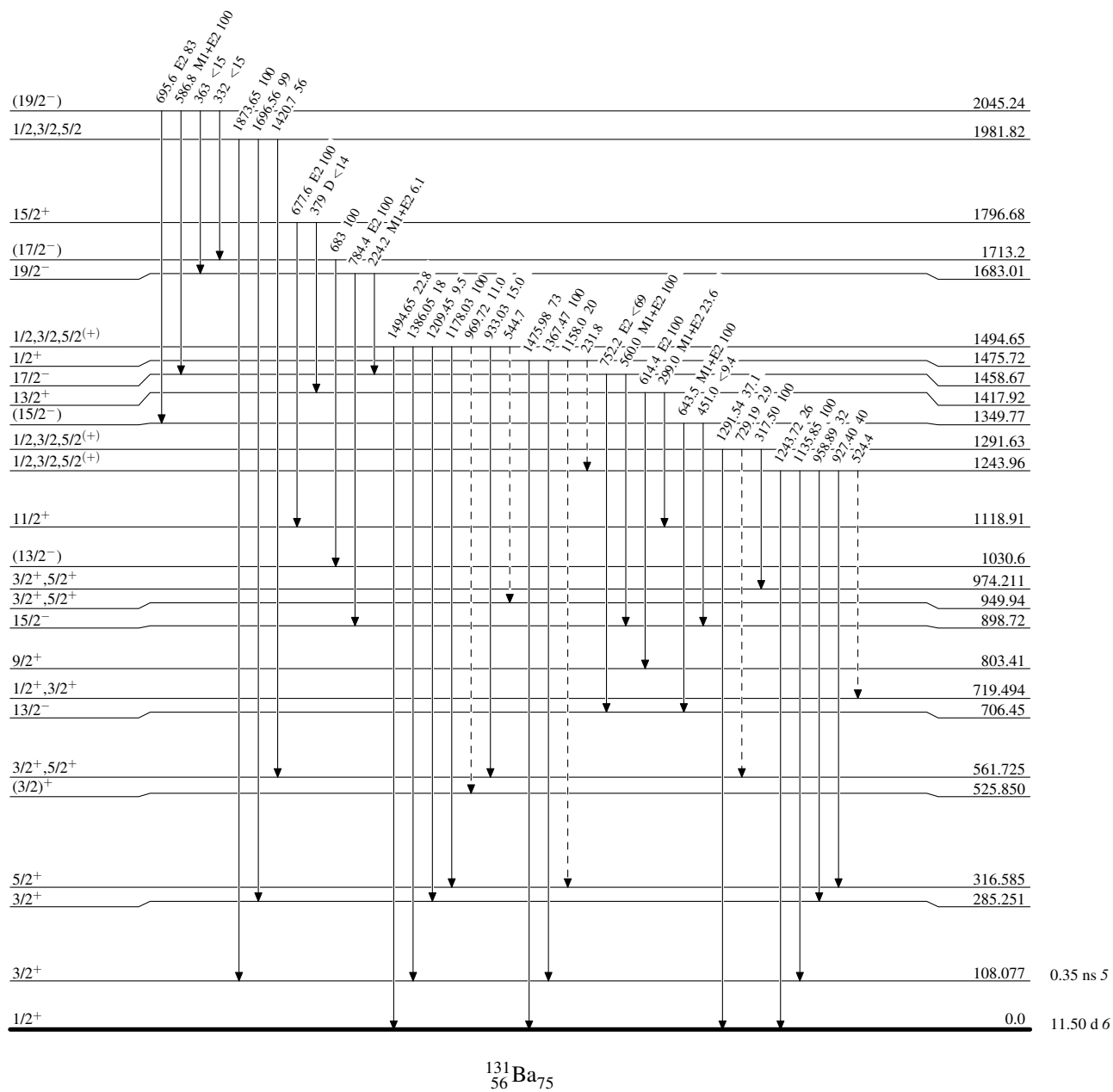
-----► γ Decay (Uncertain)

Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

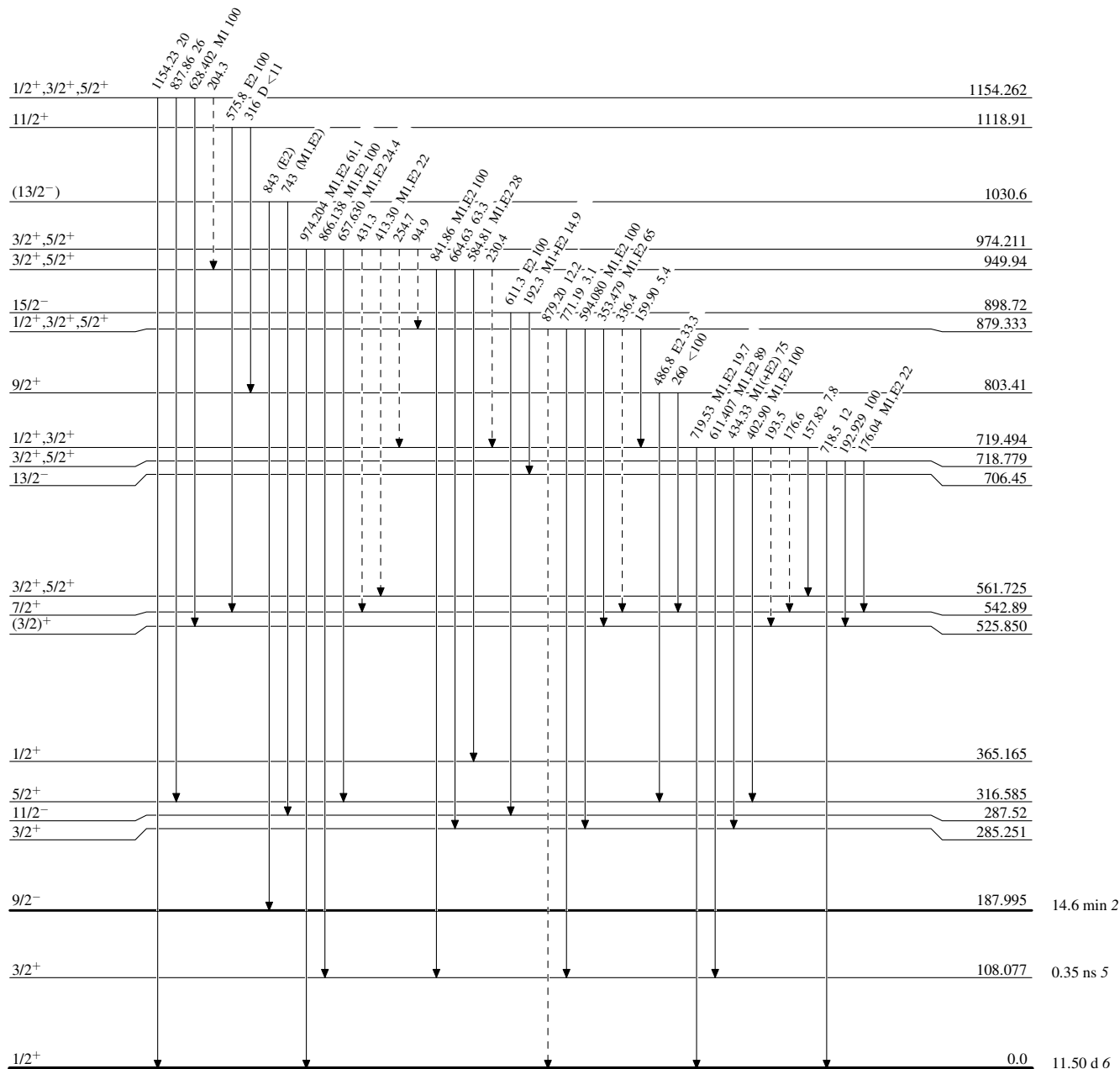
-----► γ Decay (Uncertain)

Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

-----► γ Decay (Uncertain) $^{131}_{56}\text{Ba}_{75}$

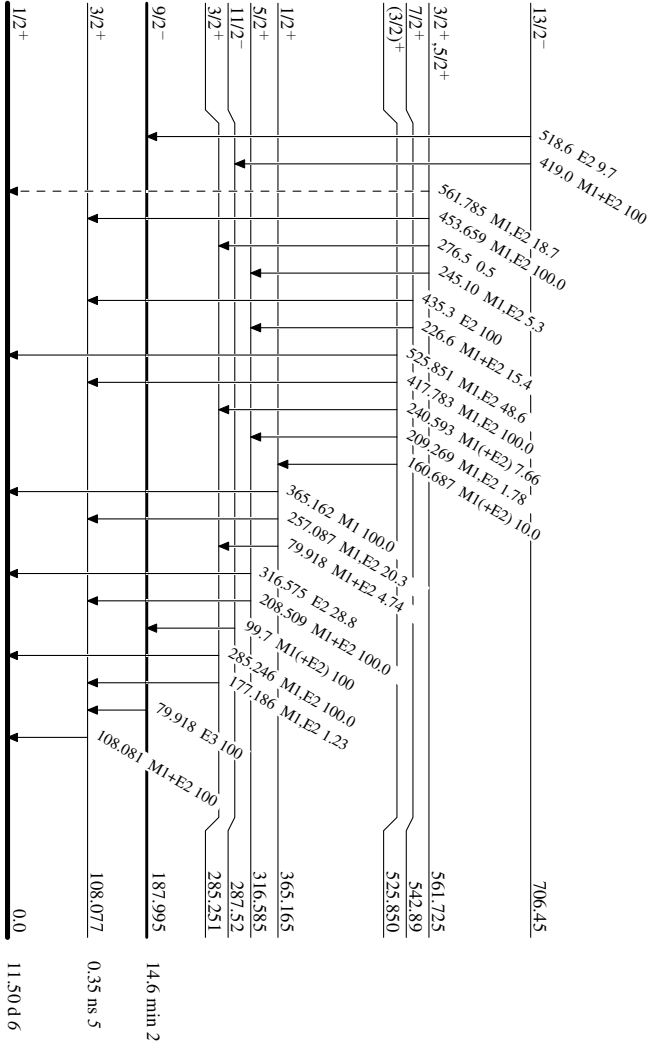
Adopted Levels, Gammas

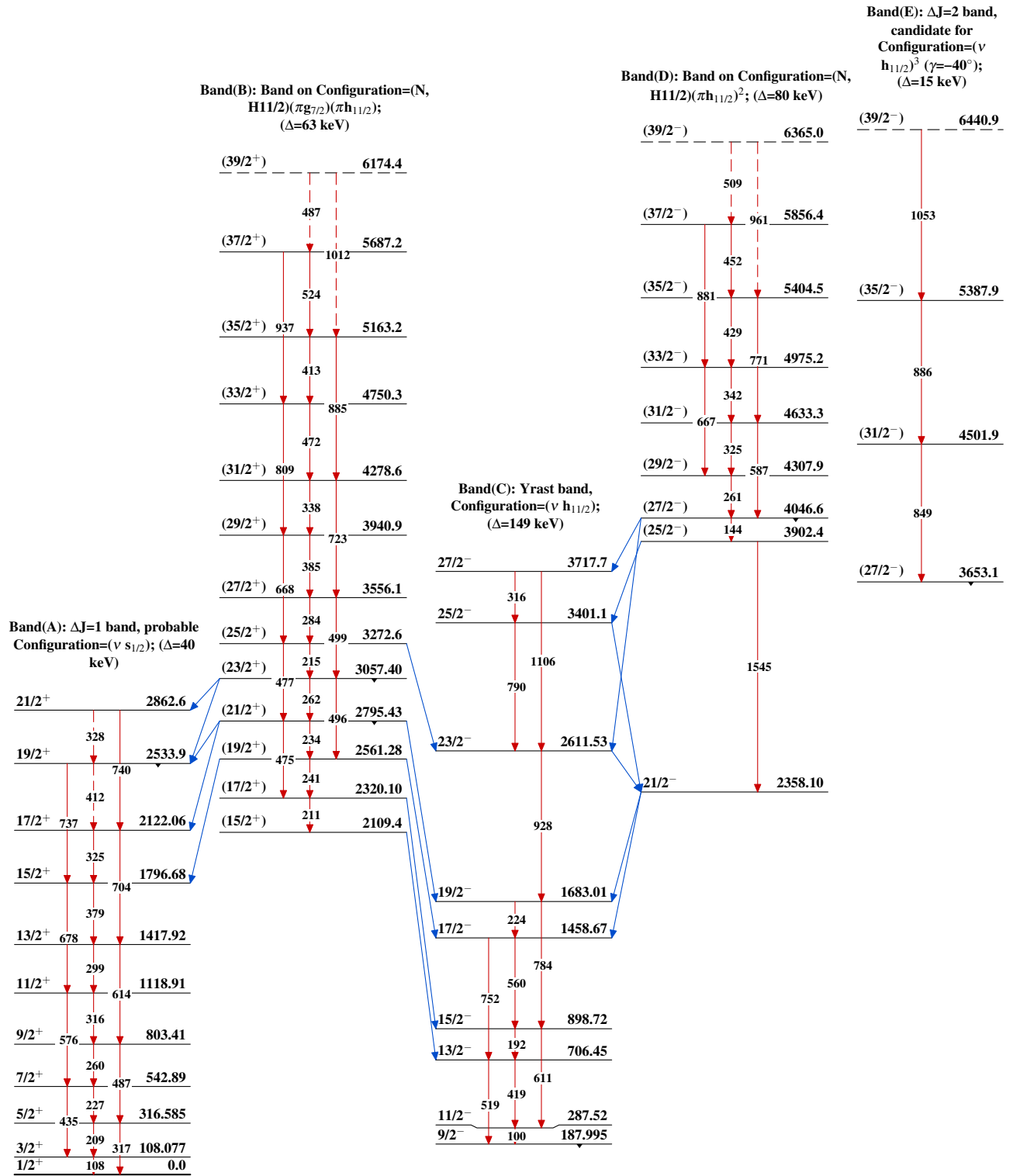
Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

-----▶ γ Decay (Uncertain)



Adopted Levels, Gammas

Adopted Levels, Gammas (continued)