Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 117, 1 (2014)	1-Oct-2013

Q(β^-)=−5738 *13*; S(n)=8984.1 *12*; S(p)=6013.9 *24*; Q(α)=3271.21 *3* 2012Wa38

Additional information 1.

Other reactions: 1991Fl03: spin dependence of GDR in Gd isotopes.

There are problems in reconciling log *ft* values from ^{148}Tb ε decay (2.20 min) with ΔJ^π of the transitions. More data are needed to clarify these problems.

^{148}Gd Levels

Cross Reference (XREF) Flags

A	^{148}Tb ε decay (60 min)	D	^{148}Gd(p,p′)
B	^{148}Tb ε decay (2.20 min)	E	(HI,xnγ)
C	^{152}Dy α decay	F	(HI,xnγ):SD

E(level)[†]	J$^\pi$[‡]	T$_{1/2}$[#]	XREF	Comments
0.0[@]	0$^+$	71.1 y *12*	ABCDE	%α=100 T$_{1/2}$: weighted average of values (In Y): 74.6 *30* (1981Pr06), and 70.9 *10* (2003Fu10, preliminary result after two year measurement). Others: 97.5 y *65* (1966Fr11), 84 y *9* (1962Si14), see also 1953Ra02.
784.433[@] *15*	2$^+$	4.2 ps *12*	AB DE	J$^\pi$: L(p,p′)=2.
1273.492[&] *18*	3$^-$	34.7 ps *21*	AB DE	J$^\pi$: L(p,p′)=3.
1416.378[@] *20*	4$^+$	8.1 ps *24*	AB DE	J$^\pi$: L(p,p′)=4.
1810.98[@] *7*	6$^+$	178 ps *20*	B DE	J$^\pi$: L(p,p′)=6. log *ft*=6.3 from (9)$^+$ to this level is very low.
1834.59 *5*	2$^+$,3$^+$		A	J$^\pi$: from $\gamma(\theta)$ of oriented nuclei in ε decay (60 min).
1863.445 *24*	2$^+$		A D	J$^\pi$: L(p,p′)=2.
1912.97[&] *6*	4$^-$		AB E	J$^\pi$: γ to 3$^-$ is M1, no γ to 2$^+$.
2082.11[&] *6*	5$^-$	2.6 ps *13*	AB DE	J$^\pi$: L(p,p′)=5.
2188.67 *4*	2$^+$		A D	J$^\pi$: L(p,p′)=2.
2233.60 *4*	3$^-$		A D	J$^\pi$: L(p,p′)=3.
2310.97 *5*	2$^+$		A D	J$^\pi$: L(p,p′)=2.
2424.10 *9*	3$^+$,4$^+$		A	J$^\pi$: from $\gamma(\theta)$ of oriented nuclei in ε decay (60 min); π from M1+E2 γ to 4$^+$, 1416.
2503.70 *6*	(1,2,3)$^-$		A	J$^\pi$: γ to 3$^-$ is E2,M1 and γ to 2$^+$.
2505.80 *4*	3$^-$		A D	J$^\pi$: γ to 4$^+$ is E1; γ to 2$^+$; seen in (p,p′).
2522.04 *11*	4$^+$		A D	J$^\pi$: L(p,p′)=4.
2563.81[&] *9*	7$^-$	21.3 ps *30*	B E	J$^\pi$: γ to 5$^-$ ΔJ=2, E2; γ to 6$^+$ is E1.
2566.82[&] *18*	6$^-$		E	
2614.59 *5*	2$^+$		A D	J$^\pi$: L(p,p′)=2.
2632.65[a] *8*	5$^-$		A DE	J$^\pi$: L(p,p′)=5.
2693.35[@] *10*	8$^+$	13.2 ps *28*	B DE	J$^\pi$: γ to 6$^+$ is ΔJ=2, E2; no γ to J<6.
2694.67[&] *13*	9$^-$	16.6 ns *3*	B E	μ=−0.162 *18* (2005St24,1987Da27) Q=1.01 *5* (2005St24,1982Ha22) J$^\pi$: γ to 7$^-$ is E2, γ to 6$^+$ is E3 (from $\gamma(\theta)$ and RUL). T$_{1/2}$: weighted average of 17.5 ns *10* (1990Pi17), 17.5 ns *10* (1984Lu09), 16.5 *3* (1979Ha15), 17.3 ns *20* (1973Kr10), 16.3 ns *9* (1972HaXQ), and 16.7 ns *9* (1971HaXD). μ: Other: −0.252 *81* (1979Ha15); both 1987Da27 and 1979Ha15 used the time

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Adopted Levels, Gammas (continued)

^{148}Gd Levels (continued)

E(level)[†]	J$^\pi$[‡]	T$_{1/2}$[#]	XREF	Comments
				dependent perturbed angular distribution method. Q: measured by the time dependent perturbed angular distribution method (1982Ha22).
2700.06 *7*	(1$^-$,2$^+$)		A	J$^\pi$: γ to 0$^+$ and 3$^-$.
2763 *3*	4$^+$		D	J$^\pi$: L(p,p′)=4.
2782.60[@] *17*			B E	J$^\pi$=(4$^+$,5,6$^+$) from gammas to 4$^+$ and 6$^+$; not consistent with log *ft*=7.1 or log $f^{1u}t$=8.6 from ^{148}Tb ε decay (2.20 min).
2868.74[@] *20*	(5)$^+$		B DE	
2872.89 *7*	(2$^-$,3,4$^+$)		A	J$^\pi$: gammas to 2$^+$ and 4$^-$.
2886.31 *10*	(2$^+$,3,4$^+$)		A	J$^\pi$: gammas to 2$^+$ and 4$^+$.
2915.50 *8*	3$^-$		A D	J$^\pi$: L(p,p′)=3.
2934.9[@] *5*	(7)$^+$		E	
2936.61[a] *24*	7$^-$	3.8 ps *26*	B DE	
3029.59[&] *13*	8$^-$	52 ps *13*	B E	
3045.7 *3*			B	
3065			A	
3076.12 *24*			A	
3089.70 *8*	(1$^-$,2$^+$)		A	J$^\pi$: gammas to 0$^+$ and 3$^-$.
3128.8 *3*			B	
3130.87 *16*	(1,2$^+$)		A	J$^\pi$: γ to 0$^+$.
3152.48[a] *14*	8$^-$		B E	
3157.0 *3*			B	
3179.7[a] *6*	7$^-$		E	
3295.03 *15*	(1,2$^+$)		A	J$^\pi$: γ to 0$^+$.
3310.4[a] *4*	8$^-$		E	
3357.80 *24*			B	
3367.26[a] *15*	9$^-$	19.1 ps *21*	E	
3478.0 *3*	(8,9)		B	J$^\pi$: log $f^{1u}t$=7.4 in ε decay from (9)$^+$ and γ to 6$^+$.
3502.1 *4*			B	
3574.94 *21*	(1$^-$,2$^+$)		A	J$^\pi$: gammas to 0$^+$ and 3$^-$.
3645.92 *23*	(8$^+$)		B	J$^\pi$: gammas to 6$^+$ and 8$^+$; and log $f^{1u}t$=7.3 in ε decay from (9)$^+$.
3666.6[@] *4*	10$^-$		B E	
3701.48[&] *20*	11$^-$	<5 ps	E	T$_{1/2}$: adopted by evaluator from 1 ps *+4−1* In (HI,xnγ).
3758.24[b] *19*	10$^+$	7.6 ps *10*	B E	
3768.35 *24*			B	
3808.34 *19*	(8$^+$)		B	J$^\pi$: gammas to 6$^+$ and 9$^-$; and log $f^{1u}t$=7.3 in ε decay from (9)$^+$.
3822.4[&] *4*	10$^+$		E	
3868.66 *18*			B	
3918.22[a] *19*	10$^-$	8.9 ps *15*	E	
3980.42[&] *20*	12$^+$	60 ps *5*	E	
3990.51 *20*	(8,9,10)$^+$		B	J$^\pi$: log *ft*=5.9 in ε decay from (9)$^+$.
4051.0 *6*	(2$^+$,3,4$^+$)		A	J$^\pi$: gammas to 2$^+$ and 4$^+$.
4068.22 *25*	(2)		A	J$^\pi$: gammas to 0$^+$ and 4$^-$.
4119.24 *14*	(8)$^+$		B	J$^\pi$: log *ft*=5.2 for ε decay from (9)$^+$; γ to 6$^+$.
4121.47[a] *21*	11$^-$	4.6 ps *34*	E	
4170.25 *20*	(8,9$^-$)		B	J$^\pi$: gammas to 7$^-$ and 9$^-$; and log $f^{1u}t$=7.0 in ε decay from (9)$^+$.
4271.4 *4*			B	
4312.01 *17*	(8,9,10)$^+$		B	J$^\pi$: log *ft*=5.1 for ε decay from (9)$^+$.
4408.90 *16*	(8)$^+$		B	J$^\pi$: log *ft*=5.3 for ε decay from (9)$^+$; and γ to (5)$^+$.
4429.74[a] *23*	12$^-$	12 ps *9*	E	
4500.33[b] *19*	12$^+$	3.9 ps *21*	E	
4542.27 *22*			A	
4551.04[a] *23*	13$^-$	38 ps *6*	E	

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Adopted Levels, Gammas (continued)

^{148}Gd Levels (continued)

E(level)[†]	J^{π}[‡]	$T_{1/2}$[#]	XREF	Comments
4740.6[a] *4*	$13^{(-)}$		E	J^{π}: from (HI,xnγ) (1990Pi17); 13^- from (HI,xnγ) (1990Dr06).
4906.0[a] *3*	14^-	<12 ps	E	$T_{1/2}$: adopted by evaluator from 3 ps *+9−3* In (HI,xnγ).
5025.83[b] *21*	14^+	25 ps *14*	E	
5117.51[a] *25*	15^-	16 ps *8*	E	
5167.8[&] *4*	14^+		E	
5355.57[b] *25*	16^+	184 ps *26*	E	
5438.6 *4*	16		E	
5578.6 *9*			E	
5800.3 *9*			E	
5832.7[b] *3*	18^+		E	
5882.8 *8*	17		E	
5933.7[a] *5*	17		E	
6210.9[c] *4*	17		E	
6268.4 *8*	18		E	
6381.4 *6*	18		E	
6545.6[c] *4*	18^-		E	
6574.9 *6*	19^+		E	
6640.8[c] *3*	19^-		E	
6834.5[b] *4*	20^-	1.5 ns *3*	E	
7051.3 *7*	19^+		E	
7110.3 *8*	20^+		E	
7155.7 *5*	21^-		E	
7274.2 *8*	20^+		E	
7333.6 *9*			E	
7530.8 *7*	21^+		E	
7790.8 *7*	22^+		E	
8004.9 *7*	22^-		E	
8242.9 *9*	22^-		E	
8304.5 *8*	23^-		E	
8309.1 *9*	23^+		E	
8364.0 *7*	23^-		E	
8455.5 *7*	23^-		E	
8609.1 *10*	23		E	
8639.1 *8*	24^-		E	
8832.1 *8*	24		E	
8987.1 *9*	25^-		E	
9243.7 *10*	25^-		E	
9258.8 *9*			E	
9652.7 *11*	26^-		E	
9757.6 *10*	26		E	
9934.3 *13*			E	
9957.3 *12*	26^-		E	
10046.5 *9*	25^-		E	
10063.0 *12*	27		E	
10317.9 *9*	27^-		E	
10474.3 *12*	27		E	
10694.0 *11*	27^-		E	
10760.1 *14*	28		E	
10869.8 *14*	28		E	
11158.4 *11*	28		E	
11185.7 *12*	29		E	
11456.9 *12*	29		E	
11477.9 *12*	29^-		E	
11545.9 *11*	29^-		E	

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Adopted Levels, Gammas (continued)

^{148}Gd Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[#]	XREF	Comments
11587.0 *12*	30		E	
11727.6 *13*	30		E	
12012.8 *16*			E	
12064.1 *13*	30		E	
12138.6 *11*	31^-		E	
12284.9 *12*	30		E	
12381.9 *13*	31		E	
12529.5 *12*	32		E	
12683.2 *13*	33		E	
13039.1 *13*	33		E	
13125.9 *15*	33^-		E	
13147.7 *13*	32		E	
13244.0 *15*			E	
13354.3? *16*			E	
13555.0 *14*	33		E	
13736.0 *13*	34		E	
13869.9 *14*	35	1.5 ns *3*	E	μ=+21 *6* (1989Ha15)
13888.3 *16*	33		E	
13911.5 *17*			E	
14011.3 *17*	34		E	
14145.8 *16*	35		E	
14206.6 *17*	36		E	
14924.4 *17*	36		E	
15165.7? *19*	38		E	
15727.8 *19*	37		E	
16077.6 *22*			E	
16112.1 *19*	38		E	
16204.2? *22*	40	<0.17 ps	E	
16257.4? *22*	40		E	
16406.8 *22*	40		E	
16473.7 *22*	39		E	
17241.0? *24*	40		E	
17320.2? *24*			E	
17370.8 *24*	42		E	
18482 *3*	44	<0.17 ps	E	
19149?	(46)		E	
x[d]	J≈(29)		F	Additional information 2. Jπ: ≈(29) from 699.9γ as a possible J=31 to J=29 transition based on the assignment (1993Ha19) of 652.3γ as a J=29 to J=27 transition. A tentative 652.3γ was reported by 1993Ha19 but is removed by 1995DeZZ. Theoretical analysis by 1993Ra07 suggests J=27, 29; J=25, 27 was proposed (1993Ra07) with the 652.3γ as the lowest energy transition.
699.90+x[d] *10*	J+2		F	
1447.80+x[d] *15*	J+4		F	
2243.61+x[d] *18*	J+6		F	
3090.31+x[d] *20*	J+8		F	
3988.21+x[d] *23*	J+10		F	
4938.51+x[d] *25*	J+12		F	
5942.4+x[d] *3*	J+14		F	
7001.1+x[d] *3*	J+16		F	
8115.3+x[d] *3*	J+18		F	
9285.9+x[d] *4*	J+20		F	
10513.7+x[d] *4*	J+22		F	

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Adopted Levels, Gammas (continued)

^{148}Gd Levels (continued)

E(level)[†]	Jπ[‡]	XREF	Comments
11799.3+x[d] 4	J+24	F	
13143.4+x[d] 4	J+26	F	
14545.9+x[d] 5	J+28	F	
16007.3+x[d] 5	J+30	F	
17527.8+x[d] 6	J+32	F	
19108.3+x[d] 9	J+34	F	
20748.3+x[d] 13	J+36	F	
22448.6+x[d] 15	J+38	F	
y[e]	J1≈(30)	F	Additional information 3. Jπ: ≈(30) from assignment of 789γ as J=34 to 32 transition. Negative parity is suggested by 1993Ha19. 1993Ra07 suggest J=30, 32 (assuming 789γ as the lowest transition).
741.8+y[e] 3	J1+2	F	
1530.7+y[e] 4	J1+4	F	
2369.5+y[e] 5	J1+6	F	
3258.6+y[e] 5	J1+8	F	
4198.4+y[e] 5	J1+10	F	
5188.8+y[e] 6	J1+12	F	
6228.5+y[e] 7	J1+14	F	
7316.3+y[e] 7	J1+16	F	
8451.5+y[e] 7	J1+18	F	
9634.2+y[e] 7	J1+20	F	
10865.4+y[e] 8	J1+22	F	
12146.3+y[e] 8	J1+24	F	
13478.6+y[e] 8	J1+26	F	
14861.9+y[e] 9	J1+28	F	
16299.4+y[e] 10	J1+30	F	
17790.5+y[e] 13	J1+32	F	
19336.7+y[e] 17	J1+34	F	
z[f]	J2	F	Additional information 4.
830.3+z[f] 6	J2+2	F	
1706.0+z[f] 7	J2+4	F	
2631.0+z[f] 7	J2+6	F	
3606.7+z[f] 8	J2+8	F	
4634.2+z[f] 8	J2+10	F	
5713.8+z[f] 9	J2+12	F	
6846.5+z[f] 9	J2+14	F	
8032.4+z[f] 10	J2+16	F	
9271.7+z[f] 10	J2+18	F	
10564.6+z[f] 10	J2+20	F	
11909.1+z[f] 11	J2+22	F	
13304.4+z[f] 12	J2+24	F	
14739.6+z[f] 13	J2+26	F	
16182.2+z[f] 16	J2+28	F	E(level): the ordering of the 1447.7γ-1442.6γ cascade is adopted from 1996De04, based on relative Iγ's. A reverse ordering is proposed by 1995DeZZ.
17629.9+z[f] 17	J2+30	F	
19101.9+z[f] 20	J2+32	F	
u[g]	J3	F	Additional information 5.

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Adopted Levels, Gammas (continued)

^{148}Gd Levels (continued)

E(level)[†]	Jπ[‡]	XREF	Comments
849.7+u[g] 3	J3+2	F	
1739.7+u[g] 4	J3+4	F	
2678.4+u[g] 5	J3+6	F	
3666.8+u[g] 5	J3+8	F	
4706.4+u[g] 6	J3+10	F	
5797.5+u[g] 7	J3+12	F	
6941.7+u[g] 8	J3+14	F	
8139.7+u[g] 8	J3+16	F	
9392.5+u[g] 9	J3+18	F	
10700.6+u[g] 9	J3+20	F	
12065.0+u[g] 10	J3+22	F	
13486.4+u[g] 11	J3+24	F	
14964.9+u[g] 11	J3+26	F	
16501.8+u[g] 15	J3+28	F	
v[h]	J4	F	Additional information 6.
853.7+v[h] 3	J4+2	F	
1753.6+v[h] 4	J4+4	F	
2698.5+v[h] 5	J+6	F	
3689.9+v[h] 5	J4+8	F	
4727.8+v[h] 6	J4+10	F	
5812.4+v[h] 6	J4+12	F	
6944.3+v[h] 7	J4+14	F	
8123.8+v[h] 7	J4+16	F	
9350.3+v[h] 7	J4+18	F	
10624.1+v[h] 7	J4+20	F	
11946.2+v[h] 8	J4+22	F	
13315.9+v[h] 8	J4+24	F	
14733.0+v[h] 9	J4+26	F	
16197.9+v[h] 10	J4+28	F	
17711.0+v[h] 14	J4+30	F	
19273.0+v[h] 17	J4+32	F	
w[i]	J5	F	Additional information 7.
802.2+w[i] 3	J5+2	F	
1651.6+w[i] 4	J5+4	F	
2549.0+w[i] 4	J5+6	F	
3494.9+w[i] 5	J5+8	F	
4491.0+w[i] 5	J5+10	F	
5537.8+w[i] 5	J5+12	F	
6637.2+w[i] 6	J5+14	F	
7789.4+w[i] 6	J5+16	F	
8996.2+w[i] 6	J5+18	F	
10257.2+w[i] 7	J5+20	F	
11573.8+w[i] 7	J5+22	F	
12945.9+w[i] 7	J5+24	F	
14374.4+w[i] 7	J5+26	F	
15859.6+w[i] 8	J5+28	F	
17402.0+w[i] 9	J5+30	F	
r[j]	J6	F	Additional information 8.

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Adopted Levels, Gammas (continued)

^{148}Gd Levels (continued)

E(level)[†]	Jπ[‡]	XREF	Comments
911.8+r[j] 4	J6+2	F	
1873.7+r[j] 5	J6+4	F	
2892.1+r[j] 6	J6+6	F	
3969.0+r[j] 7	J6+8	F	
5101.0+r[j] 8	J6+10	F	
6287.7+r[j] 9	J6+12	F	
7527.4+r[j] 10	J6+14	F	
8817.6+r[j] 10	J6+16	F	
10152.6+r[j] 10	J6+18	F	
11530.7+r[j] 11	J6+20	F	
12956.2+r[j] 12	J6+22	F	
14431.4+r[j] 13	J6+24	F	
15960.3+r[j] 14	J6+26	F	
s[k]	J7	F	Additional information 9.
887.0+s[k] 3	J7+2	F	
1822.4+s[k] 5	J7+4	F	
2812.3+s[k] 7	J7+6	F	
3858.2+s[k] 7	J7+8	F	
4961.4+s[k] 13	J7+10	F	
6120.6+s[k] 13	J7+12	F	
7332.7+s[k] 13	J7+14	F	
8596.7+s[k] 14	J7+16	F	
9908.0+s[k] 14	J7+18	F	
11263.4+s[k] 15	J7+20	F	
12664.9+s[k] 15	J7+22	F	
14115.5+s[k] 16	J7+24	F	
15618.5+s[k] 16	J7+26	F	
t[l]	J8	F	Additional information 10.
868.4+t[l] 3	J8+2	F	
1783.4+t[l] 5	J8+4	F	
2745.6+t[l] 6	J8+6	F	
3755.3+t[l] 6	J8+8	F	
4811.6+t[l] 6	J8+10	F	
5916.5+t[l] 7	J8+12	F	
7069.9+t[l] 7	J8+14	F	
8271.5+t[l] 8	J8+16	F	
9521.3+t[l] 8	J8+18	F	
10818.5+t[l] 8	J8+20	F	
12157.8+t[l] 10	J8+22	F	
13509.8+t[l] 13	J8+24	F	

† From a least-squares fit to Eγ data with ΔEγ=1 keV for Eγ′s with No assigned uncertainty.
‡ Except where noted otherwise, J^π assignments are based on conversion electron and $\gamma(\theta)$ of oriented nuclei from ε decay (60 min), conversion electron data from ε decay (2.20 min), $\gamma\gamma(\theta)$, excitation function, conversion electron and $\gamma\gamma(\theta)$ data from (HI,xnγ). Band designations for normal deformed states are from (HI,xnγ) (1990Pi17).
# From (HI,xnγ), unless indicated otherwise.
@ Band(A): ν^2 states.

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Adopted Levels, Gammas (continued)

^{148}Gd Levels (continued)

& Band(B): ν^2 x octupole states.
a Band(C): ν^2 x $\pi^{+1}\pi^{-1}$ states.
b Band(D): ν^2 x π^2 states.
c Band(E): $\nu^2\pi^2$ x octupole states.
d Band(F): SD-1 band (1995DeZZ,1993Ha19,1988De10). configuration=$\pi6^2$ $\nu(7^1$ 1/2[651],α=−1/2) (1998By02). Q(intrinsic)=14.6 *2* (1996Sa15). Percent population=1.6 *1* (1996De04), 1.30 *15* (1993Ha19), 0.72 *25* (1997Zh03) in ^{124}Sn(^{29}Si,5nγ) E=157 MeV (1996De04,1997Zh03), E=155 MeV (1993Ha19). Other values from 1992Fl02: 1.9 *5* in ^{76}Ge(^{76}Ge,4nγ); 0.8 *2* in ^{124}Sn(^{29}Si,5nγ) and 0.5 *2* in ^{122}Sn(^{30}Si,4nγ).
e Band(G): SD-2 band (1995DeZZ,1993Ha19,1996De04). configuration=$\pi6^2$ $\nu(7^1$ 1/2[651],α=+1/2) (1998By02). Promotion of neutron from 1/2[651],α=−1/2 to 1/2[651],α=+1/2. Q(intrinsic)=14.8 *3* (1996Sa15). Percent population=0.7 *2* (1996De04), 0.62 *20* (1993Ha19).
f Band(H): SD-3 band (1995DeZZ,1996De04). This band reveals a backbend at a rotational frequency of≈0.72 MeV. configuration=$\pi6^2$ ν((1/2[651],α=−1/2)(1/2[651],α=+1/2)) (1998By02). Promotion of neutron from 1/2[770],α=−1/2 to 1/2[651],α=+1/2. Q(intrinsic)=17.8 *13* (1996Sa15). Percent population=0.4 *2* (1996De04), 18% 3 of SD-1 (1995DeZZ).
g Band(I): SD-4 band (1995DeZZ,1996De04). configuration=$\pi6^2$ $\nu(7^1$(1/2[651],α=−1/2)(1/2[651],α=+1/2)) (1998By02). Promotion of neutron from 5/2[642],α=+1/2 to 1/2[651],α=+1/2. Percent population=0.5 *2* (1996De04), 12% 4 of SD-1 band (1995DeZZ).
h Band(J): SD-5 band (1995DeZZ,1996De04). configuration=$\pi(6^4$ 1/2[301]$^{-2}$) $\nu(7^2$(1/2[651],α=−1/2) (1/2[651],α=+1/2)) (1998By02). This involves promotion of two neutrons from 1/2[411] to 7^1 and 1/2[651],α=+1/2 orbitals. Or configuration=$\pi(6^2$(1/2[301],α=−1/2)$^{-1}$(3/2[651],α=+1/2)) $\nu(7^1$ 1/2[651],α=−1/2) (1998By02). This band is identical (in transition energies) to ^{152}Dy SD-1 band. Percent population=0.5 *1* (1996De04), 23% 4 of SD-1 band (1995DeZZ).
i Band(K): SD-6 band (1995DeZZ,1996De04,1997Ha19). configuration=$\pi6^2$ $\nu(7^1$(1/2[651],α=−1/2)(1/2[651],α=+1/2)) (1998By02). Promotion of neutron from 1/2[411],α=+1/2 to 1/2[651],α=+1/2. 1997Ha19 provide evidence for ΔJ=2 staggering of 0.37 keV *12*, and propose that this band is identical to ^{149}Gd SD-1, yrast band. Percent population=0.4 *1* (1996De04), 16% 3 of SD-1 band (1995DeZZ).
j Band(L): SD-7 band (1998By02). configuration=$\pi6^2$ $\nu(7^1$(5/2[402] or 9/2[514])) (1998By02). Promotion of neutron from 1/2[651],α=−1/2 to 5/2[402] or 9/2[514]. Bands SD-7 and SD-8 are probably signature partners. Percent population=5-10% of SD-1 band (1998By02).
k Band(M): SD-8 band (1998By02). configuration=$\pi6^2$ $\nu(7^1$(5/2[402] or 9/2[514])) (1998By02). Promotion of neutron from 1/2[651],α=−1/2 to 5/2[402] or 9/2[514]. Bands SD-7 and SD-8 are probably signature partners. Percent population=5-10% of SD-1 band (1998By02).
l Band(N): SD-9 band (1998By02). Percent population=5-10% of SD-1 band (1998By02).

$\gamma(^{148}Gd)$

E_i(level)	J^π_i	E_γ†	I_γ#	E_f	J^π_f	Mult.‡	δ	α[d]	Comments
784.433	2^+	784.430 *16*	100	0.0	0^+	E2		0.00466	B(E2)(W.u.)=10 *3* α(K)=0.00390 *6*; α(L)=0.000597 *9*; α(M)=0.0001305 *19* α(N)=2.99×10^{-5} *5*; α(O)=4.53×10^{-6} *7*; α(P)=2.69×10^{-7} *4*
1273.492	3^-	489.049 *12*	100@ *2*	784.433	2^+	E1+M2	+0.18 *9*	0.008 *3*	B(E1)(W.u.)=5.7×10^{-5} *4*; B(M2)(W.u.)=4.E+1 *4* α(K)=0.0063 *25*; α(L)=0.0009 *4*; α(M)=0.00020 *9* α(N)=4.6×10^{-5} *21*; α(O)=7.E−6 *4*; α(P)=4.5×10^{-7} *21*
		1273.5	0.87@ *7*	0.0	0^+	[E3]		0.00338	B(E3)(W.u.)=42 *5* α(K)=0.00281 *4*; α(L)=0.000440 *7*; α(M)=9.64×10^{-5} *14* α(N)=2.21×10^{-5} *3*; α(O)=3.37×10^{-6} *5*; α(P)=2.04×10^{-7} *3*; α(IPF)=4.74×10^{-6} *7* E_γ: from (HI,xnγ).
1416.378	4^+	142.878 *14*	2.90 *13*	1273.492	3^-	E1		0.1116	B(E1)(W.u.)=0.00029 *9* α(K)=0.0941 *14*; α(L)=0.01368 *20*; α(M)=0.00296 *5* α(N)=0.000672 *10*; α(O)=9.98×10^{-5} *14*; α(P)=5.53×10^{-6} *8*
		631.947 *17*	100 *2*	784.433	2^+	E2		0.00772	B(E2)(W.u.)=14 *5* α(K)=0.00638 *9*; α(L)=0.001044 *15*; α(M)=0.000230 *4* α(N)=5.25×10^{-5} *8*; α(O)=7.88×10^{-6} *11*; α(P)=4.36×10^{-7} *6*
1810.98	6^+	394.55 *8*	100	1416.378	4^+	E2		0.0267	B(E2)(W.u.)=7.0 *8* α(K)=0.0212 *3*; α(L)=0.00428 *6*; α(M)=0.000959 *14* α(N)=0.000218 *3*; α(O)=3.16×10^{-5} *5*; α(P)=1.386×10^{-6} *20*
1834.59	$2^+,3^+$	1050.15 *4*	100	784.433	2^+	E2+M3		0.00266 *18*	α(K)=0.00225 *15*; α(L)=0.000325 *24*; α(M)=7.1×10^{-5} *6* α(N)=1.62×10^{-5} *12*; α(O)=2.49×10^{-6} *19*; α(P)=1.58×10^{-7} *13* δ: +3 *+4−1* or −0.12 *19* if $J^\pi=2^+$; or +0.31 *12* if $J^\pi=3^+$ from $\gamma(\theta)$ of oriented nuclei in ε decay (60 min). Additional information 11.
1863.445	2^+	589.9 *7*	5.2 *3*	1273.492	3^-				
		1079.025 *25*	100.0 *22*	784.433	2^+	M1+E2	+4.6 *+35−14*	0.00242 *8*	α(K)=0.00205 *7*; α(L)=0.000291 *8*; α(M)=6.31×10^{-5} *17* α(N)=1.45×10^{-5} *4*; α(O)=2.23×10^{-6} *7*; α(P)=1.42×10^{-7} *5*
		1863.39 *4*	49.2 *10*	0.0	0^+				
1912.97	4^-	639.47 *7*	100	1273.492	3^-	M1		0.01362	α(K)=0.01159 *17*; α(L)=0.001595 *23*; α(M)=0.000345 *5* α(N)=7.94×10^{-5} *12*; α(O)=1.236×10^{-5} *18*; α(P)=8.44×10^{-7} *12*
2082.11	5^-	169.2 *1*	4.3	1912.97	4^-				
		271.1 *2*	8.8	1810.98	6^+	E1(+M2)	≤0.23	0.034 *14*	B(E1)(W.u.)>0.00016 α(K)=0.029 *11*; α(L)=0.0045 *21*; α(M)=0.0010 *5* α(N)=0.00022 *11*; α(O)=3.4×10^{-5} *16*; α(P)=2.1×10^{-6} *10*
		666.0 *4*	7.2	1416.378	4^+	E1(+M2)	≤0.34	0.0042 *17*	B(E1)(W.u.)>8.4×10^{-6}

$^{148}_{64}Gd_{84}$-9

γ(^{148}Gd) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[#]	E_f	J^π_f	Mult.[‡]	δ	α[d]	Comments
									α(K)=0.0036 *14*; α(L)=0.00051 *22*; α(M)=0.00011 *5* α(N)=2.5×10^{-5} *11*; α(O)=3.9×10^{-6} *17*; α(P)=2.6×10^{-7} *12*
2082.11	5$^-$	808.7 *1*	100	1273.492	3$^-$	E2		0.00435	B(E2)(W.u.)=11 *6* α(K)=0.00365 *6*; α(L)=0.000554 *8*; α(M)=0.0001210 *17* α(N)=2.77×10^{-5} *4*; α(O)=4.21×10^{-6} *6*; α(P)=2.51×10^{-7} *4*
2188.67	2$^+$	915.30 *12*	14.2 *16*	1273.492	3$^-$				
		1404.22 *4*	100.0 *24*	784.433	2$^+$	M1+E2		0.0018 *4*	α(K)=0.0015 *3*; α(L)=0.00020 *4*; α(M)=4.3×10^{-5} *8* α(N)=9.9×10^{-6} *18*; α(O)=1.5×10^{-6} *3*; α(P)=1.04×10^{-7} *22*; α(IPF)=4.7×10^{-5} *3* δ: +2.0 *+10−7* or +0.04 *+19−14* from $\gamma(\theta)$ of oriented nuclei in ε decay (60 min).
		2188.65 *7*	80 *3*	0.0	0$^+$				
2233.60	3$^-$	960.09 *7*	100 *9*	1273.492	3$^-$	M1+E2		0.0040 *11*	α(K)=0.0034 *9*; α(L)=0.00048 *11*; α(M)=0.000103 *23* α(N)=2.4×10^{-5} *6*; α(O)=3.7×10^{-6} *9*; α(P)=2.4×10^{-7} *7* δ: +0.02 *+21−14* or +1.3 *+4−5* from $\gamma(\theta)$ of oriented nuclei in ε decay (60 min).
		1449.16 *4*	84 *3*	784.433	2$^+$	E1(+M2)	+0.09 *10*	0.00078 *10*	α(K)=0.00053 *9*; α(L)=6.8×10^{-5} *13*; α(M)=1.5×10^{-5} *3* α(N)=3.4×10^{-6} *7*; α(O)=5.2×10^{-7} *10*; α(P)=3.6×10^{-8} *7*; α(IPF)=0.000167 *5* δ: from $\gamma(\theta)$ of oriented nuclei in ε decay (60 min).
2310.97	2$^+$	1526.45 *7*	55.0 *22*	784.433	2$^+$	M1+E2		0.0015 *3*	α(K)=0.00123 *22*; α(L)=0.00017 *3*; α(M)=3.6×10^{-5} *6* α(N)=8.2×10^{-6} *14*; α(O)=1.28×10^{-6} *23*; α(P)=8.7×10^{-8} *17*; α(IPF)=8.9×10^{-5} *6* δ: +2.4 *+22−10* or −0.0 *2* from $\gamma(\theta)$ of oriented nuclei in ε decay (60 min).
		2311.03 *7*	100 *3*	0.0	0$^+$				
2424.10	3$^+$,4$^+$	1007.72 *9*	100 *9*	1416.378	4$^+$	M1+E2		0.0036 *9*	α(K)=0.0031 *8*; α(L)=0.00042 *10*; α(M)=9.2×10^{-5} *21* α(N)=2.1×10^{-5} *5*; α(O)=3.3×10^{-6} *8*; α(P)=2.2×10^{-7} *6* δ: −1.2 *8* if J^π=3$^+$; +0.6 *8* if J^π=4$^+$ from $\gamma(\theta)$ of oriented nuclei in ε decay (60 min).
		1639.66 *22*	65 *9*	784.433	2$^+$				
2503.70	(1,2,3)$^-$	1230.18 *5*	56.6 *23*	1273.492	3$^-$	E2,M1		0.0023 *5*	α(K)=0.0020 *5*; α(L)=0.00027 *6*; α(M)=5.8×10^{-5} *12* α(N)=1.3×10^{-5} *3*; α(O)=2.1×10^{-6} *5*; α(P)=1.4×10^{-7} *4*; α(IPF)=9.6×10^{-6} *6* Mult.: from internal conversion and $\gamma(\theta)$ data in ε decay (60 min).
		1719.63 *20*	100 *6*	784.433	2$^+$				
2505.80	3$^-$	1089.41 *3*	100.0 *22*	1416.378	4$^+$	E1		9.69×10^{-4}	α(K)=0.000832 *12*; α(L)=0.0001082 *16*; α(M)=2.32×10^{-5} *4*

$^{148}_{64}$Gd$_{84}$-10

$\gamma(^{148}Gd)$ (continued)

E_i(level)	J_i^π	E_γ †	I_γ #	E_f	J_f^π	Mult. ‡	δ	α d	Comments
									α(N)=5.33×10^{-6} *8*; α(O)=8.27×10^{-7} *12*; α(P)=5.60×10^{-8} *8* Mult.: from internal conversion and $\gamma(\theta)$ data in ε decay (60 min).
2505.80	3⁻	1722.5 *3*	15 *4*	784.433	2⁺				
2522.04	4⁺	1105.65 *11*	100 *5*	1416.378	4⁺	M1+E2		0.0029 *7*	α(K)=0.0025 *6*; α(L)=0.00034 *8*; α(M)=7.4×10^{-5} *16* α(N)=1.7×10^{-5} *4*; α(O)=2.6×10^{-6} *6*; α(P)=1.8×10^{-7} *5*; α(IPF)=3.89×10^{-7} *22* δ: −0.18 *20* or +1.5 *+10−6* from $\gamma(\theta)$ of oriented nuclei in ε decay (60 min).
		1248.2 *8*	33 *8*	1273.492	3⁻				
		1737.9 *6*	27 *5*	784.433	2⁺				
2563.81	7⁻	481.65 *10*	100	2082.11	5⁻	E2		0.01541	B(E2)(W.u.)=13.0 *19* α(K)=0.01249 *18*; α(L)=0.00228 *4*; α(M)=0.000506 *7* α(N)=0.0001152 *17*; α(O)=1.699×10^{-5} *24*; α(P)=8.34×10^{-7} *12*
		752.8 *2*	68	1810.98	6⁺	E1		0.00197	B(E1)(W.u.)=1.07×10^{-5} *15* α(K)=0.001687 *24*; α(L)=0.000223 *4*; α(M)=4.80×10^{-5} *7* α(N)=1.100×10^{-5} *16*; α(O)=1.699×10^{-6} *24*; α(P)=1.127×10^{-7} *16* I_γ: from (HI,xnγ).
2566.82	6⁻	484.8 *2*		2082.11	5⁻	M1		0.0274	α(K)=0.0232 *4*; α(L)=0.00323 *5*; α(M)=0.000699 *10* α(N)=0.0001610 *23*; α(O)=2.51×10^{-5} *4*; α(P)=1.702×10^{-6} *24*
		653.6 *5*		1912.97	4⁻	E2		0.00712	α(K)=0.00590 *9*; α(L)=0.000954 *14*; α(M)=0.000210 *3* α(N)=4.79×10^{-5} *7*; α(O)=7.20×10^{-6} *11*; α(P)=4.03×10^{-7} *6*
		755.6 *4*		1810.98	6⁺				
2614.59	2⁺	1342.2 *6*	9 *4*	1273.492	3⁻				
		1830.14 *4*	100 *6*	784.433	2⁺	M1+E2		0.00120 *16*	α(K)=0.00084 *12*; α(L)=0.000112 *16*; α(M)=2.4×10^{-5} *4* α(N)=5.5×10^{-6} *8*; α(O)=8.6×10^{-7} *13*; α(P)=5.9×10^{-8} *10*; α(IPF)=0.000223 *16* δ: +2.5 *+14−8* or −0.03 *5* from $\gamma(\theta)$ of oriented nuclei in ε decay (60 min).
		2614.3 *6*	38 *3*	0.0	0⁺				
2632.65	5⁻	820.3 *4*		1810.98	6⁺	E1(+M2)	≤0.34	0.0026 *10*	α(K)=0.0022 *8*; α(L)=0.00030 *12*; α(M)=7.E−5 *3* α(N)=1.5×10^{-5} *6*; α(O)=2.3×10^{-6} *10*; α(P)=1.6×10^{-7} *6*
		1215.2 *4*		1416.378	4⁺	E1(+M2)	≤0.37	0.0012 *4*	α(K)=0.0010 *3*; α(L)=0.00013 *5*; α(M)=2.9×10^{-5} *10* α(N)=6.6×10^{-6} *23*; α(O)=1.0×10^{-6} *4*; α(P)=7.0×10^{-8} *24*; α(IPF)=2.95×10^{-5} *19*
		1357.8 *4*		1273.492	3⁻				
		1848.36 *8*		784.433	2⁺				
2693.35	8⁺	129.5 *2*	3.4	2563.81	7⁻	E1		0.1454	B(E1)(W.u.)=0.00028 *6* α(K)=0.1225 *18*; α(L)=0.0180 *3*; α(M)=0.00389 *6* α(N)=0.000882 *13*; α(O)=0.0001305 *19*; α(P)=7.10×10^{-6} *11*
		882.41 *8*	100	1810.98	6⁺	E2		0.00359	B(E2)(W.u.)=1.7 *4* α(K)=0.00302 *5*; α(L)=0.000449 *7*; α(M)=9.79×10^{-5} *14* α(N)=2.24×10^{-5} *4*; α(O)=3.42×10^{-6} *5*; α(P)=2.09×10^{-7} *3*

$^{148}_{64}Gd_{84}$-11

Adopted Levels, Gammas (continued)

$\gamma(^{148}$Gd) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[#]	E_f	J^π_f	Mult.[‡]	δ	α[d]	Comments
2694.67	9^-	130.8 *3*	100.0[@] *16*	2563.81	7^-	E2		0.956 *16*	B(E2)(W.u.)=7.31 *25* α(K)=0.550 *9*; α(L)=0.314 *6*; α(M)=0.0735 *13* α(N)=0.0164 *3*; α(O)=0.00219 *4*; α(P)=2.86×10^{-5} *5* I_γ: other: I(130.8γ)/I(883.6γ)=0.67 *8* from comparison of measured $T_{1/2}$ and presented B(E3)(W.u.)(883.6γ) (1984Lu09).
		883.6 *3*	66.0[@] *16*	1810.98	6^+	E3		0.00802	B(E3)(W.u.)=33.6 *12* α(K)=0.00650 *10*; α(L)=0.001186 *17*; α(M)=0.000264 *4* α(N)=6.04×10^{-5} *9*; α(O)=9.02×10^{-6} *13*; α(P)=4.76×10^{-7} *7* Additional information 12.
2700.06	$(1^-,2^+)$	1426.49 *8*	43 *3*	1273.492	3^-				
		1915.54 *19*	63 *4*	784.433	2^+	M1+E2	+0.8 *6*	0.00119 *10*	α(K)=0.00078 *8*; α(L)=0.000104 *10*; α(M)=2.25×10^{-5} *21* α(N)=5.2×10^{-6} *5*; α(O)=8.1×10^{-7} *8*; α(P)=5.6×10^{-8} *6*; α(IPF)=0.000269 *13* δ: from γ(θ) in ε decay (60 min).
		2700.57 *20*	100 *4*	0.0	0^+				
2782.60		971.7 *3*	68	1810.98	6^+				
		1366.4 *3*	100	1416.378	4^+				
2868.74	$(5)^+$	1057.7 *3*	100	1810.98	6^+	M1,E2		0.0032 *8*	α(K)=0.0027 *7*; α(L)=0.00038 *9*; α(M)=8.2×10^{-5} *18* α(N)=1.9×10^{-5} *4*; α(O)=2.9×10^{-6} *7*; α(P)=1.9×10^{-7} *6*
2872.89	$(2^-,3,4^+)$	960.09[e] *7*	100 *9*	1912.97	4^-				
		1599.39 *6*	100 *3*	1273.492	3^-				
		2089 *1*	41 *6*	784.433	2^+				
2886.31	$(2^+,3,4^+)$	382.0 *8*	24 *12*	2503.70	$(1,2,3)^-$				
		1470.1 *8*	20 *8*	1416.378	4^+				
		2101.87 *10*	100 *8*	784.433	2^+				
2915.50	3^-	1002.48 *9*	27.7 *17*	1912.97	4^-	M1,E2		0.0036 *9*	α(K)=0.0031 *8*; α(L)=0.00043 *10*; α(M)=9.3×10^{-5} *21* α(N)=2.1×10^{-5} *5*; α(O)=3.3×10^{-6} *8*; α(P)=2.2×10^{-7} *6*
		1641.98 *21*	37 *5*	1273.492	3^-				
		2131.14 *11*	100 *3*	784.433	2^+	E1+M2	−0.19 *7*	0.00101 *3*	α(K)=0.00031 *4*; α(L)=4.0×10^{-5} *5*; α(M)=8.6×10^{-6} *11* α(N)=1.97×10^{-6} *24*; α(O)=3.1×10^{-7} *4*; α(P)=2.1×10^{-8} *3*; α(IPF)=0.000650 *16*
2934.9	$(7)^+$	241.5 *5*	100	2693.35	8^+	M1		0.171	α(K)=0.1449 *22*; α(L)=0.0206 *4*; α(M)=0.00447 *7* α(N)=0.001028 *16*; α(O)=0.0001597 *25*; α(P)=1.073×10^{-5} *17*
2936.61	7^-	1125.6 *3*	100	1810.98	6^+	E1(+M2)	≤0.14	0.00099 *8*	B(E1)(W.u.)>1.4×10^{-5}; B(M2)(W.u.)<5.2 α(K)=0.00084 *7*; α(L)=0.000111 *9*; α(M)=2.38×10^{-5} *20* α(N)=5.5×10^{-6} *5*; α(O)=8.5×10^{-7} *7*; α(P)=5.7×10^{-8} *5*; α(IPF)=4.33×10^{-6} *9*

$^{148}_{64}$Gd$_{84}$-12

$\gamma(^{148}Gd)$ (continued)

E_i(level)	J^{π}_i	E_γ†	I_γ#	E_f	J^{π}_f	Mult.‡	δ	α[d]	Comments
3029.59	8⁻	334.9 *2*	63	2694.67	9⁻	M1		0.0714	B(M1)(W.u.)=0.0042 *11* α(K)=0.0606 *9*; α(L)=0.00852 *12*; α(M)=0.00185 *3* α(N)=0.000425 *6*; α(O)=6.61×10⁻⁵ *10*; α(P)=4.46×10⁻⁶ *7*
		465.8 *2*	100	2563.81	7⁻	M1		0.0303	B(M1)(W.u.)=0.0025 *7* α(K)=0.0257 *4*; α(L)=0.00358 *5*; α(M)=0.000776 *11* α(N)=0.000179 *3*; α(O)=2.78×10⁻⁵ *4*; α(P)=1.89×10⁻⁶ *3*
3045.7		1234.7 *3*	100	1810.98	6⁺				
3065		1230[e]	100	1834.59	2⁺,3⁺				
3076.12		1802.62 *24*	100	1273.492	3⁻				
3089.70	(1⁻,2⁺)	1007.72 *9*	100 *9*	2082.11	5⁻				
		1816.06 *9*	69 *4*	1273.492	3⁻				
		3090.5 *15*	25 *8*	0.0	0⁺				
3128.8		1317.8 *3*	100	1810.98	6⁺				
3130.87	(1,2⁺)	2345.1 *8*	63 *9*	784.433	2⁺				
		3130.89 *16*	100 *7*	0.0	0⁺				
3152.48	8⁻	122.9 *1*	75	3029.59	8⁻				
		457.9 *3*	100	2694.67	9⁻				
		588.6 *3*	95	2563.81	7⁻	M1		0.01675	α(K)=0.01424 *20*; α(L)=0.00197 *3*; α(M)=0.000425 *6* α(N)=9.79×10⁻⁵ *14*; α(O)=1.525×10⁻⁵ *22*; α(P)=1.039×10⁻⁶ *15*
3157.0		1346.0 *3*	100	1810.98	6⁺				
3179.7	7⁻	243.1 *5*	100	2936.61	7⁻	M1		0.168	α(K)=0.1423 *22*; α(L)=0.0202 *3*; α(M)=0.00439 *7* α(N)=0.001010 *16*; α(O)=0.0001569 *24*; α(P)=1.054×10⁻⁵ *16*
3295.03	(1,2⁺)	2510.56 *15*	100 *8*	784.433	2⁺				
		3295.5 *10*	33 *11*	0.0	0⁺				
3310.4	8⁻	280.6 *5*		3029.59	8⁻				
		373.8 *3*		2936.61	7⁻	M1		0.0535	α(K)=0.0454 *7*; α(L)=0.00637 *9*; α(M)=0.001380 *20* α(N)=0.000318 *5*; α(O)=4.94×10⁻⁵ *7*; α(P)=3.34×10⁻⁶ *5*
3357.80		1546.9 *3*	100	1810.98	6⁺				
3367.26	9⁻	57		3310.4	8⁻				E_γ,I_γ: measured by 2003Po02 which give I(γ+ce) branching=5.8%.
		214.8 *1*	48	3152.48	8⁻	M1		0.235	B(M1)(W.u.)=0.0186 *21* α(K)=0.199 *3*; α(L)=0.0284 *4*; α(M)=0.00616 *9* α(N)=0.001419 *20*; α(O)=0.000220 *3*; α(P)=1.478×10⁻⁵ *21*
		337.7 *3*	57	3029.59	8⁻	M1		0.0699	B(M1)(W.u.)=0.0057 *7* α(K)=0.0592 *9*; α(L)=0.00833 *12*; α(M)=0.00181 *3* α(N)=0.000416 *6*; α(O)=6.46×10⁻⁵ *10*; α(P)=4.37×10⁻⁶ *7*
		430.5 *4*	34	2936.61	7⁻				
		673.9 *3*	100	2693.35	8⁺	E1(+M2)	≤0.41	0.0047 *23*	B(E1)(W.u.)>1.0×10⁻⁵; B(M2)(W.u.)<22 α(K)=0.0040 *19*; α(L)=0.0006 *3*; α(M)=0.00012 *7* α(N)=2.9×10⁻⁵ *15*; α(O)=4.4×10⁻⁶ *23*; α(P)=2.9×10⁻⁷ *15*
		803.4	46	2563.81	7⁻				
3478.0	(8,9)	1667.0 *3*	100	1810.98	6⁺				
3502.1		938.3 *3*	100	2563.81	7⁻				
3574.94	(1⁻,2⁺)	2301.44 *21*	100 *10*	1273.492	3⁻				

$^{148}_{64}Gd_{84}$-13

γ(^{148}Gd) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[#]	E_f	J_f^π	Mult.[‡]	δ	α[d]	Comments
3574.94	(1$^-$,2$^+$)	3574.6 *10*	90 *13*	0.0	0$^+$				
3645.92	(8$^+$)	952.7 *3*	25	2693.35	8$^+$				
		1834.8 *3*	100	1810.98	6$^+$				
3666.6	10$^-$	971.9 *3*	100	2694.67	9$^-$	M1		0.00490	α(K)=0.00417 *6*; α(L)=0.000566 *8*; α(M)=0.0001223 *18* α(N)=2.82×10^{-5} *4*; α(O)=4.39×10^{-6} *7*; α(P)=3.02×10^{-7} *5*
3701.48	11$^-$	1006.8 *2*	100	2694.67	9$^-$	E2		0.00271	B(E2)(W.u.)>2.3 α(K)=0.00229 *4*; α(L)=0.000331 *5*; α(M)=7.20×10^{-5} *10* α(N)=1.650×10^{-5} *24*; α(O)=2.53×10^{-6} *4*; α(P)=1.587×10^{-7} *23*
3758.24	10$^+$	1063.6 *2*	100	2694.67	9$^-$	E1(+M2)	≤0.18	0.00115 *14*	B(E1)(W.u.)>2.2×10^{-5}; B(M2)(W.u.)<3.8 α(K)=0.00098 *12*; α(L)=0.000130 *17*; α(M)=2.8×10^{-5} *4* α(N)=6.4×10^{-6} *9*; α(O)=1.00×10^{-6} *14*; α(P)=6.7×10^{-8} *9*
3768.35		1957.2 *3*	100	1810.98	6$^+$				
3808.34	(8$^+$)	1113.7 *3*	39	2694.67	9$^-$				
		1115.0 *3*	50	2693.35	8$^+$				
		1997.3 *3*	100	1810.98	6$^+$				
3822.4	10$^+$	1127.5	100	2694.67	9$^-$				
		1129.1	29	2693.35	8$^+$				
3868.66		1174.0 *3*	100	2694.67	9$^-$				
		1175.4 *3*	28	2693.35	8$^+$				
3918.22	10$^-$	551.0 *2*	27	3367.26	9$^-$				
		765.7 *2*	100	3152.48	8$^-$	E2		0.00492	B(E2)(W.u.)=2.6 *5* α(K)=0.00411 *6*; α(L)=0.000634 *9*; α(M)=0.0001387 *20* α(N)=3.17×10^{-5} *5*; α(O)=4.81×10^{-6} *7*; α(P)=2.83×10^{-7} *4*
		888.6 *3*	73	3029.59	8$^-$				
3980.42	12$^+$	278.9 *2*	100.0[@] *2*	3701.48	11$^-$	E1(+M2)	≤0.19	0.028 *9*	B(E1)(W.u.)>0.00016; B(M2)(W.u.)<3.9×10^2 α(K)=0.023 *7*; α(L)=0.0035 *13*; α(M)=0.0008 *3* α(N)=0.00018 *7*; α(O)=2.7×10^{-5} *10*; α(P)=1.7×10^{-6} *7*
		1285.6 *5*	2.7[@] *2*	2694.67	9$^-$	E3		0.00331	B(E3)(W.u.)=69 *8* α(K)=0.00276 *4*; α(L)=0.000429 *6*; α(M)=9.41×10^{-5} *14* α(N)=2.16×10^{-5} *3*; α(O)=3.29×10^{-6} *5*; α(P)=2.00×10^{-7} *3*; α(IPF)=5.48×10^{-6} *9* Additional information 13.
3990.51	(8,9,10)$^+$	1208.2 *3*	87	2782.60					
		1295.5 *3*	17	2694.67	9$^-$				
		1297.2 *3*	100	2693.35	8$^+$				
4051.0	(2$^+$,3,4$^+$)	2634.6 *10*	39 *10*	1416.378	4$^+$				
		2777.5 *10*	≈20	1273.492	3$^-$				
		3266.4 *10*	100 *61*	784.433	2$^+$				
4068.22	(2)	2155.33 *25*	100 *16*	1912.97	4$^-$				
		2794.6 *10*	51 *11*	1273.492	3$^-$				
		4066.8 *10*	43 *11*	0.0	0$^+$				
4119.24	(8)$^+$	1089.7 *3*	13.0	3029.59	8$^-$				

$^{148}_{64}$Gd$_{84}$-14

$\gamma(^{148}Gd)$ (continued)

E_i(level)	J^π_i	E_γ†	I_γ#	E_f	J^π_f	Mult.‡	αd	Comments
4119.24	(8)+	1250.5 3	8.7	2868.74	(5)+			
		1336.6 3	13.0	2782.60				
		1424.6 3	21.7	2694.67	9−			
		1425.9 3	100	2693.35	8+			
		1555.4 3	19.1	2563.81	7−			
		2308.2 3	23.5	1810.98	6+			
4121.47	11−	420.6 5	5.4	3701.48	11−			
		754.2 2	100	3367.26	9−	E2	0.00509	B(E2)(W.u.)≈11 α(K)=0.00425 6; α(L)=0.000658 10; α(M)=0.0001441 21 α(N)=3.30×10⁻⁵ 5; α(O)=4.99×10⁻⁶ 7; α(P)=2.93×10⁻⁷ 4
4170.25	(8,9−)	1475.6 3	100	2694.67	9−			
		1476.9 3	80	2693.35	8+			
		1606.4 3	33	2563.81	7−			
4271.4		1578.0 3	100	2693.35	8+			
4312.01	(8,9,10)+	443.4 3	4.4	3868.66				
		954.3 3	22.2	3357.80				
		1282.3 3	23.3	3029.59	8−			
		1618.7 3	100	2693.35	8+			
		1748.1 3	50	2563.81	7−			
4408.90	(8)+	540.3 3	8.9	3868.66				
		640.4 3	23.2	3768.35				
		1540.1 3	7.1	2868.74	(5)+			
		1714.3 3	28.6	2694.67	9−			
		1715.7 3	100	2693.35	8+			
		1845.0 3	37.5	2563.81	7−			
4429.74	12−	308.4 2	100	4121.47	11−	M1	0.0888	B(M1)(W.u.)=0.029 22 α(K)=0.0753 11; α(L)=0.01062 15; α(M)=0.00230 4 α(N)=0.000530 8; α(O)=8.24×10⁻⁵ 12; α(P)=5.56×10⁻⁶ 8
		511.6	88	3918.22	10−			
		727.9 5	20	3701.48	11−			
4500.33	12+	519.9 1	100	3980.42	12+	E2	0.01260	B(E2)(W.u.)=40 22 α(K)=0.01028 15; α(L)=0.00181 3; α(M)=0.000401 6 α(N)=9.15×10⁻⁵ 13; α(O)=1.356×10⁻⁵ 19; α(P)=6.92×10⁻⁷ 10
		677.9 3	17	3822.4	10+	E2	0.00653	B(E2)(W.u.)=1.8 10 α(K)=0.00542 8; α(L)=0.000866 13; α(M)=0.000190 3 α(N)=4.35×10⁻⁵ 7; α(O)=6.55×10⁻⁶ 10; α(P)=3.71×10⁻⁷ 6
		742.1 1	76	3758.24	10+	E2	0.00529	B(E2)(W.u.)=5 3 α(K)=0.00441 7; α(L)=0.000686 10; α(M)=0.0001501 21 α(N)=3.43×10⁻⁵ 5; α(O)=5.20×10⁻⁶ 8; α(P)=3.03×10⁻⁷ 5
		798.9	9	3701.48	11−			
4542.27		3125.4 3	47 6	1416.378	4+			
		3269.2 3	100 8	1273.492	3−			
4551.04	13−	121.3 1	100	4429.74	12−			

γ(^{148}Gd) (continued)

E_i(level)	J^π_i	E_γ†	I_γ#	E_f	J^π_f	Mult.‡	α d	Comments
4551.04	13⁻	429.5 3	73	4121.47	11⁻			
		571.0	30	3980.42	12⁺			
4740.6	13(−)	311.0 4	100	4429.74	12⁻	D		
4906.0	14⁻	355.0 2	100	4551.04	13⁻			
5025.83	14⁺	285.5 5	5	4740.6	13(−)			
		475.3 5	13	4551.04	13⁻	D		
		525.5 1	100	4500.33	12⁺	E2	0.01225	B(E2)(W.u.)=10 6 α(K)=0.01001 14; α(L)=0.001756 25; α(M)=0.000389 6 α(N)=8.86×10^{-5} 13; α(O)=1.315×10^{-5} 19; α(P)=6.74×10^{-7} 10
		1045.3 3	7	3980.42	12⁺			
5117.51	15⁻	211.5 2	78	4906.0	14⁻	D		
		566.4 2	100	4551.04	13⁻	E2	0.01012	B(E2)(W.u.)=7 4 α(K)=0.00831 12; α(L)=0.001415 20; α(M)=0.000312 5 α(N)=7.13×10^{-5} 10; α(O)=1.063×10^{-5} 15; α(P)=5.63×10^{-7} 8
5167.8	14⁺	1187.4 3	100	3980.42	12⁺			
5355.57	16⁺	238.0 2	13	5117.51	15⁻	D		
		329.8 2	100	5025.83	14⁺			
5438.6	16	321.1 3	100	5117.51	15⁻			
		532.1	16	4906.0	14⁻			
5578.6		410.8	100	5167.8	14⁺			
5800.3		221.8	100	5578.6				
5832.7	18⁺	477.1 1	100	5355.57	16⁺	E2	0.01580	α(K)=0.01280 18; α(L)=0.00234 4; α(M)=0.000521 8 α(N)=0.0001186 17; α(O)=1.748×10^{-5} 25; α(P)=8.54×10^{-7} 12
5882.8	17	444.3	100	5438.6	16			
5933.7	17	133.4	≈15	5800.3				
		495.1 6	100	5438.6	16	D		
		578.3	39	5355.57	16⁺			
		816.0	36	5117.51	15⁻			
6210.9	17	378.4	25	5832.7	18⁺	D		
		855.3 3	100	5355.57	16⁺			
6268.4	18	435.6	100	5832.7	18⁺			
6381.4	18	447.7	100	5933.7	17			
		498.7	43	5882.8	17			
		548.8	36	5832.7	18⁺			
6545.6	18⁻	334.7 3	100	6210.9	17	D		
		612.1	9	5933.7	17			
6574.9	19⁺	193.4	62	6381.4	18	D		
		306.3	27	6268.4	18			
		742.1	100	5832.7	18⁺			
6640.8	19⁻	808.1 2	100	5832.7	18⁺	D		
6834.5	20⁻	193.7 2	63	6640.8	19⁻	D		
		259.4	13	6574.9	19⁺	D		
		288.9 2	41	6545.6	18⁻	E2	0.0677	B(E2)(W.u.)=0.96 20

$^{148}_{64}$Gd$_{84}$-16

γ(^{148}Gd) (continued)

E_i(level)	J^π_i	E_γ†	I_γ#	E_f	J^π_f	Mult.‡	αd	Comments
								α(K)=0.0514 *8*; α(L)=0.01266 *18*; α(M)=0.00287 *4* α(N)=0.000649 *10*; α(O)=9.19×10^{-5} *13*; α(P)=3.19×10^{-6} *5*
6834.5	20⁻	1001.9 *3*	100	5832.7	18⁺			
7051.3	19⁺	670.0	100	6381.4	18	D		
		1218.6	55	5832.7	18⁺			
7110.3	20⁺	1277.5	100	5832.7	18⁺			
7155.7	21⁻	321.1 *3*	100	6834.5	20⁻	D		
		515.7	8	6640.8	19⁻	E2	0.01287	α(K)=0.01049 *15*; α(L)=0.00186 *3*; α(M)=0.000411 *6* α(N)=9.37×10^{-5} *14*; α(O)=1.389×10^{-5} *20*; α(P)=7.05×10^{-7} *10*
7274.2	20⁺	223.0	14	7051.3	19⁺			
		699.3	100	6574.9	19⁺			
7333.6		758.7	100	6574.9	19⁺			
7530.8	21⁺	197.2	28	7333.6				
		256.7	100	7274.2	20⁺	D		
		420.4	7	7110.3	20⁺			
		479.4	9	7051.3	19⁺			
7790.8	22⁺	260.0	100	7530.8	21⁺	D		
		680.5	9	7110.3	20⁺	E2	0.00647	α(K)=0.00537 *8*; α(L)=0.000857 *12*; α(M)=0.000188 *3* α(N)=4.30×10^{-5} *6*; α(O)=6.48×10^{-6} *9*; α(P)=3.68×10^{-7} *6*
8004.9	22⁻	849.2	7	7155.7	21⁻			
		1170.5	100	6834.5	20⁻	E2	0.00200	α(K)=0.001690 *24*; α(L)=0.000238 *4*; α(M)=5.15×10^{-5} *8* α(N)=1.183×10^{-5} *17*; α(O)=1.82×10^{-6} *3*; α(P)=1.172×10^{-7} *17*; α(IPF)=2.88×10^{-6} *4*
8242.9	22⁻	1408.4	100	6834.5	20⁻			
8304.5	23⁻	1148.8	100	7155.7	21⁻			
8309.1	23⁺	518.2	100	7790.8	22⁺	D		
8364.0	23⁻	573.5	5	7790.8	22⁺			
		1208.2	100	7155.7	21⁻	E2	0.00188	α(K)=0.001587 *23*; α(L)=0.000222 *4*; α(M)=4.81×10^{-5} *7* α(N)=1.105×10^{-5} *16*; α(O)=1.702×10^{-6} *24*; α(P)=1.101×10^{-7} *16*; α(IPF)=6.42×10^{-6} *9*
8455.5	23⁻	151.1	21	8304.5	23⁻			
		212.7	32	8242.9	22⁻			
		450.6	73	8004.9	22⁻			
		664.6	100	7790.8	22⁺	D		
8609.1	23	818.2	100	7790.8	22⁺			
8639.1	24⁻	183.6	100	8455.5	23⁻	D		
		330	31	8309.1	23⁺			
		634.3	76	8004.9	22⁻			
8832.1	24	222.9	45	8609.1	23			
		376.7	17	8455.5	23⁻	D		
		468.2	12	8364.0	23⁻			
		522.8	100	8309.1	23⁺	D		
8987.1	25⁻	155.0	65	8832.1	24			
		348.0	79	8639.1	24⁻			

$^{148}_{64}Gd_{84}$-17

$\gamma(^{148}Gd)$ (continued)

E_i(level)	J^π_i	E_γ†	I_γ#	E_f	J^π_f	Mult.‡	α d	Comments
8987.1	25⁻	623.0	100	8364.0	23⁻	E2	0.00799	α(K)=0.00660 *10*; α(L)=0.001086 *16*; α(M)=0.000239 *4* α(N)=5.46×10⁻⁵ *8*; α(O)=8.18×10⁻⁶ *12*; α(P)=4.50×10⁻⁷ *7*
9243.7	25⁻	604.5	100	8639.1	24⁻			
9258.8		619.6	100	8639.1	24⁻			
		895	84	8364.0	23⁻			
9652.7	26⁻	665.7	100	8987.1	25⁻			
9757.6	26	513.9	54	9243.7	25⁻	D		
		770.7	100	8987.1	25⁻	D		
9934.3		1102.2	100	8832.1	24			
9957.3	26⁻	713.7	100	9243.7	25⁻			
10046.5	25⁻	787.9	24	9258.8				
		1682.4	100	8364.0	23⁻			
		1741.8	8	8304.5	23⁻			
10063.0	27	305.3	100	9757.6	26	D		
10317.9	27⁻	271.5	100	10046.5	25⁻	E2	0.0822	α(K)=0.0618 *9*; α(L)=0.01592 *23*; α(M)=0.00362 *5* α(N)=0.000818 *12*; α(O)=0.0001152 *17*; α(P)=3.79×10⁻⁶ *6*
		360.6	13	9957.3	26⁻	D		
		560.5	10	9757.6	26			
		665	12	9652.7	26⁻			
		1330.6	8	8987.1	25⁻			
10474.3	27	716.6	100	9757.6	26			
10694.0	27⁻	1041.5	100	9652.7	26⁻			
10760.1	28	697	100	10063.0	27			
10869.8	28	807	100	10063.0	27			
11158.4	28	464.5	12	10694.0	27⁻			
		684.1	19	10474.3	27			
		840.4	100	10317.9	27⁻	D		
11185.7	29	1122.6	100	10063.0	27	E2	0.00217	α(K)=0.00184 *3*; α(L)=0.000260 *4*; α(M)=5.65×10⁻⁵ *8* α(N)=1.295×10⁻⁵ *19*; α(O)=1.99×10⁻⁶ *3*; α(P)=1.273×10⁻⁷ *18*; α(IPF)=6.88×10⁻⁷ *10*
11456.9	29	271.1	22	11185.7	29			
		298.5	100	11158.4	28	D		
11477.9	29⁻	1160.0	100	10317.9	27⁻	E2	0.00203	α(K)=0.001720 *24*; α(L)=0.000243 *4*; α(M)=5.26×10⁻⁵ *8* α(N)=1.206×10⁻⁵ *17*; α(O)=1.86×10⁻⁶ *3*; α(P)=1.193×10⁻⁷ *17*; α(IPF)=2.19×10⁻⁶ *3*
11545.9	29⁻	851.9	76	10694.0	27⁻			
		1227.9	100	10317.9	27⁻	E2	0.00182	α(K)=0.001537 *22*; α(L)=0.000215 *3*; α(M)=4.65×10⁻⁵ *7* α(N)=1.068×10⁻⁵ *15*; α(O)=1.645×10⁻⁶ *23*; α(P)=1.066×10⁻⁷ *15*; α(IPF)=8.84×10⁻⁶ *13*
11587.0	30	130.1	100	11456.9	29			
11727.6	30	541.9	78	11185.7	29			
		858.0	74	10869.8	28			
		967.4	100	10760.1	28			
12012.8		555.9	100	11456.9	29			
12064.1	30	878.4	100	11185.7	29			
12138.6	31⁻	74.5		12064.1	30			

$^{148}_{64}Gd_{84}$-18

$\gamma(^{148}Gd)$ (continued)

E_i(level)	J^π_i	E_γ†	I_γ#	E_f	J^π_f	Mult.‡	α[d]	Comments
12138.6	31⁻	411.0	39	11727.6	30	D		
		551.8	14	11587.0	30			
		592.7	100	11545.9	29⁻	E2	0.00903	α(K)=0.00744 *11*; α(L)=0.001245 *18*; α(M)=0.000275 *4* α(N)=6.27×10^{-5} *9*; α(O)=9.37×10^{-6} *14*; α(P)=5.06×10^{-7} *7*
		660.7	48	11477.9	29⁻	E2	0.00694	α(K)=0.00575 *8*; α(L)=0.000927 *13*; α(M)=0.000204 *3* α(N)=4.65×10^{-5} *7*; α(O)=7.00×10^{-6} *10*; α(P)=3.93×10^{-7} *6*
12284.9	30	828.0	42	11456.9	29	D		
		1126.5	100	11158.4	28			
12381.9	31	925.0	100	11456.9	29			
12529.5	32	244.5	10	12284.9	30			
		390.9	100	12138.6	31⁻	D		
		942.6	19	11587.0	30			
12683.2	33	1096.0	100	11587.0	30			
13039.1	33	355.8	6	12683.2	33			
		509.7	100	12529.5	32	D		
		657.2	27	12381.9	31			
13125.9	33⁻	987.3	100	12138.6	31⁻			
13147.7	32	464.2	40	12683.2	33			
		765.8	100	12381.9	31			
		1009.3	60	12138.6	31⁻			
13244.0		561.0	100	12683.2	33			
13354.3?		824.8	100	12529.5	32			
13555.0	33	1025.6	100	12529.5	32			
13736.0	34	181.0	8	13555.0	33	D		
		492.1	5	13244.0				
		588.3	20	13147.7	32			
		696.7	100	13039.1	33	D		
13869.9	35	134.0	100	13736.0	34	D		
		1340.3	19	12529.5	32			
13888.3	33	849.2	100	13039.1	33			
13911.5		41.6	100	13869.9	35			
14011.3	34	972.2	100	13039.1	33			
14145.8	35	1106.7	100	13039.1	33	E2	0.00223	α(K)=0.00189 *3*; α(L)=0.000269 *4*; α(M)=5.83×10^{-5} *9* α(N)=1.336×10^{-5} *19*; α(O)=2.05×10^{-6} *3*; α(P)=1.310×10^{-7} *19*; α(IPF)=3.83×10^{-7} *6*
14206.6	36	295.1	14	13911.5				
		336.7	100	13869.9	35	D		
14924.4	36	778.6	100	14145.8	35			
		1036.1	27	13888.3	33			
15165.7?	38	959.1	100	14206.6	36	E2	0.00301	α(K)=0.00253 *4*; α(L)=0.000370 *6*; α(M)=8.05×10^{-5} *12* α(N)=1.84×10^{-5} *3*; α(O)=2.82×10^{-6} *4*; α(P)=1.753×10^{-7} *25*
15727.8	37	803.4	100	14924.4	36			
16077.6		349.8	100	15727.8	37			
16112.1	38	1187.7	100	14924.4	36			

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Adopted Levels, Gammas (continued)

$\gamma(^{148}Gd)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[#]	E_f	J_f^π
16204.2?	40	1038.5	100	15165.7?	38
16257.4?	40	1091.7	100	15165.7?	38
16406.8	40	294.7	100	16112.1	38
16473.7	39	1308.0	100	15165.7?	38
17241.0?	40	834.2	100	16406.8	40
17320.2?		846.5	100	16473.7	39
17370.8	42	964.0	100	16406.8	40
18482	44	1110.9	100	17370.8	42
19149?	(46)	667[e]	100	18482	44
699.90+x	J+2	699.9 *1*	0.54[&] *15*	x	J≈(29)
1447.80+x	J+4	747.9 *1*	0.87[&] *9*	699.90+x	J+2
2243.61+x	J+6	795.8 *1*	0.99[&] *8*	1447.80+x	J+4
3090.31+x	J+8	846.7 *1*	0.97[&] *8*	2243.61+x	J+6
3988.21+x	J+10	897.9 *1*	1.00[&] *8*	3090.31+x	J+8
4938.51+x	J+12	950.3 *1*	0.97[&] *8*	3988.21+x	J+10
5942.4+x	J+14	1003.9 *1*	1.00[&] *10*	4938.51+x	J+12
7001.1+x	J+16	1058.7 *1*	0.98[&] *9*	5942.4+x	J+14
8115.3+x	J+18	1114.2 *1*	0.99[&] *10*	7001.1+x	J+16
9285.9+x	J+20	1170.6 *1*	1.00[&] *15*	8115.3+x	J+18
10513.7+x	J+22	1227.8 *1*	0.84[&] *7*	9285.9+x	J+20
11799.3+x	J+24	1285.6 *1*	0.71[&] *8*	10513.7+x	J+22
13143.4+x	J+26	1344.0 *2*	0.66[&] *7*	11799.3+x	J+24
14545.9+x	J+28	1402.5 *2*	0.55[&] *6*	13143.4+x	J+26
16007.3+x	J+30	1461.4 *2*	0.48[&] *7*	14545.9+x	J+28
17527.8+x	J+32	1520.5 *3*	0.34[&] *5*	16007.3+x	J+30
19108.3+x	J+34	1580.5 *6*	0.19[&] *3*	17527.8+x	J+32
20748.3+x	J+36	1640.0 *10*	0.15[&] *5*	19108.3+x	J+34
22448.6+x	J+38	1700.3 *6*	0.07[&] *3*	20748.3+x	J+36
741.8+y	J1+2	741.8[a] *3*		y	J1≈(30)
1530.7+y	J1+4	788.9 *2*	0.46[&] *10*	741.8+y	J1+2
2369.5+y	J1+6	838.8 *2*	0.88[&] *9*	1530.7+y	J1+4
3258.6+y	J1+8	889.1 *2*	0.89[&] *9*	2369.5+y	J1+6
4198.4+y	J1+10	939.8 *2*	0.93[&] *15*	3258.6+y	J1+8
5188.8+y	J1+12	990.4 *3*	1.00[&] *11*	4198.4+y	J1+10
6228.5+y	J1+14	1039.7 *2*	0.95[&] *20*	5188.8+y	J1+12
7316.3+y	J1+16	1087.8 *2*	1.03[&] *15*	6228.5+y	J1+14
8451.5+y	J1+18	1135.2 *2*	0.94[&] *10*	7316.3+y	J1+16

E_i(level)	J_i^π	E_γ[†]	I_γ[#]	E_f	J_f^π
9634.2+y	J1+20	1182.7 *2*	0.82[&] *8*	8451.5+y	J1+18
10865.4+y	J1+22	1231.2 *2*	0.79[&] *8*	9634.2+y	J1+20
12146.3+y	J1+24	1280.9 *2*	0.77[&] *8*	10865.4+y	J1+22
13478.6+y	J1+26	1332.2 *2*	0.62[&] *7*	12146.3+y	J1+24
14861.9+y	J1+28	1383.3 *3*	0.56[&] *6*	13478.6+y	J1+26
16299.4+y	J1+30	1437.5 *5*	0.44[&] *5*	14861.9+y	J1+28
17790.5+y	J1+32	1491.1 *8*	0.27[&] *4*	16299.4+y	J1+30
19336.7+y	J1+34	1546.2 *10*	0.23[&] *4*	17790.5+y	J1+32
830.3+z	J2+2	830.3[b] *6*	0.23[&b] *5*	z	J2
1706.0+z	J2+4	875.7 *3*	0.42[&] *6*	830.3+z	J2+2
2631.0+z	J2+6	925.0 *2*	0.43[&] *7*	1706.0+z	J2+4
3606.7+z	J2+8	975.7 *3*	0.62[&] *7*	2631.0+z	J2+6
4634.2+z	J2+10	1027.5 *2*	0.63[&] *8*	3606.7+z	J2+8
5713.8+z	J2+12	1079.6 *3*	0.95[&] *11*	4634.2+z	J2+10
6846.5+z	J2+14	1132.7 *2*	1.00[&] *12*	5713.8+z	J2+12
8032.4+z	J2+16	1185.9 *3*	0.93[&] *30*	6846.5+z	J2+14
9271.7+z	J2+18	1239.3 *3*	0.72[&] *15*	8032.4+z	J2+16
10564.6+z	J2+20	1292.9 *3*	0.95[&] *20*	9271.7+z	J2+18
11909.1+z	J2+22	1344.5 *3*	0.71[&] *18*	10564.6+z	J2+20
13304.4+z	J2+24	1395.2 *4*	0.64[&] *15*	11909.1+z	J2+22
14739.6+z	J2+26	1435.2 *5*	0.46[&] *8*	13304.4+z	J2+24
16182.2+z	J2+28	1442.6 *10*	0.40[&] *12*	14739.6+z	J2+26
17629.9+z	J2+30	1447.7 *6*	0.18[&] *9*	16182.2+z	J2+28
19101.9+z	J2+32	1472.0 *10*	0.22[&] *8*	17629.9+z	J2+30
849.7+u	J3+2	849.7[a] *3*		u	J3
1739.7+u	J3+4	890.0 *2*	0.62[&] *15*	849.7+u	J3+2
2678.4+u	J3+6	938.7 *2*	0.60[&] *12*	1739.7+u	J3+4
3666.8+u	J3+8	988.4 *3*	0.64[&] *10*	2678.4+u	J3+6
4706.4+u	J3+10	1039.6 *3*	0.68[&] *10*	3666.8+u	J3+8
5797.5+u	J3+12	1091.1 *3*	0.92[&] *15*	4706.4+u	J3+10
6941.7+u	J3+14	1144.2 *3*	1.05[&] *20*	5797.5+u	J3+12
8139.7+u	J3+16	1198.0 *3*	1.00[&] *15*	6941.7+u	J3+14
9392.5+u	J3+18	1252.8 *3*	1.02[&] *13*	8139.7+u	J3+16
10700.6+u	J3+20	1308.1 *3*	0.88[&] *15*	9392.5+u	J3+18
12065.0+u	J3+22	1364.4 *3*	0.90[&] *18*	10700.6+u	J3+20
13486.4+u	J3+24	1421.3 *4*	0.82[&] *10*	12065.0+u	J3+22
14964.9+u	J3+26	1478.5 *4*	0.57[&] *9*	13486.4+u	J3+24

$\gamma(^{148}Gd)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[#]	E_f	J^π_f
16501.8+u	J3+28	1536.9 *10*	0.30[&] *10*	14964.9+u	J3+26
853.7+v	J4+2	853.7 *3*	0.45[&] *6*	v	J4
1753.6+v	J4+4	899.9 *2*	0.83[&] *9*	853.7+v	J4+2
2698.5+v	J+6	944.9 *3*	0.85[&] *10*	1753.6+v	J4+4
3689.9+v	J4+8	991.4 *2*	0.86[&] *10*	2698.5+v	J+6
4727.8+v	J4+10	1037.9 *2*	0.85[&] *20*	3689.9+v	J4+8
5812.4+v	J4+12	1084.6 *2*	1.00[&] *15*	4727.8+v	J4+10
6944.3+v	J4+14	1131.9 *2*	1.00[&] *13*	5812.4+v	J4+12
8123.8+v	J4+16	1179.5 *2*	0.90[&] *10*	6944.3+v	J4+14
9350.3+v	J4+18	1226.5 *2*	0.80[&] *10*	8123.8+v	J4+16
10624.1+v	J4+20	1273.8 *2*	0.80[&] *10*	9350.3+v	J4+18
11946.2+v	J4+22	1322.1 *2*	0.52[&] *8*	10624.1+v	J4+20
13315.9+v	J4+24	1369.6 *2*	0.50[&] *10*	11946.2+v	J4+22
14733.0+v	J4+26	1417.1 *3*	0.44[&] *7*	13315.9+v	J4+24
16197.9+v	J4+28	1464.9 *4*	0.31[&] *5*	14733.0+v	J4+26
17711.0+v	J4+30	1513.1 *10*	0.26[&] *4*	16197.9+v	J4+28
19273.0+v	J4+32	1562[b] *1*	0.20[&b] *6*	17711.0+v	J4+30
802.2+w	J5+2	802.2[c] *3*		w	J5
1651.6+w	J5+4	849.44 *22*		802.2+w	J5+2
2549.0+w	J5+6	897.40 *16*	0.91[&] *12*	1651.6+w	J5+4
3494.9+w	J5+8	945.86 *15*	1.00[&] *12*	2549.0+w	J5+6
4491.0+w	J5+10	996.08 *19*	1.00[&] *22*	3494.9+w	J5+8
5537.8+w	J5+12	1046.83 *14*	1.00[&] *10*	4491.0+w	J5+10
6637.2+w	J5+14	1099.39 *16*	0.95[&] *18*	5537.8+w	J5+12
7789.4+w	J5+16	1152.20 *15*	0.97[&] *10*	6637.2+w	J5+14
8996.2+w	J5+18	1206.76 *24*	1.00[&] *15*	7789.4+w	J5+16
10257.2+w	J5+20	1261.00 *16*	1.00[&] *19*	8996.2+w	J5+18
11573.8+w	J5+22	1316.57 *14*	0.96[&] *10*	10257.2+w	J5+20
12945.9+w	J5+24	1372.10 *22*	0.78[&] *9*	11573.8+w	J5+22
14374.4+w	J5+26	1428.55 *24*	0.77[&] *10*	12945.9+w	J5+24
15859.6+w	J5+28	1485.15 *26*	0.70[&] *15*	14374.4+w	J5+26
17402.0+w	J5+30	1542.4 *4*	0.63[&] *15*	15859.6+w	J5+28
911.8+r	J6+2	911.8 *4*		r	J6
1873.7+r	J6+4	961.9 *3*		911.8+r	J6+2
2892.1+r	J6+6	1018.4 *3*		1873.7+r	J6+4

E_i(level)	J^π_i	E_γ[†]	E_f	J^π_f
3969.0+r	J6+8	1076.9 *3*	2892.1+r	J6+6
5101.0+r	J6+10	1132.0 *4*	3969.0+r	J6+8
6287.7+r	J6+12	1186.7 *3*	5101.0+r	J6+10
7527.4+r	J6+14	1239.7 *4*	6287.7+r	J6+12
8817.6+r	J6+16	1290.2 *3*	7527.4+r	J6+14
10152.6+r	J6+18	1335.0 *3*	8817.6+r	J6+16
11530.7+r	J6+20	1378.1 *4*	10152.6+r	J6+18
12956.2+r	J6+22	1425.4 *4*	11530.7+r	J6+20
14431.4+r	J6+24	1475.2 *4*	12956.2+r	J6+22
15960.3+r	J6+26	1528.9 *5*	14431.4+r	J6+24
887.0+s	J7+2	887.0 *3*	s	J7
1822.4+s	J7+4	935.4 *4*	887.0+s	J7+2
2812.3+s	J7+6	989.9 *4*	1822.4+s	J7+4
3858.2+s	J7+8	1045.9 *3*	2812.3+s	J7+6
4961.4+s	J7+10	1103.2 *10*	3858.2+s	J7+8
6120.6+s	J7+12	1159.2 *3*	4961.4+s	J7+10
7332.7+s	J7+14	1212.1 *3*	6120.6+s	J7+12
8596.7+s	J7+16	1264.0 *3*	7332.7+s	J7+14
9908.0+s	J7+18	1311.3 *3*	8596.7+s	J7+16
11263.4+s	J7+20	1355.4 *4*	9908.0+s	J7+18
12664.9+s	J7+22	1401.4 *4*	11263.4+s	J7+20
14115.5+s	J7+24	1450.6 *4*	12664.9+s	J7+22
15618.5+s	J7+26	1503.0 *5*	14115.5+s	J7+24
868.4+t	J8+2	868.4 *3*	t	J8
1783.4+t	J8+4	915.0 *3*	868.4+t	J8+2
2745.6+t	J8+6	962.2 *3*	1783.4+t	J8+4
3755.3+t	J8+8	1009.7 *2*	2745.6+t	J8+6
4811.6+t	J8+10	1056.3 *2*	3755.3+t	J8+8
5916.5+t	J8+12	1104.9 *2*	4811.6+t	J8+10
7069.9+t	J8+14	1153.4 *2*	5916.5+t	J8+12
8271.5+t	J8+16	1201.6 *3*	7069.9+t	J8+14
9521.3+t	J8+18	1249.8 *2*	8271.5+t	J8+16
10818.5+t	J8+20	1297.2 *3*	9521.3+t	J8+18
12157.8+t	J8+22	1339.3 *6*	10818.5+t	J8+20
13509.8+t	J8+24	1351.9 *7*	12157.8+t	J8+22

γ(^{148}Gd) (continued)

[†] From ε decay, (HI,xnγ), and (HI,xnγ):SD.

[‡] Except where noted otherwise, mult assignments are based on conversion electron and $\gamma(\theta)$ of oriented nuclei from ε decay (60 min), conversion electron data from ε decay (2.20 min), $\gamma\gamma$ (θ), excitation function, conversion electron and $\gamma\gamma(\theta)$ data from (HI,xnγ).

[#] Relative photon branching from each level for gammas from normal deformed states as opposed to relative intensity within each SD band.

[@] Branching ratio from (HI,xnγ) (2000Po13).

[&] Relative intensity within each SD band, normalized to$\approx$1 for the most intense transition in that band.

[a] γ not reported by 1996De04.

[b] From 1996De04 only.

[c] From 1995DeZZ. γ not reported by 1996De04 and 1997Ha19.

[d] Additional information 14.

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

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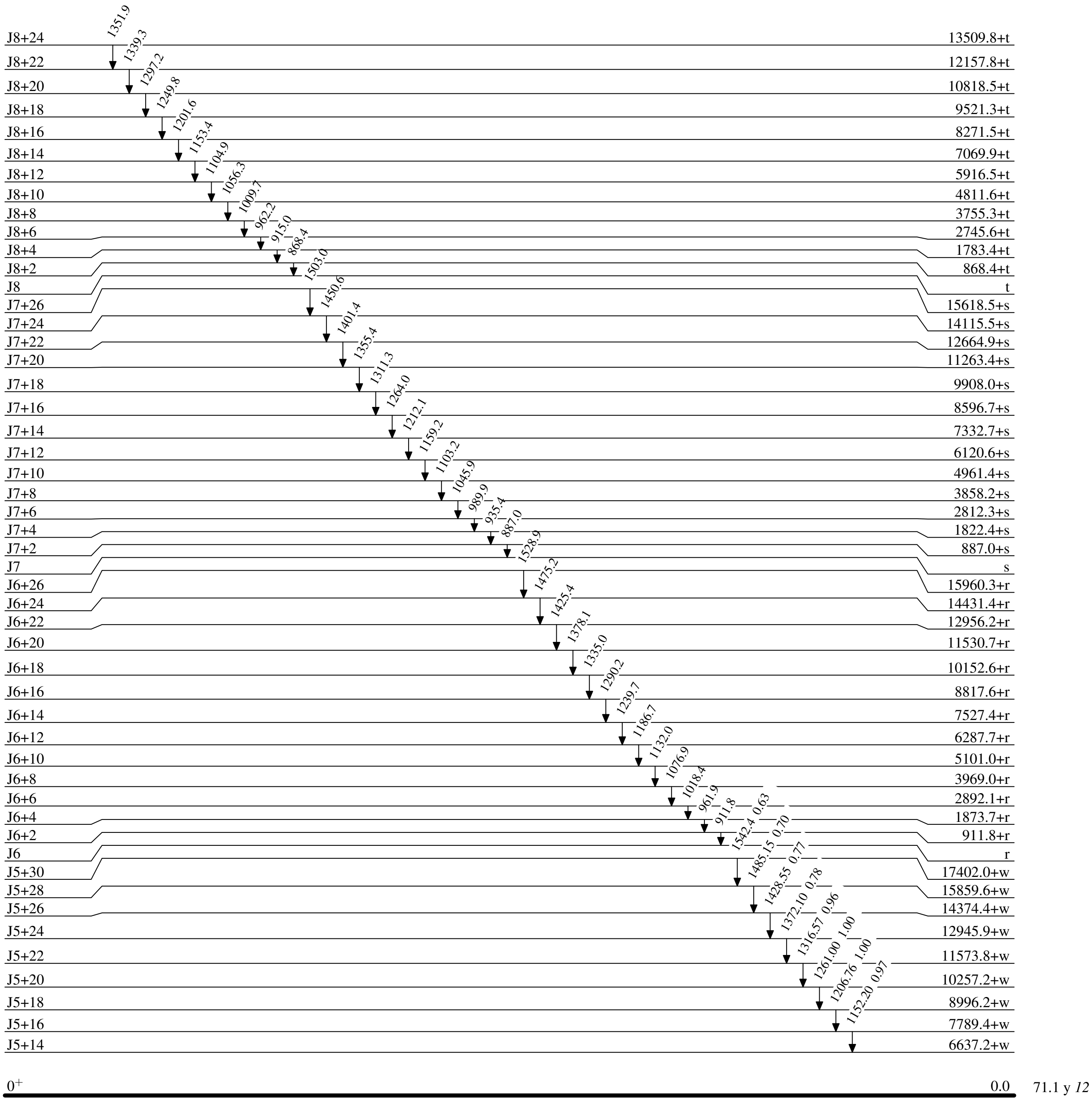
Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level

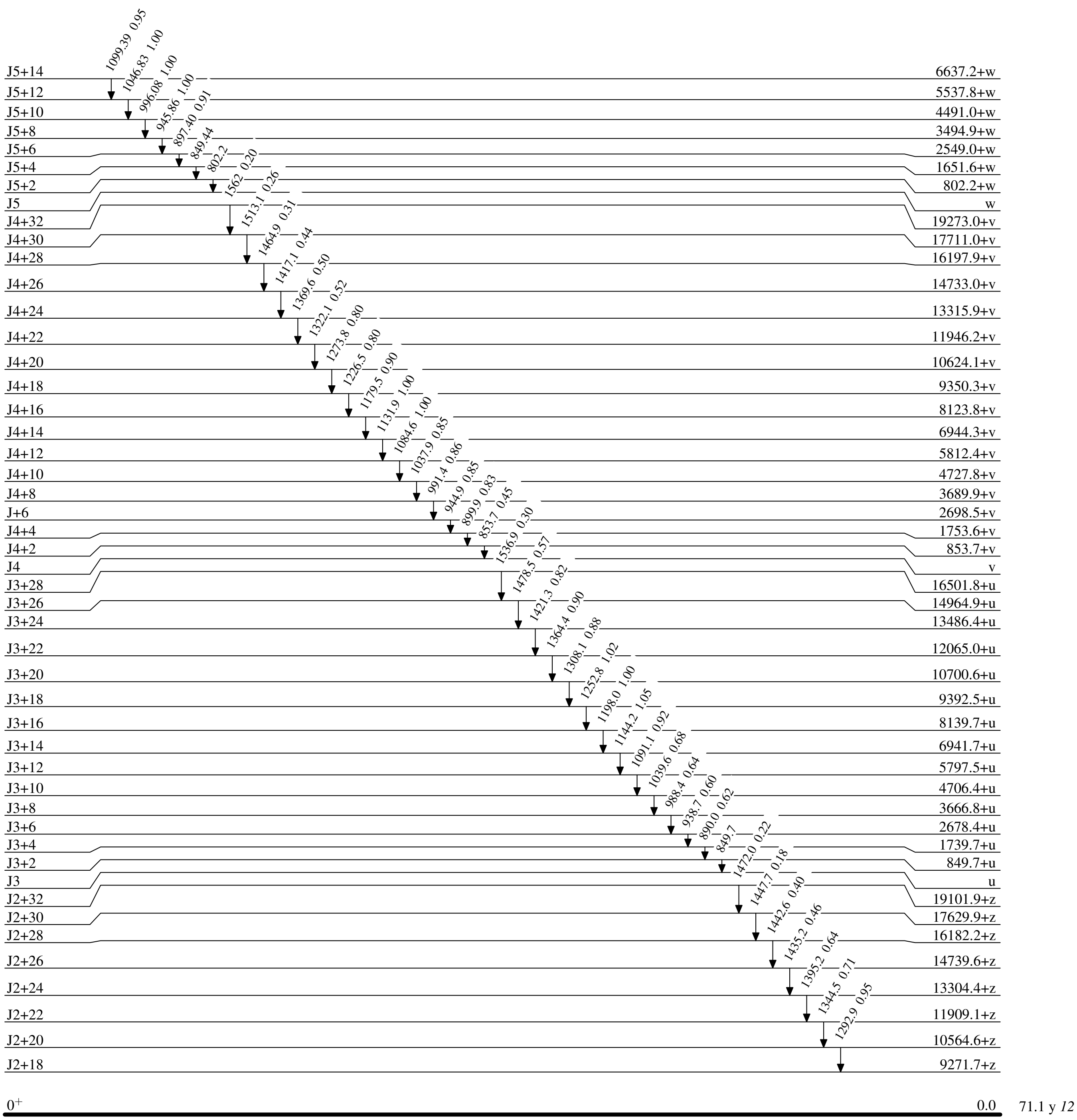


$^{148}_{64}Gd_{84}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

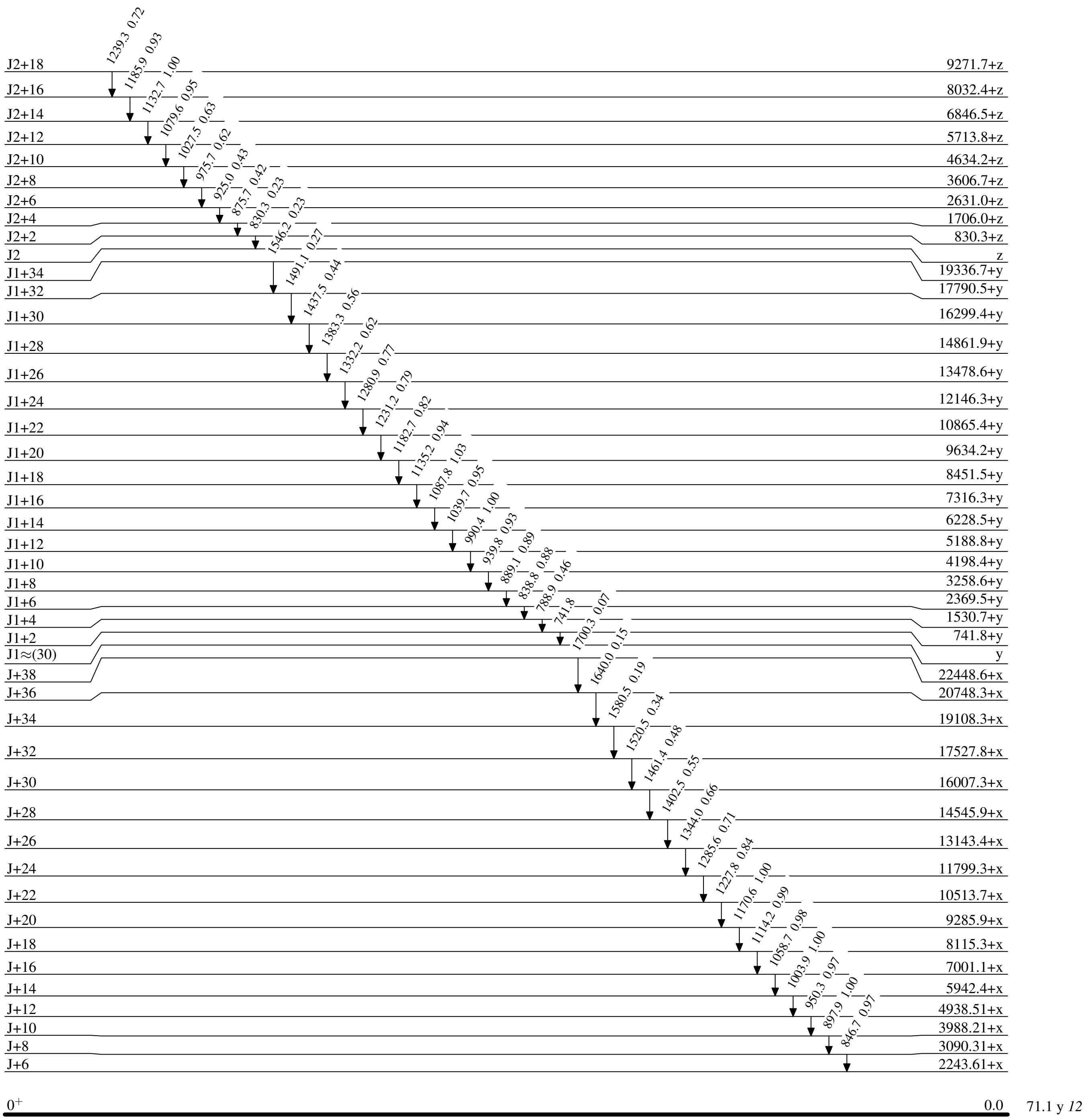


$^{148}_{64}Gd_{84}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{148}_{64}Gd_{84}$

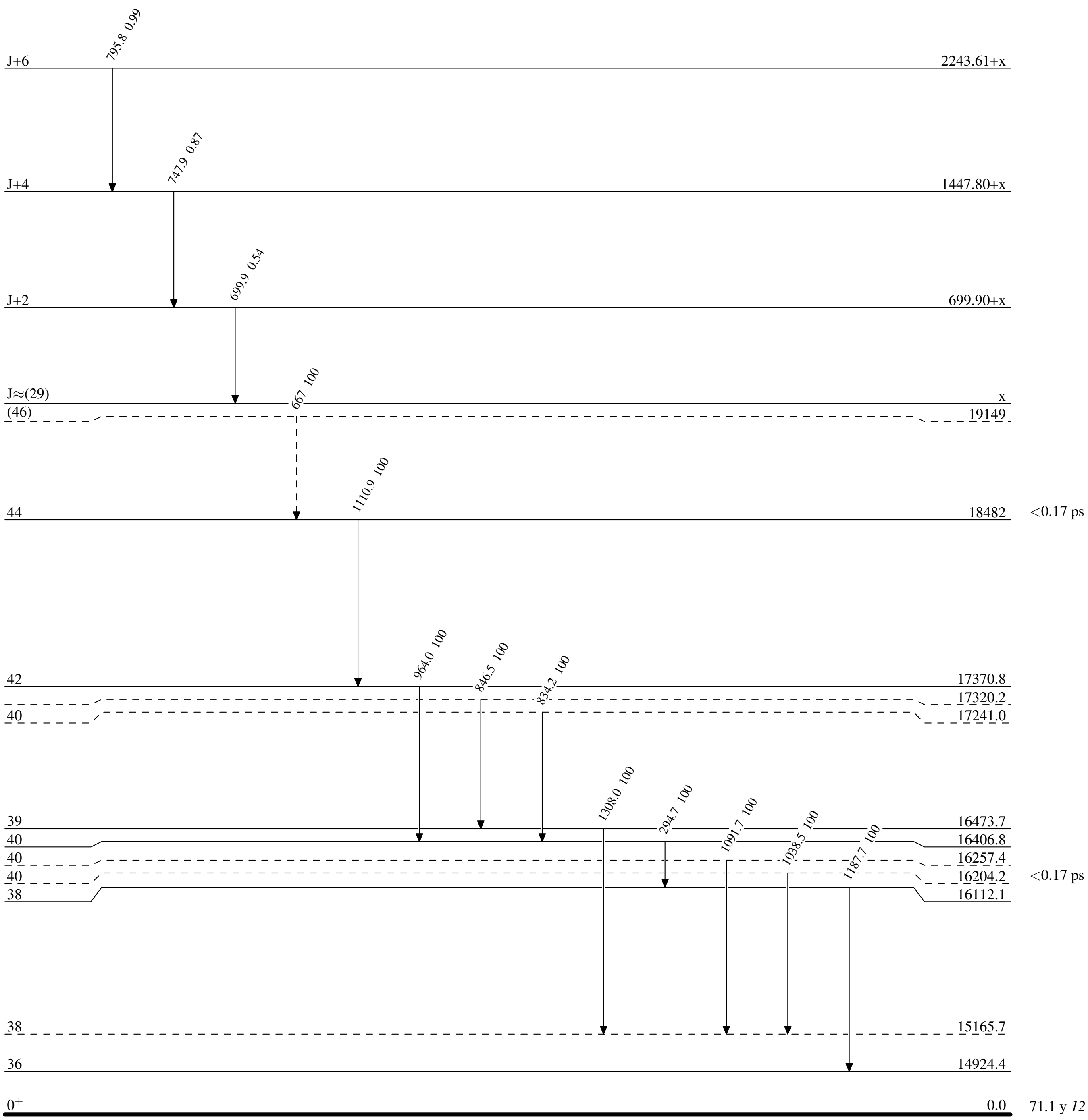
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

γ Decay (Uncertain)

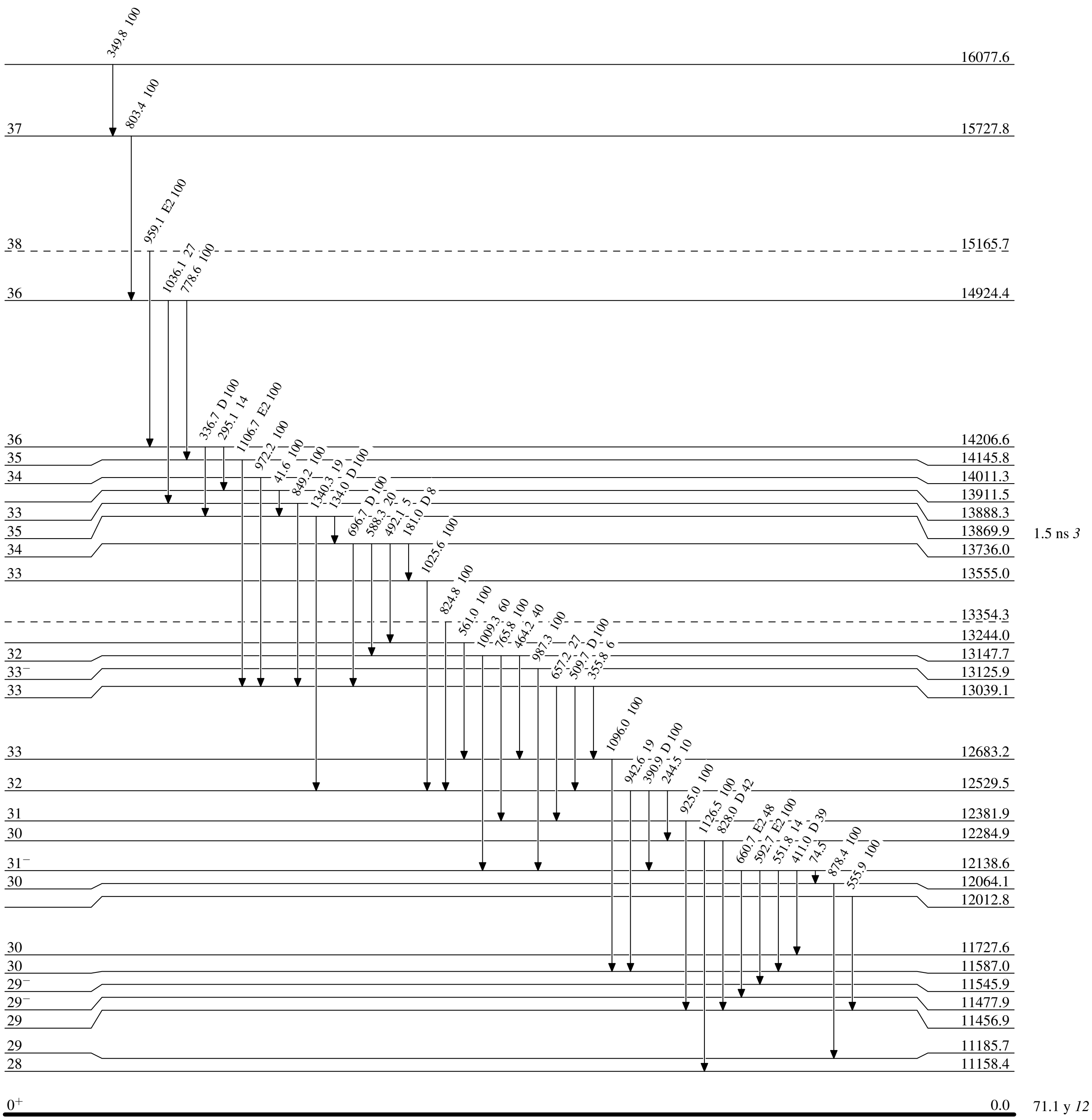


$^{148}_{64}Gd_{84}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

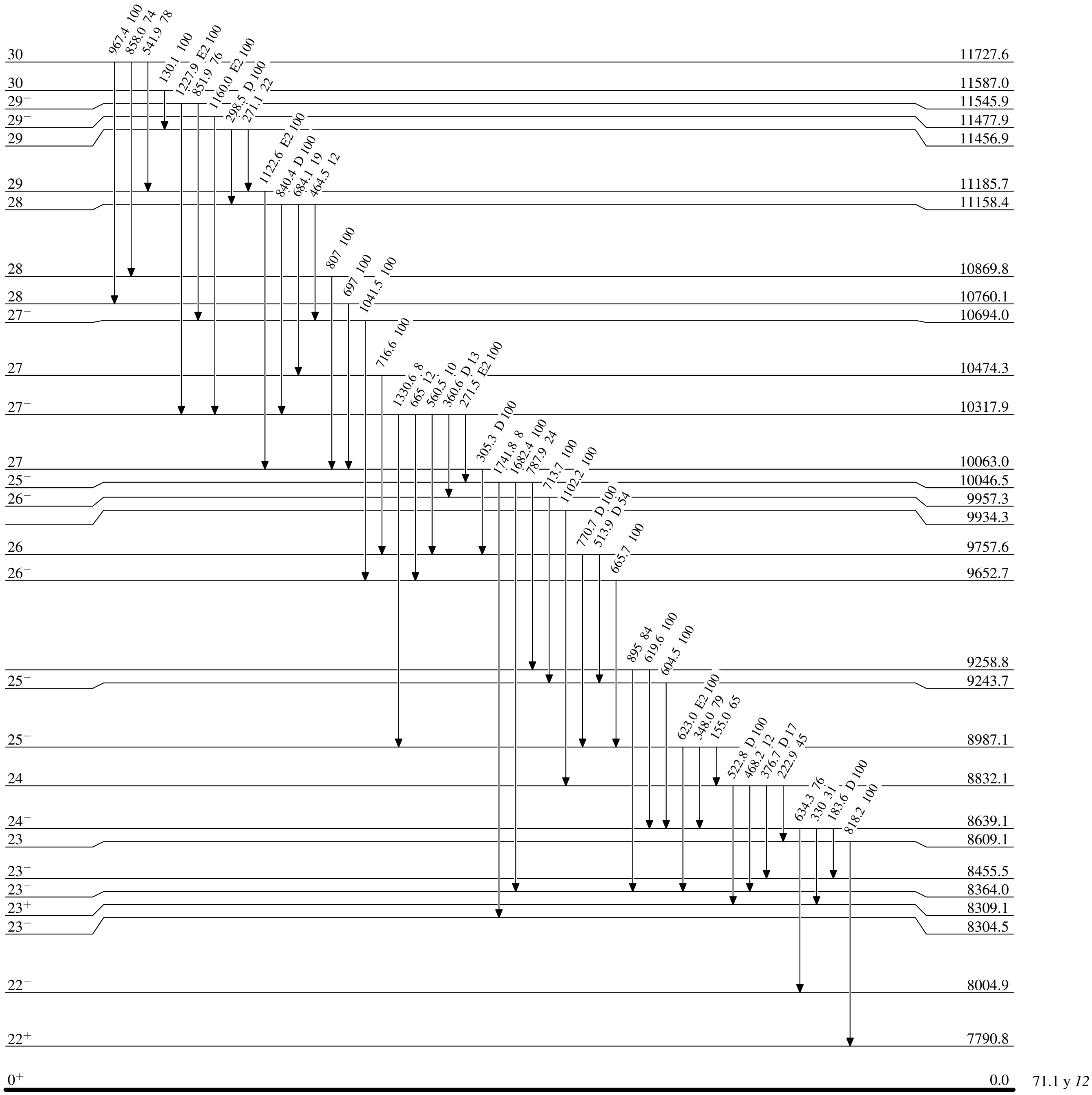


$^{148}_{64}Gd_{84}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

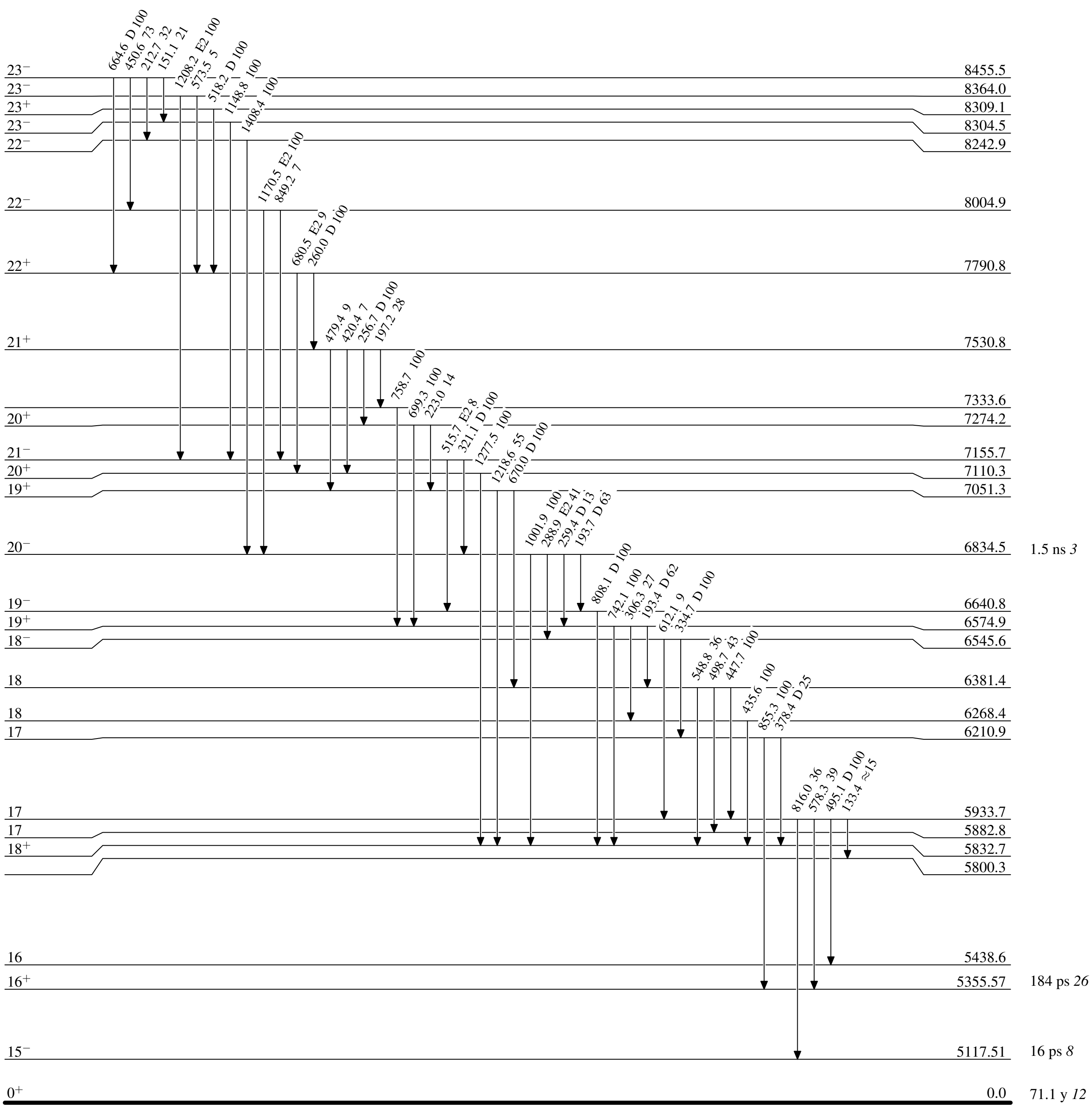


$^{148}_{64}Gd_{84}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

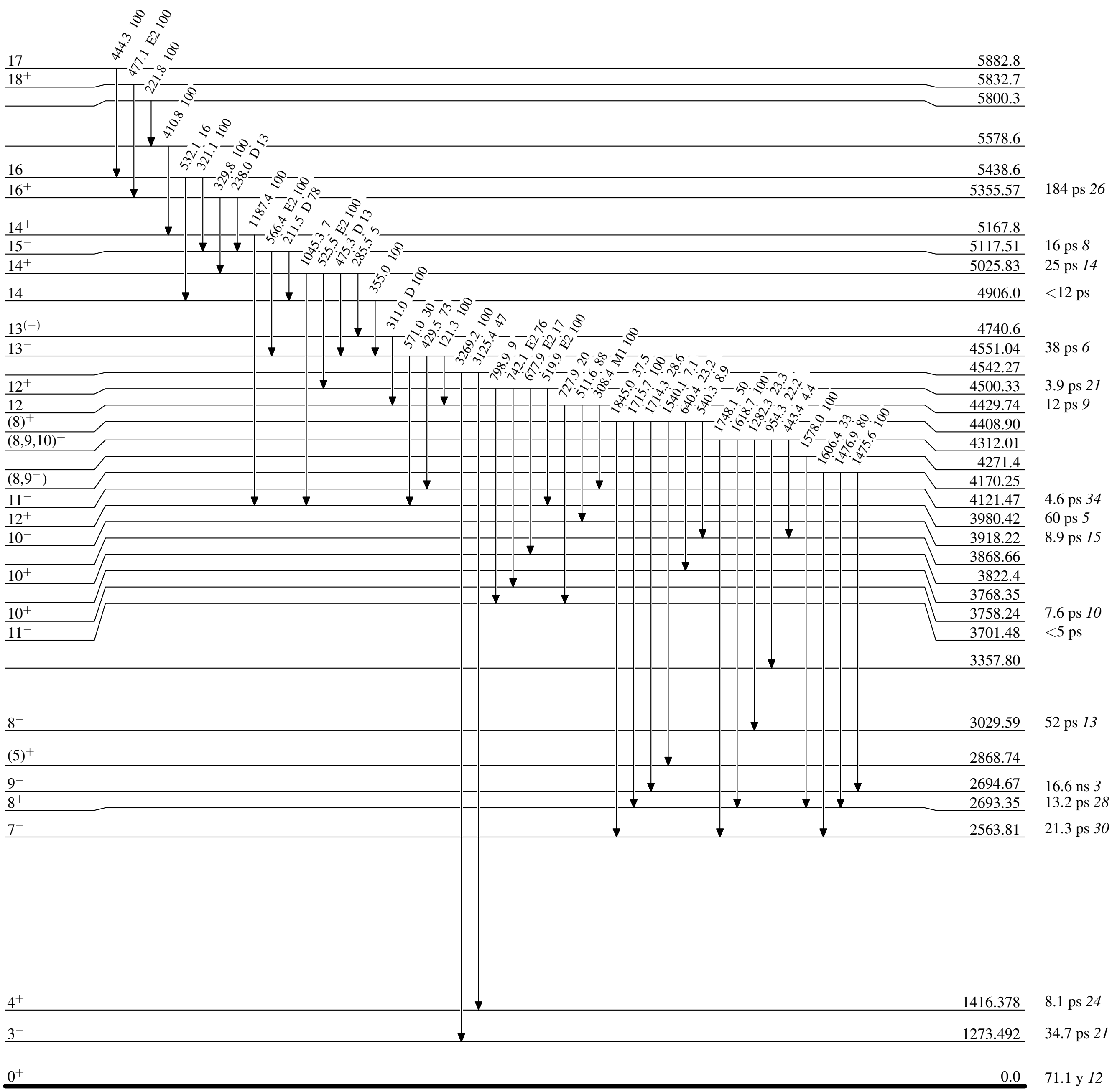


$^{148}_{64}Gd_{84}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

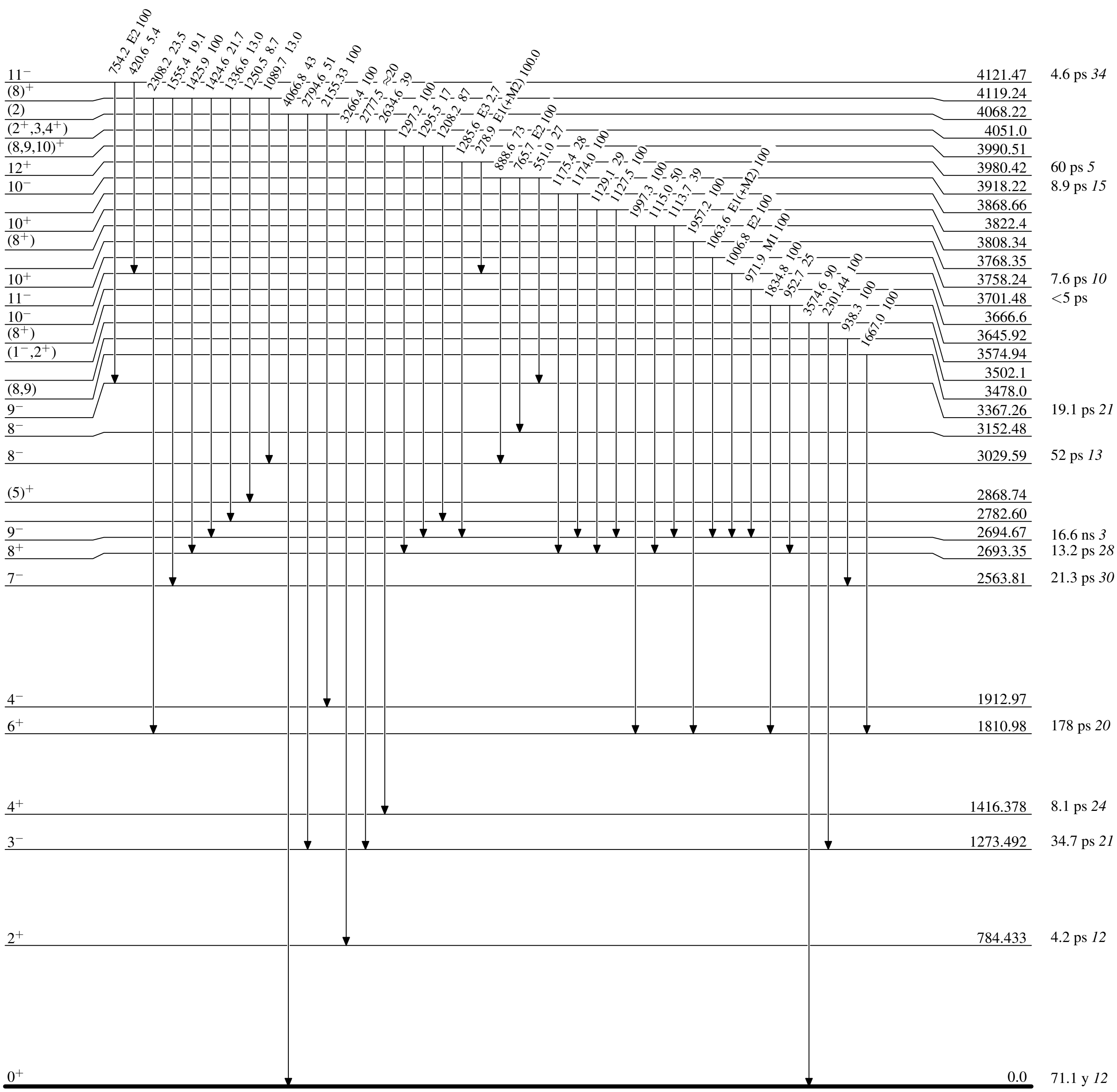


$^{148}_{64}Gd_{84}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

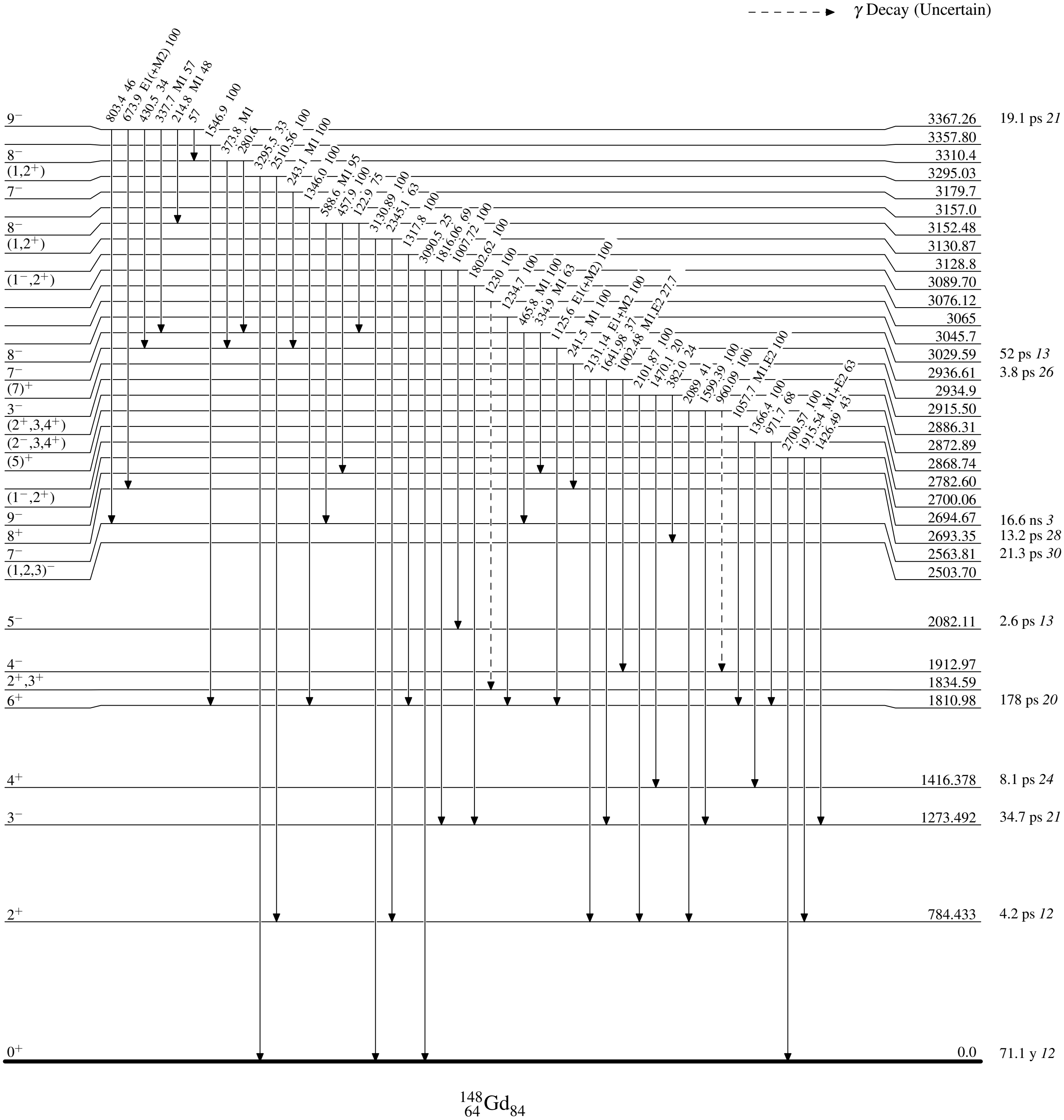


$^{148}_{64}Gd_{84}$

Adopted Levels, Gammas

Level Scheme (continued)

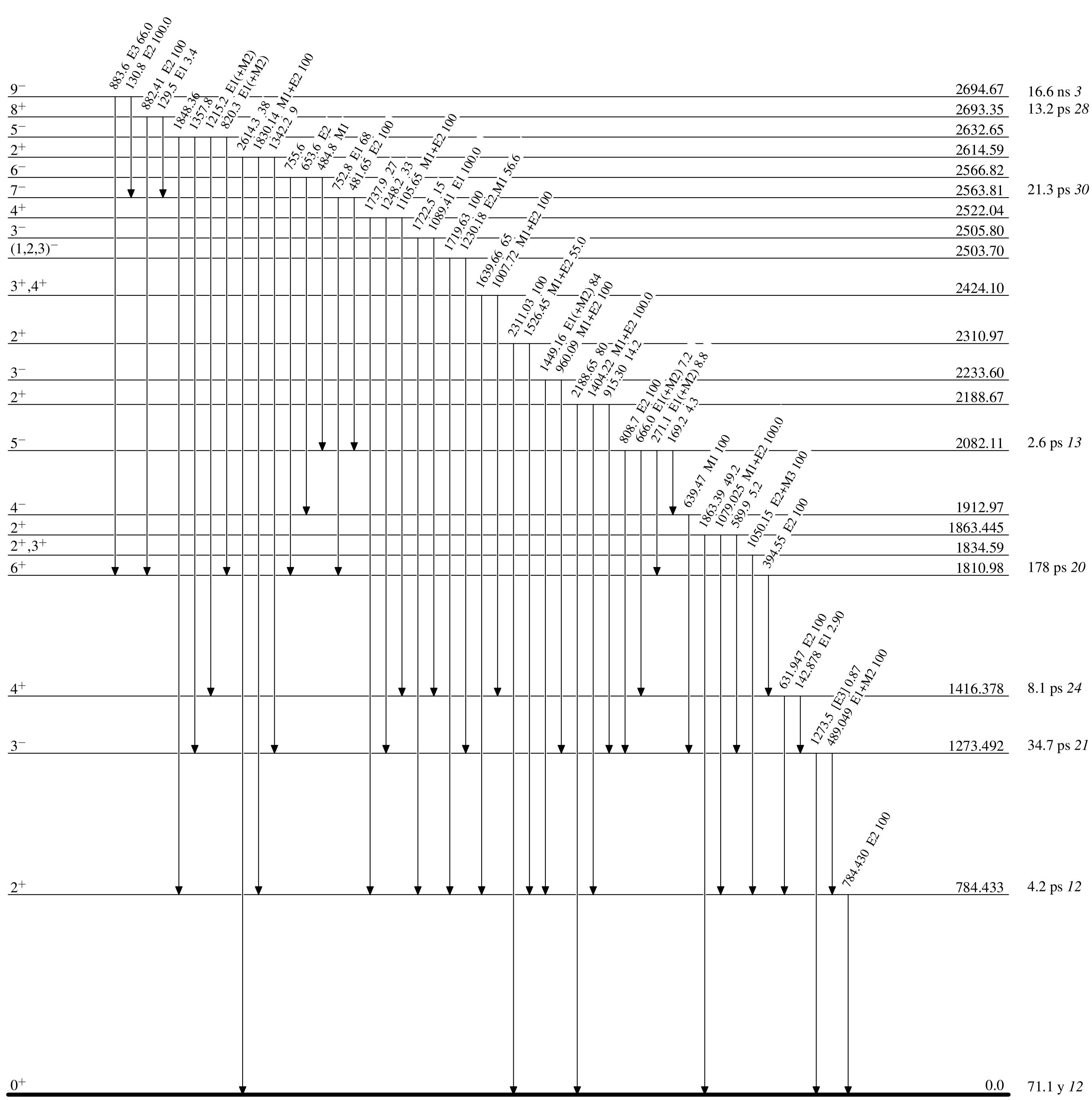
Intensities: Relative photon branching from each level



Adopted Levels, Gammas

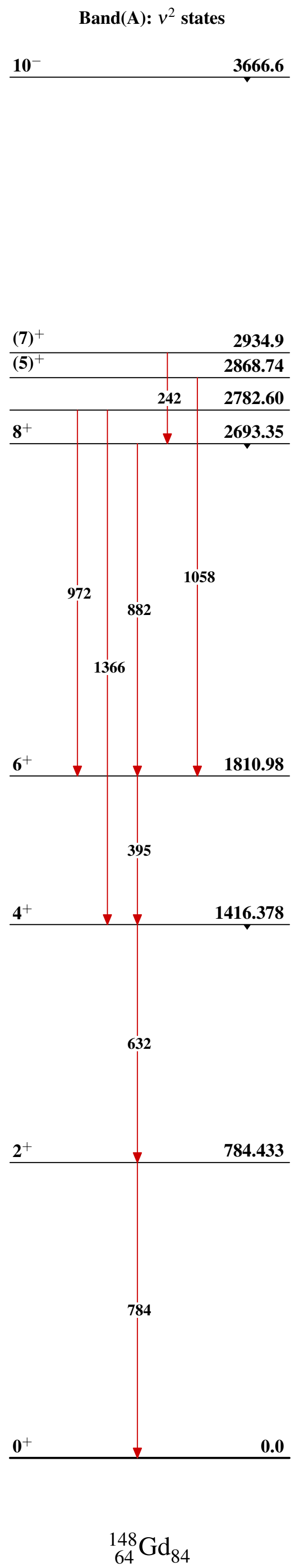
Level Scheme (continued)

Intensities: Relative photon branching from each level

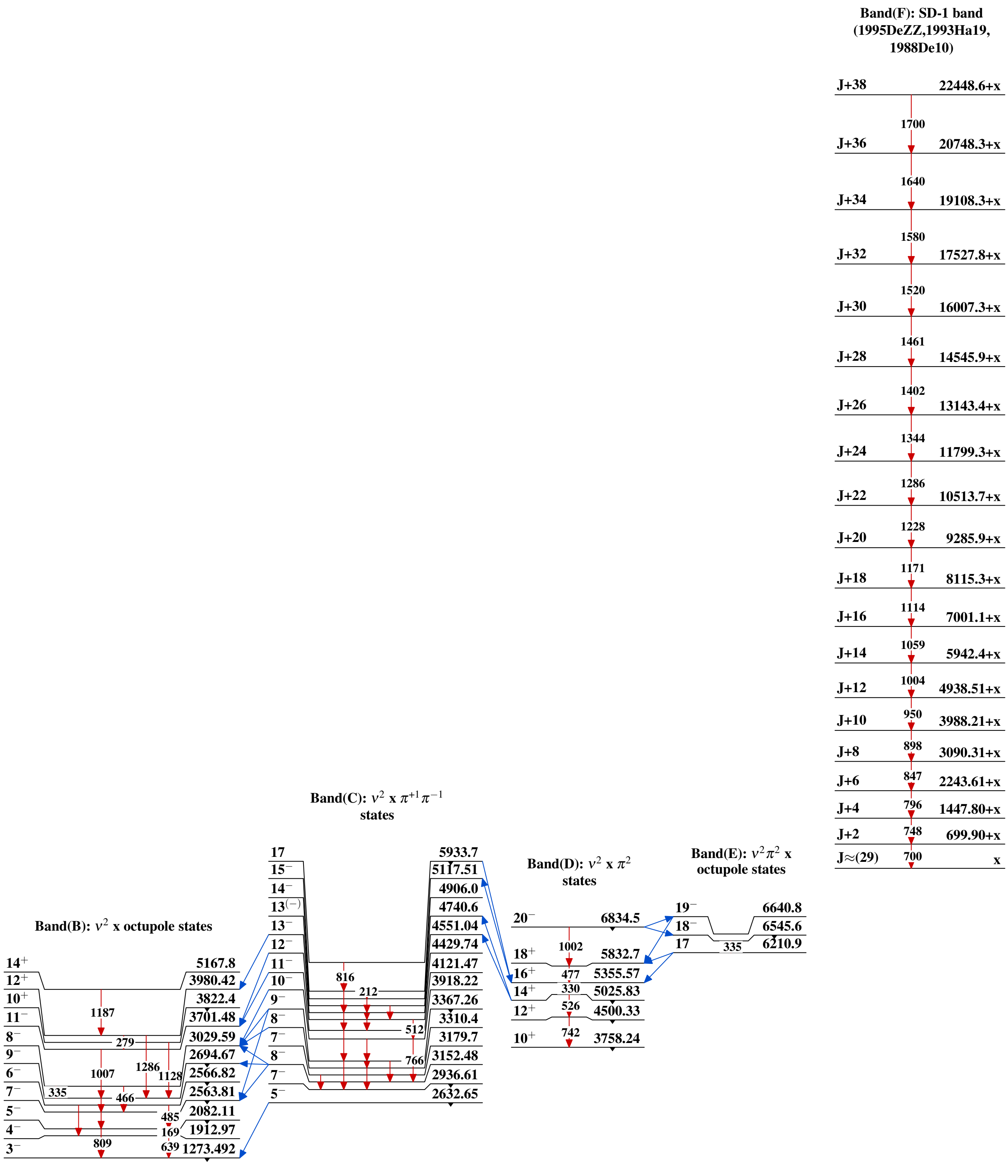


$^{148}_{64}Gd_{84}$

Adopted Levels, Gammas

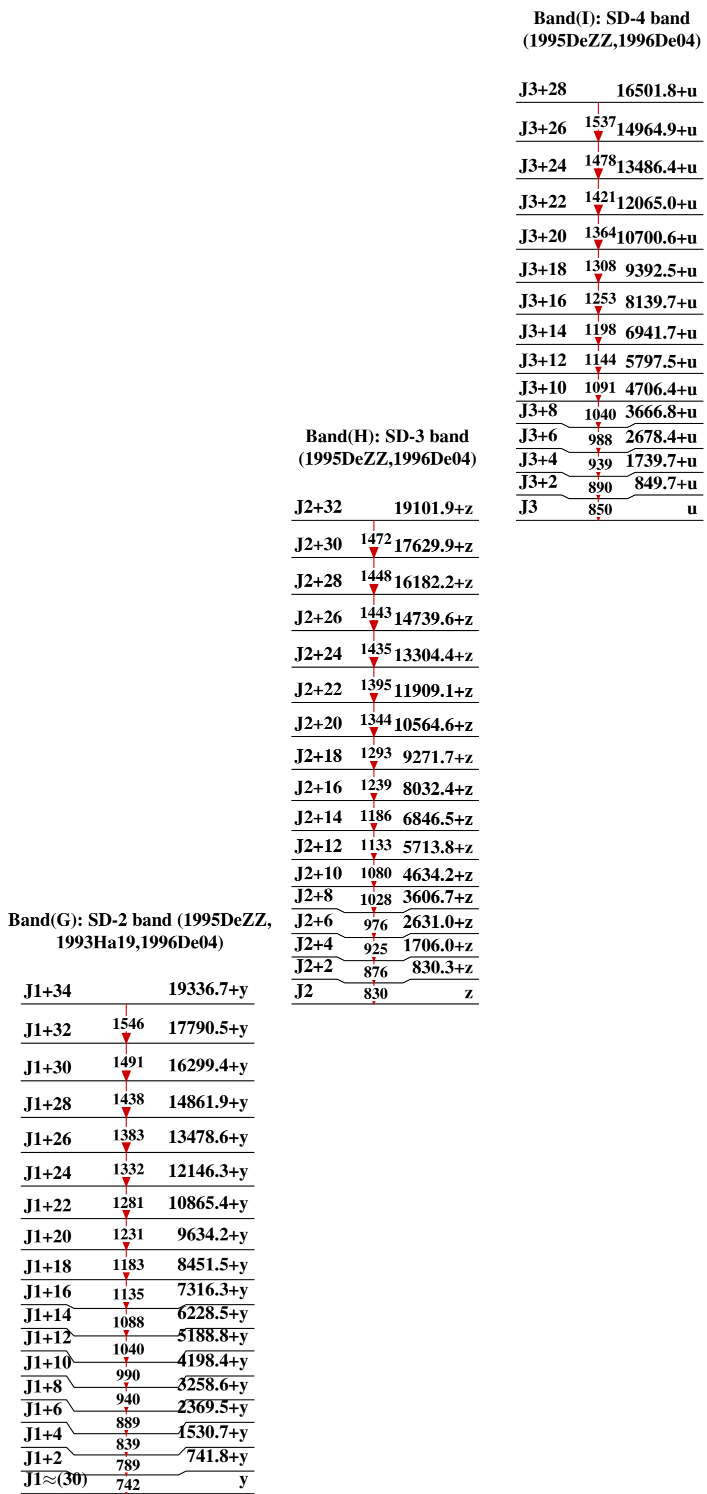


Adopted Levels, Gammas (continued)



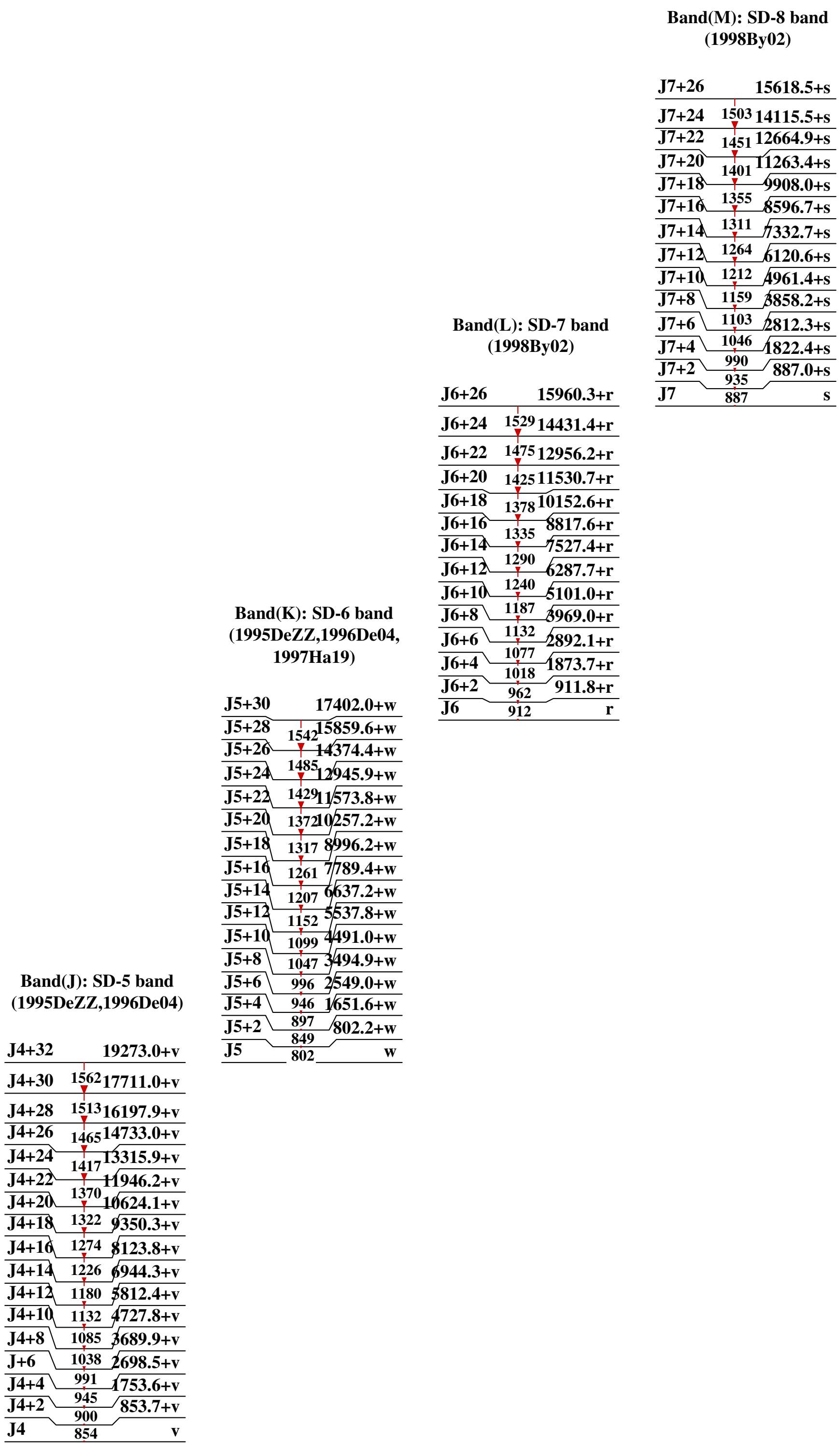
$^{148}_{64}Gd_{84}$

Adopted Levels, Gammas (continued)



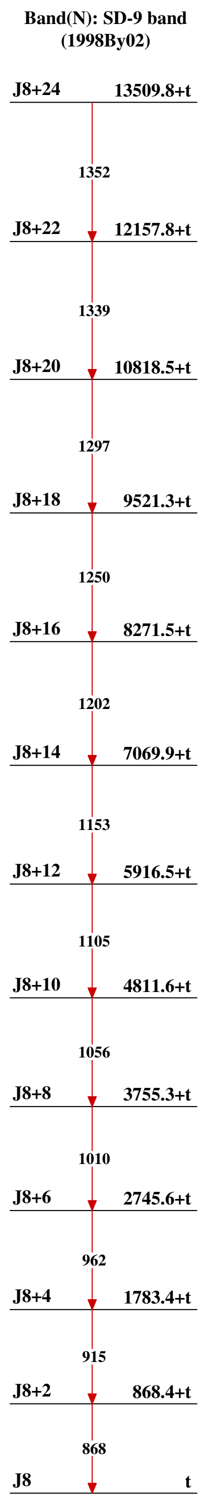
$^{148}_{64}Gd_{84}$

Adopted Levels, Gammas (continued)



$^{148}_{64}Gd_{84}$

Adopted Levels, Gammas (continued)



$^{148}_{64}Gd_{84}$