Adopted Levels, Gammas

History

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

Q(β^-)=−2.91×10^3 *3*; S(n)=7493.5 *3*; S(p)=7073 *9*; Q(α)=−787 *5* 2012Wa38
Note: Current evaluation has used the following Q record.
Q(β^-)=−2915 *28*; S(n)=7493.50 *30*; S(p)=7072 *9*; Q(α)=−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}Sn(^{13}C,4nγ),(^{12}C,3nγ)
D	^{130}Ba(d,p)

E(level)†	J$^{\pi}$	T$_{1/2}$	XREF	Comments
0.0^{c}	1/2$^+$	11.50 d *6*	ABCD	%ε+%β^+=100 μ=0.708113 *15* μ: from trapped ion spectroscopy (2001STZZ,1987Kn10). Other: −0.709 *16* from Collinear LASER spectroscopy (1983Mu12). J$^{\pi}$: 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).
108.077^{c} *5*	3/2$^+$	0.35 ns *5*	ABCD	J$^{\pi}$: 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	%IT=100 μ=−0.870 *18*; Q=+1.46 *13* (2001StZZ) μ,Q: from Collinear LASER Spectroscopy (1983Mu12). J$^{\pi}$: E3 γ to 3/2$^+$. T$_{1/2}$: from 1963Ho05.
285.251 *5*	3/2$^+$		BCD	J$^{\pi}$: L=2 in (d,p); M1+E2 γ from 1/2$^+$.
287.52^{e} *20*	11/2$^{-\ddagger}$		C	
316.585^{c} *7*	5/2$^{+\ddagger}$		BCD	
365.165 *5*	1/2$^+$		B D	J$^{\pi}$: L=0 in (d,p).
525.850 *6*	(3/2)$^+$		BCD	J$^{\pi}$: M1(+E2) γ to 1/2$^+$; L=(2) in (d,p).
542.89^{c} *14*	7/2$^{+\ddagger}$		BC	
561.725 *15*	3/2$^+$,5/2$^+$		B D	J$^{\pi}$: L=2 in (d,p).
706.45^{e} *17*	13/2$^{-\ddagger}$		C	
718.779 *10*	3/2$^+$,5/2$^+$			J$^{\pi}$: M1,E2 γ to 7/2$^+$, γ to 1/2$^+$.
719.494 *15*	1/2$^+$,3/2$^+$		B	J$^{\pi}$: from M1,E2 γ's to 1/2$^+$, 3/2$^+$ states, ε+β+ decay from 3/2$^+$ parent.
757 *10*	5/2$^-$,7/2$^-$		D	J$^{\pi}$: L=3 in (d,p).
783? *10*			D	
803.41^{c} *24*	9/2$^{+\ddagger}$		C	
839? *10*			D	
879.333 *17*	1/2$^+$,3/2$^+$,5/2$^+$		B	J$^{\pi}$: from M1,E2 γ's to 3/2$^+$ states, γ to 1/2$^+$ g.s. ε+β+ decay from 3/2$^+$

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Adopted Levels, Gammas (continued)

^{131}Ba Levels (continued)

E(level)[†]	J$^\pi$	XREF	Comments
			parent.
895 *10*	(1/2$^+$)	D	J$^\pi$: L=(0) in (d,p).
898.72[e] *17*	15/2$^-$[‡]	C	
949.94 *3*	3/2$^+$,5/2$^+$	B D	J$^\pi$: L=2 in (d,p).
974.211 *15*	3/2$^+$,5/2$^+$	B D	J$^\pi$: L=2 in (d,p).
1030.6 *6*	(13/2$^-$)	C	J$^\pi$: (E2) γ to 9/2$^-$, (M1,E2) γ to 11/2$^-$.
1100 *10*	1/2$^-$,3/2$^-$	D	J$^\pi$: 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$^\pi$: 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$^\pi$: L=3 in (d,p).
1202? *10*		D	
1243 *10*	(5/2$^-$,7/2$^-$)	D	J$^\pi$: 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$^\pi$: L=1 in (d,p).
1349.77[h] *22*	(15/2$^-$)	C	J$^\pi$: M1+E2 γ to 13/2$^-$.
1417.92[c] *23*	13/2$^+$[‡]	C	
1437 *10*	(1/2$^+$)	D	J$^\pi$: L=(0) in (d,p).
1458.67[e] *16*	17/2$^-$[‡]	C	
1475.72 *10*	1/2$^+$	B D	J$^\pi$: L=0 in (d,p).
1494.65 *4*	1/2,3/2,5/2$^{(+)}$[@]	B	
1565 *10*	5/2$^-$,7/2$^-$	D	J$^\pi$: L=3 in (d,p).
1605 *10*		D	
1669 *10*	3/2$^+$,5/2$^+$	D	J$^\pi$: L=2 in (d,p).
1683.01[e] *16*	19/2$^-$[‡]	C	
1713.2 *6*	(17/2$^-$)[&]	C	
1747 *10*	(1/2$^+$)	D	J$^\pi$: L=(0) in (d,p).
1785 *10*		D	
1796.68[c] *23*	15/2$^+$[‡]	C	
1820 *10*	1/2$^+$	D	J$^\pi$: L=0 in (d,p).
1908 *10*	(1/2$^+$)	D	J$^\pi$: L=(0) in (d,p).
1943 *10*	(1/2$^+$)	D	J$^\pi$: L=(0) in (d,p).
1965? *10*		C	
1981.82 *13*	1/2,3/2,5/2	B D	J$^\pi$: log *ft*=7.2 from 3/2$^+$ parent.
2045.24[h] *17*	(19/2$^-$)[#]	C	
2051 *15*	(5/2$^-$,7/2$^-$)	D	J$^\pi$: 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$^\pi$: stretched (E1) γ to 13/2$^-$.
2122.06[c] *21*	17/2$^+$[‡]	C	
2163.16 *8*	1/2,3/2,5/2	B	J$^\pi$: 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$^\pi$: L=3 in (d,p).
2320.10[d] *19*	(17/2$^+$)	C	J$^\pi$: stretched (E1) to 15/2$^-$.
2347 *15*	(5/2$^-$,7/2$^-$)	D	J$^\pi$: L=(3) in (d,p).
2358.10[f] *17*	21/2$^-$[‡]	C	
2385.17 *9*	1/2,3/2,5/2	B D	J$^\pi$: 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
4633.3[f] *5*	$(31/2^-)$[‡]	C
4670.0?[j] *20*		C
4750.3[d] *6*	$(33/2^+)$[‡]	C
4975.2[f] *6*	$(33/2^-)$[‡]	C
5042.0[i] *6*	$(33/2^+)$[#]	C
5163.2[d] *6*	$(35/2^+)$[‡]	C
5351.3[h] *6*	$(35/2^-)$[#]	C
5387.9[g] *6*	$(35/2^-)$[#]	C
5404.5[f] *7*	$(35/2^-)$[‡]	C
5489.4[l] *12*	(35/2)[#]	C
5687.2[d] *9*	$(37/2^+)$[‡]	C
5856.4[f] *7*	$(37/2^-)$[‡]	C
6174.4?[d] *10*	$(39/2^+)$[a]	C
6235.6?[i] *12*	$(37/2^+)$[a]	C
6365.0?[f] *10*	$(39/2^-)$[a]	C
6440.9?[g] *12*	$(39/2^-)$[a]	C

[†] From least-squares fit to Eγ's, resulted normalized χ^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): ΔJ=1 band, probable Configuration=(ν s$_{1/2}$); (Δ=40 keV).

[d] Band(B): band on Configuration=(N,H11/2)(πg$_{7/2}$)(πh$_{11/2}$); (Δ=63 keV).

[e] Band(C): yrast band, Configuration=(ν h$_{11/2}$); (Δ=149 keV).

[f] Band(D): band on Configuration=(N,H11/2)(πh$_{11/2}$)^2; (Δ=80 keV).

[g] Band(E): ΔJ=2 band, candidate for Configuration=(ν h$_{11/2}$)^3 (GAMMA=−40 DEG); (Δ=15 keV).

[h] Band(F): ΔJ=2 band, candidate for Configuration=(ν h$_{11/2}$)^3, (γ=−80°) ; Δ=51 keV.

[i] Band(G): ΔJ=2 band, Configuration=(N,S1/2)(νh$_{11/2}$)^2; (Δ=82 keV).

[j] Band(H): Possible rotational level sequence.

[k] Band(I): Possible rotational level sequence.

[l] Band(J): Possible rotational level sequence with ΔJ=2 ; (Δ=96 keV).

Adopted Levels, Gammas (continued)

γ(^{131}Ba)

E_i(level)	J_i^π	E_γ[‡]	I_γ[†‡]	E_f	J_f^π	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)

γ(^{131}Ba) (continued)

E_i(level)	J^{π}_{i}	E_{γ}[‡]	I_{γ}[†‡]	E_f	J^{π}_{f}	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			α(K)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			α(K)exp=0.067 *14*
		866.138 *26*	100 *3*	108.077	$3/2^+$	M1,E2			α(K)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			α(K)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)

γ(^{131}Ba) (continued)

E_i(level)	J^π_i	E_γ[‡]	I_γ[†‡]	E_f	J^π_f	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)

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

E_i(level)	J^π_i	E_γ[‡]	I_γ[†‡]	E_f	J^π_f	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)

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

E_i(level)	J_i^π	E_γ[‡]	I_γ[†‡]	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				

γ(^{131}Ba) (continued)

E$_i$(level)	J$_i^\pi$	E$_\gamma$[‡]	I$_\gamma$[†‡]	E$_f$	J$_f^\pi$	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$^-$)			

γ(^{131}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}C,4nγ) and (^{12}C,3nγ) are discrepant. See these data sets for details.

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

[&] Multiplet.

[a] From α(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.

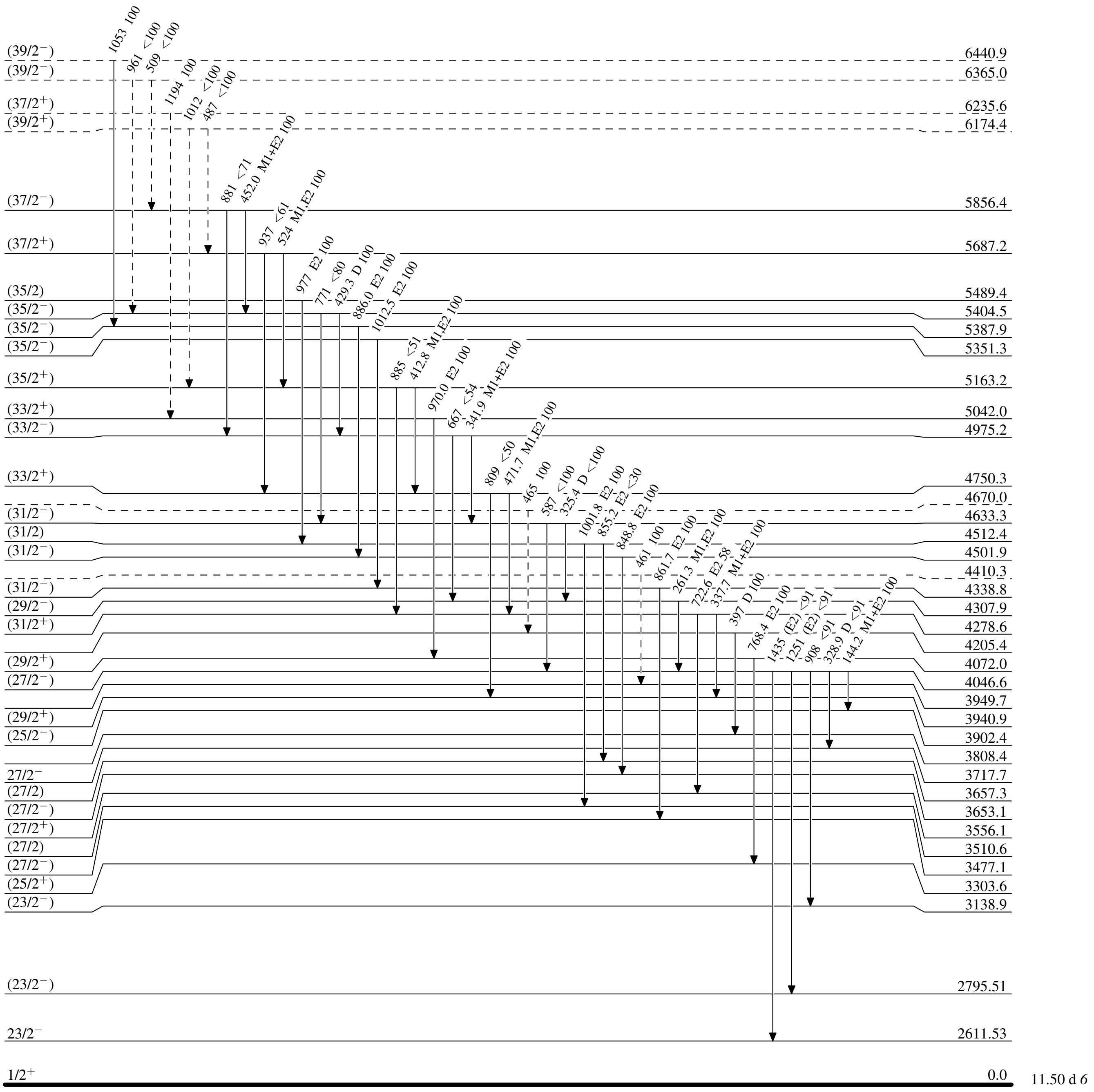
[d] Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level

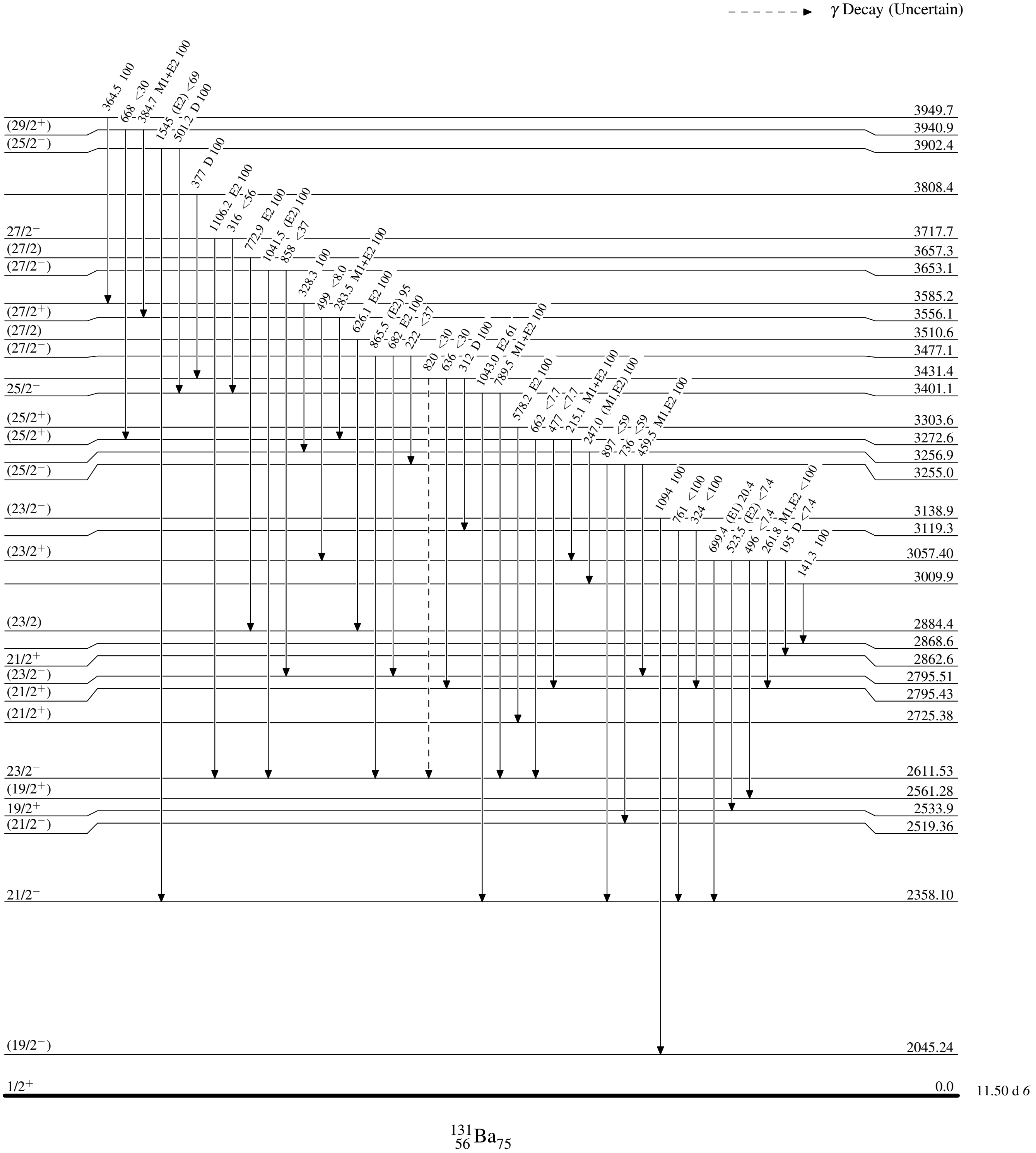


$^{131}_{56}Ba_{75}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



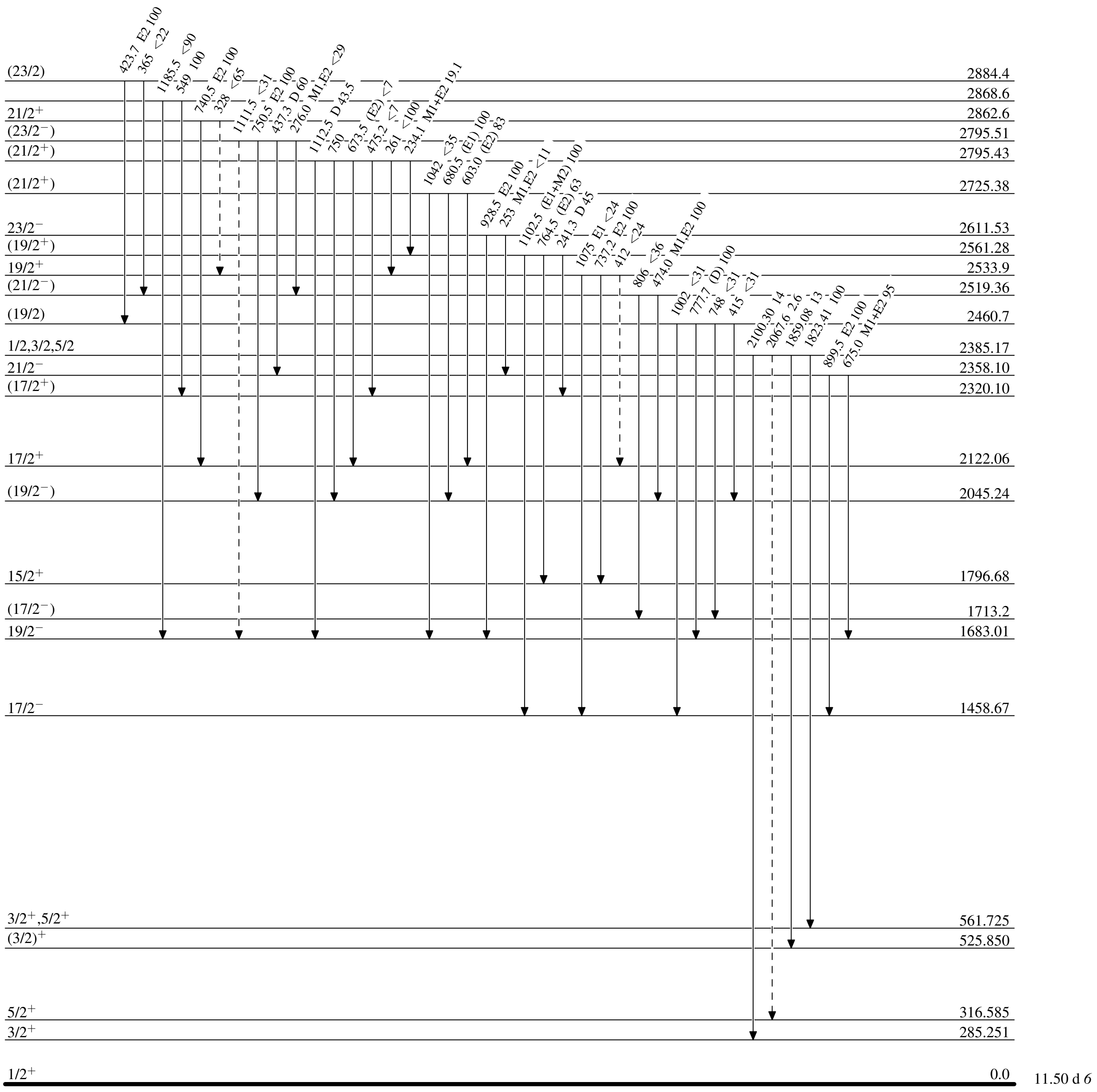
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

γ Decay (Uncertain)



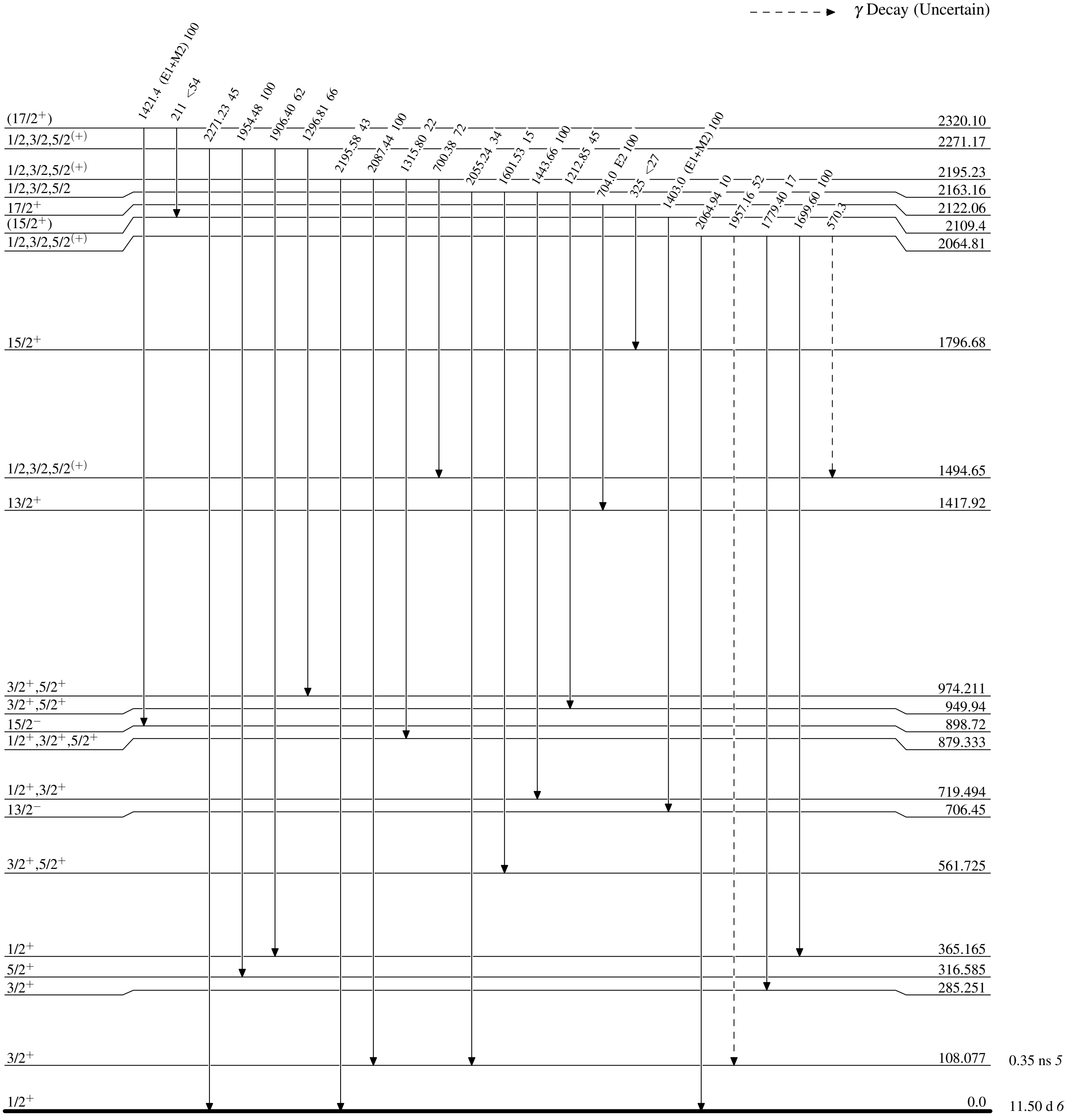
$^{131}_{56}$Ba$_{75}$

Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level



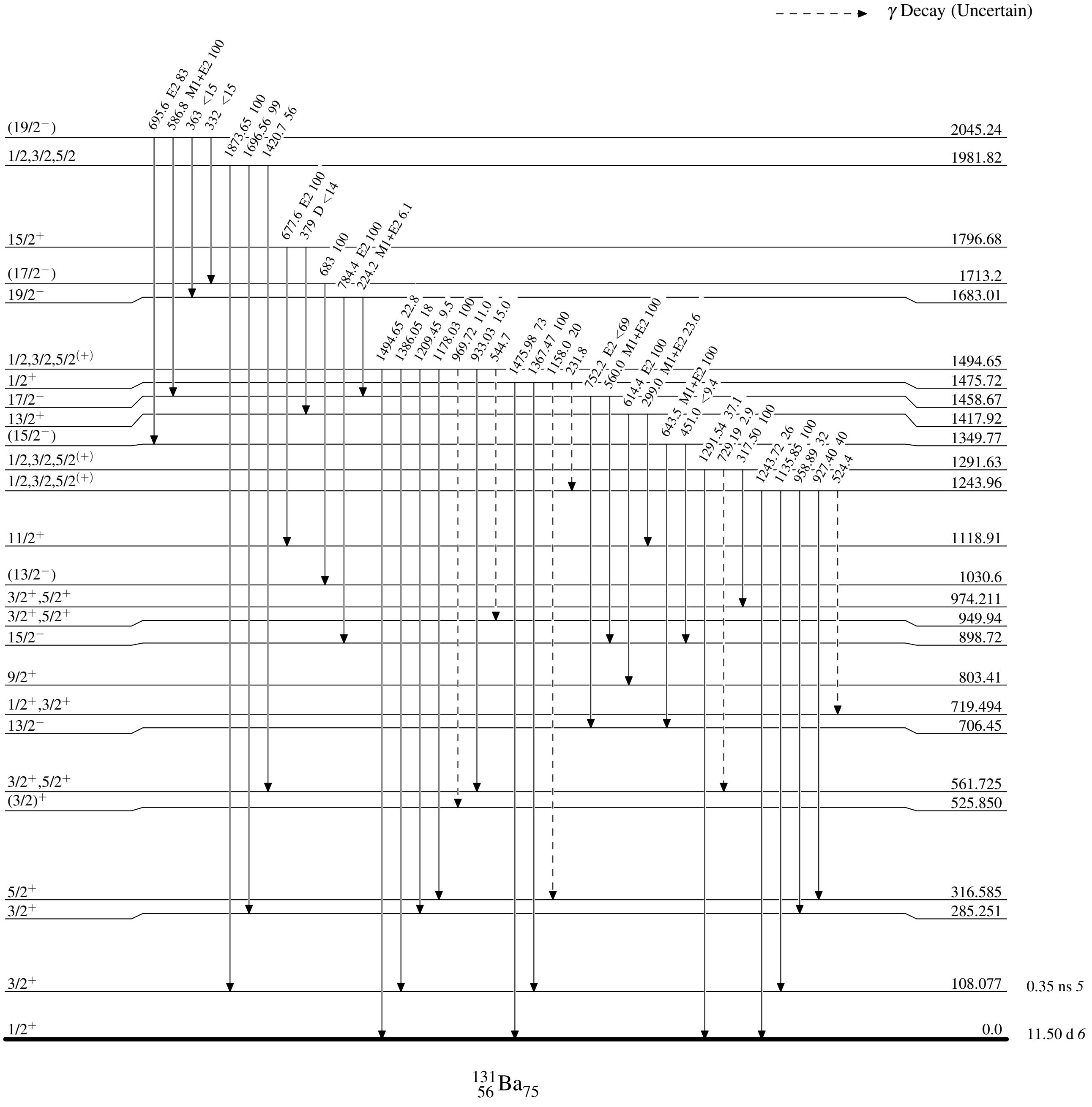
$^{131}_{56}Ba_{75}$

Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level



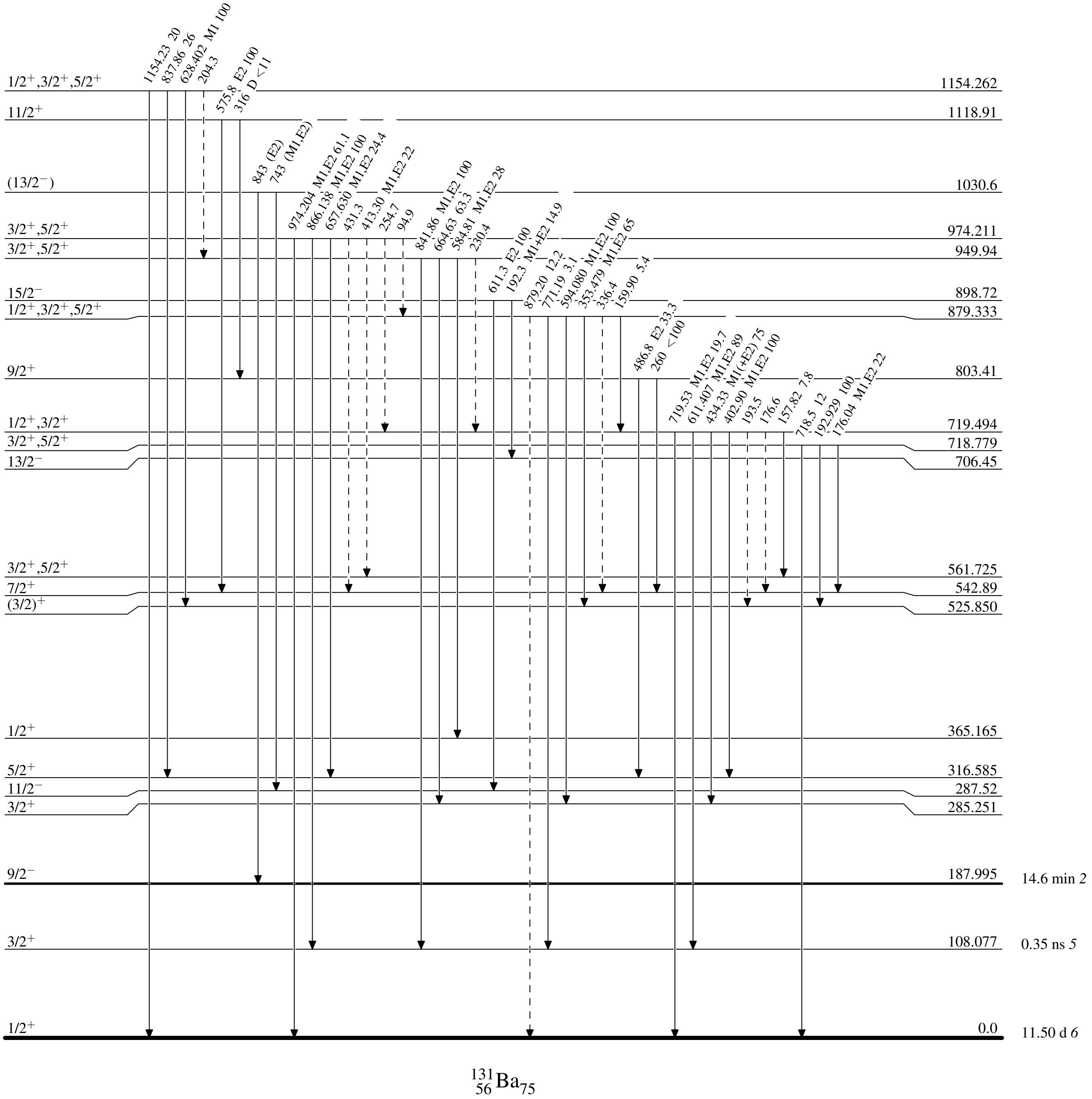
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

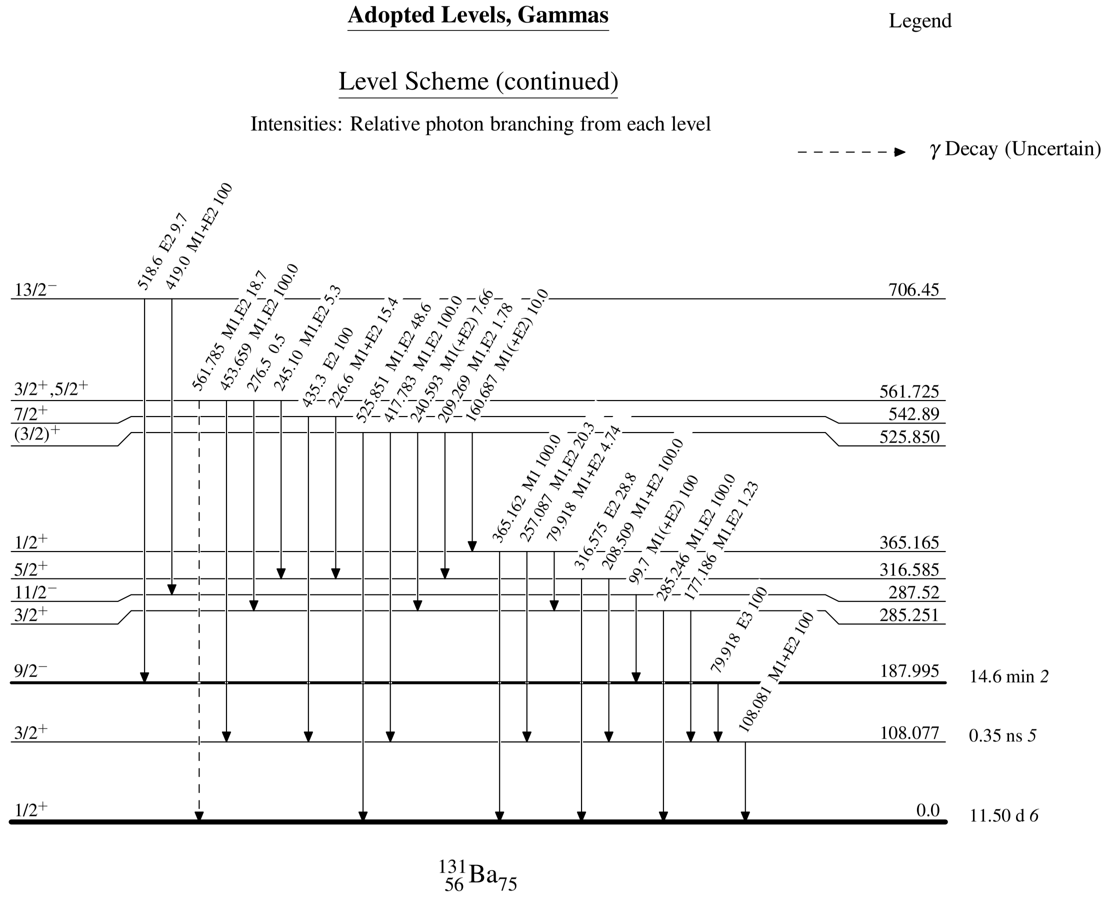
- - - - - -► γ Decay (Uncertain)



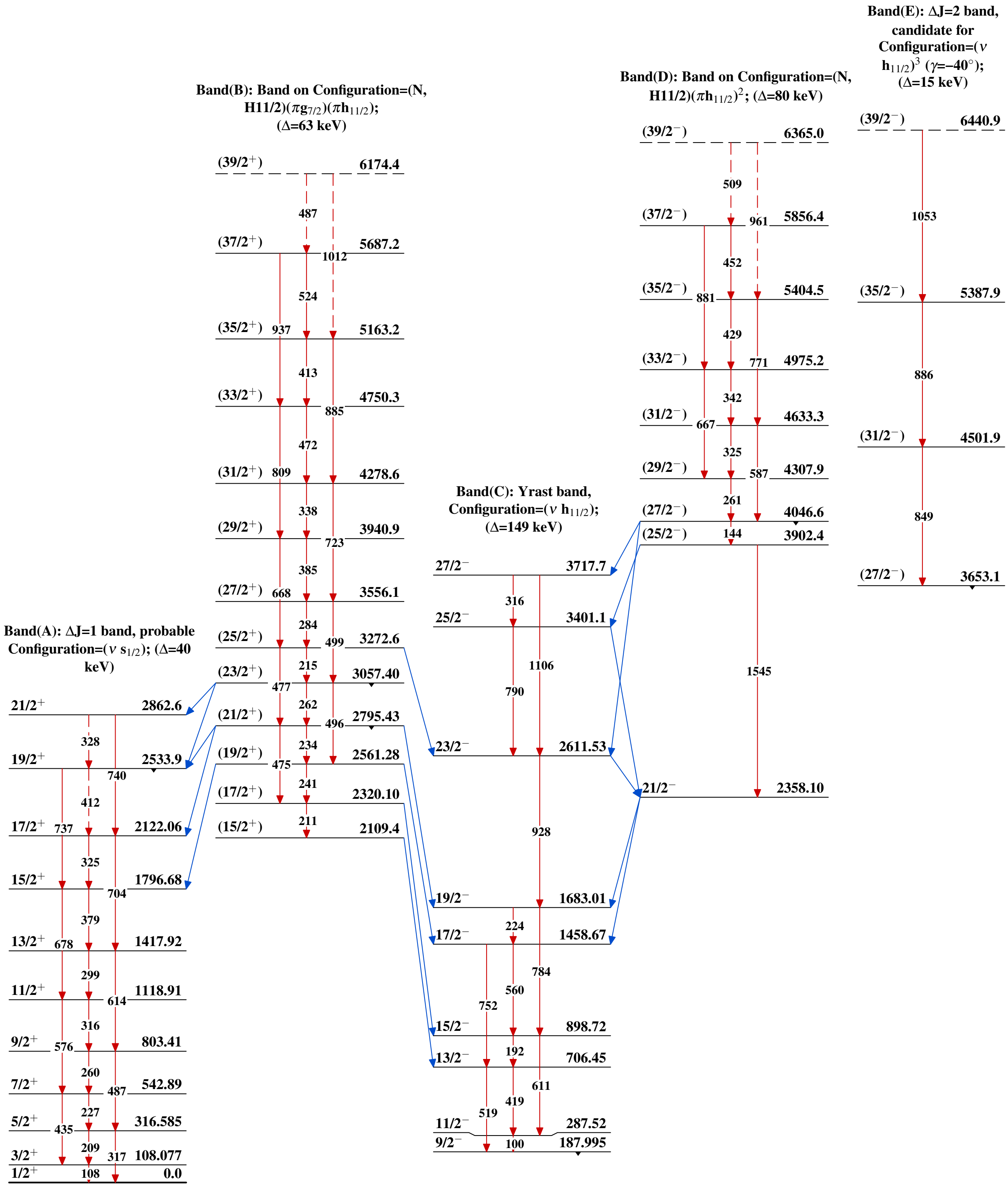
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

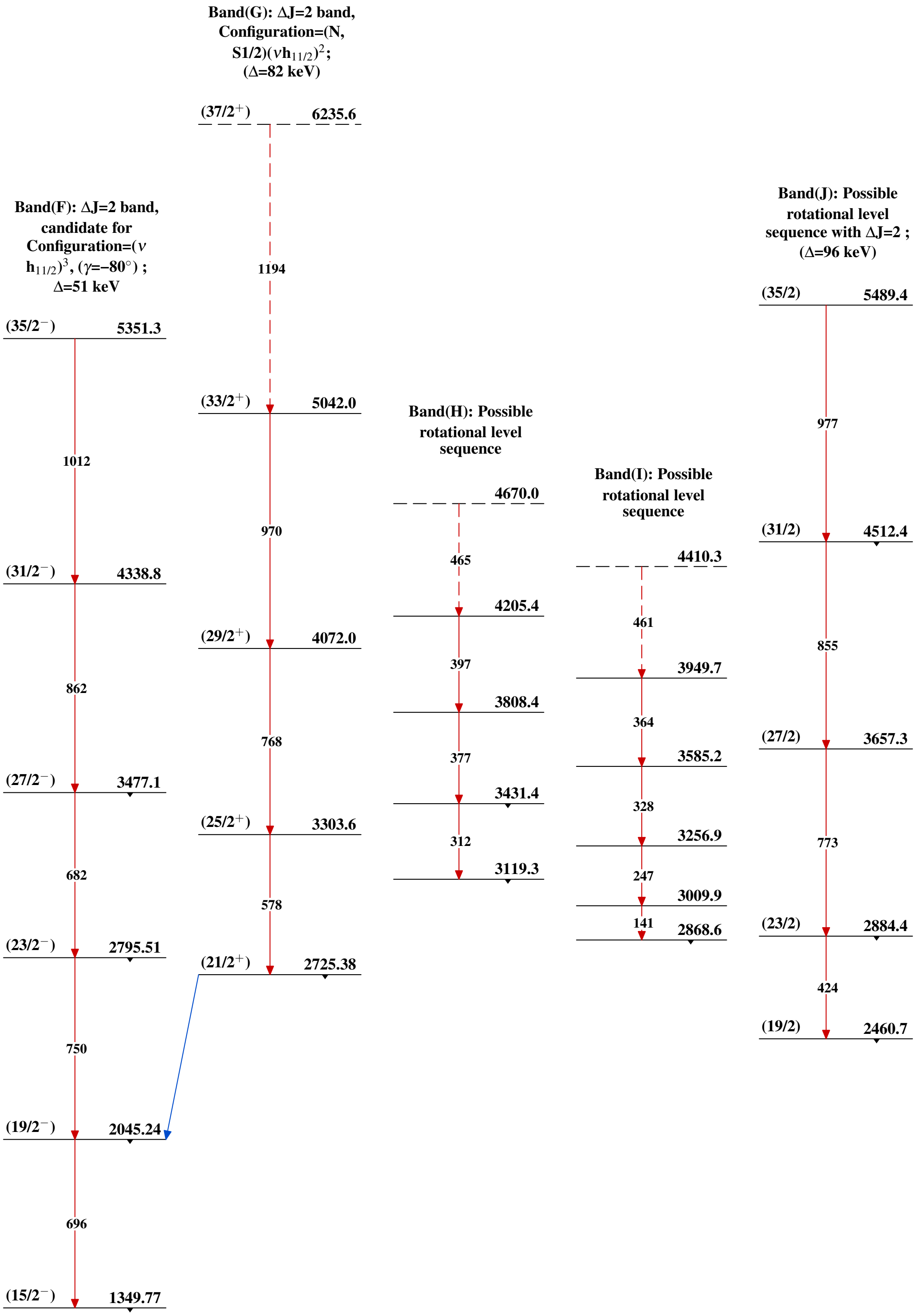


Adopted Levels, Gammas



$^{131}_{56}$Ba$_{75}$

Adopted Levels, Gammas (continued)



$^{131}_{56}Ba_{75}$

^{131}Ba IT decay (14.6 min) 1963Ho05

History

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

Parent: ^{131}Ba: E=187.50 *20*; J$^{\pi}$=9/2$^-$; T$_{1/2}$=14.6 min *2*; %IT decay=100.0

1963Ho05: ^{131}Ba IT decay [from ^{127}I(^{7}Li,3n), E≈38 MeV, ^{131}La ε decay]; measured x-rays, γ, $\gamma\gamma$, γ(t), deduced levels, J$^{\pi}$, T$_{1/2}$. Scintillation detectors, chemical separations.

1972Ha41: ^{131}Ba IT decay [from ^{131}La ε decay]; measured Ece, Ice, deduced levels, γ-multipolarities, J$^{\pi}$. Chemical separation, permanent-magnet, semi-circular focusing spectrograph with 0.5 keV FWHM at 150 keV.

^{131}Ba Levels

E(level)	J$^{\pi}$	T$_{1/2}$	Comments
0.0	1/2$^+$	11.50 d *6*	
108.45 *16*	3/2$^+$		
187.50 *20*	9/2$^-$	14.6 min *2*	The level is populated by ^{131}La ε decay with intensity ≤ 1% (1963Ho05,1972Ha41). The level is populated in ^{141}Pr,^{140}Ce,^{139}La(π^-,xpyn) reactions; σ_m/σ_g=5.1 *5* for ^{139}La(π,8n) (1982Bu07).

γ(^{131}Ba)

Iγ normalization: From level scheme.

E$_{\gamma}$ †	I$_{\gamma}$ ‡#	E$_i$(level)	J$^{\pi}_i$	E$_f$	J$^{\pi}_f$	Mult.	δ	α @	Comments
79.05 *12*	2.4 *12*	187.50	9/2$^-$	108.45	3/2$^+$	E3		80.8 *13*	α(K)exp=12.3 *15* (1963Ho05); L2:L3:M=2.3 *3*:2.1 *3*:1.5 *3* (1972Ha41) α(K)=12.21 *18*; α(L)=53.4 *9*; α(M)=12.34 *21*; α(N+..)=2.88 *5* α(N)=2.55 *5*; α(O)=0.323 *6*; α(P)=0.000490 *8*
108.45 *16*	100	108.45	3/2$^+$	0.0	1/2$^+$	M1+E2	0.127 *14*	0.794	α(K)=0.675 *10*; α(L)=0.0948 *18*; α(M)=0.0196 *4*; α(N+..)=0.00491 *10* α(N)=0.00422 *8*; α(O)=0.000640 *12*; α(P)=4.42×10^{-5} *7* α(exp): K:L1:L2:L3:M=745 *80*:100 *10*:11 *2*:4.2 *8*:26 *3* (1972Ha41). δ: from 1972Ha41.

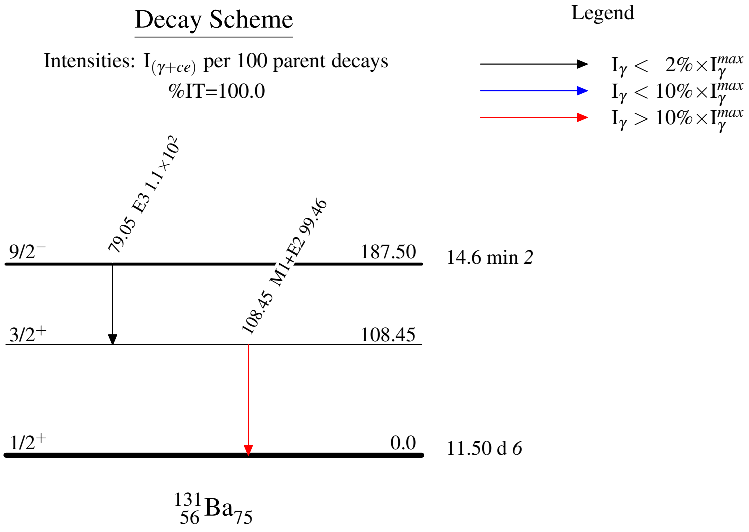
† From 1972Ha41.

‡ From 1963Ho05.

\# For absolute intensity per 100 decays, multiply by 0.5544 *8*.

@ 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.

^{131}Ba IT decay (14.6 min) 1963Ho05



Decay Scheme

Intensities: I$_{(\gamma+ce)}$ per 100 parent decays

%IT=100.0

^{131}La ε decay **1979En06**

History

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

Parent: ^{131}La: E=0.0; J^{π}=$3/2^{+}$; $T_{1/2}$=59 min *2*; Q(ε)=2915 *28*; %ε+%β^{+} decay=100.0

1979En06: ^{131}La ε decay (59 min) [from (p,X) reaction with various targets, E=660 MeV]; measured γ, $\gamma\gamma$ coin, ce, deduced levels, J^{π}. Mass-separator, synchrocyclotron, Ge(Li), Si(Li) detectors.

1972Ha41: ^{131}La ε decay [from ^{133}Cs(α,6n) reaction, E=80 MeV]; measured Ece, Ice, deduced levels, γ-multipolarities, J^{π}. Chemical separation, permanent-magnet, semi-focusing spectrograph with 0.5 keV FWHM at 150 keV.

1960Cr01: ^{131}La ε decay [from ^{130}Ba(d,n) reaction, E=11.5 MeV]; measured β^{+}, ce, γ, $\gamma\gamma$ coin, $T_{1/2}$, deduced levels, β^{+} branching (3 branches, only). Chemical separation, magnetic lens, scintillation spectrometers.

Others: 1983AbZX, 1980VyZZ, 1991Bo34.

^{131}Ba Levels

The decay scheme is that of 1979En06 and based on coincidence data and energy sums.

E(level)†	J^{π}	$T_{1/2}$	Comments
0.0	$1/2^{+}$	11.50 d *6*	$T_{1/2}$: from 1991Bo34.
108.077 *5*	$3/2^{+}$	0.35 ns *5*	$T_{1/2}$: from γce(t) (1979An06).
285.251 *5*	$3/2^{+}$		
316.585 *7*	$5/2^{+}$		
365.164 *5*	$1/2^{+}$		
525.850 *6*	$(3/2)^{+}$		
542.87 *8*	$7/2^{+}$		
561.720 *14*	$3/2^{+},5/2^{+}$		
718.779 *10*	$3/2^{+},5/2^{+}$		
719.494 *15*	$1/2^{+},3/2^{+},5/2^{+}$		
879.333 *17*	$1/2^{+},3/2^{+},5/2^{+}$		
949.94 *3*	$3/2^{+},5/2^{+}$		
974.211 *15*	$3/2^{+},5/2^{+}$		
1154.262 *24*	$1/2^{+},3/2^{+},5/2^{+}$		
1243.96 *7*	$1/2,3/2,5/2^{(+)}$		
1291.63 *5*	$1/2,3/2,5/2^{(+)}$		
1475.50 *12*	$1/2^{+}$		
1494.65 *4*	$1/2,3/2,5/2^{(+)}$		
1981.82 *13*	$1/2,3/2,5/2$		
2064.81 *11*	$1/2,3/2,5/2^{(+)}$		
2163.16 *8*	$1/2,3/2,5/2$		
2195.23 *10*	$1/2,3/2,5/2^{(+)}$		
2271.17 *9*	$1/2,3/2,5/2^{(+)}$		
2385.11 *9*	$1/2,3/2,5/2$		

† From least-squares fit to Eγ.

ε,β^{+} radiations

E(decay)	E(level)	Iε‡	Log *ft*	I($\varepsilon+\beta^{+}$)†‡	Comments
(5.3×10^{2} *3*)	2385.11	0.184 *16*	6.35 *7*	0.184 *16*	εK=0.8378 *11*; εL=0.1264 *8*; εM+=0.0357 *3*
(6.4×10^{2} *3*)	2271.17	0.101 *10*	6.79 *7*	0.101 *10*	εK=0.8410 *7*; εL=0.1241 *5*; εM+=0.03495 *17*
(7.2×10^{2} *3*)	2195.23	0.089 *13*	6.95 *8*	0.089 *13*	εK=0.8425 *6*; εL=0.1229 *4*; εM+=0.03457 *13*
(7.5×10^{2} *3*)	2163.16	0.098 *10*	6.94 *6*	0.098 *10*	εK=0.8430 *5*; εL=0.1225 *4*; εM+=0.03444 *12*

Continued on next page (footnotes at end of table)

^{131}La ε decay 1979En06 (continued)

ε,β^{+} radiations (continued)

E(decay)	E(level)	Iβ^{+} ‡	Iε‡	Log *ft*	I(ε+β^{+})†‡	Comments
(8.5×10^{2} *3*)	2064.81		0.16 *4*	6.84 *12*	0.16 *4*	εK=0.8444 *4*; εL=0.1215 *3*; εM+=0.03409 *9*
(9.3×10^{2} *3*)	1981.82		0.091 *13*	7.17 *7*	0.091 *13*	εK=0.8454 *3*; εL=0.12077 *23*; εM+=0.03386 *8*
(1.42×10^{3} *3*)	1494.65	0.0011 *4*	0.46 *3*	6.85 *4*	0.46 *3*	av Eβ=189 *13*; εK=0.8465 *6*; εL=0.11806 *18*; εM+=0.03299 *6*
(1.44×10^{3} *3*)	1475.50	0.00039 *13*	0.13 *2*	7.41 *7*	0.13 *2*	av Eβ=197 *13*; εK=0.8461 *7*; εL=0.11793 *19*; εM+=0.03295 *6*
(1.62×10^{3} *3*)	1291.63	0.0048 *10*	0.39 *3*	7.04 *4*	0.38 *3*	av Eβ=278 *13*; εK=0.8390 *19*; εL=0.1163 *4*; εM+=0.03248 *10*
(1.67×10^{3} *3*)	1243.96	0.0026 *5*	0.16 *1*	7.45 *4*	0.16 *1*	av Eβ=298 *13*; εK=0.8357 *22*; εL=0.1158 *4*; εM+=0.03231 *11*
(1.76×10^{3} *3*)	1154.262	0.0062 *9*	0.23 *1*	7.33 *3*	0.24 *1*	av Eβ=338 *13*; εK=0.828 *3*; εL=0.1144 *5*; εM+=0.03193 *14*
(1.94×10^{3} *3*)	974.211	0.090 *10*	1.56 *6*	6.59 *3*	1.64 *6*	av Eβ=417 *13*; εK=0.804 *5*; εL=0.1107 *7*; εM+=0.03089 *20*
(1.97×10^{3} *3*)	949.94	0.026 *3*	0.40 *2*	7.19 *3*	0.43 *2*	av Eβ=427 *13*; εK=0.800 *5*; εL=0.1101 *8*; εM+=0.03072 *21*
(2.04×10^{3} *3*)	879.333	0.203 *20*	2.51 *10*	6.43 *3*	2.79 *11*	av Eβ=458 *13*; εK=0.787 *6*; εL=0.1082 *9*; εM+=0.03017 *24*
(2.20×10^{3} *3*)	719.494	0.29 *3*	2.16 *13*	6.56 *4*	2.45 *15*	av Eβ=529 *13*; εK=0.751 *8*; εL=0.1030 *11*; εM+=0.0287 *3*
(2.20×10^{3} *3*)	718.779	0.020 *5*	0.15 *4*	7.72 *11*	0.17 *4*	av Eβ=529 *13*; εK=0.750 *8*; εL=0.1030 *11*; εM+=0.0287 *3*
(2.35×10^{3} *3*)	561.720	1.21 *8*	5.94 *20*	6.18 *3*	7.14 *23*	av Eβ=599 *13*; εK=0.707 *9*; εL=0.0969 *12*; εM+=0.0270 *4*
(2.37×10^{3} *3*)	542.87	0.007 *7*	0.03 *3*	8.4 *5*	0.04 *4*	av Eβ=607 *13*; εK=0.702 *9*; εL=0.0961 *12*; εM+=0.0268 *4*
(2.39×10^{3} *3*)	525.850	5.4 *3*	24.6 *8*	5.58 *3*	30.0 *9*	av Eβ=615 *13*; εK=0.697 *9*; εL=0.0954 *12*; εM+=0.0266 *4*
(2.55×10^{3} *3*)	365.164	5.1 *3*	15.9 *6*	5.82 *3*	21.1 *7*	av Eβ=686 *13*; εK=0.646 *10*; εL=0.0883 *13*; εM+=0.0246 *4*
(2.60×10^{3} *3*)	316.585	0.54 *5*	1.54 *14*	6.85 *5*	2.08 *19*	av Eβ=708 *13*; εK=0.630 *10*; εL=0.0860 *13*; εM+=0.0240 *4*
(2.63×10^{3} *3*)	285.251	1.9 *1*	5.1 *3*	6.34 *4*	7.0 *4*	av Eβ=722 *13*; εK=0.619 *10*; εL=0.0846 *14*; εM+=0.0236 *4*
(2.81×10^{3} *3*)	108.077	3.8 *4*	7.2 *7*	6.25 *5*	11.2 *10*	av Eβ=802 *13*; εK=0.559 *10*; εL=0.0762 *14*; εM+=0.0212 *4*
2961 *45*	0.0	4.8 *9*	7.5 *15*	6.26 *9*	13.6 *24*	av Eβ=851 *13*; εK=0.522 *10*; εL=0.0712 *13*; εM+=0.0198 *4* E(decay): from Eβ+=1939 *45* (1960Cr01).

† Level populations (%) by ε+β^{+} decay were computed (by evaluators) using the total intensities of γ′s.

‡ Absolute intensity per 100 decays.

γ(^{131}Ba)

Iγ normalization: Σ(I(γ+ce) of γ's to g.s.)=345 *4*; %ε+%β+(to g.s.)=13.6 *23*.
α(K)exp of 1979En06 is normalized to α(K)(108γ)=0.681 (by evaluators).

E$_\gamma$[†]	I$_\gamma$[†&]	E$_i$(level)	J$^\pi_i$	E$_f$	J$^\pi_f$	Mult.[‡]	δ[‡]	α[a]	Comments
79.918 *7*	3.21 *6*	365.164	1/2$^+$	285.251	3/2$^+$	M1+E2	0.21 *2*	1.98 *4*	α(K)=1.635 *24*; α(L)=0.272 *12*; α(M)=0.0571 *25*; α(N+..)=0.0141 *6* α(N)=0.0122 *6*; α(O)=0.00180 *7*; α(P)=0.0001058 *15* α(exp): K:L1:L2:L3:M=62 *9*:10 *2*:1.9 *3*:1.2 *3*:2.6 *4* (1972Ha41).
94.9[#b]		974.211	3/2$^+$,5/2$^+$	879.333	1/2$^+$,3/2$^+$,5/2$^+$				
^{x}98.197 *27*	0.146 *21*								
^{x}107.22 *5*	1.70 *17*					M1,E2		1.2 *4*	α(K)=0.84 *15*; α(L)=0.25 *16*; α(M)=0.05 *4*; α(N+..)=0.013 *9* α(N)=0.011 *8*; α(O)=0.0016 *10*; α(P)=4.57$\times$10^{-5} *7*
108.081 *5*	100.0 *18*	108.077	3/2$^+$	0.0	1/2$^+$	M1+E2	0.127 *14*	0.802	α(K)=0.681 *10*; α(L)=0.0957 *18*; α(M)=0.0198 *4*; α(N+..)=0.00496 *9* α(N)=0.00427 *8*; α(O)=0.000646 *12*; α(P)=4.46$\times$10^{-5} *7* α(exp): K:L1:L2:L3:M=745 *80*:100 *10*:11 *2*:4.2 *8*:26 *3* (1972Ha41).
157.82 *8*	0.274 *18*	719.494	1/2$^+$,3/2$^+$,5/2$^+$	561.720	3/2$^+$,5/2$^+$				
159.90 *9*	0.31 *6*	879.333	1/2$^+$,3/2$^+$,5/2$^+$	719.494	1/2$^+$,3/2$^+$,5/2$^+$				
160.687 *7*	7.21 *20*	525.850	(3/2)$^+$	365.164	1/2$^+$	M1(+E2)	<0.4	0.268 *8*	α(K)exp=0.214 *20*; K/L=7.3 *8* α(K)=0.226 *5*; α(L)=0.033 *3*; α(M)=0.0068 *7*; α(N+..)=0.00169 *16* α(N)=0.00146 *14*; α(O)=0.000220 *18*; α(P)=1.461$\times$10^{-5} *22*
176.04 *16*	0.11 *7*	718.779	3/2$^+$,5/2$^+$	542.87	7/2$^+$	M1,E2		0.23 *4*	α(K)=0.188 *15*; α(L)=0.037 *14*; α(M)=0.008 *3*; α(N+..)=0.0019 *7* α(N)=0.0017 *7*; α(O)=0.00024 *8*; α(P)=1.09$\times$10^{-5} *6*
176.6[#b]		719.494	1/2$^+$,3/2$^+$,5/2$^+$	542.87	7/2$^+$				
177.186 *16*	0.61[@] *6*	285.251	3/2$^+$	108.077	3/2$^+$	M1,E2		0.23 *3*	α(K)=0.184 *14*; α(L)=0.036 *14*; α(M)=0.008 *3*; α(N+..)=0.0019 *7* α(N)=0.0016 *6*; α(O)=0.00023 *8*; α(P)=1.07$\times$10^{-5} *6*
192.929 *8*	0.49 *9*	718.779	3/2$^+$,5/2$^+$	525.850	(3/2)$^+$				
193.5[#b]		719.494	1/2$^+$,3/2$^+$,5/2$^+$	525.850	(3/2)$^+$				
204.3[#b]		1154.262	1/2$^+$,3/2$^+$,5/2$^+$	949.94	3/2$^+$,5/2$^+$				

E$_\gamma$[†]	I$_\gamma$[†&]	E$_i$(level)	J$^\pi_i$	E$_f$	J$^\pi_f$	Mult.[‡]	δ[‡]	α[a]	Comments
208.509 *8*	12.1[@] *3*	316.585	$5/2^+$	108.077	$3/2^+$	M1,E2		0.139 *11*	α(K)exp=0.107 *7* α(K)=0.113 *4*; α(L)=0.020 *6*; α(M)=0.0043 *13*; α(N+..)=0.0010 *3* α(N)=0.0009 *3*; α(O)=0.00013 *4*; α(P)=6.7×10^{-6} *5*
209.269 *27*	1.28 *13*	525.850	$(3/2)^+$	316.585	$5/2^+$	M1,E2		0.137 *11*	α(K)exp=0.110 *8* α(K)=0.112 *4*; α(L)=0.020 *6*; α(M)=0.0042 *13*; α(N+..)=0.0010 *3* α(N)=0.0009 *3*; α(O)=0.00013 *4*; α(P)=6.6×10^{-6} *5*
226.3[#b]		542.87	$7/2^+$	316.585	$5/2^+$				
230.4[#b]		949.94	$3/2^+,5/2^+$	719.494	$1/2^+,3/2^+,5/2^+$				
231.8[#b]		1475.50	$1/2^+$	1243.96	$1/2,3/2,5/2^{(+)}$				
240.593 *7*	5.50 *14*	525.850	$(3/2)^+$	285.251	$3/2^+$	M1(+E2)	<0.2	0.0870	α(K)exp=0.073 *6*; K/L=8.7 *12* α(K)=0.0745 *11*; α(L)=0.00992 *17*; α(M)=0.00205 *4*; α(N+..)=0.000514 *9* α(N)=0.000441 *8*; α(O)=6.74×10^{-5} *11*; α(P)=4.87×10^{-6} *7*
245.10 *3*	1.25 *20*	561.720	$3/2^+,5/2^+$	316.585	$5/2^+$	M1,E2		0.085 *3*	α(K)exp=0.069 *8* α(K)=0.0702 *13*; α(L)=0.0117 *24*; α(M)=0.0024 *6*; α(N+..)=0.00060 *12* α(N)=0.00052 *11*; α(O)=7.6×10^{-5} *13*; α(P)=4.2×10^{-6} *5*
254.7[#b]		974.211	$3/2^+,5/2^+$	719.494	$1/2^+,3/2^+,5/2^+$				
257.087 *9*	13.71 *27*	365.164	$1/2^+$	108.077	$3/2^+$	M1,E2		0.0736 *13*	α(K)exp=0.057 *6* α(K)=0.0611 *17*; α(L)=0.0100 *18*; α(M)=0.0021 *4*; α(N+..)=0.00051 *9* α(N)=0.00044 *8*; α(O)=6.5×10^{-5} *10*; α(P)=3.7×10^{-6} *4*
276.4 *3*	0.12 *6*	561.720	$3/2^+,5/2^+$	285.251	$3/2^+$				
285.246 *7*	49.6[@] *11*	285.251	$3/2^+$	0.0	$1/2^+$	M1,E2		0.0542 *14*	α(K)exp=0.042 *4* α(K)=0.0453 *24*; α(L)=0.0071 *9*; α(M)=0.00149 *21*; α(N+..)=0.00037 *5* α(N)=0.00032 *4*; α(O)=4.7×10^{-5} *5*; α(P)=2.8×10^{-6} *4*
316.575 *14*	3.49[@] *15*	316.585	$5/2^+$	0.0	$1/2^+$	E2		0.0381	α(K)=0.0312 *5*; α(L)=0.00552 *8*; α(M)=0.001163 *17*; α(N+..)=0.000284 *4* α(N)=0.000247 *4*; α(O)=3.56×10^{-5} *5*; α(P)=1.781×10^{-6} *25* α(L)exp=0.0059 *22* (calculated by evaluators from 1980VyZZ).

From ENSDF

γ(^{131}Ba) (continued)

E$_\gamma$[†]	I$_\gamma$[†&]	E$_i$(level)	J$^\pi_i$	E$_f$	J$^\pi_f$	Mult.[‡]	δ[‡]	α[a]	Comments
317.50 *6*	1.10 *10*	1291.63	$1/2,3/2,5/2^{(+)}$	974.211	$3/2^+,5/2^+$				
336.4[#b]		879.333	$1/2^+,3/2^+,5/2^+$	542.87	$7/2^+$				
^{x}352.07 *15*	0.50 *23*					M1,E2		0.0297 *24*	α(K)=0.0250 *25*; α(L)=0.00370 *14*; α(M)=0.00077 *4*; α(N+..)=0.000191 *7* α(N)=0.000165 *7*; α(O)=2.46×10^{-5} *4*; α(P)=1.55×10^{-6} *25*
353.479 *24*	3.76 *26*	879.333	$1/2^+,3/2^+,5/2^+$	525.850	$(3/2)^+$	M1,E2		0.0294 *24*	α(K)exp=0.026 *3* α(K)=0.0248 *25*; α(L)=0.00366 *13*; α(M)=0.00076 *4*; α(N+..)=0.000189 *6* α(N)=0.000163 *6*; α(O)=2.43×10^{-5} *4*; α(P)=1.53×10^{-6} *24*
^{x}354.32 *19*	0.61 *15*								
365.162 *8*	67.7 *13*	365.164	$1/2^+$	0.0	$1/2^+$	M1		0.0291	α(K)exp=0.025 *3*; K/L=8.0 *4* α(K)=0.0250 *4*; α(L)=0.00325 *5*; α(M)=0.000670 *10*; α(N+..)=0.0001683 *24* α(N)=0.0001445 *21*; α(O)=2.22×10^{-5} *4*; α(P)=1.630×10^{-6} *23*
402.90 *4*	3.5 *5*	719.494	$1/2^+,3/2^+,5/2^+$	316.585	$5/2^+$	M1,E2		0.0205 *23*	α(K)exp=0.016 *3* α(K)=0.0173 *22*; α(L)=0.00249 *6*; α(M)=0.000516 *8*; α(N+..)=0.000128 *3* α(N)=0.0001105 *22*; α(O)=1.66×10^{-5} *7*; α(P)=1.08×10^{-6} *19*
413.30[b] *23*	0.94 *18*	974.211	$3/2^+,5/2^+$	561.720	$3/2^+,5/2^+$	M1,E2		0.0191 *22*	α(K)exp=0.013 *4* α(K)=0.0162 *21*; α(L)=0.00231 *7*; α(M)=0.000479 *10*; α(N+..)=0.000119 *4* α(N)=0.000103 *3*; α(O)=1.54×10^{-5} *8*; α(P)=1.01×10^{-6} *18* E$_\gamma$: the level energy difference is equal to 412.463 *18*.
^{x}416.21 *21*	2.2 *7*					M1,E2		0.0187 *22*	α(K)=0.0159 *21*; α(L)=0.00226 *7*; α(M)=0.000469 *11*; α(N+..)=0.000117 *4* α(N)=0.000101 *3*; α(O)=1.51×10^{-5} *8*; α(P)=9.9×10^{-7} *18*
417.783 *15*	71.8[@] *16*	525.850	$(3/2)^+$	108.077	$3/2^+$	M1,E2		0.0185 *22*	α(K)=0.0157 *21*; α(L)=0.00224 *7*; α(M)=0.000464 *11*; α(N+..)=0.000115 *4* α(N)=0.000100 *3*; α(O)=1.49×10^{-5} *8*; α(P)=9.8×10^{-7} *18*
431.3[#b]		974.211	$3/2^+,5/2^+$	542.87	$7/2^+$				
434.33 *10*	2.61 *10*	719.494	$1/2^+,3/2^+,5/2^+$	285.251	$3/2^+$	M1(+E2)	≤0.64	0.0181 *7*	α(K)=0.0155 *6*; α(L)=0.00206 *4*; α(M)=0.000424 *7*; α(N+..)=0.0001064 *20* α(N)=9.14×10^{-5} *17*; α(O)=1.40×10^{-5} *3*;

γ(^{131}Ba) (continued)

E$_\gamma$[†]	I$_\gamma$[†&]	E$_i$(level)	J$^\pi_i$	E$_f$	J$^\pi_f$	Mult.[‡]	α[a]	Comments
								α(P)=1.00$\times10^{-6}$ *5* α(K)exp=0.0232 *25* (recalculated by evaluators)$ α(K)exp=0.058 *15* in 1979En06 apparently, is a misprint.
434.83 *8*	0.30 *9*	542.87	7/2$^+$	108.077	3/2$^+$	E2	0.01461	α(K)=0.01220 *17*; α(L)=0.00192 *3*; α(M)=0.000400 *6*; α(N+..)=9.86$\times10^{-5}$ *14* α(N)=8.53$\times10^{-5}$ *12*; α(O)=1.256$\times10^{-5}$ *18*; α(P)=7.24$\times10^{-7}$ *11*
^{x}448.92 *29*	0.424 *15*							
453.659 *15*	23.5 *5*	561.720	3/2$^+$,5/2$^+$	108.077	3/2$^+$	M1,E2	0.0149 *20*	α(K)exp=0.0159 *9* α(K)=0.0126 *19*; α(L)=0.00177 *10*; α(M)=0.000367 *18*; α(N+..)=9.1$\times10^{-5}$ *6* α(N)=7.9$\times10^{-5}$ *5*; α(O)=1.19$\times10^{-5}$ *9*; α(P)=7.9$\times10^{-7}$ *15*
^{x}483.87 *18*	0.26 *3*							
524.4[#b]		1243.96	1/2,3/2,5/2$^{(+)}$	719.494	1/2$^+$,3/2$^+$,5/2$^+$			
525.851 *16*	34.9[@] *7*	525.850	(3/2)$^+$	0.0	1/2$^+$	M1,E2	0.0101 *16*	α(K)=0.0086 *14*; α(L)=0.00118 *11*; α(M)=0.000244 *21*; α(N+..)=6.1$\times10^{-5}$ *6* α(N)=5.2$\times10^{-5}$ *5*; α(O)=7.9$\times10^{-6}$ *9*; α(P)=5.4$\times10^{-7}$ *11*
544.7[#b]		1494.65	1/2,3/2,5/2$^{(+)}$	949.94	3/2$^+$,5/2$^+$			
561.785[b] *16*	4.40 *10*	561.720	3/2$^+$,5/2$^+$	0.0	1/2$^+$	M1,E2	0.0085 *14*	α(K)exp=0.0078 *20* α(K)=0.0073 *13*; α(L)=0.00099 *11*; α(M)=0.000204 *20*; α(N+..)=5.1$\times10^{-5}$ *6* α(N)=4.4$\times10^{-5}$ *5*; α(O)=6.6$\times10^{-6}$ *8*; α(P)=4.6$\times10^{-7}$ *9* E$_\gamma$: the level energy difference is equal to 561.748 *11*.
^{x}567.1 *3*	0.106 *29*					M1,E2	0.0083 *14*	α(K)=0.0071 *12*; α(L)=0.00096 *10*; α(M)=0.000199 *20*; α(N+..)=5.0$\times10^{-5}$ *6* α(N)=4.3$\times10^{-5}$ *5*; α(O)=6.5$\times10^{-6}$ *8*; α(P)=4.5$\times10^{-7}$ *9*
570.3[#b]		2064.81	1/2,3/2,5/2$^{(+)}$	1494.65	1/2,3/2,5/2$^{(+)}$			
584.81 *5*	0.263 *28*	949.94	3/2$^+$,5/2$^+$	365.164	1/2$^+$	M1,E2	0.0077 *13*	α(K)=0.0066 *12*; α(L)=0.00089 *10*; α(M)=0.000183 *20*; α(N+..)=4.6$\times10^{-5}$ *6* α(N)=3.9$\times10^{-5}$ *5*; α(O)=6.0$\times10^{-6}$ *8*; α(P)=4.2$\times10^{-7}$ *9*
594.080 *22*	5.75 *15*	879.333	1/2$^+$,3/2$^+$,5/2$^+$	285.251	3/2$^+$	M1,E2	0.0074 *12*	α(K)=0.0063 *11*; α(L)=0.00085 *10*; α(M)=0.000176 *19*; α(N+..)=4.4$\times10^{-5}$ *5* α(N)=3.8$\times10^{-5}$ *5*; α(O)=5.7$\times10^{-6}$ *8*; α(P)=4.0$\times10^{-7}$ *8*
611.407 *18*	3.11 *9*	719.494	1/2$^+$,3/2$^+$,5/2$^+$	108.077	3/2$^+$	M1,E2	0.0069 *12*	α(K)=0.0059 *11*; α(L)=0.00079 *10*; α(M)=0.000163 *19*; α(N+..)=4.1$\times10^{-5}$ *5* α(N)=3.5$\times10^{-5}$ *4*; α(O)=5.3$\times10^{-6}$ *7*; α(P)=3.7$\times10^{-7}$ *8*
628.402 *24*	0.655 *20*	1154.262	1/2$^+$,3/2$^+$,5/2$^+$	525.850	(3/2)$^+$	M1	0.00765	α(K)exp=0.0071 *8* α=0.00765; α(K)=0.00654 *20*; α(L)=0.00083 *3*
^{x}647.03 *9*	0.183 *20*							

From ENSDF

γ(^{131}Ba) (continued)

E_γ†	I_γ†&	E_i(level)	J^π_i	E_f	J^π_f	Mult.‡	α[a]	Comments
657.630 *23*	1.022 *27*	974.211	3/2$^+$,5/2$^+$	316.585	5/2$^+$	M1,E2	0.0058 *10*	α(K)exp=0.0066 *14* α(K)=0.0049 *9*; α(L)=0.00066 *9*; α(M)=0.000135 *17*; α(N+..)=3.4×10^{-5} *5* α(N)=2.9×10^{-5} *4*; α(O)=4.4×10^{-6} *6*; α(P)=3.1×10^{-7} *7*
^{x}661.08 *4*	0.752 *29*							
664.63 *5*	0.595 *23*	949.94	3/2$^+$,5/2$^+$	285.251	3/2$^+$			
^{x}694.62 *14*	0.116 *29*							
700.38 *15*	0.108 *22*	2195.23	1/2,3/2,5/2$^{(+)}$	1494.65	1/2,3/2,5/2$^{(+)}$			
718.5 *3*	0.060 *23*	718.779	3/2$^+$,5/2$^+$	0.0	1/2$^+$			
719.53 *4*	0.690 *24*	719.494	1/2$^+$,3/2$^+$,5/2$^+$	0.0	1/2$^+$	M1,E2	0.0046 *8*	α(K)exp=0.0045 *14* α(K)=0.0040 *7*; α(L)=0.00052 *7*; α(M)=0.000108 *15*; α(N+..)=2.7×10^{-5} *4* α(N)=2.3×10^{-5} *4*; α(O)=3.5×10^{-6} *6*; α(P)=2.5×10^{-7} *5*
729.19^b *27*	0.032 *19*	1291.63	1/2,3/2,5/2$^{(+)}$	561.720	3/2$^+$,5/2$^+$			E_γ: the level energy difference is equal to 729.86 *5*.
^{x}768.93 *9*	0.243 *21*							
771.19 *23*	0.18 *5*	879.333	1/2$^+$,3/2$^+$,5/2$^+$	108.077	3/2$^+$			
837.86 *11*	0.172 *30*	1154.262	1/2$^+$,3/2$^+$,5/2$^+$	316.585	5/2$^+$			
841.86 *4*	0.94 *3*	949.94	3/2$^+$,5/2$^+$	108.077	3/2$^+$	M1,E2	0.0032 *6*	α(K)exp=0.0025 *6* α(K)=0.0027 *5*; α(L)=0.00036 *5*; α(M)=7.3×10^{-5} *11*; α(N+..)=1.8×10^{-5} *3* α(N)=1.58×10^{-5} *23*; α(O)=2.4×10^{-6} *4*; α(P)=1.7×10^{-7} *4*
866.138 *26*	4.19 *11*	974.211	3/2$^+$,5/2$^+$	108.077	3/2$^+$	M1,E2	0.0030 *5*	α(K)exp=0.0029 *16* α(K)=0.0026 *5*; α(L)=0.00033 *5*; α(M)=6.8×10^{-5} *10*; α(N+..)=1.72×10^{-5} *25* α(N)=1.47×10^{-5} *22*; α(O)=2.3×10^{-6} *4*; α(P)=1.6×10^{-7} *3*
879.20^b *4*	0.704 *25*	879.333	1/2$^+$,3/2$^+$,5/2$^+$	0.0	1/2$^+$			E_γ: the level energy difference is equal to 879.315 *16*.
927.40 *13*	0.129 *16*	1243.96	1/2,3/2,5/2$^{(+)}$	316.585	5/2$^+$			
933.03 *8*	0.175 *28*	1494.65	1/2,3/2,5/2$^{(+)}$	561.720	3/2$^+$,5/2$^+$			
^{x}944.13 *14*	0.083 *15*							
958.89 *14*	0.101 *22*	1243.96	1/2,3/2,5/2$^{(+)}$	285.251	3/2$^+$			
969.72^b *30*	0.129 *21*	1494.65	1/2,3/2,5/2$^{(+)}$	525.850	(3/2)$^+$			E_γ: the level energy difference is equal to 968.81 *4*.
974.204 *26*	2.56 *6*	974.211	3/2$^+$,5/2$^+$	0.0	1/2$^+$	M1,E2	0.0023 *4*	α(K)exp=0.0025 *3* α(K)=0.0020 *4*; α(L)=0.00025 *4*; α(M)=5.2×10^{-5} *8*; α(N+..)=1.30×10^{-5} *19* α(N)=1.12×10^{-5} *16*; α(O)=1.7×10^{-6} *3*; α(P)=1.24×10^{-7} *23*
^{x}1105.93 *14*	0.103 *16*							
^{x}1129.3 *4*	0.065 *16*							
1135.85 *12*	0.320 *17*	1243.96	1/2,3/2,5/2$^{(+)}$	108.077	3/2$^+$			
1154.23 *20*	0.128 *20*	1154.262	1/2$^+$,3/2$^+$,5/2$^+$	0.0	1/2$^+$			
1158.0^b *5*	0.052 *15*	1475.50	1/2$^+$	316.585	5/2$^+$			E_γ: the level energy difference is equal to 1159.09 *10*.

From ENSDF

^{131}La ε decay 1979En06 (continued)

γ(^{131}Ba) (continued)

E$_\gamma$[†]	I$_\gamma$[†&]	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Comments
1178.03 *4*	1.17 *6*	1494.65	1/2,3/2,5/2$^{(+)}$	316.585	5/2$^+$	
1209.45 *15*	0.111 *26*	1494.65	1/2,3/2,5/2$^{(+)}$	285.251	3/2$^+$	
1212.85 *22*	0.09 *3*	2163.16	1/2,3/2,5/2	949.94	3/2$^+$,5/2$^+$	
^{x}1227.74 *10*	0.095 *13*					
1243.72 *16*	0.083 *18*	1243.96	1/2,3/2,5/2$^{(+)}$	0.0	1/2$^+$	
1291.54 *6*	0.408 *21*	1291.63	1/2,3/2,5/2$^{(+)}$	0.0	1/2$^+$	
1296.81 *17*	0.098 *14*	2271.17	1/2,3/2,5/2$^{(+)}$	974.211	3/2$^+$,5/2$^+$	
1315.80 *17*	0.033 *13*	2195.23	1/2,3/2,5/2$^{(+)}$	879.333	1/2$^+$,3/2$^+$,5/2$^+$	
^{x}1351.48 *13*	0.175 *21*					
^{x}1355.99 *17*	0.119 *20*					
1367.47 *12*	0.26 *4*	1475.50	1/2$^+$	108.077	3/2$^+$	
1386.05 *28*	0.21 *4*	1494.65	1/2,3/2,5/2$^{(+)}$	108.077	3/2$^+$	
^{x}1389.64 *27*	0.25 *4*					
1420.7 *5*	0.08 *4*	1981.82	1/2,3/2,5/2	561.720	3/2$^+$,5/2$^+$	
1443.66 *11*	0.201 *14*	2163.16	1/2,3/2,5/2	719.494	1/2$^+$,3/2$^+$,5/2$^+$	
^{x}1455.05 *25*	0.088 *22*					
1475.98 *15*	0.18 *5*	1475.50	1/2$^+$	0.0	1/2$^+$	E$_\gamma$: 1476.22 *13* in 1980VyZZ.
1494.65 *8*	0.267 *26*	1494.65	1/2,3/2,5/2$^{(+)}$	0.0	1/2$^+$	
^{x}1500.11 *6*	0.50 *4*					
^{x}1560.41 *18*	0.101 *19*					
^{x}1564.22 *18*	0.097 *18*					
^{x}1570.19 *20*	0.079 *17*					
^{x}1582.24 *20*	0.158 *17*					
^{x}1591.05 *22*	0.086 *16*					
1601.53 *17*	0.031 *8*	2163.16	1/2,3/2,5/2	561.720	3/2$^+$,5/2$^+$	
^{x}1664.60 *25*	0.076 *16*					
1696.56 *22*	0.141 *18*	1981.82	1/2,3/2,5/2	285.251	3/2$^+$	
1699.60 *15*	0.35 *15*	2064.81	1/2,3/2,5/2$^{(+)}$	365.164	1/2$^+$	
^{x}1717.6 *5*	0.15 *3*					
^{x}1754.39 *14*	0.154 *28*					
^{x}1771.21 *27*	0.062 *20*					
1779.40 *26*	0.060 *17*	2064.81	1/2,3/2,5/2$^{(+)}$	285.251	3/2$^+$	
^{x}1793.24 *10*	0.173 *26*					
1823.41 *10*	0.57 *5*	2385.11	1/2,3/2,5/2	561.720	3/2$^+$,5/2$^+$	
^{x}1844.94 *21*	0.110 *28*					
^{x}1849.80 *21*	0.105 *26*					
1859.08 *21*	0.072 *27*	2385.11	1/2,3/2,5/2	525.850	(3/2)$^+$	
1873.65 *17*	0.142 *21*	1981.82	1/2,3/2,5/2	108.077	3/2$^+$	
1906.40 *24*	0.092 *26*	2271.17	1/2,3/2,5/2$^{(+)}$	365.164	1/2$^+$	
^{x}1947.22 *12*	0.167 *34*					
1954.48 *15*	0.148 *19*	2271.17	1/2,3/2,5/2$^{(+)}$	316.585	5/2$^+$	
1957.16[b] *13*	0.183 *21*	2064.81	1/2,3/2,5/2$^{(+)}$	108.077	3/2$^+$	E$_\gamma$: the level energy difference is equal to 1956.91 *9*.

γ(^{131}Ba) (continued)

E$_\gamma$[†]	I$_\gamma$[†&]	E$_i$(level)	J$^\pi_i$	E$_f$	J$^\pi_f$	Comments
2055.24 *22*	0.069 *14*	2163.16	1/2,3/2,5/2	108.077	3/2$^+$	
2064.94 *20*	0.035 *10*	2064.81	1/2,3/2,5/2$^{(+)}$	0.0	1/2$^+$	
2067.6[b] *4*	0.015 *5*	2385.11	1/2,3/2,5/2	316.585	5/2$^+$	E$_\gamma$: the level energy difference is equal to 2068.56 *9*.
2087.44 *20*	0.15 *4*	2195.23	1/2,3/2,5/2$^{(+)}$	108.077	3/2$^+$	
2100.30[b] *23*	0.080 *18*	2385.11	1/2,3/2,5/2	285.251	3/2$^+$	E$_\gamma$: the level energy difference is equal to 2099.90 *0*.
[x]2164.2 *5*	0.14 *8*					
[x]2172.3 *5*	0.14 *5*					
2195.58 *30*	0.065 *20*	2195.23	1/2,3/2,5/2$^{(+)}$	0.0	1/2$^+$	
[x]2206.9 *4*	0.097 *27*					
[x]2215.51 *15*	0.096 *21*					
[x]2238.60 *25*	0.063 *14*					
[x]2263.9 *4*	0.031 *9*					
2271.23 *20*	0.066 *12*	2271.17	1/2,3/2,5/2$^{(+)}$	0.0	1/2$^+$	

[†] From 1980VyZZ, 1979En06.

[‡] From ce data of 1972Ha41, 1979En06, and 1983AbZX.

[#] From 1983AbZX, Iγ not given.

[@] Iγ(177γ)/Iγ(285γ)=0.0122 *12*, Iγ(209γ)/Iγ(316γ)=0.288 *15*, and Iγ(526γ)/Iγ(418γ)=0.486 *15* are discrepant with 0.39 *6*, 0.62, and 0.0066 *10* from (^{13}C,4nγ), (^{12}C,3nγ).

[&] For absolute intensity per 100 decays, multiply by 0.250 *7*.

[a] 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.

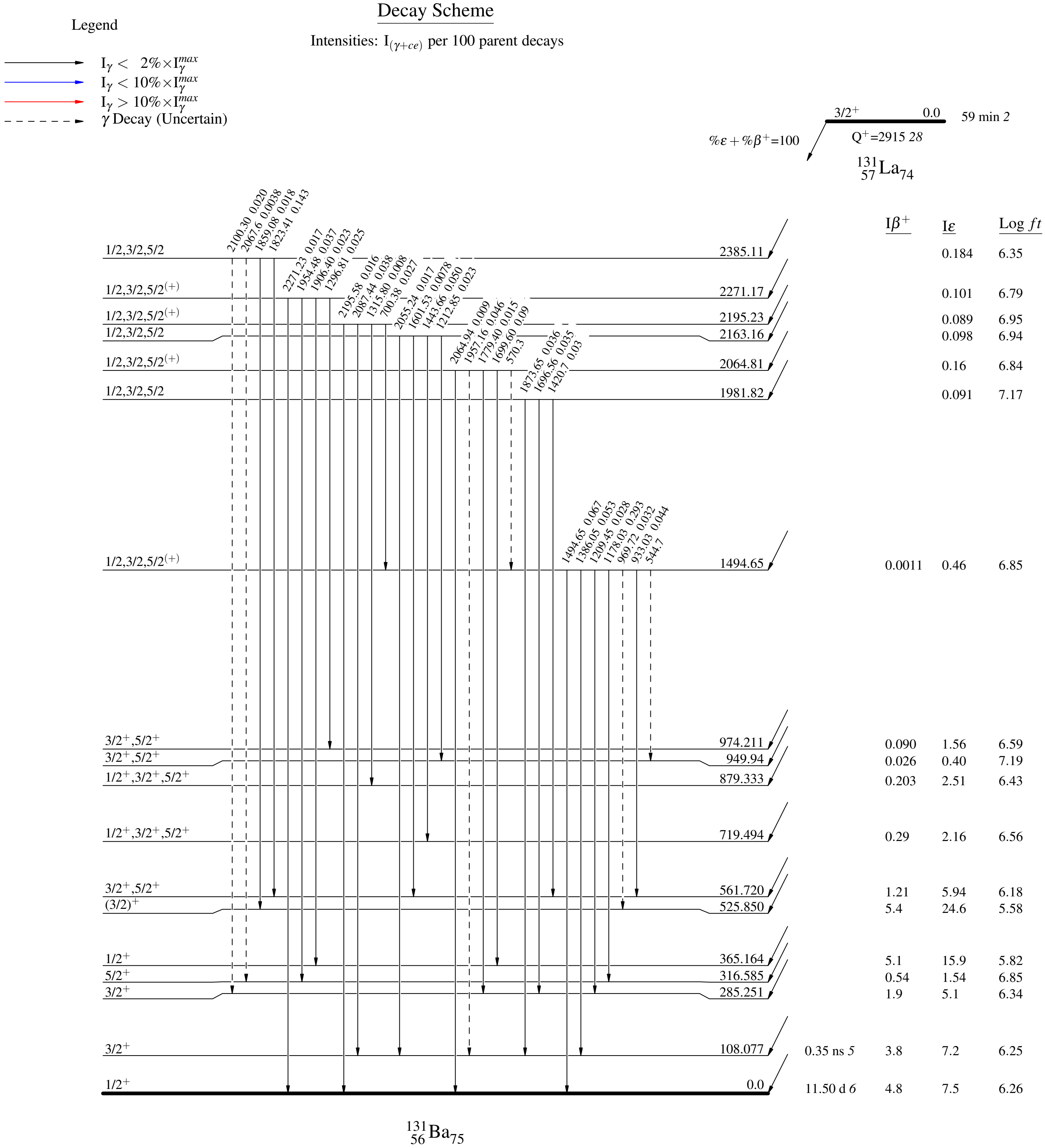
[b] Placement of transition in the level scheme is uncertain.

[x] γ ray not placed in level scheme.

^{131}La ε decay 1979En06

Decay Scheme

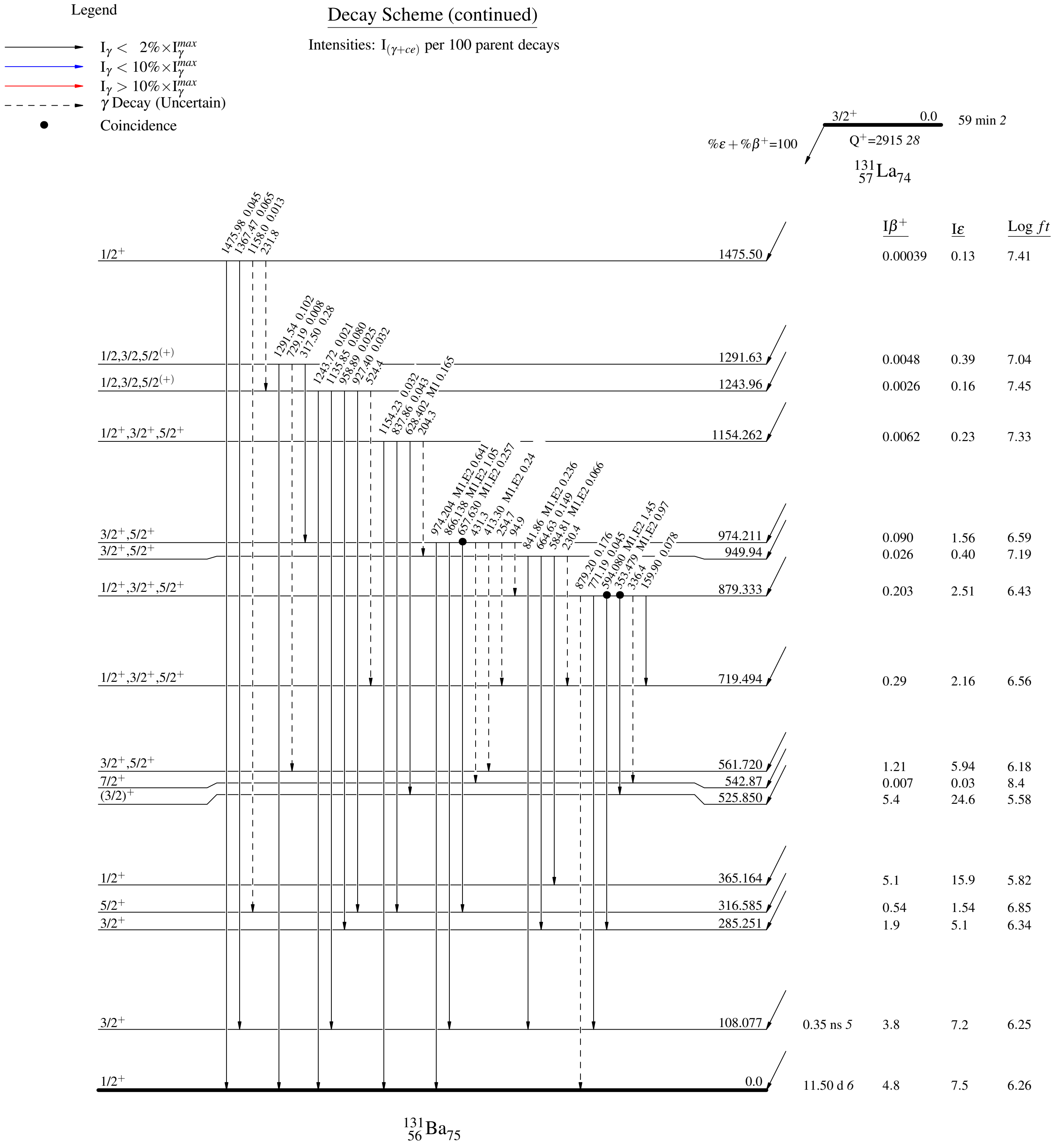
Intensities: $I_{(\gamma+ce)}$ per 100 parent decays



^{131}La ε decay 1979En06

Decay Scheme (continued)

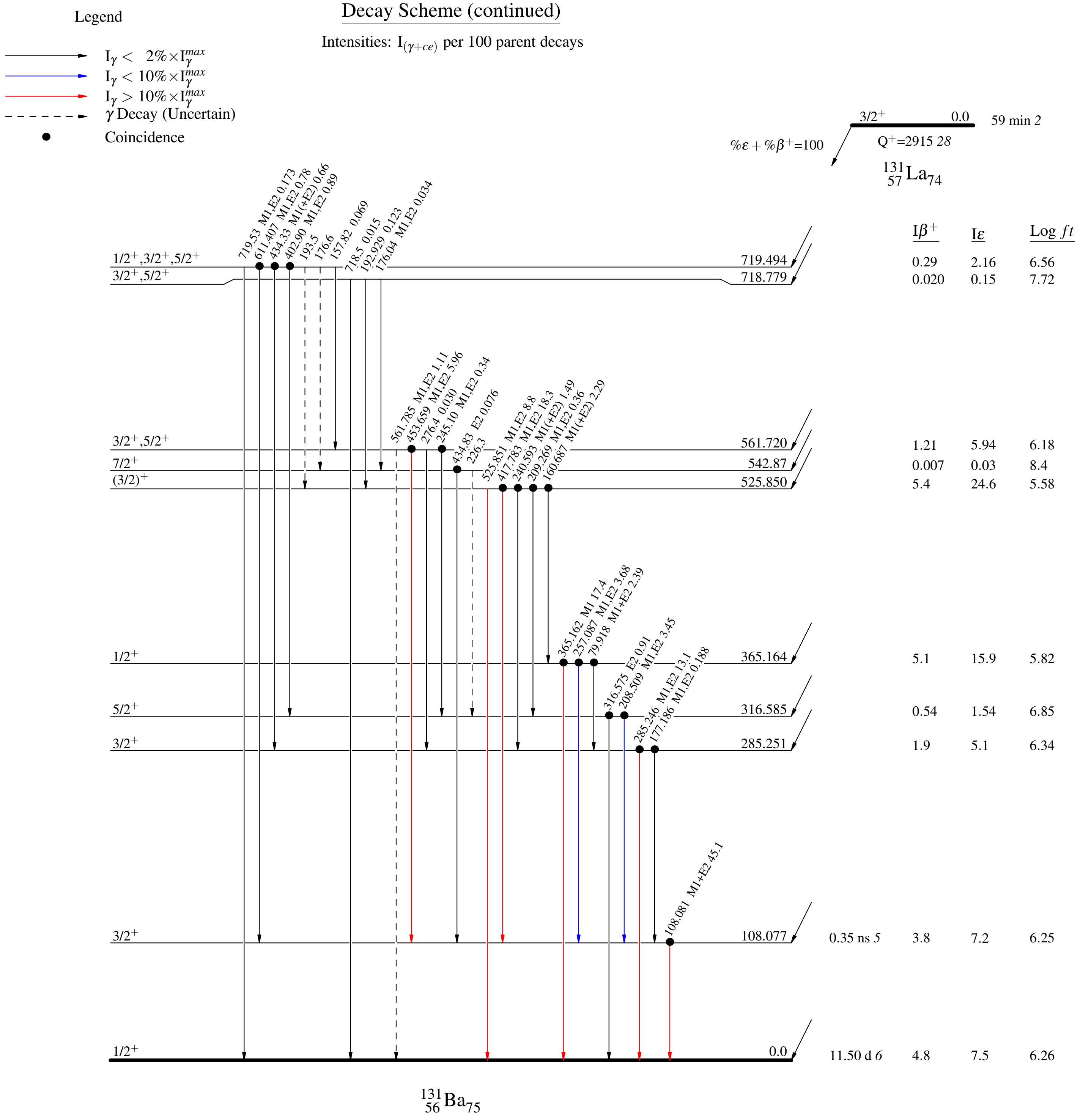
Intensities: $I_{(\gamma+ce)}$ per 100 parent decays



^{131}La ε decay 1979En06

Decay Scheme (continued)

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays



^{122}Sn(^{13}C,4nγ),(^{12}C,3nγ) 1990Ma07,1975Gi11

History

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

1990Ma07: ^{122}Sn(^{13}C,4nγ), E=57 MeV; measured $\gamma\gamma$, $\gamma(\theta)$, deduced A$_2$, A$_4$, DCO. Five Ge detectors, BGO anti-Compton shielding. Cranking model calculations, band assignment.

1975Gi11: ^{122}Sn(^{12}C,3nγ) E=49 MeV; measured Eγ, Iγ, $\gamma(\theta)$, $\gamma\gamma$, deduced A$_2$, J^π. Ge(Li) detectors. Band assignment.

^{131}Ba Levels

The level scheme is that of 1990Ma07, partly of 1975Gi11, and based on coincidence relationships and relative transition intensities. The spin and parity values are from the angular distribution and correlation data.

E(level)[†]	J$^\pi$	T$_{1/2}$[‡]	Comments
0.0[c]	$1/2^+$	11.50 d *6*	
108.01[c] *16*	$3/2^+$		
187.09[e] *18*	$9/2^-$	14.6 min *2*	
285.10 *20*	$3/2^+$		
286.86[e] *23*	$11/2^-$		
316.49[c] *20*	$5/2^+$		
526.4 *4*	$(3/2)^+$		
543.55[c] *23*	$7/2^+$		
705.86[e] *20*	$13/2^-$		
803.4[c] *3*	$9/2^+$		
898.23[e] *18*	$15/2^-$		
1029.9 *7*	$(13/2^-)$		
1119.08[c] *25*	$11/2^+$		
1349.27[h] *23*	$(15/2^-)$		
1417.89[c] *25*	$13/2^+$		
1458.24[e] *17*	$17/2^-$		
1682.61[e] *17*	$19/2^-$		
1712.7 *6*	$(17/2^-)$		
1796.56[c] *23*	$15/2^+$		
2044.83[h] *17*	$(19/2^-)$		
2108.9[d] *4*	$(15/2^+)$		
2121.85[c] *21*	$17/2^+$		
2319.73[d] *20*	$(17/2^+)$		
2357.72[e] *17*	$21/2^-$		
2460.3 *3*	(19/2)		
2518.95 *22*	$(21/2^-)$		
2533.7[c] *3*	$19/2^+$		
2560.97[d] *18*	$(19/2^+)$		
2611.14[e] *24*	$23/2^-$		
2725.1[i] *3*	$(21/2^+)$		
2795.11[ah] *4*	$(23/2^-)$		Additional information 1.
2795.13[ad] *23*	$(21/2^+)$		Additional information 2.
2862.3[c] *4*	$21/2^+$		
2868.2[@] *4*			
2884.0[&] *4*	(23/2)		
3009.5[@] *5*			
3057.10[d] *20*	$(23/2^+)$		

Continued on next page (footnotes at end of table)

^{122}Sn(^{13}C,4nγ),(^{12}C,3nγ) 1990Ma07,1975Gi11 (continued)

^{131}Ba Levels (continued)

E(level)[†]	J$^\pi$	E(level)[†]	J$^\pi$	E(level)[†]	J$^\pi$	E(level)[†]	J$^\pi$
3119.0[#] *7*		3584.8[@] *7*		4278.3[d] *5*	$(31/2^+)$	5162.9[d] *6*	$(35/2^+)$
3138.5 *8*	$(23/2^-)$	3652.7[g] *4*	$(27/2^-)$	4307.5[f] *5*	$(29/2^-)$	5350.9[h] *6*	$(35/2^-)$
3254.6 *3*	$(25/2^-)$	3656.9[&] *5*	(27/2)	4338.4[h] *5*	$(31/2^-)$	5387.5[g] *6*	$(35/2^-)$
3256.5[@] *6*		3717.3[e] *4*	$27/2^-$	4410.4?[@] *13*		5404.1[f] *7*	$(35/2^-)$
3272.3[d] *4*	$(25/2^+)$	3808.1[#] *13*		4501.5[g] *5*	$(31/2^-)$	5489.0[&] *12*	(35/2)
3303.3[i] *4*	$(25/2^+)$	3902.0[f] *4*	$(25/2^-)$	4512.0[&] *5*	(31/2)	5686.9[d] *9*	$(37/2^+)$
3400.7[e] *3*	$25/2^-$	3940.6[d] *5*	$(29/2^+)$	4632.9[f] *5*	$(31/2^-)$	5856.1[f] *7*	$(37/2^-)$
3431.0[#] *8*		3949.3[@] *7*		4669.8?[#] *20*		6174.6?[d] *11*	$(39/2^+)$
3476.7[h] *4*	$(27/2^-)$	4046.2[f] *4*	$(27/2^-)$	4750.0[d] *6*	$(33/2^+)$	6235.7?[i] *12*	$(37/2^+)$
3510.2[b] *5*	(27/2)	4071.7[i] *5*	$(29/2^+)$	4974.8[f] *6*	$(33/2^-)$	6365.1?[f] *10*	$(39/2^-)$
3555.8[d] *4*	$(27/2^+)$	4205.1[#] *17*		5041.7[i] *6*	$(33/2^+)$	6440.5?[g] *12*	$(39/2^-)$

[†] From least-squares fit to Eγ's.

[‡] From the Adopted Levels.

[#] Possible rotational level sequence.

[@] Possible rotational level sequence.

[&] Possible rotational level sequence with ΔJ=2.

[a] The levels 1795.11, $23/2^-$ and 2795.13, $21/2^+$ are very close; during least square fitting, at first the level energies were fixed by turns, at final stage both energies were fixed.

[b] State was assumed in 1994Se10 as a member of rotational band with ΔJ=2. Analysis based on the Variable Moment of Inertia model shows.

[c] Band(A): ΔJ=1 band, probable Configuration=(ν $s_{1/2}$).

[d] Band(B): band, Configuration=(N,H11/2)(π,$G_{7/2}$)(π,$H_{11/2}$).

[e] Band(C): yrast band, Configuration=(ν $h_{11/2}$).

[f] Band(D): band, Configuration=(N,H11/2)(π,$H_{11/2}$)^2.

[g] Band(E): ΔJ=2 band, candidate for Configuration=(ν $h_{11/2}$)^3 (GAMMA=−40 DEG).

[h] Band(F): ΔJ=2 band, candidate for Configuration=(ν $h_{11/2}$)^3 (GAMMA=−80 DEG).

[i] Band(G): ΔJ=2 band, Configuration=(N,S1/2)($\nu$$H_{11/2}$)^2.

γ(^{131}Ba)

E$_\gamma$[†]	I$_\gamma$[†]	E$_i$(level)	J$^\pi_i$	E$_f$	J$^\pi_f$	Mult.[‡]	δ[#]	α[d]	I$_{(\gamma+ce)}$[†]	Comments
(79.05 *12*)		187.09	$9/2^-$	108.01	$3/2^+$	E3		76.2 *11*		E$_\gamma$: from ^{131}Ba IT decay, not observed in ^{122}Sn(^{13}C,4nγ), (^{12}C,3nγ).
99.7 *3*	91.1[@]	286.86	$11/2^-$	187.09	$9/2^-$	M1(+E2)	−0.01 *4*	0.995 *17*	181.7	Mult.: $\gamma(\theta)$: A_2=−0.30 *4* (1975Gi11). δ: from 1977Kr13.
108.0 *3*	121.7[@]	108.01	$3/2^+$	0.0	$1/2^+$	M1+E2	−0.7 *4*	1.01 *17*	244.6	Mult.: $\gamma(\theta)$: A_2=−0.59 *4*, A_4=0.08 *6*.
141.3 *3*	<2.0	3009.5		2868.2						
144.2 *3*	2.2[@]	4046.2	$(27/2^-)$	3902.0	$(25/2^-)$	M1+E2	−0.39 *6*	0.375 *9*	3.1	Mult.: $\gamma(\theta)$: A_2=−0.70 *8*, A_4=0.01 *11*.
^{x}173.8 *3*						(D)			7.0	Mult.: $\gamma(\theta)$: A_2=−0.38 *5*, A_4=0.10 *7*.
177.0[c] *2*	[&]	285.10	$3/2^+$	108.01	$3/2^+$	M1,E2		0.23 *4*		I$_\gamma$: 3.8 *4* (1975Gi11). Mult.: $\gamma(\theta)$: A_2=0.01 *10* (1975Gi11).
192.3 *3*	14.8[@]	898.23	$15/2^-$	705.86	$13/2^-$	M1+E2	−0.24 *12*	0.161 *4*	17.2	Mult.: $\gamma(\theta)$: A_2=−0.56 *4*, A_4=0.12 *6*. δ: +0.02 *4* obtained by 1977Kr13 from data of 1975Gi11.
195 *1*	<2.0	3057.10	$(23/2^+)$	2862.3	$21/2^+$	D				
208.5 *3*	7.7[@][&]	316.49	$5/2^+$	108.01	$3/2^+$	M1+E2	−0.21 *3*	0.1286 *19*	8.7	Mult.: $\gamma(\theta)$: A_2=−0.41 *4*, A_4=0.09 *6*.
^{x}209 *1*									5.4	
211 *1*	<2.0	2319.73	$(17/2^+)$	2108.9	$(15/2^+)$					
215.1 *3*	25.9[@]	3272.3	$(25/2^+)$	3057.10	$(23/2^+)$	M1+E2	−0.12 *5*	0.1176 *18*	29.0	Mult.: $\gamma(\theta)$: A_2=−0.38 *4*, A_4=0.06 *6*.
222 *1*	<2.0	3476.7	$(27/2^-)$	3254.6	$(25/2^-)$					
224.2 *3*	3.4[@]	1682.61	$19/2^-$	1458.24	$17/2^-$	M1+E2	−0.19 *10*	0.1054 *17*	3.8	Mult.: $\gamma(\theta)$: A_2=−0.48 *6*, A_4=0.10 *8*. δ: +0.12 *8* obtained by 1977Kr13 from data of 1975Gi11.
227.2 *3*	3.1[@]	543.55	$7/2^+$	316.49	$5/2^+$	M1+E2	−0.23 *8*	0.1019 *16*	3.4	Mult.: $\gamma(\theta)$: A_2=−0.47 *7*, A_4+0.05 *9*.
^{x}231 *1*						D			3.7	Mult.: $\gamma(\theta)$: A_2=−0.48 *7*, A_4=0.08 *10*.
234.1 *3*	5.6[@]	2795.13	$(21/2^+)$	2560.97	$(19/2^+)$	M1+E2	−0.22 *4*	0.0939	6.1	Mult.: $\gamma(\theta)$: A_2=−0.52 *5*, A_4=0.02 *8*.
241.3 *3*	2.5	2560.97	$(19/2^+)$	2319.73	$(17/2^+)$	D				
247.0 *3*	2.9[@]	3256.5		3009.5		(M1,E2)		0.0830 *23*	3.1	Mult.: $\gamma(\theta)$: A_2=−0.5 *7*, A_4=0.03 *10*.
253 *1*	<1.9[@]	2611.14	$23/2^-$	2357.72	$21/2^-$	M1,E2		0.0772 *19*	<2.0	
260 *1*	<29.0[a]	803.4	$9/2^+$	543.55	$7/2^+$					
261 *1*	<29.0[a]	2795.13	$(21/2^+)$	2533.7	$19/2^+$					
261.3 *3*	<27.1[a][@]	4307.5	$(29/2^-)$	4046.2	$(27/2^-)$	M1,E2		0.0702 *11*	<29.0[a]	
261.8 *3*	<27.1[a][@]	3057.10	$(23/2^+)$	2795.13	$(21/2^+)$	M1,E2		0.0698 *11*	<29.0[a]	Mult.: $\gamma(\theta)$: A_2=−0.43 *4*, A_4=0.04 *6* (average values for 261 multiplet).
276.0 *3*	<1.9[@]	2795.11	$(23/2^-)$	2518.95	$(21/2^-)$	M1,E2		0.0597 *11*	<2.0	
283.5 *3*	25.1	3555.8	$(27/2^+)$	3272.3	$(25/2^+)$	M1+E2	−0.07 *4*	0.0562	26.5	Mult.: $\gamma(\theta)$: A_2=−0.31 *4*, A_4=0.04 *6*.
285.3[c] *3*	[&]	285.10	$3/2^+$	0.0	$1/2^+$	M1,E2		0.0542 *14*		I$_\gamma$: 9.7 *10* (1975Gi11). Mult.: $\gamma(\theta)$: A_2=−0.36 *7* (1975Gi11).
299.0 *3*	2.1[@]	1417.89	$13/2^+$	1119.08	$11/2^+$	M1+E2	−0.19 *10*	0.0488	2.2	Mult.: $\gamma(\theta)$: A_2=−0.40 *9*, A_4=−0.07 *2*.
312 *1*	6.8	3431.0		3119.0		D				

γ(^{131}Ba) (continued)

E_γ†	I_γ†	E_i(level)	J^π_i	E_f	J^π_f	Mult.‡	$\delta$$^{\#}$	α^{d}	$I_{(\gamma+ce)}$†	Comments
316^{eb} *1*	<2.0^{e}	1119.08	$11/2^+$	803.4	$9/2^+$	D				
316^{eb} *1*	<2.0^{e}	3717.3	$27/2^-$	3400.7	$25/2^-$					Mult.: $\gamma(\theta)$: A_2=0.20 *5*, A_4=−0.02 *6*.
316.5 *3*	4.8$^{@\&}$	316.49	$5/2^+$	0.0	$1/2^+$	E2		0.0382	5.0	
324 *1*	<2.0^{a}	3119.0		2795.13	$(21/2^+)$					
325 *1*	<2.0^{a}	2121.85	$17/2^+$	1796.56	$15/2^+$					
325.4 *3*	<2.0^{a}	4632.9	$(31/2^-)$	4307.5	$(29/2^-)$	D				
328^{f} *1*	<2.0	2862.3	$21/2^+$	2533.7	$19/2^+$					
328.3 *3*	<2.0	3584.8		3256.5						
328.9 *3*	<2.0	4046.2	$(27/2^-)$	3717.3	$27/2^-$	D				
332 *1*	<2.0	2044.83	$(19/2^-)$	1712.7	$(17/2^-)$					
337.7 *3*	6.4$^{@}$	4278.3	$(31/2^+)$	3940.6	$(29/2^+)$	M1+E2	−0.12 *12*	0.0356 *6*	6.6	Mult.: $\gamma(\theta)$: A_2=−0.38 *5*, A_4=0.13 *8*.
341.9 *3*	3.7$^{@}$	4974.8	$(33/2^-)$	4632.9	$(31/2^-)$	M1+E2	−0.10 *3*	0.0345	3.8	Mult.: $\gamma(\theta)$: A_2=−0.36 *7*, A_4=0.04 *16*.
363 *1*	<2.0	2044.83	$(19/2^-)$	1682.61	$19/2^-$					
364.5 *3*	<2.0	3949.3		3584.8						
365 *1*	<2.0	2884.0	(23/2)	2518.95	$(21/2^-)$					
377 *1*	3.6	3808.1		3431.0		D				Mult.: $\gamma(\theta)$: A_2=−0.59 *7*, A_4=0.03 *14*.
379 *1*	<2.0	1796.56	$15/2^+$	1417.89	$13/2^+$	D				
384.7 *3*	6.7$^{@}$	3940.6	$(29/2^+)$	3555.8	$(27/2^+)$	M1+E2	−0.34 *5*	0.0250	6.9	Mult.: $\gamma(\theta)$: A_2=−0.64 *5*, A_4=0.02 *7*.
397 *1*	2.8	4205.1		3808.1		D				
412^{f} *1*	<2.0	2533.7	$19/2^+$	2121.85	$17/2^+$					
412.8 *3*	3.9$^{@}$	5162.9	$(35/2^+)$	4750.0	$(33/2^+)$	M1,E2		0.0191 *22*	4.0	Mult.: $\gamma(\theta)$: A_2=−0.23 *7*, A_4=0.08 *10*.
415 *1*	<2.0	2460.3	(19/2)	2044.83	$(19/2^-)$					
^{x}417 *1*	10.9$^{@}$					(E2)		0.0165 *3*	11.1	
418.8^{c} *4*	$^{\&}$	526.4	$(3/2)^+$	108.01	$3/2^+$					I_γ: 72.5 *73* (1975Gi11, composite line).
419.0 *3*	73.9$^{@}$	705.86	$13/2^-$	286.86	$11/2^-$	M1+E2	−0.32 *7*	0.0201 *4*	75.4	Mult.: $\gamma(\theta)$: A_2=−0.65 *4*, A_4=0.06 *6*.
423.7 *3*	9.1$^{@}$	2884.0	(23/2)	2460.3	(19/2)	E2		0.01575	9.2	Mult.: $\gamma(\theta)$: A_2=0.32 *6*, A_4=−0.04 *7*.
429.3 *3*	2.5	5404.1	$(35/2^-)$	4974.8	$(33/2^-)$	D				
435.7 *3*	20.1$^{@}$	543.55	$7/2^+$	108.01	$3/2^+$	E2		0.01453	20.4	Mult.: $\gamma(\theta)$: A_2=0.19 *5*, A_4=−0.07 *6*.
^{x}436 *1*	<2.0									
437.3 *3*	3.9	2795.11	$(23/2^-)$	2357.72	$21/2^-$	D				
451.0 *3*	<2.0	1349.27	$(15/2^-)$	898.23	$15/2^-$					
452.0 *3*	2.8	5856.1	$(37/2^-)$	5404.1	$(35/2^-)$	M1+E2	−0.17 *3*	0.01683		Mult.: $\gamma(\theta)$: A_2=−0.44 *9*, A_4=0.03 *12*.
459.5 *3*	3.4$^{@}$	3254.6	$(25/2^-)$	2795.11	$(23/2^-)$	M1,E2		0.0144 *19*	3.5	
461^{f} *1*	<2.0	4410.4?		3949.3						
465^{f} *1*	<2.0	4669.8?		4205.1						
471.7 *3*	4.0$^{@}$	4750.0	$(33/2^+)$	4278.3	$(31/2^+)$	M1,E2		0.0134 *19*	4.1	Mult.: $\gamma(\theta)$: A_2=−0.70 *7*, A_4=0.12 *10*.
474.0 *3*	5.6$^{@}$	2518.95	$(21/2^-)$	2044.83	$(19/2^-)$	M1,E2		0.0132 *19*	5.7	
475.2 *3*	<2.0	2795.13	$(21/2^+)$	2319.73	$(17/2^+)$					

γ(^{131}Ba) (continued)

E$_\gamma$[†]	I$_\gamma$[†]	E$_i$(level)	J$^\pi_i$	E$_f$	J$^\pi_f$	Mult.[‡]	δ[#]	α[d]	I$_{(\gamma+ce)}$[†]	Comments
477 *1*	<2.0	3272.3	(25/2$^+$)	2795.13	(21/2$^+$)					
486.8 *3*	9.7[@]	803.4	9/2$^+$	316.49	5/2$^+$	E2		0.01061	9.8	Mult.: $\gamma(\theta)$: A_2=0.25 *6*, A_4=0.02 *7*.
487[f] *1*	<2.0	6174.6?	(39/2$^+$)	5686.9	(37/2$^+$)					
496 *1*	<2.0	3057.10	(23/2$^+$)	2560.97	(19/2$^+$)					
499 *1*	<2.0	3555.8	(27/2$^+$)	3057.10	(23/2$^+$)					
501.2 *3*	2.9	3902.0	(25/2$^-$)	3400.7	25/2$^-$	D				
509[f] *1*	<2.0	6365.1?	(39/2$^-$)	5856.1	(37/2$^-$)					
518.6 *3*	7.2[@]	705.86	13/2$^-$	187.09	9/2$^-$	E2		0.00892	7.3	Mult.: $\gamma(\theta)$: A_2=0.34 *6*, A_4=−0.09 *8*.
523.5 *3*	<2.0	3057.10	(23/2$^+$)	2533.7	19/2$^+$	(E2)		0.00869		
524 *1*	3.3	5686.9	(37/2$^+$)	5162.9	(35/2$^+$)	M1,E2		0.0102 *16*		
525.8[c] *5*	&	526.4	(3/2)$^+$	0.0	1/2$^+$					I$_\gamma$: 4.8 *5* (1975Gi11). Mult.: $\gamma(\theta)$: A_2=0.23 *10* (1975Gi11).
[x]544.8 *3*	6.0					D				
549 *1*	2.2	2868.2		2319.73	(17/2$^+$)					
560.0 *3*	28.9[@]	1458.24	17/2$^-$	898.23	15/2$^-$	M1+E2	−0.42 *9*	0.00954 *21*	29.2	Mult.: $\gamma(\theta)$: A_2=−0.73 *4*, A_4=0.06 *6*. δ: −0.25 *12* obtained by 1977Kr13 from data of 1975Gi11.
575.8 *3*	17.8[@]	1119.08	11/2$^+$	543.55	7/2$^+$	E2		0.00674	17.9	Mult.: $\gamma(\theta)$: A_2=0.31 *6*, A_4=0.02 *7*.
578.2 *3*	5.6	3303.3	(25/2$^+$)	2725.1	(21/2$^+$)	E2		0.00667		Mult.: $\gamma(\theta)$: A_2=0.28 *7*, A_4=0.05 *8*.
586.8 *3*	13.4[@]	2044.83	(19/2$^-$)	1458.24	17/2$^-$	M1+E2	−0.32 *7*	0.00864 *16*	13.5	Mult.: $\gamma(\theta)$: A_2=−0.63 *5*, A_4=0.07 *7*.
587 *1*	<2.0	4632.9	(31/2$^-$)	4046.2	(27/2$^-$)					
[x]593 *1*	4.6					(E2)		0.00624		
603.0 *3*	4.8	2725.1	(21/2$^+$)	2121.85	17/2$^+$	(E2)		0.00598		
[x]605 *1*										
[x]608 *1*										
611.3 *3*	99.4[@]	898.23	15/2$^-$	286.86	11/2$^-$	E2		0.00577	100.0	Mult.: $\gamma(\theta)$: A_2=0.31 *5*, A_4=−0.04 *6*.
614.4 *3*	8.9[@]	1417.89	13/2$^+$	803.4	9/2$^+$	E2		0.00570	9.0	
626.1 *3*	5.2	3510.2	(27/2)	2884.0	(23/2)	E2		0.00543		Mult.: $\gamma(\theta)$: A_2=0.39 *8*, A_4=0.02 *9*.
636 *1*	<2.0	3431.0		2795.13	(21/2$^+$)					
643.5 *3*	21.3[@]	1349.27	(15/2$^-$)	705.86	13/2$^-$	M1+E2	−0.32 *9*	0.00690 *15*	21.4	Mult.: $\gamma(\theta)$: A_2=−0.64 *4*, A_4=0.10 *6*.
662 *1*	<2.0	3272.3	(25/2$^+$)	2611.14	23/2$^-$					
667 *1*	<2.0	4974.8	(33/2$^-$)	4307.5	(29/2$^-$)					
668 *1*	<2.0	3940.6	(29/2$^+$)	3272.3	(25/2$^+$)					
673.5 *3*	<2.0	2795.13	(21/2$^+$)	2121.85	17/2$^+$	(E2)		0.00452		
675.0 *3*	9.5[@]	2357.72	21/2$^-$	1682.61	19/2$^-$	M1+E2	−0.49 *14*	0.00596 *19*	9.6	Mult.: $\gamma(\theta)$: A_2=−0.78 *6*, A_4=0.09 *8*.
677.6 *3*	14.2[@]	1796.56	15/2$^+$	1119.08	11/2$^+$	E2		0.00445	14.3	Mult.: $\gamma(\theta)$: A_2=0.24 *6*, A_4=−0.02 *7*.
[x]678 *1*						(E2)		0.00445		
680.5 *3*	5.8	2725.1	(21/2$^+$)	2044.83	(19/2$^-$)	(E1)		1.65×10^{-3}		
682 *1*	5.4	3476.7	(27/2$^-$)	2795.11	(23/2$^-$)	E2		0.00438		
683 *1*		1712.7	(17/2$^-$)	1029.9	(13/2$^-$)					

^{122}Sn(^{13}C,4nγ),(^{12}C,3nγ) **1990Ma07,1975Gi11** (continued)

γ(^{131}Ba) (continued)

E_γ [†]	I_γ [†]	E_i(level)	J^π_i	E_f	J^π_f	Mult. [‡]	δ [#]	α [d]	$I_{(\gamma+ce)}$ [†]	Comments
695.6 *3*	11.1	2044.83	(19/2$^-$)	1349.27	(15/2$^-$)	E2		0.00417		Mult.: $\gamma(\theta)$: A_2=0.21 *6*, A_4=−0.02 *7*.
699.4 *3*	5.5	3057.10	(23/2$^+$)	2357.72	21/2$^-$	(E1)		1.55×10^{-3}		
704.0^b *3*	7.3	2121.85	17/2$^+$	1417.89	13/2$^+$	E2		0.00405		Mult.: $\gamma(\theta)$: A_2=0.17 *5*, A_4=0.06 *6*.
722.6 *3*	3.7	4278.3	(31/2$^+$)	3555.8	(27/2$^+$)	E2		0.00380		
736 *1*	<2.0	3254.6	(25/2$^-$)	2518.95	(21/2$^-$)					
737.2 *3*	8.4	2533.7	19/2$^+$	1796.56	15/2$^+$	E2		0.00363		Mult.: $\gamma(\theta)$: A_2=0.26 *6*, A_4=−0.05 *8*.
740.5 *3*	3.1	2862.3	21/2$^+$	2121.85	17/2$^+$	E2		0.00359		
743 *1*	3.3	1029.9	(13/2$^-$)	286.86	11/2$^-$	(M1,E2)		0.0043 *8*		
748 *1*	<2.0	2460.3	(19/2)	1712.7	(17/2$^-$)					
750 *1*		2795.13	(21/2$^+$)	2044.83	(19/2$^-$)					
750.5 *3*	6.5	2795.11	(23/2$^-$)	2044.83	(19/2$^-$)	E2		0.00347		
752.2 *3*	<19.9$^@$	1458.24	17/2$^-$	705.86	13/2$^-$	E2		0.00345	<20.0	Mult.: $\gamma(\theta)$: A_2=0.31 *6*, A_4=0.06 *7*.
761 *1*	<2.0	3119.0		2357.72	21/2$^-$					
764.5 *3*	3.5	2560.97	(19/2$^+$)	1796.56	15/2$^+$	(E2)		0.00332		Mult.: $\gamma(\theta)$: A_2=0.32 *9*, A_4=0.05 *11*.
768.4 *3*	3.4	4071.7	(29/2$^+$)	3303.3	(25/2$^+$)	E2		0.00328		
771 *1*	<2.0	5404.1	(35/2$^-$)	4632.9	(31/2$^-$)					
772.9 *3*	<2.0	3656.9	(27/2)	2884.0	(23/2)	E2		0.00324		
777.7 *3*	6.4	2460.3	(19/2)	1682.61	19/2$^-$	(D)				Mult.: $\gamma(\theta)$: A_2=0.40 *6*, A_4=0.09 *8*.
784.4 *3*	56.0$^@$	1682.61	19/2$^-$	898.23	15/2$^-$	E2		0.00313	56.2	Mult.: $\gamma(\theta)$: A_2=0.34 *6*, A_4=−0.05 *6*.
^{x}787.5 *3*	<2.0					(E2)		0.00310		
789.5^b *3*	4.1	3400.7	25/2$^-$	2611.14	23/2$^-$	M1+E2	−0.56 *13*	0.00404 *12*		Mult.: $\gamma(\theta)$: A_2=−0.80 *8*, A_4=0.11 *11*.
806 *1*	<2.0	2518.95	(21/2$^-$)	1712.7	(17/2$^-$)					
809 *1*	<2.0	4750.0	(33/2$^+$)	3940.6	(29/2$^+$)					
820^f *1*	<2.0	3431.0		2611.14	23/2$^-$					
^{x}834 *1*										
843 *1*		1029.9	(13/2$^-$)	187.09	9/2$^-$	(E2)		0.00265		
^{x}844 *1*										
848.8 *3*	5.0	4501.5	(31/2$^-$)	3652.7	(27/2$^-$)	E2		0.00261		
855.2 *3*	<2.0	4512.0	(31/2)	3656.9	(27/2)	E2		0.00256		
858 *1*	<2.0	3652.7	(27/2$^-$)	2795.13	(21/2$^+$)					
861.7 *3*	4.3	4338.4	(31/2$^-$)	3476.7	(27/2$^-$)	E2		0.00252		Mult.: $\gamma(\theta)$: A_2=0.30 *8*, A_4=−0.01 *9*.
865.5 *3*	5.1	3476.7	(27/2$^-$)	2611.14	23/2$^-$	(E2)		0.00249		Mult.: $\gamma(\theta)$: A_2=0.25 *7*, A_4=−0.04 *8*.
881 *1*	<2.0	5856.1	(37/2$^-$)	4974.8	(33/2$^-$)					
885 *1*	<2.0	5162.9	(35/2$^+$)	4278.3	(31/2$^+$)					
886.0 *3*	<2.0	5387.5	(35/2$^-$)	4501.5	(31/2$^-$)	E2		0.00236		
897 *1*	<2.0	3254.6	(25/2$^-$)	2357.72	21/2$^-$					
899.5 *3*	10.0	2357.72	21/2$^-$	1458.24	17/2$^-$	E2		0.00229		Mult.: $\gamma(\theta)$: A_2=0.27 *6*, A_4=−0.05 *7*.
908 *1*	<2.0	4046.2	(27/2$^-$)	3138.5	(23/2$^-$)					
928.5 *3*	16.8	2611.14	23/2$^-$	1682.61	19/2$^-$	E2		0.00213		Mult.: $\gamma(\theta)$: A_2=0.25 *6*, A_4=−0.06 *7*.
937 *1*	<2.0	5686.9	(37/2$^+$)	4750.0	(33/2$^+$)					
961^f *1*	<2.0	6365.1?	(39/2$^-$)	5404.1	(35/2$^-$)					
970.0 *3*	2.6 *6*	5041.7	(33/2$^+$)	4071.7	(29/2$^+$)	E2		0.00193		

γ(^{131}Ba) (continued)

E$_γ$[†]	I$_γ$[†]	E$_i$(level)	J^π_i	E$_f$	J^π_f	Mult.[‡]	δ[#]	α[d]	Comments
977 *1*	<2.0	5489.0	(35/2)	4512.0	(31/2)	E2		0.00190	
1001.8 *3*	6.7	4512.0	(31/2)	3510.2	(27/2)	E2		0.00180	
1002 *1*	<2.0	2460.3	(19/2)	1458.24	17/2$^-$				
1012[f] *1*	<2.0	6174.6?	(39/2$^+$)	5162.9	(35/2$^+$)				
1012.5 *3*		5350.9	(35/2$^-$)	4338.4	(31/2$^-$)	E2		1.76×10^{-3}	
[x]1038 *1*	<2.0					(E2)		1.67×10^{-3}	
1041.5 *3*	5.4	3652.7	(27/2$^-$)	2611.14	23/2$^-$	(E2)		1.66×10^{-3}	
1042 *1*	<2.0	2725.1	(21/2$^+$)	1682.61	19/2$^-$				
1043.0 *3*	2.5	3400.7	25/2$^-$	2357.72	21/2$^-$	E2		1.65×10^{-3}	
1053 *1*	<2.0	6440.5?	(39/2$^-$)	5387.5	(35/2$^-$)				
1075 *1*	<2.0	2533.7	19/2$^+$	1458.24	17/2$^-$	E1		6.65×10^{-4}	
1094 *1*	<2.0	3138.5	(23/2$^-$)	2044.83	(19/2$^-$)				
1102.5 *3*	5.6	2560.97	(19/2$^+$)	1458.24	17/2$^-$	(E1+M2)	+0.04 *12*	0.00064 *10*	Mult.: γ(θ): A$_2$=−0.15 *6*, A$_4$=−0.13 *8*.
1106.2 *3*	3.6	3717.3	27/2$^-$	2611.14	23/2$^-$	E2		1.46×10^{-3}	Mult.: γ(θ): A$_2$=0.37 *8*, A$_4$=−0.06 *10*.
1111.5[b][f] *3*	<2.0	2795.11	(23/2$^-$)	1682.61	19/2$^-$				E$_γ$: poor fit, level energy difference is equal to 1112.10 *19*.
1112.5[b] *3*	12.8	2795.13	(21/2$^+$)	1682.61	19/2$^-$	D			
[x]1132 *1*	<2.0								
[x]1180 *1*	<2.0								
1185.5 *3*	<2.0	2868.2		1682.61	19/2$^-$				
1194[f] *1*	<2.0	6235.7?	(37/2$^+$)	5041.7	(33/2$^+$)				
[x]1222 *1*	<2.0					(E2)		1.20×10^{-3}	
1251 *1*	<2.0	4046.2	(27/2$^-$)	2795.11	(23/2$^-$)	(E2)		1.15×10^{-3} *2*	
1403.0 *3*	1.7	2108.9	(15/2$^+$)	705.86	13/2$^-$	(E1+M2)	−0.03 *6*	5.64×10^{-4} *17*	Mult.: γ(θ): A$_2$=−0.27 *7*, A$_4$=0.06 *14*.
1421.4 *3*	3.7	2319.73	(17/2$^+$)	898.23	15/2$^-$	(E1+M2)	−0.05 *5*	5.71×10^{-4} *17*	Mult.: γ(θ): A$_2$=−0.30 *7*, A$_4$=−0.05 *10*.
1435 *1*	<2.0	4046.2	(27/2$^-$)	2611.14	23/2$^-$	(E2)		9.18×10^{-4}	
1545 *1*	<2.0	3902.0	(25/2$^-$)	2357.72	21/2$^-$	(E2)		8.41×10^{-4}	

[†] From 1990Ma07, except as noted. Iγ′s given in comments are relative to Iγ(99.7γ)=100 *10* (1975Gi11).

[‡] From γ(θ) and DCO measurements (1990Ma07), except as noted. E2 is assumed for quadrupole transitions, and M1+E2 is assumed for D+Q transitions within a band.

[#] From γ(θ) (1990Ma07), except as noted.

[@] From I(γ+ce) and adopted α′s (evaluators).

[&] Iγ(177γ)/Iγ(285γ)=0.39 *6*, Iγ(209γ)/Iγ(316γ)=0.62, and Iγ(526γ)/Iγ(418γ)=0.0066 *10* from 1975Gi11 discrepant with 0. 0.288 *15*, and 0.486 *15* from ε decay.

[a] Multiplet.

[b] Doublet with a transition in ^{132}Ba.

[c] From 1975Gi11.

γ(^{131}Ba) (continued)

[d] 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.

[e] Multiply placed with undivided intensity.

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

[x] γ ray not placed in level scheme.

^{122}Sn(^{13}C,4nγ),(^{12}C,3nγ) 1990Ma07,1975Gi11

Level Scheme

Intensities: Relative I$_{(\gamma+ce)}$

Legend

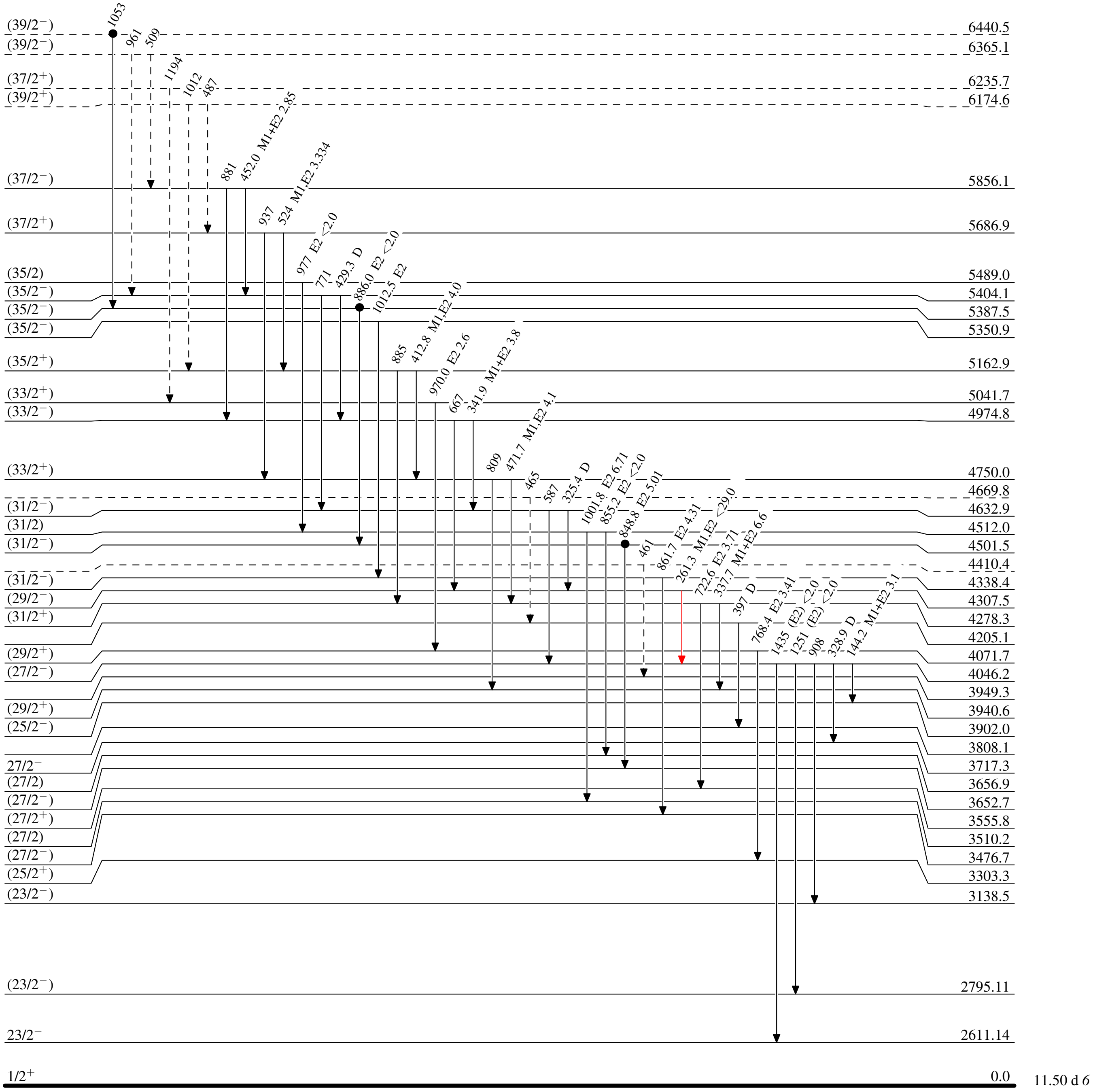
$I_\gamma < 2\% \times I_\gamma^{max}$

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

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

γ Decay (Uncertain)

● Coincidence



$^{131}_{56}$Ba$_{75}$

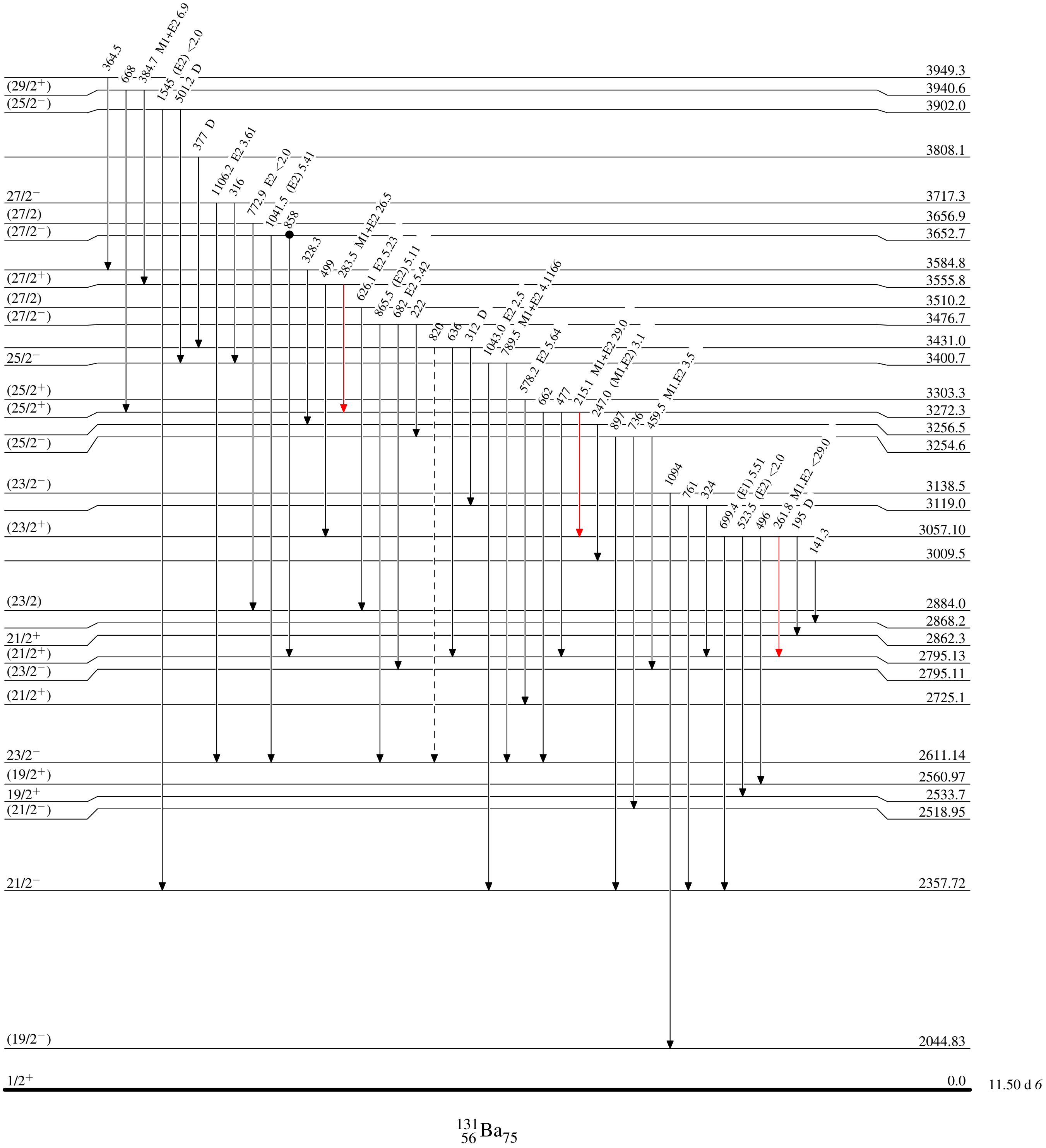
^{122}Sn(^{13}C,4nγ),(^{12}C,3nγ) 1990Ma07,1975Gi11

Level Scheme (continued)

Intensities: Relative $I_{(\gamma+ce)}$

Legend

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



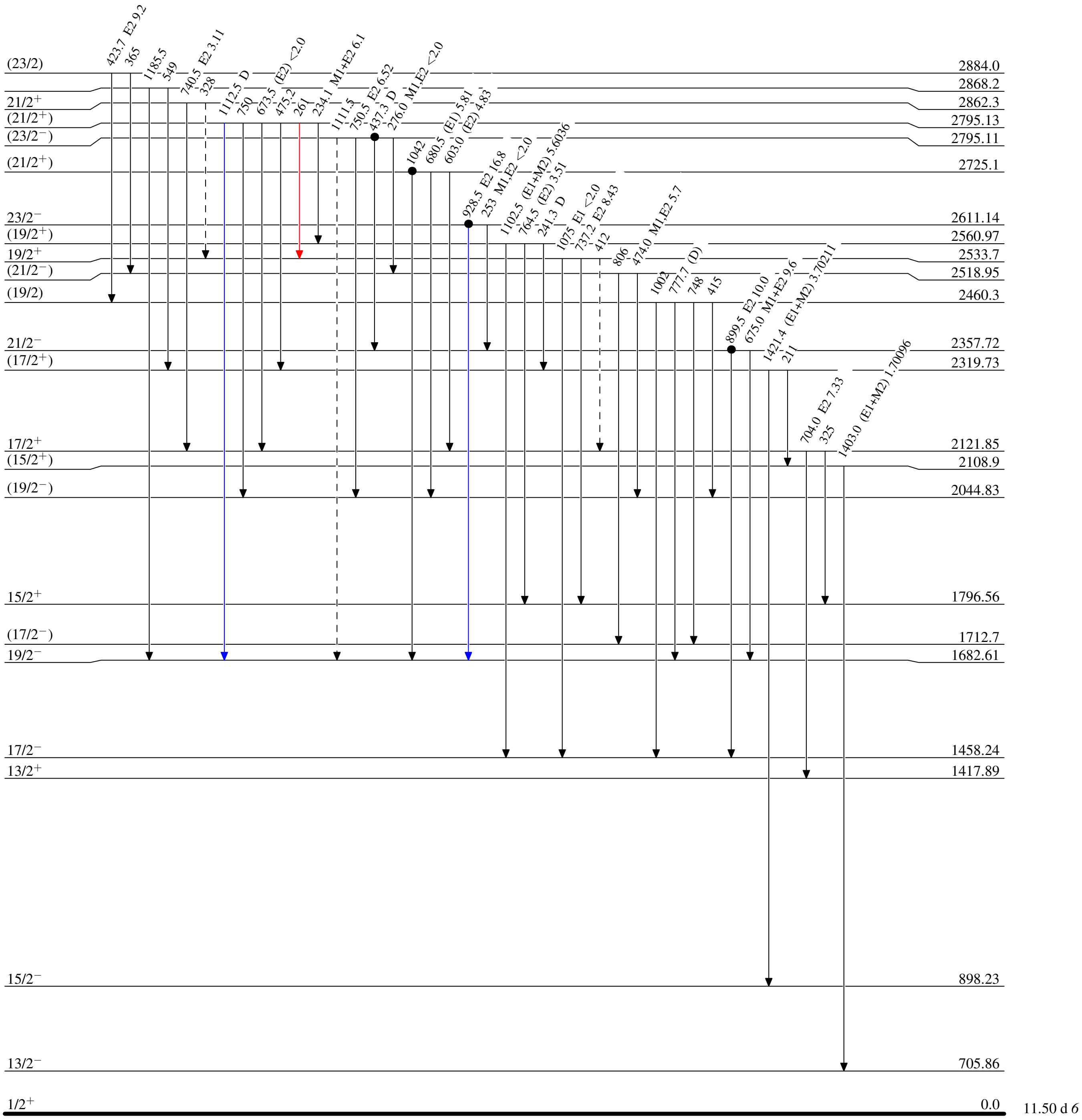
^{122}Sn(^{13}C,4nγ),(^{12}C,3nγ) 1990Ma07,1975Gi11

Level Scheme (continued)

Intensities: Relative $I_{(\gamma+ce)}$

Legend

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

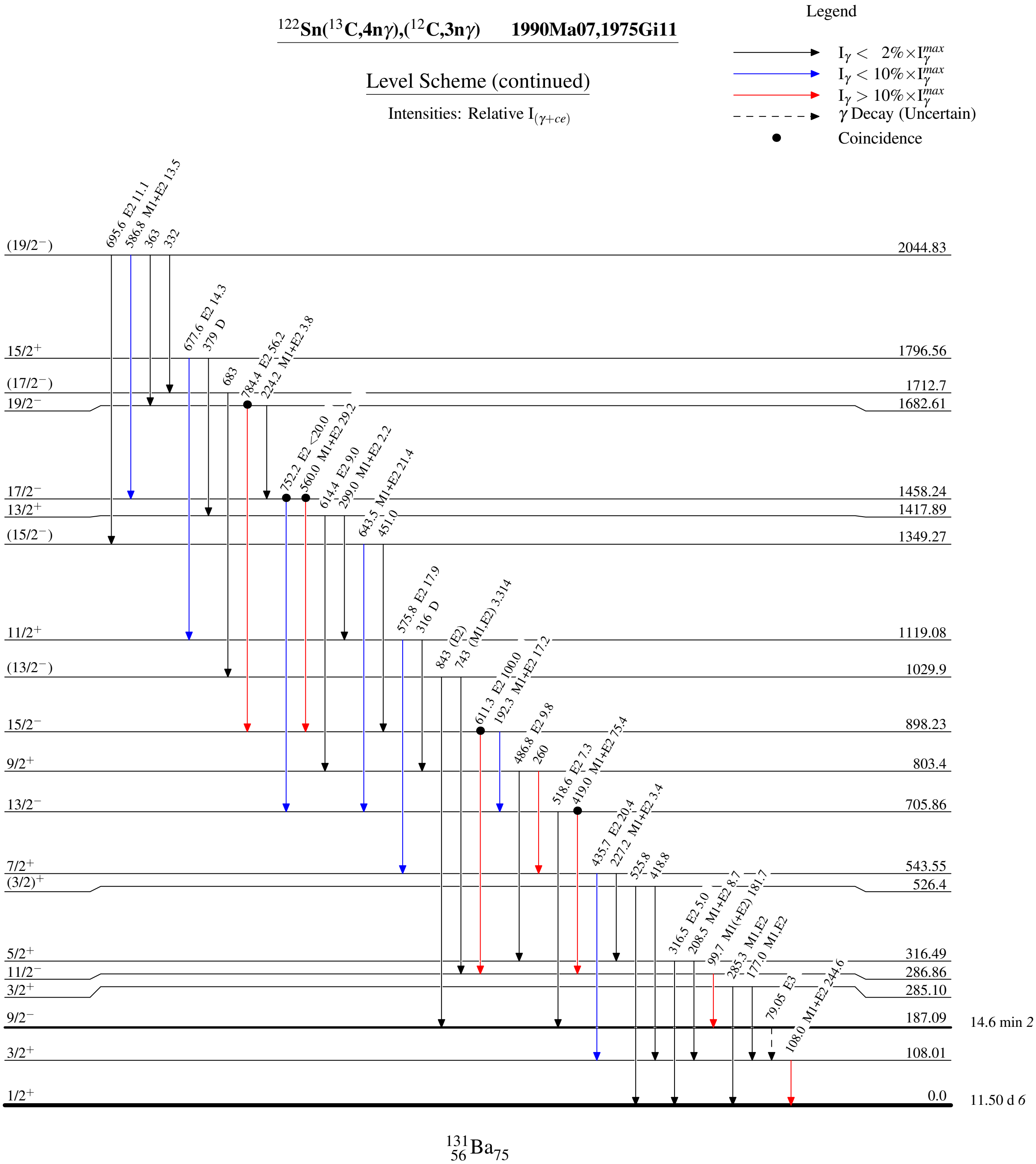


$^{131}_{56}$Ba$_{75}$

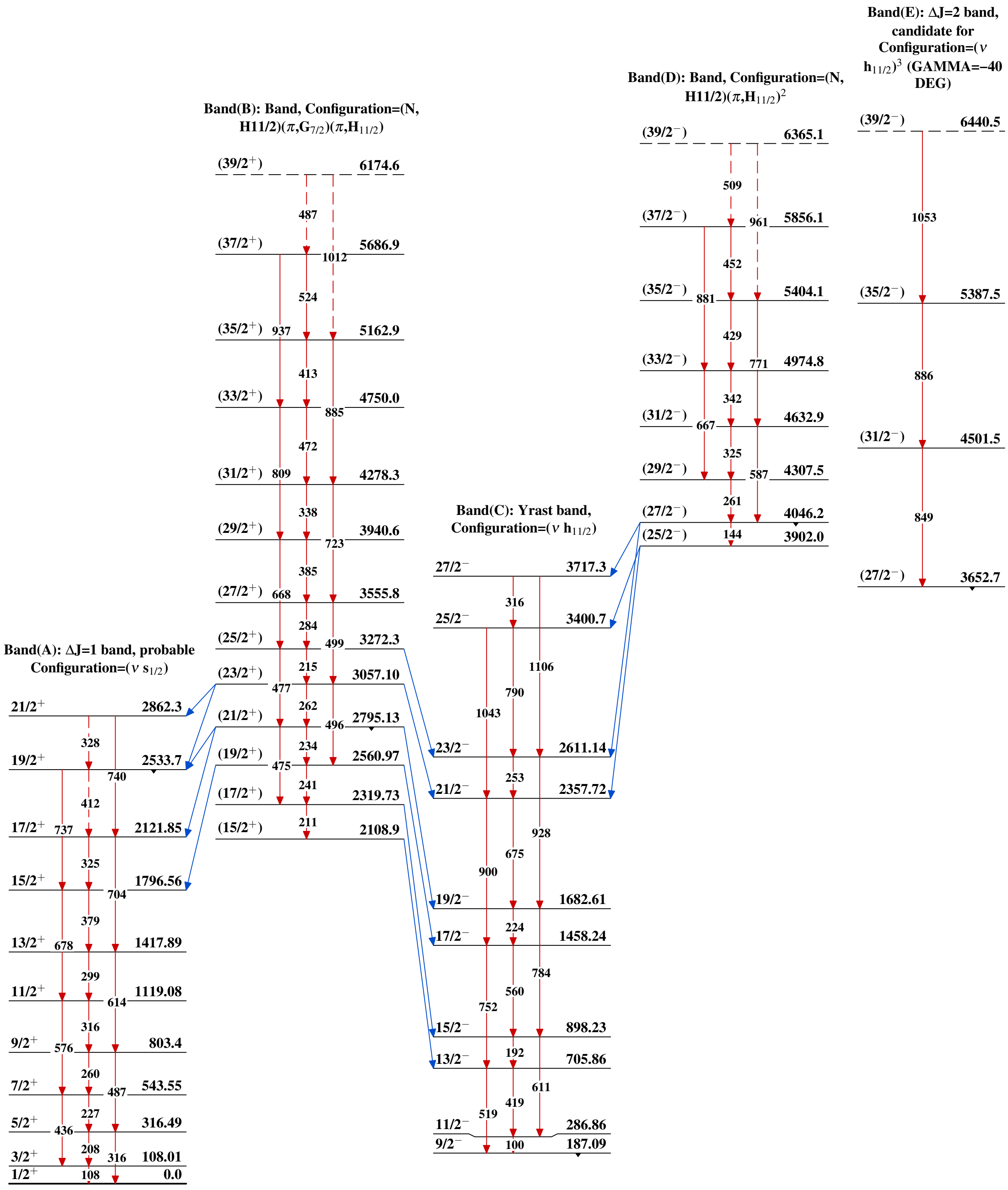
^{122}Sn(^{13}C,4nγ),(^{12}C,3nγ) 1990Ma07,1975Gi11

Level Scheme (continued)

Intensities: Relative $I_{(\gamma+ce)}$

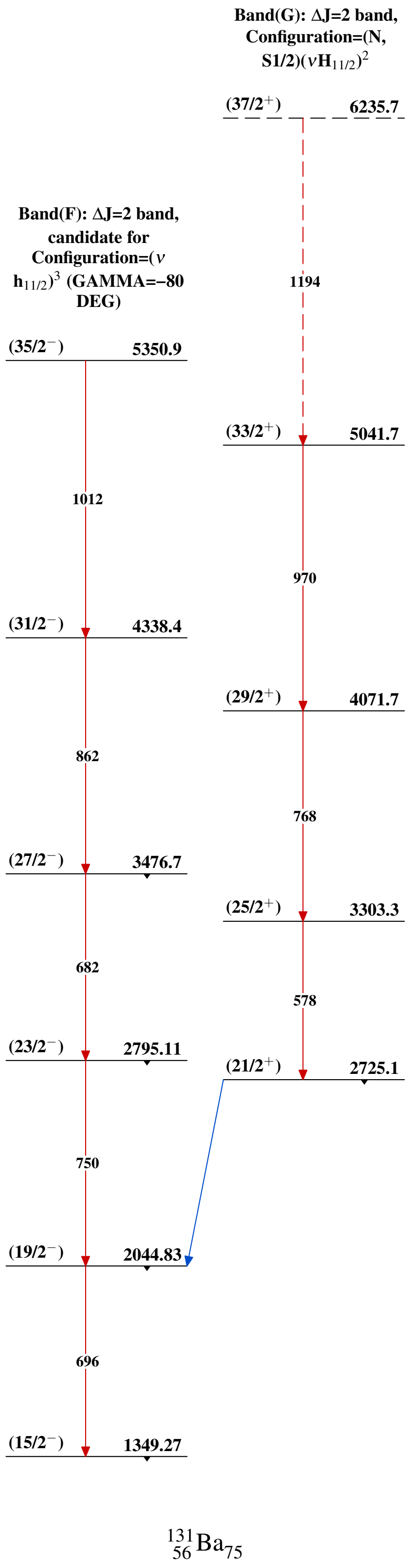


^{122}Sn(^{13}C,4nγ),(^{12}C,3nγ) 1990Ma07,1975Gi11



$^{131}_{56}$Ba$_{75}$

^{122}Sn(^{13}C,4nγ),(^{12}C,3nγ) 1990Ma07,1975Gi11 (continued)



^{130}**Ba(d,p)** **1970Vo04**

History

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

1970Vo04: ^{130}Ba(d,p), E=12 MeV, FWHM=15 keV; E(p), I(p)(θ); deduced L_n.

^{131}Ba Levels

E(level)	L	S′[†]	E(level)	L	S′[†]	E(level)	L	S′[†]	E(level)	L	S′[†]
0.0	0	0.53	895 *10*	(0)	0.01	1565 *10*	3	0.34	2310 *15*	3	0.11
105 *5*	2	1.03	946 *10*	2	0.17	1605 *10*			2347 *15*	(3)	0.06
187? *5*			970 *10*	2	0.22	1669 *10*	2	0.09	2384? *15*		
284 *5*	2	0.43	1100 *10*	1	0.62	1747 *10*	(0)	0.008	2401 *15*		
316? *5*			1135? *10*			1785 *10*			2433? *15*		
364 *5*	0	0.016	1162 *10*	3	1.19	1820 *10*	0	0.049	2487 *15*	3	0.28
520? *10*	(2)	0.20	1202? *10*			1908 *10*	(0)	0.052	2524 *15*	2	0.50
559 *10*	2	0.51	1243 *10*	(3)	0.07	1943 *10*	(0)	0.011	2592 *15*	(3)	0.14
718? *10*			1282 *10*			1965? *10*			2616 *15*	(3)	0.13
757 *10*	3	0.35	1317 *10*	1	0.16	1991 *10*			2656 *15*	(3)	0.18
783? *10*			1437 *10*	(0)	0.008	2051 *15*	(3)	0.06			
839? *10*			1472 *10*	0	0.018	2100? *15*					

[†] DWBA calculations without cutoff.