Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	A. Hashizume	NDS 112,1647 (2011)	1-Oct-2009

Q(β^-)=−7.44×10^3 *syst*; S(n)=9.23×10^3 *4*; S(p)=4.29×10^3 *10*; Q(α)=1.25×10^3 *4* 2012Wa38
Note: Current evaluation has used the following Q record −7540 syst 9230 *60* 4.29E3 11 *1250* 60 2003Au03.
Δ(Q(β^-))=200 (2003Au03).

^{127}Ce Levels

Cross Reference (XREF) Flags

A ^{127}Pr ε decay
B (HI,xnγ)

E(level)†	J$^\pi$‡	T$_{1/2}$	XREF	Comments
0#	(1/2$^+$)	34 s *2*	AB	%ε+%β^+=100 T$_{1/2}$: From (1996Ge07).
7.3@ *11*	(5/2$^+$)	28.6 s *7*	AB	%ε+%β^+=100 T$_{1/2}$: From (2005Ii01). Other: 29 s *2* (1996Ge07).
29.2# *3*	(3/2$^+$)		AB	
36.8& *12*	(7/2$^-$)	>10 μs	AB	T$_{1/2}$: From (1995Os03).
162.7& *12*	(9/2$^-$)		AB	
167.1@ *11*	(7/2$^+$)		AB	
205.67# *9*	(5/2$^+$)		AB	
272.3# *3*	(7/2$^+$)		AB	
325.2& *12*	(11/2$^-$)		AB	
365.9@ *11*	(9/2$^+$)		AB	
553.2& *12*	(13/2$^-$)		AB	
571.3# *4*	(9/2$^+$)		B	
600.8@ *11*	(11/2$^+$)		AB	
674.7# *5*	(11/2$^+$)		B	
703.7 *3*	(5/2$^+$)		A	
710.2 *15*	(7/2$^+$,5/2$^+$)		A	
742.0 *12*			A	
774.2& *12*	(15/2$^-$)		B	
777.0 *12*			A	
821.2 *12*			A	
866.4@ *11*	(13/2$^+$)		B	
997.4 *12*			A	
1057.5 *12*			A	
1073.6# *5*	(13/2$^+$)		B	
1094.6& *12*	(17/2$^-$)		B	
1160.5@ *11*	(15/2$^+$)		B	
1215.3# *6*	(15/2$^+$)		B	
1351.5& *12*	(19/2$^-$)		B	
1478.3@ *11*	(17/2$^+$)		B	
1683.4# *6*	(17/2$^+$)		B	
1752.6& *12*	(21/2$^-$)		B	

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Adopted Levels, Gammas (continued)

^{127}Ce Levels (continued)

E(level)†	Jπ‡	XREF	E(level)†	Jπ‡	XREF	E(level)†	Jπ‡	XREF
1810.8@ *11*	(19/2+)	B	3427.1# *9*	(29/2+)	B	5701.8@ *13*	(41/2+)	B
1865.3# *7*	(19/2+)	B	3630.9# *10*	(31/2+)	B	5882.1# *12*	(41/2+)	B
2028.1& *12*	(23/2−)	B	3633.1& *13*	(33/2−)	B	6131.2# *12*	(43/2+)	B
2146.1@ *11*	(21/2+)	B	3713.5@ *11*	(31/2+)	B	6147.8@ *13*	(43/2+)	B
2330.3# *7*	(21/2+)	B	3953.8& *13*	(35/2−)	B	6157.8& *14*	(45/2−)	B
2459.4& *12*	(25/2−)	B	4049.6@ *11*	(33/2+)	B	6624.8@ *13*	(45/2+)	B
2492.4@ *10*	(23/2+)	B	4109.7# *10*	(33/2+)	B	6670.8& *14*	(47/2−)	B
2540.3# *8*	(23/2+)	B	4331.8# *11*	(35/2+)	B	7099.0@ *14*	(47/2+)	B
2714.6& *13*	(27/2−)	B	4340.9& *13*	(37/2−)	B	7259.4& *14*	(49/2−)	B
2746.9 *11*		B	4430.4@ *12*	(35/2+)	B	7622.6@ *14*	(49/2+)	B
2826.6@ *11*	(25/2+)	B	4733.3& *13*	(39/2−)	B	7810.7& *14*	(51/2−)	B
2865.2# *9*	(25/2+)	B	4833.2@ *12*	(37/2+)	B	8142.8@ *14*	(51/2+)	B
3044.5& *13*	(29/2−)	B	4923.9# *11*	(37/2+)	B	8482.1& *15*	(53/2−)	B
3058.3# *9*	(27/2+)	B	5167.1# *12*	(39/2+)	B	8712.5@ *15*	(53/2+)	B
3101.9@ *11*	(27/2+)	B	5183.6& *13*	(41/2−)	B	9053.1& *15*	(55/2−)	B
3300.9& *13*	(31/2−)	B	5251.1@ *12*	(39/2+)	B	9819.1& *15*	(57/2−)	B
3402.1@ *11*	(29/2+)	B	5641.3& *14*	(43/2−)	B			

† From least-squares fit to E_γ's. Assuming $\Delta(E_\gamma)$=0.4 keV for the strong transitions (510γ) and $\Delta(E_\gamma)$=0.6 keV for the weak transitions (410γ) for the γ's reported by 2009Pa40 (evaluator). 2009Pa40 estimate ΔE_γ as follows: the γ-ray energies are estimated to be accurate to ±0.3 keV to the strong transitions (510γ), rising to ±0.6 keV for the weaker transitions. However, the least-squares fit with these uncertainties cause seven γ rays that fit poorly, just outside 2σ's.

‡ Based on the band structure studied by four fold γ-γ coincidence (2009Pa40) and level systematics of Ce nuclei (2009Pa40,1989Ny03). The analysis of signature splittings (2009Pa40,1989Ny03) and B(M1)/B(E2) ratios are made for band assignments (2009Pa40,1989Ny03). the spins and parities proposed by the (HI,xnγ) reactions are put in parentheses due to the lack of strong supporting arguments.

Band(A): π =+ band built on the ground (1/2+) state. Possible configuration is (ν $d_{3/2}$)[411]1/2+ orbital. After bandcrossing, the possible configuration is (ν $h_{11/2}$)⊗(π $h_{11/2}g_{7/2}$) (2009Pa40,1989Ny03).

@ Band(B): π =+ band built on the (5/2+) state. Possible configuration is (ν $d_{5/2}$)[402]5/2+ orbital.

& Band(C): π =− band built on the (7/2−) state. Possible configuration is (ν $h_{11/2}$)[523]7/2− orbital. After bandcrossing, possible configuration is (ν $h_{11/2}$)⊗(π $h_{11/2}$)^2 (2009Pa40,1989Ny03).

γ(^{127}Ce)

E_i(level)	J_i^π	E_γ†	I_γ†	E_f	J_f^π	Mult.&	α[a]	Comments
29.2	(3/2+)	28.8‡ *5*	≈100.0‡	0	(1/2+)	[M1]	6.7 *4*	α(L)=5.3 *3*; α(M)=1.11 *6*; α(N+..)=0.287 *16* α(N)=0.245 *14*; α(O)=0.0396 *22*; α(P)=0.00295 *17*
36.8	(7/2−)	29.56‡ *5*	100.0‡	7.3	(5/2+)	[E1]	1.158	α(L)=0.918 *14*; α(M)=0.192 *3*; α(N+..)=0.0472 *7* α(N)=0.0410 *6*; α(O)=0.00591 *9*; α(P)=0.000256 *4*
162.7	(9/2−)	125.84‡ *5*	100.0‡	36.8	(7/2−)	[M1]	0.617	α(K)=0.526 *8*; α(L)=0.0717 *10*; α(M)=0.01501 *21*; α(N+..)=0.00391 *6* α(N)=0.00333 *5*; α(O)=0.000539 *8*; α(P)=4.07×10^{-5} *6*
167.1	(7/2+)	159.84‡ *7*	100.0‡	7.3	(5/2+)	[M1]	0.316	α(K)=0.270 *4*; α(L)=0.0366 *6*; α(M)=0.00765 *11*; α(N+..)=0.00199 *3* α(N)=0.001698 *24*; α(O)=0.000275 *4*; α(P)=2.08×10^{-5} *3*

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Adopted Levels, Gammas (continued)

$\gamma(^{127}Ce)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[&]	α[a]	Comments
205.67	(5/2$^+$)	176.1 *4*	1.0×10^2 *3*	29.2	(3/2$^+$)	[M1]	0.242	α(K)=0.206 *4*; α(L)=0.0279 *5*; α(M)=0.00585 *9*; α(N+..)=0.001523 *24* α(N)=0.001297 *20*; α(O)=0.000210 *4*; α(P)=1.592×10^{-5} *25*
		205.68[#] *9*	67 *8*	0	(1/2$^+$)	[E2]	0.1673	α(K)=0.1276 *18*; α(L)=0.0312 *5*; α(M)=0.00680 *10*; α(N+..)=0.001700 *24* α(N)=0.001474 *21*; α(O)=0.000218 *3*; α(P)=7.87×10^{-6} *11*
272.3	(7/2$^+$)	66.0[#]	0.000	205.67	(5/2$^+$)	[M1]	3.92	α(K)=3.34 *5*; α(L)=0.459 *7*; α(M)=0.0962 *14*; α(N+..)=0.0250 *4* α(N)=0.0213 *3*; α(O)=0.00345 *5*; α(P)=0.000259 *4*
		243.14[‡] *7*	100[‡] *16*	29.2	(3/2$^+$)	[E2]	0.0959	α(K)=0.0751 *11*; α(L)=0.01638 *23*; α(M)=0.00355 *5*; α(N+..)=0.000891 *13* α(N)=0.000771 *11*; α(O)=0.0001155 *17*; α(P)=4.78×10^{-6} *7*
325.2	(11/2$^-$)	162.53[#] *5*	100 *4*	162.7	(9/2$^-$)	[M1]	0.302	α(K)=0.257 *4*; α(L)=0.0349 *5*; α(M)=0.00731 *11*; α(N+..)=0.00190 *3* α(N)=0.001621 *23*; α(O)=0.000263 *4*; α(P)=1.99×10^{-5} *3*
		288.3 *4*	30.3 *14*	36.8	(7/2$^-$)	[E2]	0.0553	α(K)=0.0442 *7*; α(L)=0.00872 *13*; α(M)=0.00188 *3*; α(N+..)=0.000474 *7* α(N)=0.000409 *6*; α(O)=6.20×10^{-5} *10*; α(P)=2.90×10^{-6} *5*
365.9	(9/2$^+$)	198.79[#] *7*	100 *4*	167.1	(7/2$^+$)	[M1]	0.1734	α(K)=0.1482 *21*; α(L)=0.0200 *3*; α(M)=0.00418 *6*; α(N+..)=0.001090 *16* α(N)=0.000928 *13*; α(O)=0.0001504 *22*; α(P)=1.141×10^{-5} *16*
		359.2 *4*	77 *6*	7.3	(5/2$^+$)	[E2]	0.0279	α(K)=0.0228 *4*; α(L)=0.00404 *6*; α(M)=0.000865 *13*; α(N+..)=0.000220 *4* α(N)=0.000189 *3*; α(O)=2.91×10^{-5} *5*; α(P)=1.545×10^{-6} *23*
553.2	(13/2$^-$)	227.7 *4*	100 *4*	325.2	(11/2$^-$)	[M1]	0.1200	α(K)=0.1026 *16*; α(L)=0.01379 *21*; α(M)=0.00288 *5*; α(N+..)=0.000752 *12* α(N)=0.000640 *10*; α(O)=0.0001038 *16*; α(P)=7.89×10^{-6} *12*
		390.55[#] *8*	54.0 *19*	162.7	(9/2$^-$)	[E2]	0.0218	α(K)=0.0179 *3*; α(L)=0.00306 *5*; α(M)=0.000653 *10*; α(N+..)=0.0001663 *24* α(N)=0.0001429 *20*; α(O)=2.21×10^{-5} *3*; α(P)=1.224×10^{-6} *18*
571.3	(9/2$^+$)	298.5 *4*	22 *6*	272.3	(7/2$^+$)	D		
		365.6 *4*	100 *8*	205.67	(5/2$^+$)	Q		
600.8	(11/2$^+$)	234.8 *4*	100 *7*	365.9	(9/2$^+$)	D		
		433.5 *4*	54 *4*	167.1	(7/2$^+$)	Q		
674.7	(11/2$^+$)	402.9 *4*	100.0	272.3	(7/2$^+$)	Q		
703.7	(5/2$^+$)	431.38[‡] *9*	100[‡] *8*	272.3	(7/2$^+$)			
		674.3[#]	0.000	29.2	(3/2$^+$)			

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Adopted Levels, Gammas (continued)

γ(^{127}Ce) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[&]
710.2	(7/2$^+$,5/2$^+$)	543.1[‡]	100.0[‡]	167.1	(7/2$^+$)	
742.0		579.31[‡] *10*	100.0[‡]	162.7	(9/2$^-$)	
774.2	(15/2$^-$)	220.8 *4*	77 *3*	553.2	(13/2$^-$)	D
		448.8 *4*	100.0	325.2	(11/2$^-$)	Q
777.0		614.31[‡] *10*	55[‡] *6*	162.7	(9/2$^-$)	
		740.19[‡] *27*	100[‡] *12*	36.8	(7/2$^-$)	
821.2		658.51[‡] *27*	100.0[‡]	162.7	(9/2$^-$)	
866.4	(13/2$^+$)	265.4 *4*	63 *3*	600.8	(11/2$^+$)	D
		500.7 *4*	100 *7*	365.9	(9/2$^+$)	Q
997.4		672.32[‡] *27*	100[‡] *19*	325.2	(11/2$^-$)	
		834.75[‡] *11*	97[‡] *17*	162.7	(9/2$^-$)	
1057.5		894.87[‡] *27*	100.0[‡]	162.7	(9/2$^-$)	
1073.6	(13/2$^+$)	399.3 *4*	78 *14*	674.7	(11/2$^+$)	D
		501.8 *4*	100 *9*	571.3	(9/2$^+$)	Q
1094.6	(17/2$^-$)	320.2 *4*	49 *3*	774.2	(15/2$^-$)	D
		541.7 *4*	100 *4*	553.2	(13/2$^-$)	Q
1160.5	(15/2$^+$)	294.5 *6*	20.4 *20*	866.4	(13/2$^+$)	D
		559.8 *4*	100 *7*	600.8	(11/2$^+$)	Q
1215.3	(15/2$^+$)	540.6 *4*	100.0	674.7	(11/2$^+$)	Q
1351.5	(19/2$^-$)	257.0 *4*	19 *9*	1094.6	(17/2$^-$)	D
		577.3 *4*	100 *4*	774.2	(15/2$^-$)	Q
1478.3	(17/2$^+$)	316.6[b] *4*	87 *7*	1160.5	(15/2$^+$)	D
		611.6 *4*	100 *19*	866.4	(13/2$^+$)	Q
1683.4	(17/2$^+$)	466.2[b] *4*	5 *7*	1215.3	(15/2$^+$)	D
		609.8 *4*	100 *15*	1073.6	(13/2$^+$)	Q
1752.6	(21/2$^-$)	400.9 *4*	46 *3*	1351.5	(19/2$^-$)	D
		658.1 *4*	100 *6*	1094.6	(17/2$^-$)	Q
1810.8	(19/2$^+$)	334[@] *1*	21.3 *22*	1478.3	(17/2$^+$)	D
		650.5 *4*	100 *9*	1160.5	(15/2$^+$)	Q
1865.3	(19/2$^+$)	649.9 *4*	100.0	1215.3	(15/2$^+$)	Q
2028.1	(23/2$^-$)	275.3 *4*	13.0 *6*	1752.6	(21/2$^-$)	D
		676.7 *4*	100 *4*	1351.5	(19/2$^-$)	Q
2146.1	(21/2$^+$)	334.9[b] *4*	71 *15*	1810.8	(19/2$^+$)	D
		667.4 *4*	100 *15*	1478.3	(17/2$^+$)	Q
2330.3	(21/2$^+$)	646.9 *4*	100.0	1683.4	(17/2$^+$)	Q
2459.4	(25/2$^-$)	430.9 *4*	57 *3*	2028.1	(23/2$^-$)	D
		706.9 *4*	100 *9*	1752.6	(21/2$^-$)	Q
2492.4	(23/2$^+$)	345.8 *6*	23.0 *24*	2146.1	(21/2$^+$)	D
		682.1 *4*	100 *17*	1810.8	(19/2$^+$)	Q
2540.3	(23/2$^+$)	675.0 *4*	100.0	1865.3	(19/2$^+$)	Q
2714.6	(27/2$^-$)	254.9 *4*	48.6 *15*	2459.4	(25/2$^-$)	D
		686.7 *4*	100 *5*	2028.1	(23/2$^-$)	Q
2746.9		254.8 *6*	100.0	2492.4	(23/2$^+$)	D
2826.6	(25/2$^+$)	333.9 *4*	45 *9*	2492.4	(23/2$^+$)	D
		680.2 *4*	100 *22*	2146.1	(21/2$^+$)	Q
2865.2	(25/2$^+$)	534.9 *4*	100.0	2330.3	(21/2$^+$)	Q
3044.5	(29/2$^-$)	330.1 *4*	92 *4*	2714.6	(27/2$^-$)	D
		585.3 *4*	100 *6*	2459.4	(25/2$^-$)	Q
3058.3	(27/2$^+$)	311.6 *6*	13.1 *14*	2746.9		D
		518.0 *4*	90 *11*	2540.3	(23/2$^+$)	Q
		565.7 *4*	100.0 *14*	2492.4	(23/2$^+$)	Q
3101.9	(27/2$^+$)	274.3 *6*	14.6 *11*	2826.6	(25/2$^+$)	D

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Adopted Levels, Gammas (continued)

$\gamma(^{127}Ce)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[&]
3101.9	(27/2$^+$)	609.9 *4*	100 *9*	2492.4	(23/2$^+$)	Q
3300.9	(31/2$^-$)	255.9 *4*	10.1 *12*	3044.5	(29/2$^-$)	D
		585.9 *4*	100 *6*	2714.6	(27/2$^-$)	Q
3402.1	(29/2$^+$)	300.2 *4*	53 *4*	3101.9	(27/2$^+$)	D
		575.5 *4*	100 *12*	2826.6	(25/2$^+$)	Q
3427.1	(29/2$^+$)	561.9 *4*	100.0	2865.2	(25/2$^+$)	Q
3630.9	(31/2$^+$)	572.6 *4*	100.0	3058.3	(27/2$^+$)	Q
3633.1	(33/2$^-$)	332.0 *4*	1.0×10^2 *6*	3300.9	(31/2$^-$)	D
		589.3 *4*	100 *6*	3044.5	(29/2$^-$)	Q
3713.5	(31/2$^+$)	311.6 *4*	46 *3*	3402.1	(29/2$^+$)	D
		611.7 *4*	100 *8*	3101.9	(27/2$^+$)	Q
3953.8	(35/2$^-$)	321.0 *4*	48.1 *24*	3633.1	(33/2$^-$)	D
		652.4 *4*	100 *6*	3300.9	(31/2$^-$)	Q
4049.6	(33/2$^+$)	336.6 *6*	33 *5*	3713.5	(31/2$^+$)	D
		647.3 *4*	100 *16*	3402.1	(29/2$^+$)	Q
4109.7	(33/2$^+$)	682.6 *4*	100.0	3427.1	(29/2$^+$)	Q
4331.8	(35/2$^+$)	700.9 *4*	100.0	3630.9	(31/2$^+$)	Q
4340.9	(37/2$^-$)	386.6 *4*	42.0 *16*	3953.8	(35/2$^-$)	D
		708.0 *4*	100 *10*	3633.1	(33/2$^-$)	Q
4430.4	(35/2$^+$)	716.9 *4*	100.0	3713.5	(31/2$^+$)	Q
4733.3	(39/2$^-$)	392.8 *4*	18.1 *16*	4340.9	(37/2$^-$)	D
		779.8 *4*	100 *9*	3953.8	(35/2$^-$)	Q
4833.2	(37/2$^+$)	783.6 *4*	100.0	4049.6	(33/2$^+$)	Q
4923.9	(37/2$^+$)	814.2 *4*	100.0	4109.7	(33/2$^+$)	Q
5167.1	(39/2$^+$)	835.3 *4*	100.0	4331.8	(35/2$^+$)	Q
5183.6	(41/2$^-$)	451.0 *4*	44 *4*	4733.3	(39/2$^-$)	D
		842.0 *4*	100 *8*	4340.9	(37/2$^-$)	Q
5251.1	(39/2$^+$)	820.7 *4*	100.0	4430.4	(35/2$^+$)	Q
5641.3	(43/2$^-$)	458.3 *4*	22 *4*	5183.6	(41/2$^-$)	D
		908.0 *4*	100 *11*	4733.3	(39/2$^-$)	Q
5701.8	(41/2$^+$)	868.6 *4*	100.0	4833.2	(37/2$^+$)	Q
5882.1	(41/2$^+$)	958.2 *4*	100.0	4923.9	(37/2$^+$)	Q
6131.2	(43/2$^+$)	964.1 *4*	100.0	5167.1	(39/2$^+$)	Q
6147.8	(43/2$^+$)	896.7 *4*	100.0	5251.1	(39/2$^+$)	Q
6157.8	(45/2$^-$)	516.5 *6*	14 *3*	5641.3	(43/2$^-$)	D
		973.5 *4*	100 *14*	5183.6	(41/2$^-$)	Q
6624.8	(45/2$^+$)	923.0 *4*	100.0	5701.8	(41/2$^+$)	Q
6670.8	(47/2$^-$)	512.4 *4*	13.3 *20*	6157.8	(45/2$^-$)	D
		1030.2 *4*	100 *11*	5641.3	(43/2$^-$)	Q
7099.0	(47/2$^+$)	951.2 *4*	100.0	6147.8	(43/2$^+$)	Q
7259.4	(49/2$^-$)	1101.6 *4*	100.0	6157.8	(45/2$^-$)	Q
7622.6	(49/2$^+$)	997.8 *4*	100.0	6624.8	(45/2$^+$)	Q
7810.7	(51/2$^-$)	1139.9 *4*	100.0	6670.8	(47/2$^-$)	Q
8142.8	(51/2$^+$)	1043.8 *4*	100.0	7099.0	(47/2$^+$)	Q
8482.1	(53/2$^-$)	1222.7 *4*	100.0	7259.4	(49/2$^-$)	Q
8712.5	(53/2$^+$)	1089.9 *6*	100.0	7622.6	(49/2$^+$)	Q
9053.1	(55/2$^-$)	1242.4 *4*	100.0	7810.7	(51/2$^-$)	Q
9819.1	(57/2$^-$)	1337.0 *4*	100.0	8482.1	(53/2$^-$)	Q

[†] From ^{100}Mo(^{32}S,5nγ), except as noted.
[‡] From ^{127}Pr β^+ decay.
[#] Energy from ^{127}Pr β^+ decay, Iγ from ^{100}Mo(^{32}S,5nγ) reaction.
[@] Energy from ^{93}Nb(^{37}Cl,3nγ) reaction, Iγ from ^{100}Mo(^{32}S,5nγ) reaction.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

$\gamma(^{127}Ce)$ (continued)

& The assignments D or Q (most likely E2) are from angular correlation/distribution data in $^{100}Mo(^{32}S,5n\gamma)$ reaction.

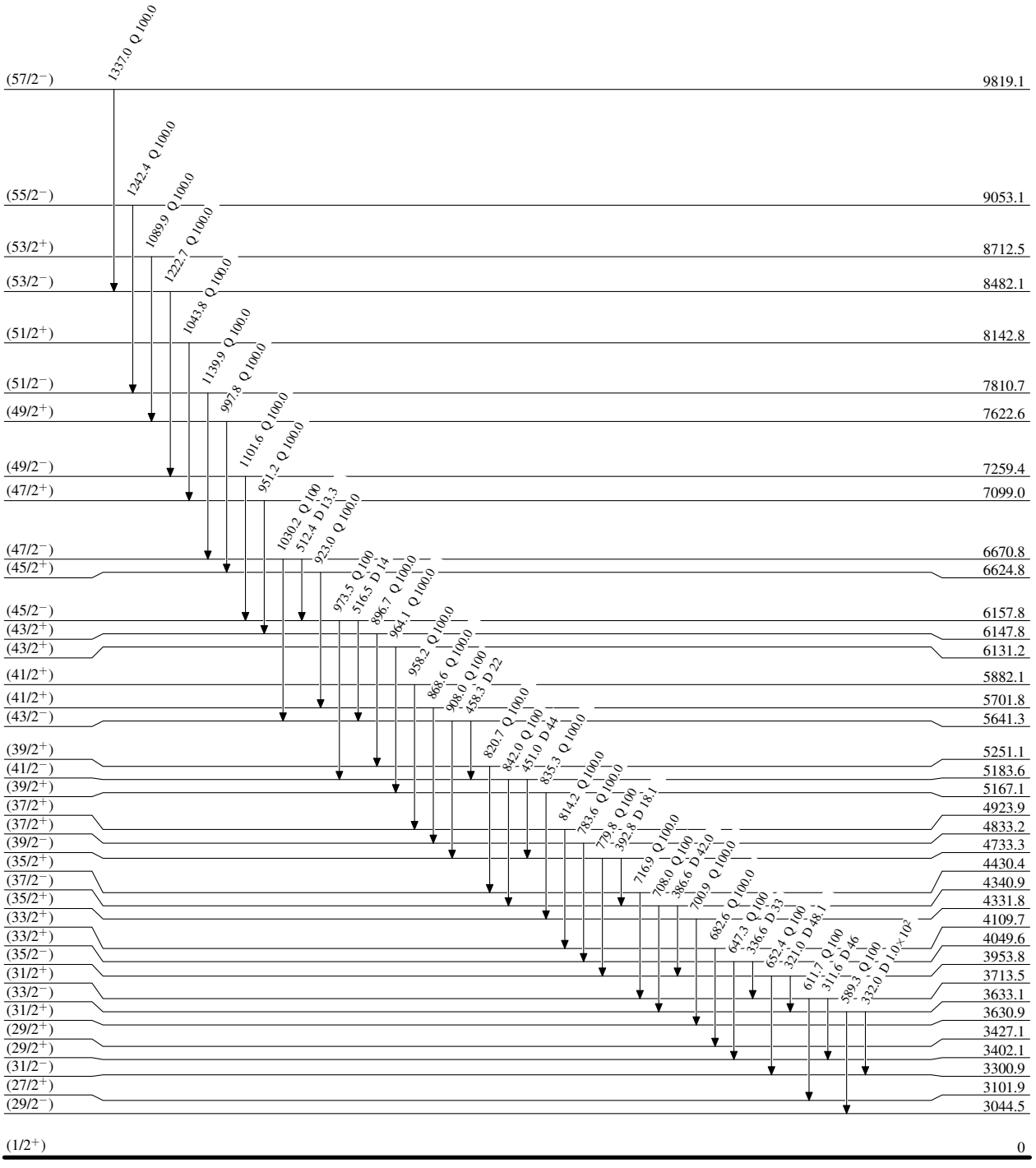
[a] Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

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

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level



$^{127}_{58}Ce_{69}$

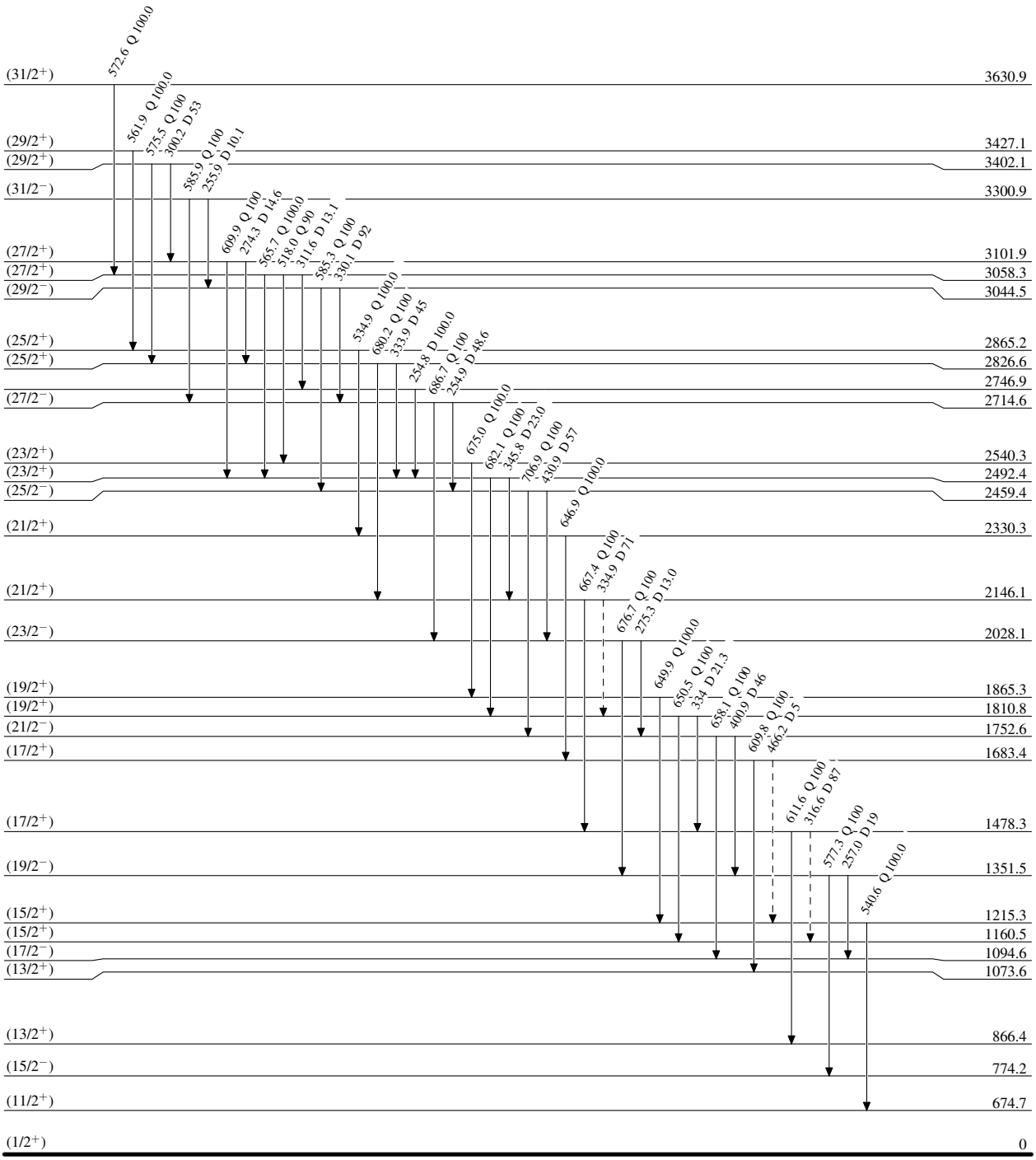
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

- - - - - - ► γ Decay (Uncertain)

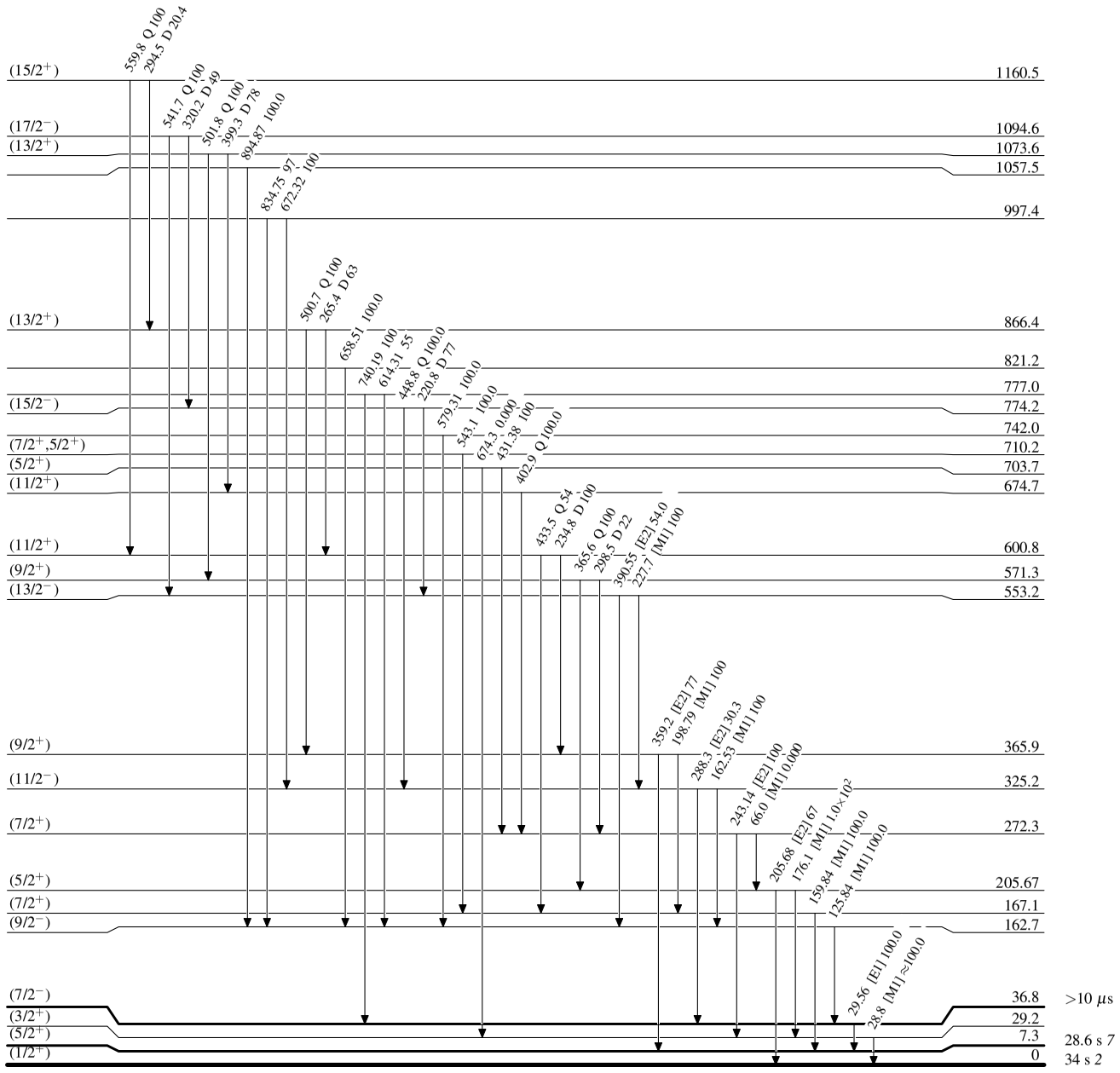


$^{127}_{58}Ce_{69}$

Adopted Levels, Gammas

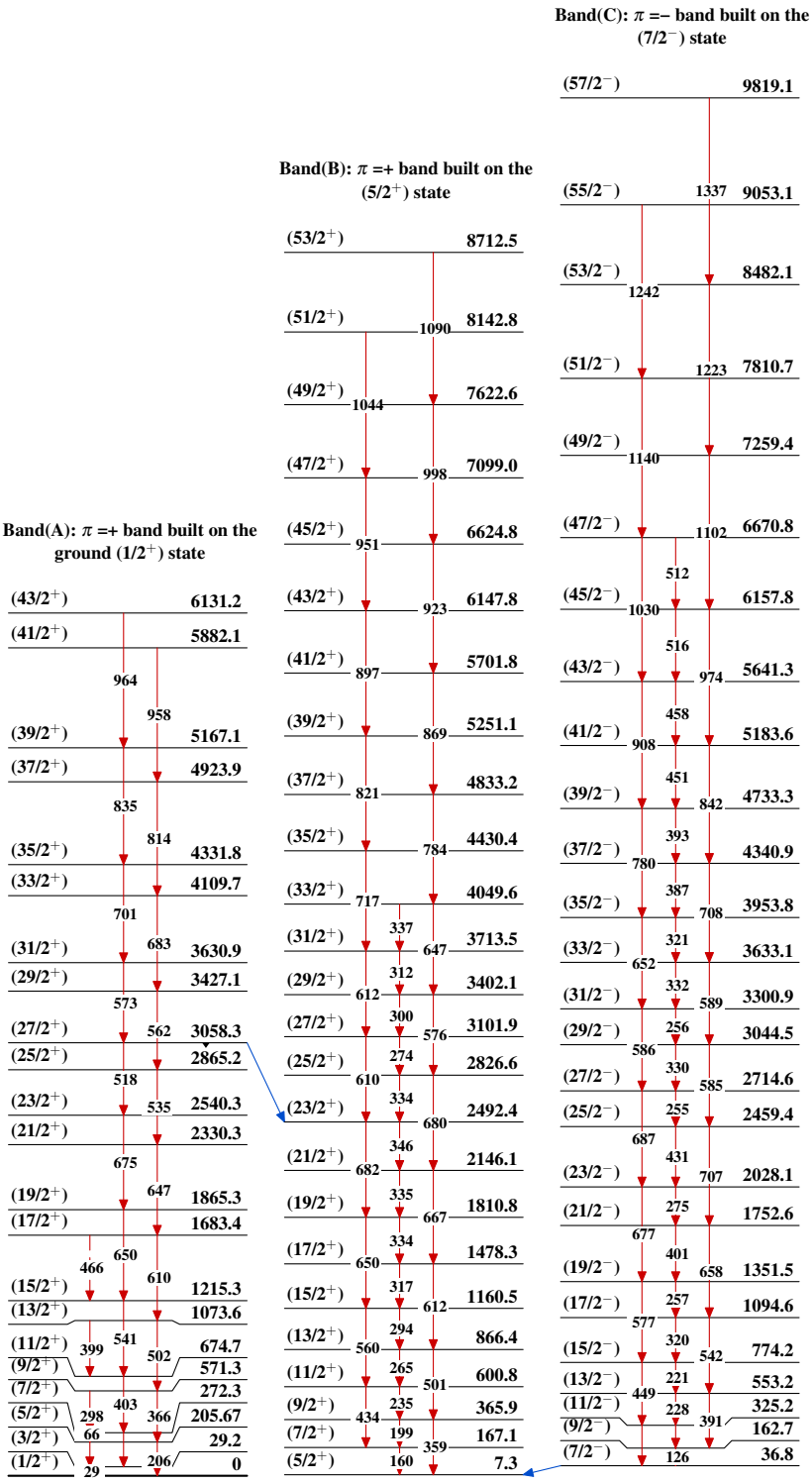
Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{127}_{58}Ce_{69}$

Adopted Levels, Gammas



$^{127}_{58}Ce_{69}$