

Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	A. A. Sonzogni	NDS 93,599 (2001)	1-Dec-2000

$Q(\beta^-) = -9.39 \times 10^3$ 4; $S(n) = 1.160 \times 10^4$ 21; $S(p) = 4.81 \times 10^3$ 3; $Q(\alpha) = 1.27 \times 10^3$ 3 [2012Wa38](#)

Note: Current evaluation has used the following Q record -9074 syst 11750 syst 4958 syst 1113 syst [1995Au04](#).

$\Delta Q(\beta^-) = 359$ keV.

$\Delta S(n) = 284$ keV.

$\Delta S(p) = 201$ keV.

$\Delta Q(\alpha) = 201$ keV.

Theory, shape, systematics, shell closure, spectra, etc.: [1999Kh05](#), [1998Af02](#), [1998Ka41](#), [1998La12](#), [1994Sa35](#), [1993Mi10](#), [1987Ar05](#), [1985Ar16](#), [1986Ci03](#), [1985Ze01](#), [1985Du01](#), [1984Ab01](#).

Isotope shifts: [1988Ga17](#).

GDR studies: [1985Ba15](#), [1983Ha02](#).

 ^{144}Gd LevelsCross Reference (XREF) Flags

A	^{144}Tb ε decay (1 s)	D	$^{144}\text{Sm}(^3\text{He}, 3n\gamma), (\alpha, 4n\gamma)$
B	^{144}Tb ε decay (4.25 s)	E	$^{108}\text{Pd}(^{40}\text{Ar}, 4n\gamma)$
C	$^{144}\text{Sm}(\alpha, 4n\gamma)$	F	(HL,xn γ):SD

E(level) [†]	J ^{π}	T _{1/2}	XREF	Comments
0.0	0 ⁺	4.47 min 6	ABCDE	$\% \varepsilon + \% \beta^+ = 100$ T _{1/2} : from 1991Tu01 ; others: 4.5 min 1 (1968Ke14), 4.9 min 4 (1970Ar04), 4.4 min 3 (1973VaYZ).
743.00 17	2 ⁺		ABCDE	J ^{π} : E2 γ to 0 ⁺ g.s.
1702.29 24	(3 ⁻)		BCDE	J ^{π} : from systematics of 3 ⁻ states in neighboring nuclei.
1744.52 24	(4 ⁺)		BCDE	J ^{π} : Expected 2-phonon 4 ⁺ from systematics of near-spherical even-even nuclei.
1876.41 23	(2 ⁺)		A	
1886.9 4	(0 ⁺)		A	
2226.51 23	(2 ⁺)		A	
2302.6 3	(5 ⁻)		BCDE	J ^{π} : E1 γ to (4 ⁺).
2330.5 4	(4 ⁻ , 5 ⁻)		B D	J ^{π} : Because it feeds a 3 ⁻ state with a 628 keV γ , 1984La29 assigned a (4 ⁻) J ^{π} to this level. However, this level is fed in β decay with a log ft=6.0 from a (6 ⁻) parent. Both facts may be reconciled with a (5 ⁻) assignment.
2354.3	(6 ⁺)		B	
2442.3 4	(5 ⁻)		B D	
2462.1 4	(0 ⁺ , 1 ⁺ , 2 ⁺)		A	
2471.6 4	(7 ⁻)	13 ns 2	BCDE	T _{1/2} : from ($\alpha, 4n\gamma$) (1978Ma43), other T _{1/2} =13 ns (1984La29). J ^{π} : E2 γ to (5 ⁻). J ^{π} : M1 γ to (7 ⁻).
2786.7 4	(7 ⁻)		BCDE	
2787.9 4			B	
2861.9 4	(6 ⁺)		B D	
2912.5 5			B	
3015.4 4	(5 ⁻ , 6 ⁻ , 7 ⁻)		B	
3018.0 4	(8 ⁻)		CDE	J ^{π} : M1 γ to (7 ⁻).
3244.2 7	(8 ⁻)		DE	
3345.7 5	(9 ⁻)		CDE	
3433.1 5	(10 ⁺)	145 ns 30	CDE	$\mu = +12.76$ 14 (1979Ha15); $Q = -1.46$ 6 (1982Ha22)

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Adopted Levels, Gammas (continued) ^{144}Gd Levels (continued)

E(level) [†]	J ^π	XREF	Comments
			J ^π : E1 γ to (9 ⁻) and M2 γ to (8 ⁻). μ, Q from γ(θ, H, t) in $^{120}\text{Sn}(^{28}\text{Si}, 4n)$ (1979Ha15 , 1982Ha22). μ includes paramagnetic correction factor. Oblate shape for the isomer established by determining the deformation sign to be negative (1985Da20 , 1984Da21) (from γ(θ, t), polarized isomer). T _{1/2} : from 1978Ma43 ; other 131 ns (1984La29).
3697.0 9	(10 ⁺)	D	
3910.0 8	(10 ⁻)	D	
4144.5 6	(11 ⁺)	CDE	J ^π : M1+E2 γ to (10 ⁺).
4267.0 11	(11 ⁻)	D	
4450.9 6	(12 ⁺)	CDE	J ^π : E2 γ to (10 ⁺).
4756.0 10	(12 ⁺)	DE	J ^π : M1+E2 γ to (11 ⁺).
4954.0 8	(12 ⁺)	E	J ^π : M1+E2 γ to (11 ⁺).
5086.4 8	(13 ⁺)	E	J ^π : M1+E2 γ to (12 ⁺).
5133.9 8	(13 ⁺)	DE	J ^π : E2 γ to (11 ⁺).
5179.5 10	(14 ⁺)	DE	J ^π : E2 γ to (12 ⁺).
5227.9 10	(14 ⁺)	E	
5369.9 8	(14 ⁺)	DE	J ^π : E2 γ to (12 ⁺).
5455.0 11	(14 ⁺)	E	
5486.8 10	(14 ⁺)	E	
5497.1 9	(13 ⁺)	DE	J ^π : M1+E2 γ to (12 ⁺).
5613.1 10	(14 ⁺)	E	J ^π : E2 γ to (12 ⁺).
5626.4 10	(14 ⁺)	DE	J ^π : M1+E2 γ to (13 ⁺).
5722.9 10	(15 ⁺)	DE	J ^π : M1+E2 γ to (14 ⁺).
5835.2 11	(15 ⁺)	DE	J ^π : M1+E2 γ to (14 ⁺).
6213.7 11	(16 ⁺)	E	J ^π : M1+E2 γ to (15 ⁺).
6233.0 15	(16 ⁺)	E	
6264.2 13	(17 ⁺)	E	J ^π : E2 γ to (15 ⁺).
6325.0 14		E	
6380.6 15		E	
6382.1 13	(17 ⁺)	E	
6432.4 18	(17 ⁺)	E	
6443.1 15		E	
6618.4 13	(17 ⁺)	E	J ^π : M1+E2 γ to (17 ⁺).
6669.9 11	(16 ⁺)	E	J ^π : E2 γ to (14 ⁺).
6703.3 11	(16 ⁺)	E	J ^π : E2 γ to (14 ⁺).
6747.8 18		E	
6824.6 12	(16 ⁺)	E	
6927.7 20	(18 ⁺)	E	
7014.1 15	(18 ⁺)	E	J ^π : M1+(E2) γ to (17 ⁺).
7339.1 22		E	
7349.1 16	(19 ⁺)	E	J ^π : M1+E2 γ to (18 ⁺).
7349.7 ^b 10	(18 ⁺)	E	J ^π : E2 γ to (16 ⁺).
7351.5 22	(19 ⁺)	E	
7418.6 18	(19 ⁺)	E	J ^π : M1+E2 γ to (18 ⁺).
7569.4 14	(20 ⁺)	E	
7606.6 23	(20 ⁺)	E	
7756.4 16	(20 ⁺)	E	J ^π : M1+(E2) γ to (19 ⁺).
7760.8 24		E	
7885.9 25		E	
7923.0 21	(20 ⁺)	E	J ^π : M1+E2 γ to (19 ⁺).
8104.4 ^b 15	(20 ⁺)	E	J ^π : E2 γ to (18 ⁺).
8189.5 16	(21 ⁺)	E	
8221.2 23	(21 ⁺)	E	
8476.1 19	(22 ⁺)	E	
8539.9 25	(22 ⁺)	E	

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Adopted Levels, Gammas (continued) ^{144}Gd Levels (continued)

E(level) [†]	J ^π	XREF	Comments
8595.3 25	(22 ⁺)	E	
8641.9 20	(24 ⁺)	E	
8993 3	(23 ⁺)	E	
9069.8 ^b 18	(22 ⁺)	E	
9079 3	(23 ⁺)	E	
9198.9 20	(24 ⁺)	E	
9603.0 21		E	
9862.4 20	(24 ⁺)	E	
9958.6 ^b 20	(24 ⁺)	E	
10066.1 23		E	
10424.1 23		E	
10441.4 23	(26 ⁺)	E	
10795.2 ^b 23	(26 ⁺)	E	
11178.3 25	(28 ⁺)	E	
11723.7 ^b 25	(28 ⁺)	E	
12843 ^b 3	(30 ⁺)	E	
13941 ^b 3	(32 ⁺)	E	
x [‡]	J≈(22)	F	J ^π : from 1997Lu03, π=+ from proposed configuration. Quadrupole moment measurements reported in 1999Ur02, Q ₀ =11.6 eb +14–10 below the backbending and Q ₀ =13.7 eb +11–9 above.
802.8+x [‡] 3	J+2	F	
1649.0+x [‡] 4	J+4	F	
2528.2+x [‡] 5	J+6	F	
3430.7+x [‡] 5	J+8	F	
4323.3+x [‡] 7	J+10	F	
5257.5+x [‡] 7	J+12	F	
6237.5+x [‡] 8	J+14	F	
7268.8+x [‡] 9	J+16	F	
8353.4+x [‡] 11	J+18	F	
9492.9+x [‡] 11	J+20	F	
10687.6+x [‡] 11	J+22	F	
11937.4+x [‡] 11	J+24	F	
13243.0+x [‡] 12	J+26	F	
14605.0+x [‡] 13	J+28	F	
16022.8+x [‡] 14	J+30	F	
17497.3+x [‡] 15	J+32	F	
19029.1+x [‡] 18	J+34	F	
20617.1+x [‡] 24	J+36	F	
22262+x [‡] 3	J+38	F	
y [#]	J≈(25) ^c	F	
774.5+y [#]	J+2	F	
1609.3+y [#] 7	J+4	F	
2503.5+y [#] 8	J+6	F	
3456.9+y [#] 9	J+8	F	
4468.5+y [#] 9	J+10	F	
5538.1+y [#] 10	J+12	F	

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Adopted Levels, Gammas (continued) ^{144}Gd Levels (continued)

E(level) [†]	J ^π	XREF	E(level) [†]	J ^π	XREF
6666.0+y [#] 11	J+14	F	u ^{&}	J≈(29) ^c	F
7852.6+y [#] 13	J+16	F	852.9+u ^{&} 4	J+2	F
9098.1+y [#] 14	J+18	F	1764.6+u ^{&} 6	J+4	F
10402.0+y [#] 16	J+20	F	2735.3+u ^{&} 8	J+6	F
11764.6+y [#] 19	J+22	F	3764.5+u ^{&} 10	J+8	F
13186.6+y [#] 24	J+24	F	4850.0+u ^{&} 12	J+10	F
14668+y [#] 3	J+26	F	5994.0+u ^{&} 14	J+12	F
16208+y [#] 4	J+28	F	7194.1+u ^{&} 15	J+14	F
z [@]	J≈(24) ^c	F	8452.6+u ^{&} 16	J+16	F
743.6+z [@] 8	J+2	F	9769.1+u ^{&} 17	J+18	F
1548.3+z [@] 11	J+4	F	11144.6+u ^{&} 19	J+20	F
2409.7+z [@] 12	J+6	F	12581.6+u ^{&} 24	J+22	F
3332.8+z [@] 13	J+8	F	v ^a	J≈(32) ^c	F
4316.0+z [@] 14	J+10	F	936.8+v ^a 5	J+2	F
5357.4+z [@] 15	J+12	F	1935.2+v ^a 10	J+4	F
6457.6+z [@] 15	J+14	F	2993.1+v ^a 11	J+6	F
7617.6+z [@] 16	J+16	F	4105.7+v ^a 13	J+8	F
8833.6+z [@] 16	J+18	F	5277.7+v ^a 16	J+10	F
10110.7+z [@] 19	J+20	F	6507.7+v ^a 19	J+12	F
11443.7+z [@] 23	J+22	F	7794.7+v ^a 24	J+14	F
12837+z [@] 3	J+24	F	9144+v ^a 4	J+16	F
14289+z [@] 4	J+26	F	10554+v ^a 4	J+18	F

[†] From least square fit performed by evaluator assuming $\Delta E\gamma=1$ keV in γ observed exclusively by 1994Rz01 and/or 1984La29.

[‡] Band(A): SD-1 band (1994Lu03,1997Lu03). percent population=1.6 (1998Zh20) in $^{74}\text{Ge}(^{74}\text{Ge},4n\gamma)$ E=318 MeV.

Configuration= $\pi 6^2$; $(\pi,\alpha)=(+,0)$ (1997Lu03). Percent feeding=1.2 *I* at E(^{48}Ti)=215 MeV, 0.7 *I* at E(^{48}Ti)=221 MeV (1997Lu03). Observed band crossing is interpreted (1995Li24) as due to alignment of $\pi 6^2$.

[#] Band(B): SD-2 band (1997Lu03). Configuration= $\pi 6^1\pi 9/2[404]$; $(\pi,\alpha)=(+,1)$ (1997Lu03). Percent feeding=0.31 *I* at E(^{48}Ti)=215 MeV (1997Lu03).

[@] Band(C): SD-3 band (1997Lu03). Configuration= $\pi 6^1\pi 9/2[404]$; $(\pi,\alpha)=(+,0)$ (1997Lu03). Percent feeding=0.31 *I* (1997Lu03). SD-2 and SD-3 are possible signature partners.

[&] Band(D): SD-4 band (1997Lu03). Configuration= $\pi 6^1\pi 3/2[411]$; $(\pi,\alpha)=(+,1)$ (1997Lu03). Percent feeding=0.28 *I* (1997Lu03).

^a Band(E): SD-5 band (1997Lu03). Configuration= $\pi 6^1\pi 3/2[411]$; $(\pi,\alpha)=(+,0)$ (1997Lu03). Percent feeding=0.18 *I* (1997Lu03). SD-4 and SD-5 are possible signature partners.

^b Band(F): Band based on 18^+ state at 7350 keV.

^c From 1997Lu03, $\pi=+$ from proposed configuration.

Adopted Levels, Gammas (continued)

$\gamma(^{144}\text{Gd})$									
$E_i(\text{level})$	J_i^π	E_γ	$I_\gamma^\dagger$	E_f	J_f^π	Mult. [‡]	δ	$\alpha^\&$	Comments
743.00	2 ⁺	743.0 2	100	0.0	0 ⁺	E2		0.00531	$\alpha(\text{K})=0.00440$ 14; $\alpha(\text{L})=0.00068$ 2 E _γ : weighted average of 1978Ma43 and 1986Re11 values.
1702.29	(3 ⁻)	959.3 2	100	743.00	2 ⁺	(E1+M2)	+0.12 [#] 5	0.00140 17	$\alpha(\text{K})=0.00119$ 14; $\alpha(\text{L})=0.00016$ 2 E _γ : weighted average of 1978Ma43 and 1986Re11 values.
1744.52	(4 ⁺)	1001.5 2	100	743.00	2 ⁺				$\alpha(\text{K})=0.00119$ 14; $\alpha(\text{L})=0.00016$ 2 E _γ : weighted average of 1978Ma43 and 1986Re11 values.
1876.41	(2 ⁺)	1133.4 3	75 11	743.00	2 ⁺				E _γ : weighted average of 1978Ma43 and 1986Re11 values.
		1876.4 3	100	0.0	0 ⁺				
1886.9	(0 ⁺)	1143.9 3	100	743.00	2 ⁺				
2226.51	(2 ⁺)	1483.5 3	100	743.00	2 ⁺				
		2226.5 3	80 11	0.0	0 ⁺				
2302.6	(5 ⁻)	558.0 2	100	1744.52	(4 ⁺)	E1		0.00372	$\alpha(\text{K})=0.00316$ 10; $\alpha(\text{L})=0.00042$ 1 E _γ : weighted average of 1978Ma43 and 1986Re11 values. E _γ : weighted average of 1978Ma43 and 1986Re11 values, I _γ : average of 1978Ma43 and 1986Re11 values.
		600.3 2	68 12	1702.29	(3 ⁻)				
2330.5	(4 ⁻ ,5 ⁻)	628.2 3	100	1702.29	(3 ⁻)				
2354.3	(6 ⁺)	609.7 ^a 3	100	1744.52	(4 ⁺)				
2442.3	(5 ⁻)	139.7 3	43 6	2302.6	(5 ⁻)				E _γ ,I _γ : from 1986Re11.
		697.9 3	100	1744.52	(4 ⁺)				E _γ ,I _γ : from 1986Re11.
2462.1	(0 ⁺ ,1 ⁺ ,2 ⁺)	1719.1 3	100	743.00	2 ⁺				
2471.6	(7 ⁻)	169.0 2	100	2302.6	(5 ⁻)	E2		0.396	$\alpha(\text{K})=0.260$ 8; $\alpha(\text{L})=0.105$ 4; $\alpha(\text{M})=0.0243$ 8; $\alpha(\text{N}+..)=0.00677$ 21 B(E2)(W.u.)=5.0 8
2786.7	(7 ⁻)	315.1 2	100	2471.6	(7 ⁻)	M1		0.085	$\alpha(\text{K})=0.0724$ 22; $\alpha(\text{L})=0.0102$ 3; $\alpha(\text{M})=0.00220$ 7; $\alpha(\text{N}+..)=0.00062$ 2 E _γ : average of 1978Ma43 and 1986Re11 values.
2787.9		485.3 3	100	2302.6	(5 ⁻)				
2861.9	(6 ⁺)	1117.4 3	100	1744.52	(4 ⁺)				E _γ : from 1986Re11.
2912.5		470.2 3	100	2442.3	(5 ⁻)				
3015.4	(5 ⁻ ,6 ⁻ ,7 ⁻)	573.5 ^a 3	40 6	2442.3	(5 ⁻)				
		712.8 3	100	2302.6	(5 ⁻)				
3018.0	(8 ⁻)	231.3 2	67	2786.7	(7 ⁻)	M1		0.196	$\alpha(\text{K})=0.166$ 5; $\alpha(\text{L})=0.0236$ 7; $\alpha(\text{M})=0.00509$ 16; $\alpha(\text{N}+..)=0.00146$ 5 E _γ : from 1978Ma43.
		546.4 2	100	2471.6	(7 ⁻)	M1+E2		0.016 5	$\alpha(\text{K})=0.013$ 5; $\alpha(\text{L})=0.0020$ 5 E _γ : from 1978Ma43.
3244.2	(8 ⁻)	226.3		3018.0	(8 ⁻)				E _γ : average from 1984La29 and 1994Rz01 values.
		457.6		2786.7	(7 ⁻)				E _γ : average from 1984La29 and 1994Rz01 values.
3345.7	(9 ⁻)	101.7		3244.2	(8 ⁻)				Seen by 1984La29 and 1994Rz01 only.
		327.7 3	100	3018.0	(8 ⁻)	M1		0.0770	$\alpha(\text{K})=0.0653$ 20; $\alpha(\text{L})=0.0092$ 3; $\alpha(\text{M})=0.00198$ 6; $\alpha(\text{N}+..)=0.00056$ 2
3433.1	(10 ⁺)	87.4 3	100	3345.7	(9 ⁻)	E1		0.423	$\alpha(\text{K})=0.353$ 11; $\alpha(\text{L})=0.0543$ 17; $\alpha(\text{M})=0.0117$ 4;

Adopted Levels, Gammas (continued)

$\gamma(^{144}\text{Gd})$ (continued)									
$E_i(\text{level})$	J_i^π	E_γ	$I_\gamma^\dagger$	E_f	J_f^π	Mult. ‡	δ	$\alpha^\&$	Comments
3433.1	(10 ⁺)	415.2 3	19	3018.0 (8 ⁻)	M2			0.145	$\alpha(\text{N}+..)=0.00328$ 10 B(E1)(W.u.)= 1.6×10^{-6} 4 E_γ, I_γ : from 1978Ma43. B(M2)(W.u.)=0.073 16 $\alpha(\text{K})=0.119$ 4; $\alpha(\text{L})=0.0199$ 6; $\alpha(\text{M})=0.00438$ 14; $\alpha(\text{N}+..)=0.00124$ 4 E_γ, I_γ : from 1978Ma43.
3697.0	(10 ⁺)	263.8		3433.1 (10 ⁺)					
3910.0	(10 ⁻)	351.3		3345.7 (9 ⁻)					
		564.3		3345.7 (9 ⁻)					
		892.0		3018.0 (8 ⁻)					
4144.5	(11 ⁺)	711.3 3	100	3433.1 (10 ⁺)	M1+E2	-0.9 2		0.0086 6	$\alpha(\text{K})=0.0072$ 5; $\alpha(\text{L})=0.00103$ 6 E_γ : from 1978Ma43. δ : from 1994Rz01 in ($^{40}\text{Ar}, 4n\gamma$).
4267.0	(11 ⁻)	921.3		3345.7 (9 ⁻)					
4450.9	(12 ⁺)	306.3	7	4144.5 (11 ⁺)	M1+E2			0.074 18	$\alpha(\text{K})=0.061$ 18; $\alpha(\text{L})=0.0107$ 4; $\alpha(\text{M})=0.00235$ 3; $\alpha(\text{N}+..)=0.00066$ 2 observed by 1994Rz01 only.
		1017.8 3	100	3433.1 (10 ⁺)	E2			0.00267	$\alpha(\text{K})=0.00224$ 7; $\alpha(\text{L})=0.00032$ 1
4756.0	(12 ⁺)	611.5	100	4144.5 (11 ⁺)	M1+E2			0.012 4	$\alpha(\text{K})=0.010$ 4; $\alpha(\text{L})=0.0015$ 4
4954.0	(12 ⁺)	809.5	100	4144.5 (11 ⁺)	M1+E2			0.0061 18	$\alpha(\text{K})=0.0051$ 15; $\alpha(\text{L})=0.00073$ 18
		1521.0	90	3433.1 (10 ⁺)	E2			0.00102	$\alpha(\text{K})=0.00102$ 3
5086.4	(13 ⁺)	132.5	100	4954.0 (12 ⁺)	M1+(E2)			0.92	$\alpha(\text{K})=0.66$ 13; $\alpha(\text{L})=0.21$ 10; $\alpha(\text{M})=0.047$ 23; $\alpha(\text{N}+..)=0.013$ 7
		635.3	82	4450.9 (12 ⁺)	M1+E2			0.011 4	$\alpha(\text{K})=0.009$ 3; $\alpha(\text{L})=0.0013$ 3
		941.8	100	4144.5 (11 ⁺)	E2			0.00314	$\alpha(\text{K})=0.00263$ 8; $\alpha(\text{L})=0.00039$ 1
5133.9	(13 ⁺)	377.9	52	4756.0 (12 ⁺)	M1+E2			0.042 12	$\alpha(\text{K})=0.034$ 11; $\alpha(\text{L})=0.0056$ 7; $\alpha(\text{M})=0.00124$ 13; $\alpha(\text{N}+..)=0.00034$ 4 E_γ : average from 1984La29 and 1994Rz01 values.
		989.4	100	4144.5 (11 ⁺)	E2			0.00283	$\alpha(\text{K})=0.00237$ 8; $\alpha(\text{L})=0.00034$ 1
5179.5	(14 ⁺)	728.6	100	4450.9 (12 ⁺)	E2			0.00556	E_γ : average from 1984La29 and 1994Rz01 values. $\alpha(\text{K})=0.00460$ 14; $\alpha(\text{L})=0.00072$ 2 E_γ : average from 1984La29 and 1994Rz01 values.
5227.9	(14 ⁺)	141.6	100	5086.4 (13 ⁺)					
5369.9	(14 ⁺)	142.1	11	5227.9 (14 ⁺)					
		236.0	53	5133.9 (13 ⁺)	M1+(E2)			0.16 3	Seen only by 1994Rz01. $\alpha(\text{K})=0.13$ 4; $\alpha(\text{L})=0.025$ 3; $\alpha(\text{M})=0.0055$ 7; $\alpha(\text{N}+..)=0.00155$ 17 E_γ : average of 1984La29 and 1994Rz01 values.
		283.4	21	5086.4 (13 ⁺)	M1+E2			0.093 21	$\alpha(\text{K})=0.075$ 21; $\alpha(\text{L})=0.0136$ 1; $\alpha(\text{M})=0.00301$ 9; $\alpha(\text{N}+..)=0.00084$ 1 Seen only by 1994Rz01.
		919.0	100	4450.9 (12 ⁺)	E2			0.00331	$\alpha(\text{K})=0.00277$ 9; $\alpha(\text{L})=0.00041$ 1 Seen only by 1994Rz01.
5455.0	(14 ⁺)	227.1	100	5227.9 (14 ⁺)					
5486.8	(14 ⁺)	1036.0	100	4450.9 (12 ⁺)					
5497.1	(13 ⁺)	317.7	50	5179.5 (14 ⁺)					
		1046.2	100	4450.9 (12 ⁺)	M1+E2			0.0034 9	Seen only by 1994Rz01. $\alpha(\text{K})=0.0028$ 8; $\alpha(\text{L})=0.00039$ 9 E_γ : average of 1984La29 and 1994Rz01 values.

Adopted Levels, Gammas (continued)

$\gamma(^{144}\text{Gd})$ (continued)

$E_i(\text{level})$	J_i^π	E_γ	$I_\gamma^\dagger$	E_f	J_f^π	Mult. [‡]	$\alpha\&$	Comments
5613.1	(14 ⁺)	1162.2	100	4450.9	(12 ⁺)	E2	0.00204	$\alpha(\text{K})=0.00172\ 6$; $\alpha(\text{L})=0.00024\ 1$
5626.4	(14 ⁺)	129.3	100	5497.1	(13 ⁺)	M1+(E2)	1.00 1	$\alpha(\text{K})=0.70\ 13$; $\alpha(\text{L})=0.23\ 11$; $\alpha(\text{M})=0.05\ 3$; $\alpha(\text{N}+..)=0.015\ 7$ E_γ : average of 1984La29 and 1994Rz01 values, I_γ from 1994Rz01.
		492.4	92	5133.9	(13 ⁺)	M1+E2	0.021 6	$\alpha(\text{K})=0.017\ 6$; $\alpha(\text{L})=0.0026\ 5$; $\alpha(\text{M})=0.00058\ 11$; $\alpha(\text{N}+..)=0.00016\ 3$ E_γ : average of 1984La29 and 1994Rz01 values, I_γ from 1994Rz01.
5722.9	(15 ⁺)	267.9	22	5455.0	(14 ⁺)			Seen only by 1994Rz01.
		352.9	100	5369.9	(14 ⁺)	M1+E2	0.050 14	$\alpha(\text{K})=0.041\ 13$; $\alpha(\text{L})=0.0069\ 7$; $\alpha(\text{M})=0.00152\ 11$; $\alpha(\text{N}+..)=0.00042\ 4$ E_γ : average of 1984La29 and 1994Rz01 values, I_γ from 1994Rz01.
5835.2	(15 ⁺)	208.7	100	5626.4	(14 ⁺)	M1+(E2)	0.23 4	$\alpha(\text{K})=0.18\ 5$; $\alpha(\text{L})=0.038\ 7$; $\alpha(\text{M})=0.0085\ 17$; $\alpha(\text{N}+..)=0.0024\ 5$ E_γ : average of 1984La29 and 1994Rz01 values, I_γ from 1994Rz01.
		465.3 @ @	50	5369.9	(14 ⁺)	M1+E2	0.024 7	$\alpha(\text{K})=0.020\ 7$; $\alpha(\text{L})=0.0031\ 6$; $\alpha(\text{M})=0.00068\ 12$; $\alpha(\text{N}+..)=0.00019\ 4$
6213.7	(16 ⁺)	490.6	100	5722.9	(15 ⁺)	M1+E2	0.021 7	$\alpha(\text{K})=0.017\ 6$; $\alpha(\text{L})=0.0027\ 6$; $\alpha(\text{M})=0.00058\ 11$; $\alpha(\text{N}+..)=0.00016\ 3$
6233.0	(16 ⁺)	397.8	100	5835.2	(15 ⁺)			
6264.2	(17 ⁺)	541.4	100	5722.9	(15 ⁺)	E2	0.0115	$\alpha(\text{K})=0.0093\ 3$; $\alpha(\text{L})=0.00162\ 5$
6325.0		711.9		5613.1	(14 ⁺)			
6380.6		545.4	100	5835.2	(15 ⁺)			
6382.1	(17 ⁺)	118.0	46	6264.2	(17 ⁺)			
		168.0	100	6213.7	(16 ⁺)			
6432.4	(17 ⁺)	199.4	100	6233.0	(16 ⁺)			
6443.1		607.9	100	5835.2	(15 ⁺)			
6618.4	(17 ⁺)	236.0	75	6382.1	(17 ⁺)			
		404.8	100	6213.7	(16 ⁺)	M1+E2	0.035 10	$\alpha(\text{K})=0.029\ 9$; $\alpha(\text{L})=0.0046\ 7$; $\alpha(\text{M})=0.00101\ 13$; $\alpha(\text{N}+..)=0.00028\ 4$
6669.9	(16 ⁺)	1056.8	100	5613.1	(14 ⁺)	E2	0.00247	$\alpha(\text{K})=0.00207\ 7$; $\alpha(\text{L})=0.00030\ 1$
		1183.2	86	5486.8	(14 ⁺)	E2	0.00197	$\alpha(\text{K})=0.00166\ 5$; $\alpha(\text{L})=0.00023\ 1$
6703.3	(16 ⁺)	1090.2	100	5613.1	(14 ⁺)	E2	0.00232	$\alpha(\text{K})=0.00195\ 6$; $\alpha(\text{L})=0.00028\ 1$
		1216.6	100	5486.8	(14 ⁺)	E2	0.00186	$\alpha(\text{K})=0.00157\ 5$; $\alpha(\text{L})=0.00022\ 1$
6747.8		514.8		6233.0	(16 ⁺)			
6824.6	(16 ⁺)	1337.6	100	5486.8	(14 ⁺)	(E2)	0.00154	$\alpha(\text{K})=0.00131\ 4$; $\alpha(\text{L})=0.00018\ 1$
6927.7	(18 ⁺)	495.3	100	6432.4	(17 ⁺)			
7014.1	(18 ⁺)	395.6	100	6618.4	(17 ⁺)	M1+(E2)	0.037 11	$\alpha(\text{K})=0.031\ 10$; $\alpha(\text{L})=0.0049\ 7$; $\alpha(\text{M})=0.00108\ 13$; $\alpha(\text{N}+..)=0.00030\ 4$
7339.1		411.4	100	6927.7	(18 ⁺)			
7349.1	(19 ⁺)	334.9	100	7014.1	(18 ⁺)	M1+E2	0.058 15	$\alpha(\text{K})=0.048\ 14$; $\alpha(\text{L})=0.0081\ 6$; $\alpha(\text{M})=0.00178\ 9$; $\alpha(\text{N}+..)=0.00050\ 4$
7349.7	(18 ⁺)	525.0	8	6824.6	(16 ⁺)	E2	0.0124	$\alpha(\text{K})=0.0101\ 3$; $\alpha(\text{L})=0.00177\ 6$
		646.4	100	6703.3	(16 ⁺)	E2	0.00737	$\alpha(\text{K})=0.00606\ 19$; $\alpha(\text{L})=0.00098\ 3$
		679.8	64	6669.9	(16 ⁺)	E2	0.00654	$\alpha(\text{K})=0.00539\ 17$; $\alpha(\text{L})=0.00086\ 3$
		1136.0	20	6213.7	(16 ⁺)			
7351.5	(19 ⁺)	423.8	100	6927.7	(18 ⁺)			
7418.6	(19 ⁺)	404.5	100	7014.1	(18 ⁺)	M1+E2	0.035 10	$\alpha(\text{K})=0.029\ 9$; $\alpha(\text{L})=0.0046\ 7$; $\alpha(\text{M})=0.00101\ 13$; $\alpha(\text{N}+..)=0.00028\ 4$
7569.4	(20 ⁺)	219.9	100	7349.7	(18 ⁺)			
7606.6	(20 ⁺)	255.1	100	7351.5	(19 ⁺)			
		267.5	39	7339.1				

Adopted Levels, Gammas (continued)

$\gamma(^{144}\text{Gd})$ (continued)

$E_i(\text{level})$	J_i^π	E_γ	$I_\gamma^\dagger$	E_f	J_f^π	Mult. [‡]	$\alpha^\&$	Comments
7756.4	(20 ⁺)	407.2	100	7349.1	(19 ⁺)	M1+(E2)	0.034 10	$\alpha(\text{K})=0.028$ 9; $\alpha(\text{L})=0.0045$ 7; $\alpha(\text{M})=0.00099$ 13; $\alpha(\text{N}+..)=0.00027$ 4
7760.8		421.7		7339.1				
7885.9		279.3	100	7606.6	(20 ⁺)			
7923.0	(20 ⁺)	504.4	100	7418.6	(19 ⁺)	M1+E2	0.020 6	$\alpha(\text{K})=0.016$ 6; $\alpha(\text{L})=0.0025$ 5
8104.4	(20 ⁺)	754.7	100	7349.7	(18 ⁺)	E2	0.00513	$\alpha(\text{K})=0.00425$ 13; $\alpha(\text{L})=0.00066$ 2
8189.5	(21 ⁺)	432.9	100	7756.4	(20 ⁺)	M1+(E2)	0.029 9	$\alpha(\text{K})=0.024$ 8; $\alpha(\text{L})=0.0038$ 7; $\alpha(\text{M})=0.00083$ 12; $\alpha(\text{N}+..)=0.00023$ 4
		620.2	23	7569.4	(20 ⁺)			
8221.2	(21 ⁺)	298.2	100	7923.0	(20 ⁺)	M1+(E2)	0.080 19	$\alpha(\text{K})=0.065$ 19; $\alpha(\text{L})=0.0116$ 2; $\alpha(\text{M})=0.00256$ 1; $\alpha(\text{N}+..)=0.00072$ 1
8476.1	(22 ⁺)	286.6	100	8189.5	(21 ⁺)			
8539.9	(22 ⁺)	318.7	100	8221.2	(21 ⁺)	M1+E2	0.067 17	$\alpha(\text{K})=0.055$ 16; $\alpha(\text{L})=0.0094$ 5; $\alpha(\text{M})=0.00208$ 6; $\alpha(\text{N}+..)=0.00058$ 3
8595.3	(22 ⁺)	374.1	100	8221.2	(21 ⁺)			
8641.9	(24 ⁺)	165.8	100	8476.1	(22 ⁺)			
8993	(23 ⁺)	453.4	100	8539.9	(22 ⁺)	M1+(E2)	0.026 8	$\alpha(\text{K})=0.021$ 7; $\alpha(\text{L})=0.0033$ 6; $\alpha(\text{M})=0.00073$ 12; $\alpha(\text{N}+..)=0.00020$ 4
9069.8	(22 ⁺)	965.4	100	8104.4	(20 ⁺)			
9079	(23 ⁺)	483.8	100	8595.3	(22 ⁺)			
9198.9	(24 ⁺)	722.8	100	8476.1	(22 ⁺)			
9603.0		404.2	100	9198.9	(24 ⁺)			
		961.1	31	8641.9	(24 ⁺)			
9862.4	(24 ⁺)	792.6	100	9069.8	(22 ⁺)	E2	0.00459	$\alpha(\text{K})=0.00381$ 12; $\alpha(\text{L})=0.00058$ 2
9958.6	(24 ⁺)	888.8	100	9069.8	(22 ⁺)	E2	0.00356	$\alpha(\text{K})=0.00297$ 9; $\alpha(\text{L})=0.00044$ 1
10066.1		463.1	100	9603.0				
10424.1		561.7	100	9862.4	(24 ⁺)			
10441.4	(26 ⁺)	579.0	100	9862.4	(24 ⁺)	E2	0.0097	$\alpha(\text{K})=0.00789$ 24; $\alpha(\text{L})=0.00133$ 4
10795.2	(26 ⁺)	836.6	100	9958.6	(24 ⁺)	E2	0.00407	$\alpha(\text{K})=0.00339$ 11; $\alpha(\text{L})=0.00051$ 2
11178.3	(28 ⁺)	736.9	100	10441.4	(26 ⁺)			
11723.7	(28 ⁺)	928.5	100	10795.2	(26 ⁺)	(E2)	0.00324	$\alpha(\text{K})=0.00271$ 9; $\alpha(\text{L})=0.00040$ 1
12843	(30 ⁺)	1119.5		11723.7	(28 ⁺)	(E2)	0.00220	$\alpha(\text{K})=0.00185$ 6; $\alpha(\text{L})=0.00026$ 1
13941	(32 ⁺)	1098		12843	(30 ⁺)	(E2)	0.00228	$\alpha(\text{K})=0.00192$ 6; $\alpha(\text{L})=0.00027$ 1
802.8+x	J+2	802.8 3	0.22 4	x	J $\approx$ (22)			
1649.0+x	J+4	846.2 2	0.43 5	802.8+x	J+2			
2528.2+x	J+6	879.2 2	0.55 5	1649.0+x	J+4	(E2)		
3430.7+x	J+8	902.5 2	0.87 4	2528.2+x	J+6	(E2)		
4323.3+x	J+10	892.6 5	1.00 3	3430.7+x	J+8	(E2)		
5257.5+x	J+12	934.2 2	1.00 3	4323.3+x	J+10	(E2)		
6237.5+x	J+14	980.0 2	0.99 3	5257.5+x	J+12	(E2)		
7268.8+x	J+16	1031.3 5	1.01 5	6237.5+x	J+14	(E2)		
8353.4+x	J+18	1084.6 5	0.92 4	7268.8+x	J+16	(E2)		
9492.9+x	J+20	1139.5 2	0.87 5	8353.4+x	J+18	(E2)		
10687.6+x	J+22	1194.7 2	0.83 7	9492.9+x	J+20	(E2)		
11937.4+x	J+24	1249.8 2	0.74 7	10687.6+x	J+22			
13243.0+x	J+26	1305.6 5	0.65 7	11937.4+x	J+24	(E2)		
14605.0+x	J+28	1362.0 5	0.55 5	13243.0+x	J+26			

Adopted Levels, Gammas (continued)

$\gamma(^{144}\text{Gd})$ (continued)

$E_i(\text{level})$	J_i^π	E_γ	$I_\gamma^\dagger$	E_f	J_f^π	$E_i(\text{level})$	J_i^π	E_γ	$I_\gamma^\dagger$	E_f	J_f^π
16022.8+x	J+30	1417.8 5	0.43 4	14605.0+x	J+28	7617.6+z	J+16	1160.0 5	1.09 10	6457.6+z	J+14
17497.3+x	J+32	1474.5 6	0.34 5	16022.8+x	J+30	8833.6+z	J+18	1216.0 4	0.85 13	7617.6+z	J+16
19029.1+x	J+34	1531.8 10	0.24 4	17497.3+x	J+32	10110.7+z	J+20	1277.1 9	0.68 10	8833.6+z	J+18
20617.1+x	J+36	1588.0 15	0.16 3	19029.1+x	J+34	11443.7+z	J+22	1333.0 13	0.43 14	10110.7+z	J+20
22262+x	J+38	1645 2	0.09 2	20617.1+x	J+36	12837+z	J+24	1393.0 15	0.37 18	11443.7+z	J+22
774.5+y	J+2	774.5 5	0.39 8	y	J≈(25)	14289+z	J+26	1452.0 25	0.26 14	12837+z	J+24
1609.3+y	J+4	834.8 4	0.48 8	774.5+y	J+2	852.9+u	J+2	852.9 4	0.62 9	u	J≈(29)
2503.5+y	J+6	894.2 4	0.56 7	1609.3+y	J+4	1764.6+u	J+4	911.7 4	0.83 13	852.9+u	J+2
3456.9+y	J+8	953.4 3	0.77 9	2503.5+y	J+6	2735.3+u	J+6	970.7 5	0.95 10	1764.6+u	J+4
4468.5+y	J+10	1011.6 4	1.00 3	3456.9+y	J+8	3764.5+u	J+8	1029.2 6	1.03 14	2735.3+u	J+6
5538.1+y	J+12	1069.6 4	0.84 6	4468.5+y	J+10	4850.0+u	J+10	1085.5 6	1.00 6	3764.5+u	J+8
6666.0+y	J+14	1127.9 5	1.00 8	5538.1+y	J+12	5994.0+u	J+12	1144.0 7	0.63 15	4850.0+u	J+10
7852.6+y	J+16	1186.6 5	1.03 9	6666.0+y	J+14	7194.1+u	J+14	1200.1 5	0.52 11	5994.0+u	J+12
9098.1+y	J+18	1245.5 6	0.79 14	7852.6+y	J+16	8452.6+u	J+16	1258.5 6	0.45 11	7194.1+u	J+14
10402.0+y	J+20	1303.9 7	0.65 11	9098.1+y	J+18	9769.1+u	J+18	1316.5 5	0.38 9	8452.6+u	J+16
11764.6+y	J+22	1362.6 10	0.48 10	10402.0+y	J+20	11144.6+u	J+20	1375.5 8	0.28 10	9769.1+u	J+18
13186.6+y	J+24	1422.0 15	0.36 7	11764.6+y	J+22	12581.6+u	J+22	1437.0 15	0.19 9	11144.6+u	J+20
14668+y	J+26	1481.0 15	0.22 6	13186.6+y	J+24	936.8+v	J+2	936.8 5	0.89 11	v	J≈(32)
16208+y	J+28	1540 2	0.16 5	14668+y	J+26	1935.2+v	J+4	998.4 8	0.80 11	936.8+v	J+2
743.6+z	J+2	743.6 8	0.44 8	z	J≈(24)	2993.1+v	J+6	1057.9 5	1.01 8	1935.2+v	J+4
1548.3+z	J+4	804.7 7	0.52 8	743.6+z	J+2	4105.7+v	J+8	1112.6 6	0.97 12	2993.1+v	J+6
2409.7+z	J+6	861.4 5	0.59 13	1548.3+z	J+4	5277.7+v	J+10	1172 1	1.00 8	4105.7+v	J+8
3332.8+z	J+8	923.1 5	1.11 15	2409.7+z	J+6	6507.7+v	J+12	1230 1	0.90 11	5277.7+v	J+10
4316.0+z	J+10	983.2 4	1.03 10	3332.8+z	J+8	7794.7+v	J+14	1287.0 15	0.57 11	6507.7+v	J+12
5357.4+z	J+12	1041.4 5	1.00 7	4316.0+z	J+10	9144+v	J+16	1349 2	0.50 13	7794.7+v	J+14
6457.6+z	J+14	1100.2 3	0.96 12	5357.4+z	J+12	10554+v	J+18	1410 2	0.44 8	9144+v	J+16

[†] For SD bands, intensities are relative within each band.

[‡] For SD-1 band, assignments are from R(DCO) values.

From $\gamma\gamma(\theta)$ in ¹⁴⁴Tb ε decay (1986Re11).

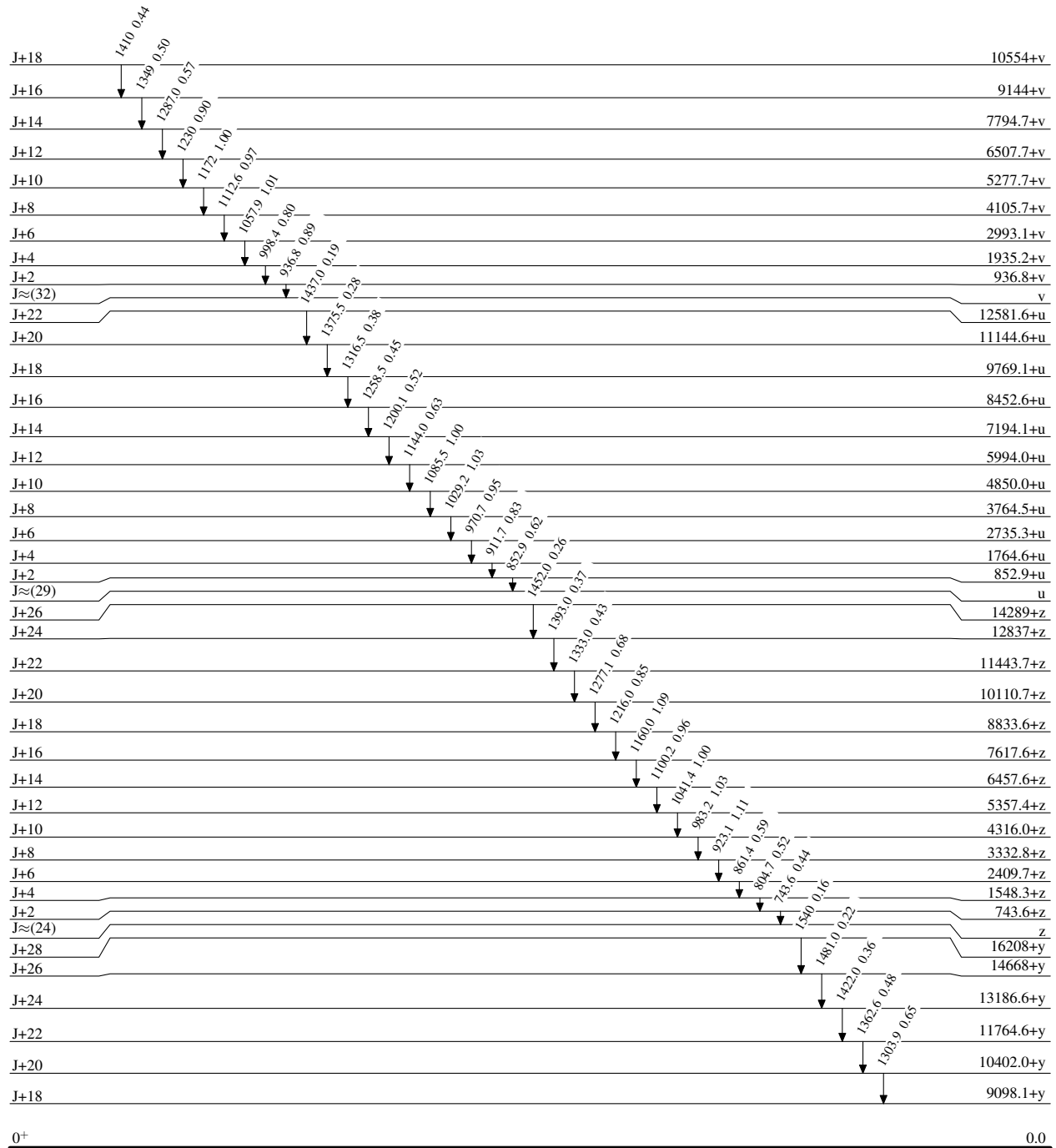
@ Seen only by 1994Rz01.

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

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

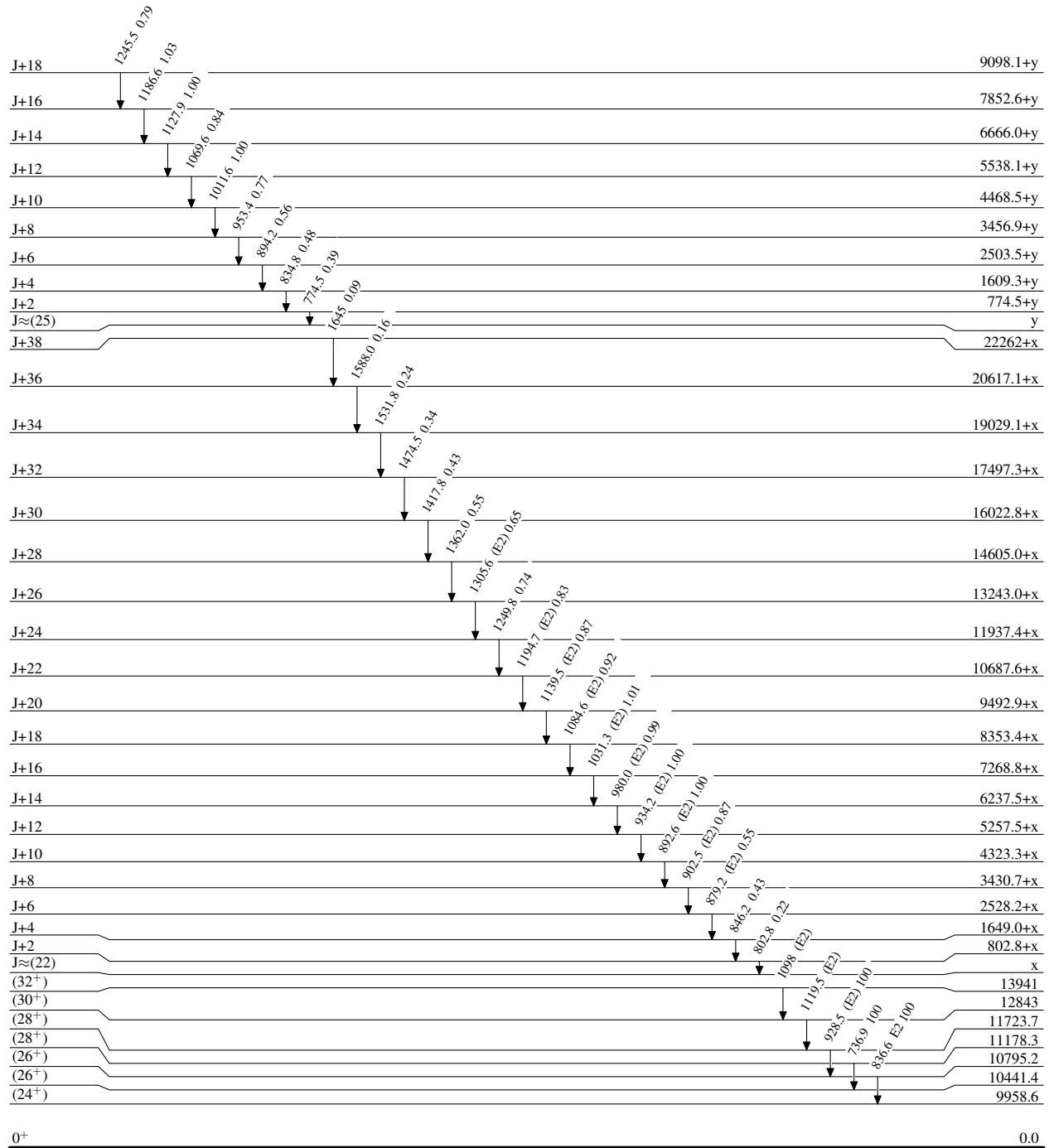
Adopted Levels, GammasLevel Scheme

Intensities: Relative photon branching from each level



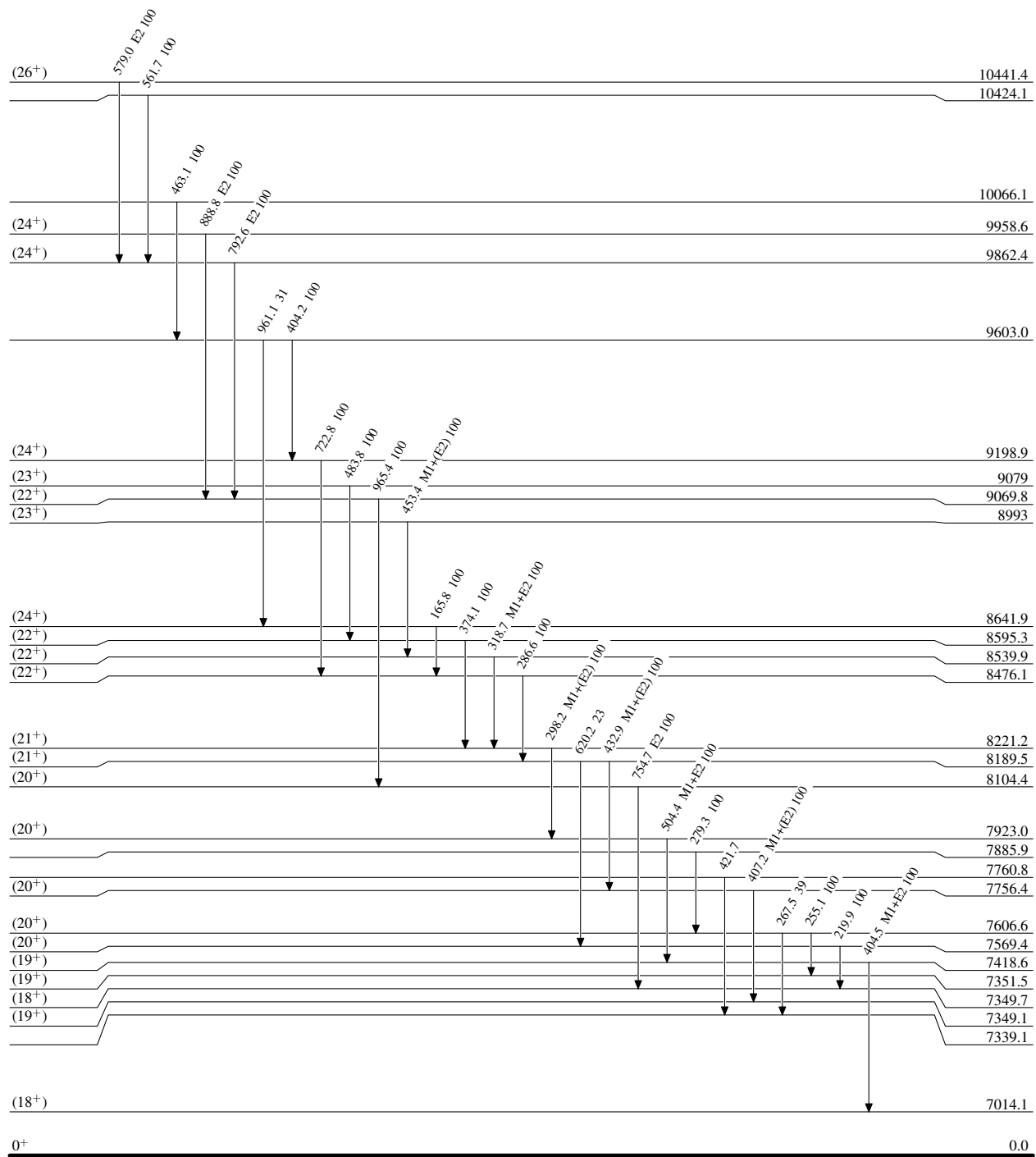
Adopted Levels, GammasLevel Scheme (continued)

Intensities: Relative photon branching from each level



Adopted Levels, Gammas**Level Scheme (continued)**

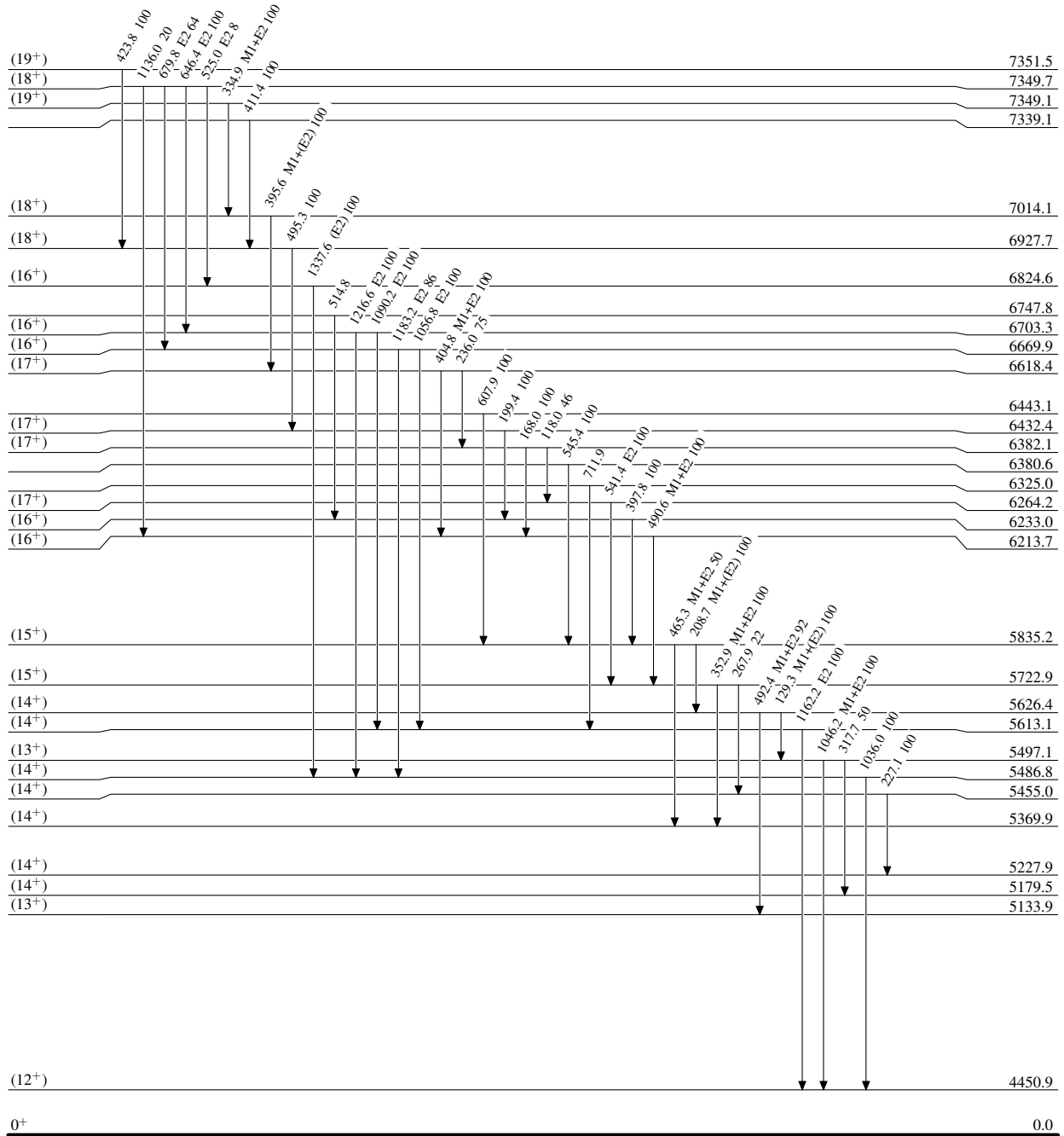
Intensities: Relative photon branching from each level



4.47 min 6

Adopted Levels, Gammas**Level Scheme (continued)**

Intensities: Relative photon branching from each level

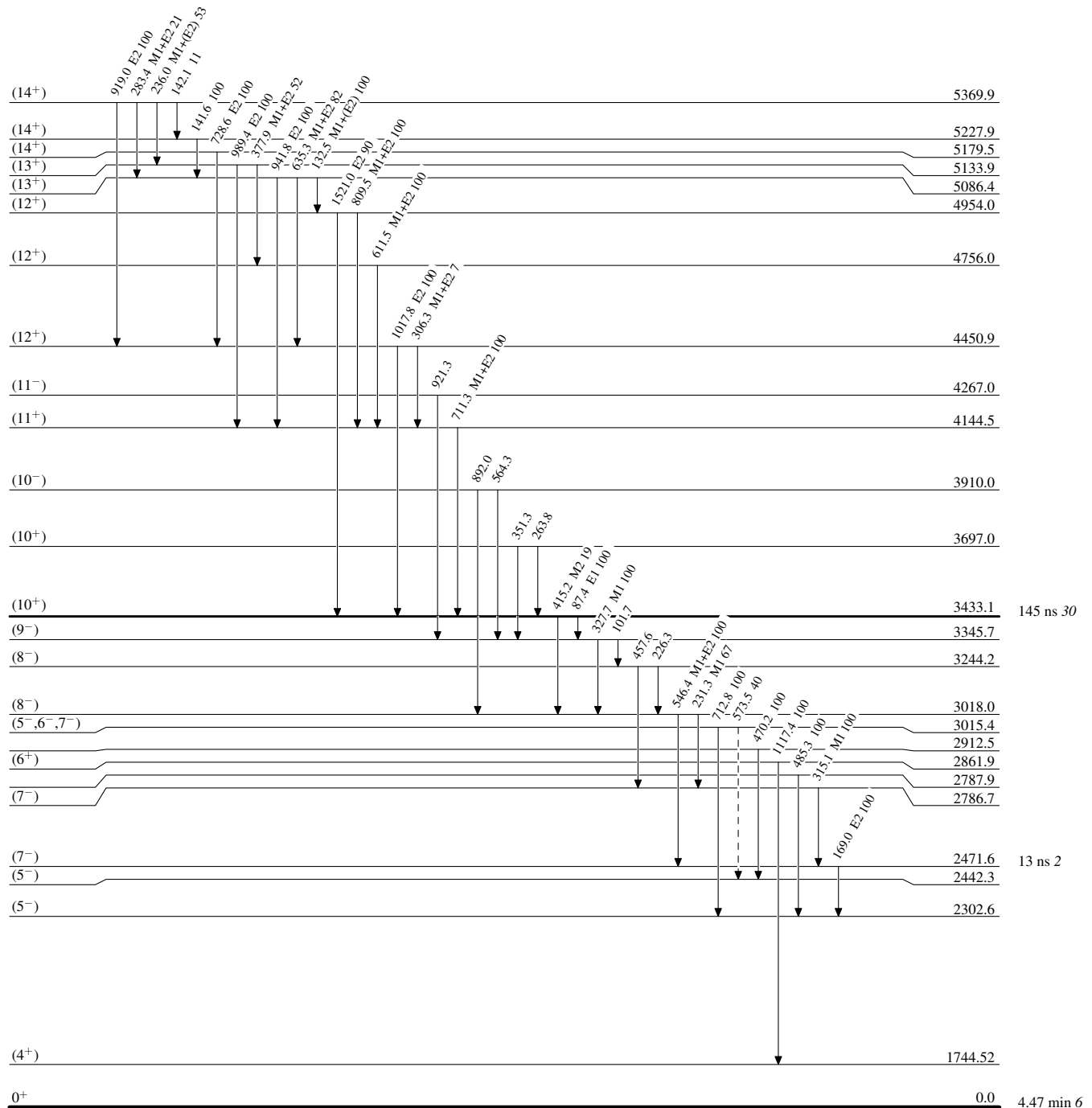


Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

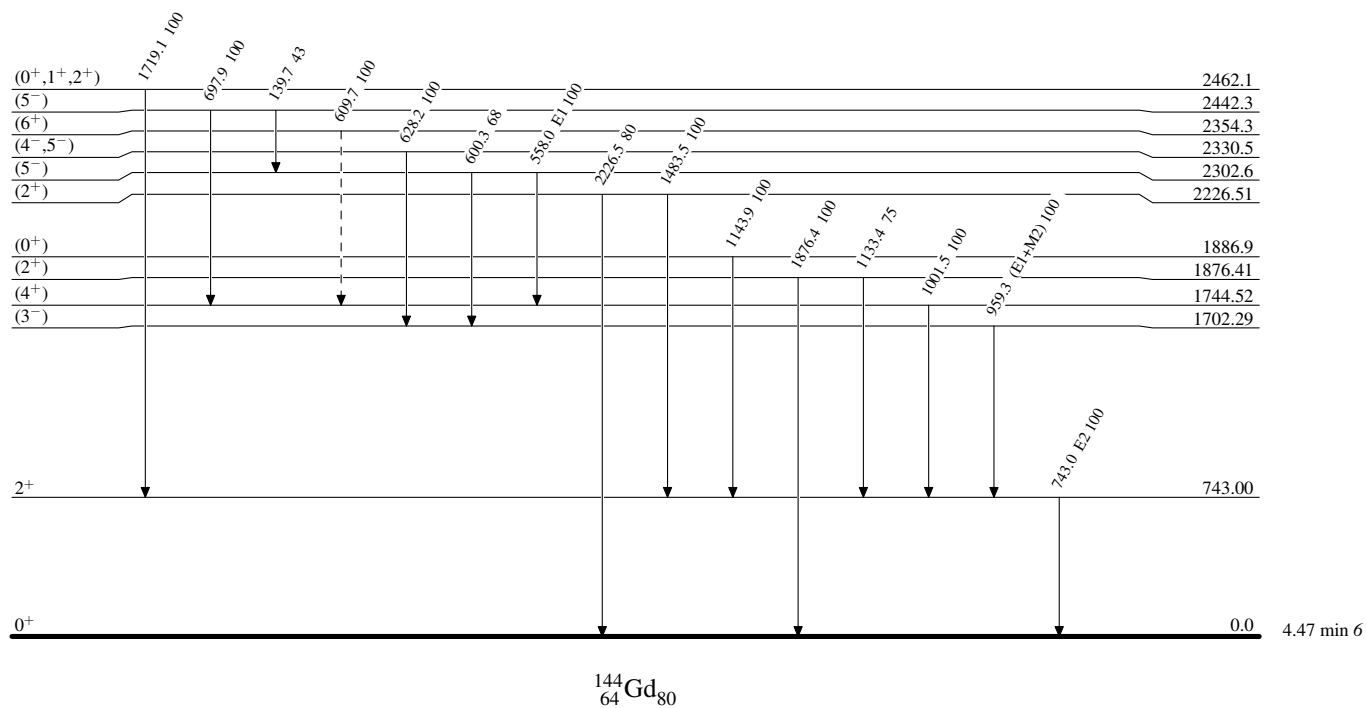
-----► γ Decay (Uncertain)

Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

-----► γ Decay (Uncertain)


Adopted Levels, Gammas

			Band(D): SD-4 band (1997Lu03)		
			J+22	12581.6+u	
			J+20	1437	11144.6+u
			J+18	1376	9769.1+u
			J+16	1316	8452.6+u
			J+14	1258	7194.1+u
			J+12	1200	5994.0+u
			J+10	1144	4850.0+u
			J+8	1086	3764.5+u
			J+6	1029	2735.3+u
			J+4	971	1764.6+u
			J+2	912	852.9+u
			J≈(29)	853	u
			Band(C): SD-3 band (1997Lu03)		
			J+26	14289+z	
			J+24	1452	12837+z
			J+22	1393	11443.7+z
			J+20	1333	10110.7+z
			J+18	1277	8833.6+z
			J+16	1216	7617.6+z
			J+14	1160	6457.6+z
			J+12	1100	5357.4+z
			J+10	1041	4316.0+z
			J+8	983	3332.8+z
			J+6	923	2409.7+z
			J+4	861	1548.3+z
			J+2	805	743.6+z
			J≈(24)	744	z
			Band(B): SD-2 band (1997Lu03)		
			J+28	16208+y	
			J+26	1540	14668+y
			J+24	1481	13186.6+y
			J+22	1422	11764.6+y
			J+20	1363	10402.0+y
			J+18	1304	9098.1+y
			J+16	1246	7852.6+y
			J+14	1187	6666.0+y
			J+12	1128	5538.1+y
			J+10	1070	4468.5+y
			J+8	1012	3456.9+y
			J+6	953	2503.5+y
			J+4	894	1609.3+y
			J+2	835	774.5+y
			J≈(25)	774	y
			Band(A): SD-1 band (1994Lu03,1997Lu03)		
			J+38	22262+x	
			J+36	1645	20617.1+x
			J+34	1588	19029.1+x
			J+32	1532	17497.3+x
			J+30	1474	16022.8+x
			J+28	1418	14605.0+x
			J+26	1362	13243.0+x
			J+24	1306	11937.4+x
			J+22	1250	10687.6+x
			J+20	1195	9492.9+x
			J+18	1140	8353.4+x
			J+16	1085	7268.8+x
			J+14	1031	6237.5+x
			J+12	980	5257.5+x
			J+10	934	4323.3+x
			J+8	893	3430.7+x
			J+6	902	2528.2+x
			J+4	879	1649.0+x
			J+2	846	802.8+x
			J≈(22)	803	x

Adopted Levels, Gammas (continued)**Band(E): SD-5 band
(1997Lu03)**

J+18	10554+v
1410	
J+16	9144+v
1349	
J+14	7794.7+v
1287	
J+12	6507.7+v
1230	
J+10	5277.7+v
1172	
J+8	4105.7+v
1113	
J+6	2993.1+v
1058	
J+4	1935.2+v
998	
J+2	936.8+v
937	
J≈(32)	v

**Band(F): Band based on
18⁺ state at 7350 keV**

(32⁺)	13941
1098	
(30⁺)	12843
1120	
(28⁺)	11723.7
928	
(26⁺)	10795.2
837	
(24⁺)	9958.6
889	
(22⁺)	9069.8
965	
(20⁺)	8104.4
755	
(18⁺)	7349.7