Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	C. W. Reich	NDS 113, 157 (2012)	31-Dec-2010

Q(β^-)=−365.2 *12*; S(n)=8133.0 *6*; S(p)=6131.8 *8*; Q(α)=−139.2 *11* 2017Wa10
S(2n)=14911.6 *6*; S(2p)=14651 *8* 2017Wa10
Additional information 1.
Additional information 2.

^{159}Tb Levels

Model calculations of possible interest are configurations of nonrotational states (1973Ga29,1985GuZR), μ (1973Ra06,1974Ba18,1976Ga35), and IBFM model (1994St05).
An extensive discussion of the band assignments and mixing is given by 1992Ga15.

Cross Reference (XREF) Flags

A	^{159}Gd β^- decay (18.479 h)	E	^{160}Gd(p,2nγ)
B	^{159}Dy ε decay	F	^{159}Tb(γ,γ')
C	Coulomb excitation	G	^{159}Tb(n,n'γ)
D	^{158}Gd(^{3}He,d), ^{158}Gd(α,t),		

E(level)†	J$^\pi$	T$_{1/2}$	XREF	Comments
0.0‡	3/2$^+$	stable	ABCDEFG	Q=+1.432 *8*; μ=+2.014 *4* J$^\pi$: J measured by paramagnetic resonance as quoted in 1969Fu11. π=+, from (α,t). J$^\pi$: Nilsson orbital assignment is supported by μ; alternative assignment of π3/2[402] gives μ < +0.5 (1989Be04). μ: From the evaluation by 1989Ra17 and the compilation by 2005St24. Others: see values quoted in 1969Fu11. Q: From the evaluation by 1989Ra17 and the compilation by 2005St24. Others: +1.26 *12* (1965Ar05); +1.32 (1966Ar18); 1.185 (1969Kl04 and 1970De05); and +1.34 *11* (1970Ch26). δ<r^2>(^{157}Tb−^{159}Tb)≈0.10 fm^2 (1990Al36, as read from graph by evaluator). From an evaluation of data on nuclear rms charge radii, 2004An14 report <r^2>$^{1/2}$=5.06 fm *15*.
57.9964‡ *15*	5/2$^+$	55.0 ps *22*	ABCDEFG	μ=3.86 *19* J$^\pi$: From M1 γ to 3/2$^+$ level and expected band structure. T$_{1/2}$: Calculated from B(E2)=2.81 *8* from Coul. ex. and properties of the deexciting γ (1960Ol02). Others:≥105 ps (1966At05), 96 ps *+37−21* (1966Wo01), 59 ps *13* (1978En01), and > 30 ps (1966Cz02), from (γ,γ') or Mossbauer measurements; and 130 ps *40* (1961Be30), from ^{159}Dy ε decay. μ: From the evaluation by 1989Ra17. 1989Ra17 also quote 1.62 *9* or 2.32 *13*, from 1966At05. These latter two values are listed (incorrectly) as Q values in the compilation by 2005St24. They are to be regarded as having been superseded by the adopted μ value (private communication to the evaluator from N. Stone, Jan., 2011).
137.5055‡ *17*	7/2$^+$	41.3 ps *21*	ABCDEFG	J$^\pi$: From M1 γ to 5/2$^+$ level and expected band structure. T$_{1/2}$: Weighted average of: 35.6 ps *43* (1970Ar22), from Coul. ex.; and 43.1 ps *24*, from B(E2)=1.45 *6* from Coul. ex. and the properties of the deexciting γ's (1960Ol02). Other:≤1.0 ns (1963Go28), from ^{159}Gd β^- decay.
241.15‡ *4*	9/2$^+$	27.2 ps *12*	CDE G	J$^\pi$: From M1 γ to 7/2$^+$ level, intensity pattern in the charged-particle reactions, and expected band structure.

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Adopted Levels, Gammas (continued)

^{159}Tb Levels (continued)

E(level)†	Jπ	$T_{1/2}$	XREF	Comments
				$T_{1/2}$: Weighted average of 27.5 ps *17* (1984Va30) and 26.8 ps *17* (1983Ch09), both by recoil-distance method in Coul. ex.
348.2832# *15*	5/2+		ABCD G	Jπ: From M1 component in γ to 3/2+ level and intensity pattern in the charged-particle reactions.
362.05‡ *4*	11/2+	15.2 ps *2*	C E G	Jπ: From M1 component in γ to 9/2+ level and expected band structure. $T_{1/2}$: Weighted average of 15.2 ps *3* (1984Va30) and 15.3 ps *4* (1983Ch09), both by recoil-distance method in Coul. ex.
363.5449@ *14*	5/2−	153 ps *5*	ABCDEFG	Jπ: From E1 γ′s to 3/2+ and 7/2+ levels. $T_{1/2}$: Weighted average of: 133 ps *21* (1959Me78), 152 ps *10* (1966Ra06), and 133 ps *17* (1972Da35), from (γ,γ′); and 160 ps *16* (1961Go32), 170 ps *70* (1961Va36), 180 ps *15* (1967Ko17), 150 ps *10* (1967Ma33), and 152 ps *15* (1969Be54), from ^{159}Gd β^- decay.
388.4@	7/2−		DE G	XREF: G(386). Jπ: From γ′s to 5/2+ and 7/2+ levels, proposed band structure, and intensity pattern in charged-particle reaction.
428.2#	7/2+		CD G	Jπ: From γ′s to 3/2+ and 7/2+ levels, expected band structure, and intensity pattern in the charged-particle reactions.
454.6@	(9/2−)		DE	Jπ: From γ′s to 7/2− and 7/2+ levels, expected band structure, and intensity pattern in the charged-particle reactions.
510.40‡ *5*	13/2+	9.17 ps *22*	CD G	XREF: D(513). Jπ: From M1 γ to 11/2+ level and expected band structure. $T_{1/2}$: Weighted average of: 9.8 ps *4* (1984Va30) and 9.09 ps *17* (1983Ch09), by recoil-distance method; and 8.0 ps *10* (1983Ch09), by Doppler-shift method.
532#	(9/2+)		D G	Jπ: From γ to 7/2+ level and expected band structure.
536.7			D G	
545.1@	11/2−		dE	XREF: d(545). Jπ: From γ′s to 7/2−, (9/2−), and 9/2+ levels, proposed band structure, and intensity pattern in the charged-particle reactions.
547.6&	7/2−		dE	XREF: d(545). Jπ: From γ′s to 5/2− and 7/2− levels, proposed band structure, and intensity pattern in the charged-particle reactions.
580.808[a] *6*	1/2+	0.76 ps *10*	A CDEFG	Jπ: From M1 component in γ to 3/2+ level and intensity pattern in the charged-particle reactions. $T_{1/2}$: From (γ,γ′) (1966Ra06). Other: < 1.3 ps, from Doppler broadening of conversion line in Coul. ex. (1963Di09).
617.621[a] *15*	3/2+		A CDE G	Jπ: From intensity pattern in the charged-particle reactions and (M1) γ′s to 3/2+ and 5/2+ levels.
668.91‡ *5*	15/2+	6.2 ps *4*	C G	Jπ: From M1 γ to 13/2+ level and expected band structure. $T_{1/2}$: Weighted average of: 7.14 ps *21* (1984Va30) and 6.04 ps *14* (1983Ch09), by recoil-distance method; and 5.3 ps *6* (1983Ch09) and 5.3 ps *3* (1984Va30), by Doppler-shift method.
674.235[a] *17*	5/2+	<2.3 ps	A CdE G	XREF: d(673). Jπ: From intensity pattern in the charged-particle reactions and (M1) γ′s to 3/2+ and 7/2+ levels. $T_{1/2}$: From Doppler broadening of conversion line in Coul. ex. (1963Di09).
677.9&	(9/2−)		dE	XREF: d(673). Jπ: From γ′s to 7/2− and (9/2−) levels, intensity pattern in the charged-particle reactions, and proposed band structure.
761.3[a]	(7/2+)		DE G	XREF: D(763). Jπ: From γ′s to 5/2+ and 9/2+ levels and intensity pattern in the charged-particle reactions.
777.1[b]	7/2+		DE	Jπ: From γ′s to 7/2− levels and interpretation of charged-particle reaction

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Adopted Levels, Gammas (continued)

^{159}Tb Levels (continued)

E(level)[†]	J^π	$T_{1/2}$	XREF	Comments
				data. Calculations of 1985GuZR suggest a significant component of the K+2 γ-vibr based on the π3/2[411] g.s.
799[@]	$15/2^-$		D	J^π: From interpretation of charged-particle reaction data and proposed band structure.
822.2[&]	$11/2^-$		DE	J^π: From intensity pattern in the charged-particle reactions, γ to $(9/2^-)$ level, and proposed band structure.
854.962[c] *14*	$(1/2^-)$		A D G	XREF: D(857). J^π: From γ's to $1/2^+$ and $3/2^+$ levels and intensity pattern in the charged-particle reactions.
857.3[a]	$(9/2^+)$		E	J^π: From γ's to $9/2^+$ and $11/2^+$ levels and proposed band structure.
859.98[‡] *7*	$17/2^+$	3.98 ps *20*	C	J^π: From M1 γ to $15/2^+$ level and expected band structure. $T_{1/2}$: Weighted average of: 3.3 ps *3* (1984Va30) and 3.3 ps *4* (1983Ch09) by Doppler-shift method; and 4.10 ps *10* (1983Ch09) by recoil-distance method.
891.25[c] *6*	$(5/2^-)$		A D	J^π: From interpretation of charged-particle reaction data.
946[d]	$(1/2^+\&3/2^-)$		D	J^π: From (^{3}He,d), (α,t) (1992Ga15). From interpretation of charged-particle reaction data, assigned by 1972Ti05 as a doublet consisting of the π1/2[411] bandhead and the $3/2^-$ member of the π1/2[541] band. Calculations of 1985GuZR suggest a significant contribution from the K-2 γ-vibrational band built on π5/2[413].
971?	$(1/2^+)$		Cd	XREF: d(974). J^π: From γ to $3/2^+$ level and analysis of the charged-particle reaction data.
978[d]	$(3/2^+)$		Cd	XREF: d(974). J^π: From γ's to $3/2^+$ and $5/2^+$ levels and analysis of the charged-particle reaction data. 1972Ti05 assign this level as the $3/2^+$ member of the π1/2[411] band; and 1972Bo47 assign it as a doublet consisting of the $1/2^+$ and $3/2^+$ members of this band.
1008.6[a]	$(11/2^+)$		E	J^π: From γ to $11/2^+$ level and proposed band structure.
1018[d]	$(5/2^+)$		D	J^π: From (^{3}He,d), (α,t) (1992Ga15). 1972Ti05 assign this level as a triplet consisting of the $5/2^+$ states from the π1/2[411] and π5/2[402] bands and the $9/2^-$ member of the π1/2[541] band. 1972Bo47 give the π5/2[402] assignment. In addition to the π5/2[402] bandhead, the calculations of 1985GuZR suggest a significant contribution from the β-vibrational band based on π5/2[413].
1049[d]	$(7/2^+)$		D	J^π: From interpretation of the charged-particle reaction data.
1052.32[‡] *7*	$19/2^+$	2.45 ps *8*	C	J^π: From (M1) γ to $17/2^+$ level and expected band structure. $T_{1/2}$: Weighted average of: 2.15 ps *21* (1984Va30) and 2.5 ps *3* (1983Ch09) by Doppler-shift method; and 2.49 ps *8* (1983Ch09) by recoil-distance method.
1086.5			C	
1099	$(5/2^+)$		d	XREF: d(1099). J^π: From interpretation of the charged-particle reaction data. Assigned by 1972Ti05 as the $7/2^+$ member of the π1/2[411] band, and by 1972Bo47 as a doublet consisting of the $5/2^+$ and $7/2^+$ members of this band.
1102.5?	$(7/2^+)$		Cd	XREF: d(1099). J^π: From γ to $7/2^+$ level; assumed to be a member of a doublet proposed by 1972Bo47.
1156[e]	$(1/2^+)$		D	J^π: From (^{3}He,d),(α,t) (1992Ga15). J^π=$7/2^-$,$1/2^+$ from interpretation of the charged-particle reaction data. Assigned as the $7/2^-$ member of the π1/2[541] band (1972Ti05) and as the bandhead of the $\pi1/2^+$[420] band.
1218[e]	$(3/2^+\&5/2^+)$		D	J^π: From the charged-particle reaction data, 1992Ga15 assign this peak

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Adopted Levels, Gammas (continued)

^{159}Tb Levels (continued)

E(level)[†]	J^π	$T_{1/2}$	XREF	Comments
				as the $3/2^+$ and $5/2^+$ members of the $\pi 1/2[420]$ band.
1264			D	
1282.56[‡] *10*	$21/2^+$	1.57 ps *16*	C	J^π: From M1 γ to $19/2^+$ level and expected band structure. $T_{1/2}$: Weighted average of 1.52 ps *28* (1984Va30) and 1.6 ps *2* (1983Ch09) by Doppler-shift method.
1325			D	
1358			D	
1392[e]	$(7/2^+\&9/2^+)$		D	J^π: From charged-particle reaction data, 1992Ga15 assign this as the $7/2^+$ and $9/2^+$ members of the $\pi 1/2[420]$ band.
1439			D	
1505.18[‡] *13*	$23/2^+$	1.05 ps *13*	C	J^π: From M1 γ to $21/2^+$ level and expected band structure. $T_{1/2}$: Weighted average of 1.11 ps *28* (1984Va30) and 1.04 ps *14* (1983Ch09) by Doppler-shift method.
1530			D	
1567			D	
1604			D	
1634			D	
1666			D	
1712			D	
1743			D	
1769.61[‡] *12*	$25/2^+$		CD	XREF: D(1780). J^π: From E2 γ to $21/2^+$ level and expected band structure.
1823			D	
1872			D	
1888			D	
1904			D	
1943			D	
2019.40[‡] *14*	$27/2^+$		C	J^π: From γ's to $23/2^+$ and $25/2^+$ levels and expected band structure.
2311.51[‡] *14*	$29/2^+$		C	J^π: From γ's to $25/2^+$ and $29/2^+$ levels and expected band structure.
2583.00[‡] *17*	$31/2^+$		C	J^π: From γ to $27/2^+$ level and expected band structure.
2893.1[‡] *6*	$33/2^+$		C	J^π: From γ to $29/2^+$ level and expected band structure.
3179.2[‡] *6*	$35/2^+$		C	J^π: From γ to $31/2^+$ level and expected band structure.
3498.1[‡] *8*	$37/2^+$		C	J^π: From γ to $33/2^+$ level and expected band structure.
3794?[‡] *1*	$(39/2^+)$		C	J^π: From γ to $35/2^+$ level and expected band structure.

[†] From least-squares fit to γ energies.
[‡] Band(A): $K^\pi=3/2^+$, $\pi 3/2[411]$ (g.s.) band. α=11.61 keV, β=−7.3 eV, A_3=+8.6 eV.
[#] Band(B): $K^\pi=5/2^+$, $\pi 5/2[413]$ band. α=11.33 keV, β=+7 eV.
[@] Band(C): $\pi 5/2[532]+\pi 7/2[523]$ band. Dominant conf=$\pi 5/2[532]$, with a large admixture of $\pi 7/2[523]$ along with other $\pi h_{11/2}$-based Nilsson orbitals due to the strong Coriolis mixing among them. From the $5/2^-$ and $7/2^-$ level energies, α=3.6 keV is deduced, indicating a strong compression of the band owing to the strong coupling with the higher-lying bands.
[&] Band(D): $\pi 7/2[523]+\pi 5/2[532]$ band. Dominant conf=$\pi 7/2[523]$, with a large admixture of $\pi 5/2[532]$. a≈14 keV, estimated from the energies of the $7/2^-$ through $11/2^-$ band members, reflecting strong Coriolis mixing with other $h_{11/2}$-based Nilsson orbitals, especially the lower-lying -π band. See the comment on this latter band.
[a] Band(E): $K^\pi=1/2^+$ band. Contains a mixture of the K-2 γ-vibr built on the $\pi 3/2^+[411]$ g.s. and $\pi 1/2[411]$. α=11.73 keV, β=+8.3 eV, a=+0.043.
[b] Band(F): $K^\pi=7/2^+$ bandhead. Dominant conf=$\pi 7/2[404]$, with a significant admixture of the K+2 γ vibr built on the g.s.
[c] Band(G): $K^\pi=1/2^-$, $\pi 1/2[541]$ band.
[d] Band(H): Fragment of the $\pi 1/2[411]$ band. The energy spacings of the band members are not well described by the

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Adopted Levels, Gammas (continued)

^{159}Tb Levels (continued)

rotational-band energy expression.

[e] Band(I): $K^{\pi}=1/2^{+}$, $\pi 1/2[420]$ band. The energy spacings of the band members are not well described by the rotational-band energy expression.

Adopted Levels, Gammas (continued)

γ(^{159}Tb)

E_i(level)	J_i^π	E_γ	I_γ[†]	E_f	J_f^π	Mult.	δ	α[‡]	Comments
57.9964	5/2$^+$	58.0000 *22*	100	0.0	3/2$^+$	M1+E2	+0.119 *2*	10.73	B(M1)(W.u.)=0.173 *8*; B(E2)(W.u.)=365 *10* B(E2)(W.u.): Computed from the measured B(E2)↑=2.81 *8*, from Coul. ex. δ: From L1/L2=5.96 *21*, L1/L3=9.47 *29*, and L2/L3=1.59 *7* from ^{159}Gd β$^-$ decay (1964No08 and reanalyzed by 1965Ba37). Others: +0.122 *13* from γ(θ) in Coul. ex. (1966As02) and 0.122 *17* from L1/L2/L3=1.0 *1*/0.18 *7*/0/13 *3* from ^{159}Dy ε decay (1963Ry02).
137.5055	7/2$^+$	79.5132 *27*	100.0 *23*	57.9964	5/2$^+$	M1+E2	+0.126 *8*	4.28	B(M1)(W.u.)=0.189 *12*; B(E2)(W.u.)=2.4×10^2 *4* δ: From γ(θ) in Coul. ex. (1966As02); other: +0.13 *6*, from γγ(θ) in ^{159}Gd β$^-$ decay (1962Su04).
		137.515 *5*	13.8 *3*	0.0	3/2$^+$	[E2]		0.828	B(E2)(W.u.)=142 *7* B(E2)(W.u.): Computed from the measured B(E2)↑=1.45 *6*, from Coul. ex.
241.15	9/2$^+$	103.60 *6*	100	137.5055	7/2$^+$	M1+E2	0.111 *5*	1.99	B(M1)(W.u.)=0.205 *10*; B(E2)(W.u.)=118 *12* δ: From 1983Ch09. Other: 0.31 *6* from (1984Va30), both values from γ(θ) in Coul. ex.
		183.10 *5*	39	57.9964	5/2$^+$	E2		0.308	B(E2)(W.u.)=220 *10* I_γ: From Coul. ex. Other: 400 *20* from (n,n′γ). Mult.: From γ(θ) in Coul. ex. (1983Ch09,1984Va30).
348.2832	5/2$^+$	210.783 *3*	8.4 *6*	137.5055	7/2$^+$				
		290.2865 *25*	13.5 *2*	57.9964	5/2$^+$				
		348.2807 *18*	100.0 *10*	0.0	3/2$^+$	M1+E2	0.43 *+10−9*	0.0653 *22*	δ: From γ(θ) in (n,n′γ) (1987Al07). Other: +0.2 or −10 from γ(θ) in oriented nuclei (1971Kr19).
362.05	11/2$^+$	120.79 *4*	100	241.15	9/2$^+$	M1+E2	0.112 *5*	1.281	B(M1)(W.u.)=0.261 *5*; B(E2)(W.u.)=113 *11* δ: From 1983Ch09. Other: 0.187 *22* from 1984Va30, both values are from γ(θ) in Coul. ex.
		224.62 *5*	72	137.5055	7/2$^+$	E2		0.1561	B(E2)(W.u.)=294 *5* I_γ: From Coul. ex. Other: 133 23 from (n,n′γ). Mult.: From γ(θ) in Coul. ex. (1983Ch09,1984Va30).
363.5449	5/2$^-$	15.4		348.2832	5/2$^+$	[E1]		9.03	
		226.0406 *18*	1.84 *2*	137.5055	7/2$^+$	E1		0.0341	B(E1)(W.u.)=2.32×10^{-6} *10* δ: The δ(M2/E1) values do not agree: they are < 0.03, from γγ(θ) (1962Su04), 0.17 *5*, from γ(θ) from oriented nuclei (1971Kr19), and 0.026 *5* from α_K(exp) (1975SeZD), all from ^{159}Gd β$^-$ decay. B(E1)(W.u.): Assumes Iγ(1+α)(15.4) is negligible.
		305.5492 *20*	0.53 *1*	57.9964	5/2$^+$	E1		0.01582	B(E1)(W.u.)=2.70×10^{-7} *12* I_γ: From ^{159}Gd β$^-$ decay; other: 5.9 *10* from (n,n′γ). δ: δ(M2/E1)=0.028 *4* (1975SeZD); other: < 0.04 (1964Pe07), both from α_K(exp) from ^{159}Gd β$^-$ decay. B(E1)(W.u.): Assumes Iγ(1+α)(15.4) is negligible.
		363.5430 *18*	100 *2*	0.0	3/2$^+$	E1		0.01033	B(E1)(W.u.)=3.03×10^{-5} *13*

$^{159}_{65}Tb_{94}$-6

Adopted Levels, Gammas (continued)

γ(^{159}Tb) (continued)

E_i(level)	J_i^π	E_γ	I_γ[†]	E_f	J_f^π	Mult.	δ	α[‡]	Comments
									δ: δ(M2/E1)=+0.06 *+1−2* from γ(θ) from oriented ^{159}Gd nuclei (1971Kr19); other: 0.00 *5* from γ(θ) in (n,n′γ) (1987Al07). B(E1)(W.u.): Assumes Iγ(1+α)(15.4) is negligible.
388.4	7/2⁻	248	5.0 *9*	137.5055	7/2⁺				
		331.5	100 *5*	57.9964	5/2⁺	[E1]			δ: δ(M2/E1)=0.00 *5*, from γ(θ) in (n,n′γ) (1987Al07).
428.2	7/2⁺	289		137.5055	7/2⁺				
		371.	100 *9*	57.9964	5/2⁺	[M1]			δ: δ(E2/M1)=0.05 *5*, from γ(θ) in (n,n′γ) (1987Al07).
		429	18 *5*	0.0	3/2⁺				
454.6	(9/2⁻)	65.7	23	388.4	7/2⁻				
		317.7	100	137.5055	7/2⁺				
510.40	13/2⁺	148.21 *4*	90.2 *23*	362.05	11/2⁺	M1+E2	0.106 *6*	0.717	B(M1)(W.u.)=0.250 *10*; B(E2)(W.u.)=64 *8* Iγ: From Coul. ex. Other: 56 *16*, from (n,n′γ). δ: Weighted average of 0.107 *6* (1983Ch09) and 0.097 *15* (1984Va30), both from γ(θ) in Coul. ex.
		269.34 *5*	100	241.15	9/2⁺	E2		0.0872	B(E2)(W.u.)=323 *10* Mult.: From γ(θ) in Coul. ex. (1983Ch09,1984Va30).
532	(9/2⁺)	395		137.5055	7/2⁺	[M1]			δ: δ(E2/M1)=0.057 *25*, from γ(θ) in (n,n′γ) (1987Al07).
536.7		536.7		0.0	3/2⁺	[M3]			δ(E4/M3)=−0.08 *5*, from γ(θ) in (n,n′γ) (1987Al07).
545.1	11/2⁻	90.5	100	454.6	(9/2⁻)				
		156.2	14	388.4	7/2⁻				
		304.4	50	241.15	9/2⁺				
547.6	7/2⁻	158.8	18	388.4	7/2⁻				
		184.7	100	363.5449	5/2⁻				
580.808	1/2⁺	522[#]	2	57.9964	5/2⁺	[E2]		0.01300	B(E2)(W.u.)=7.3 *10* Iγ: From α_K(exp) in Coul. ex. (1963Di09).
		580.808 *6*	100	0.0	3/2⁺	M1+E2		0.014 *5*	
617.621	3/2⁺	559.63 *14*	100.0 *27*	57.9964	5/2⁺	(M1+E2)	0.67 *+58−4*		δ: From γ(θ) in (n,n′γ) (1987Al07).
		617.70 *17*	71.8 *21*	0.0	3/2⁺	(M1)			Iγ: From ^{159}Gd β⁻ decay. Other: 107 *23* from (n,n′γ).
668.91	15/2⁺	158.37 *5*	64.3 *20*	510.40	13/2⁺	M1+E2	0.117 *9*	0.595	B(M1)(W.u.)=0.272 *20*; B(E2)(W.u.)=75 *13* δ: From 1983Ch09. Other: 0.051 *25* (1984Va30). Both values from γ(θ) in Coul. ex.
		307.00 *5*	100	362.05	11/2⁺	E2		0.0581	B(E2)(W.u.)=314 *21* Mult.: From γ(θ) in Coul. ex. (1983Ch09,1984Va30).
674.235	5/2⁺	536.78 *18*	85.0 *25*	137.5055	7/2⁺	(M1)		0.0229	B(M1)(W.u.)>0.026
		616.233 *18*	100 *4*	57.9964	5/2⁺	(M1)		0.01617	B(M1)(W.u.)>0.020
		674.26 *5*	16.9 *13*	0.0	3/2⁺	(M1)		0.01292	B(M1)(W.u.)>0.0026
677.9	(9/2⁻)	130.4	74	547.6	7/2⁻				
		223.5	35	454.6	(9/2⁻)				
		289.2	100	388.4	7/2⁻				
761.3	(7/2⁺)	520.0	80	241.15	9/2⁺	[M1]			δ: δ(E2/M1)=0.09 *+7−6* from γ(θ) in (n,n′γ) (1987Al07).
		623.8	100	137.5055	7/2⁺				
		703.3	20	57.9964	5/2⁺				

$^{159}_{65}Tb_{94}$-7

Adopted Levels, Gammas (continued)

$\gamma(^{159}Tb)$ (continued)

E_i(level)	J_i^π	E_γ	I_γ[†]	E_f	J_f^π	Mult.	δ	α[‡]	Comments
777.1	7/2$^+$	229.7	100	547.6	7/2$^-$				
		388.5	93	388.4	7/2$^-$				
822.2	11/2$^-$	144.3	100	677.9	(9/2$^-$)				
854.962	(1/2$^-$)	237.341 *5*	100.0 *21*	617.621	3/2$^+$				
		274.163 *19*	74 *5*	580.808	1/2$^+$				I_γ: From ^{159}Gd β^- decay; other: 233 *23* from (n,n$'\gamma$).
		854.947 *20*	32.0 *18*	0.0	3/2$^+$				
857.3	(9/2$^+$)	495.2	37	362.05	11/2$^+$				
		616.3	100	241.15	9/2$^+$				
859.98	17/2$^+$	191.21 *8*	53 *5*	668.91	15/2$^+$	M1+E2	0.091 *20*	0.352	B(M1)(W.u.)=0.24 *3*; B(E2)(W.u.)=27 *13* δ: From $\gamma(\theta)$ in Coul. ex. (1984Va30).
		349.58 *6*	100	510.40	13/2$^+$	E2		0.0394	B(E2)(W.u.)=303 *20* Mult.: From $\gamma(\theta)$ in Coul. ex. (1983Ch09,1984Va30).
891.25	(5/2$^-$)	273.62 *12*	100 *50*	617.621	3/2$^+$				
		753.74 *6*	25 *3*	137.5055	7/2$^+$				
971?	(1/2$^+$)	971[#]		0.0	3/2$^+$				
978	(3/2$^+$)	920		57.9964	5/2$^+$				
		978		0.0	3/2$^+$				
1008.6	(11/2$^+$)	646.6	100	362.05	11/2$^+$				
1052.32	19/2$^+$	192.58 *15*		859.98	17/2$^+$	(M1,E2)		0.30 *5*	
		383.33 *6*		668.91	15/2$^+$	E2		0.0301	Mult.: From $\gamma(\theta)$ in Coul. ex. (1983Ch09,1984Va30).
1086.5		949		137.5055	7/2$^+$				
1102.5?	(7/2$^+$)	965		137.5055	7/2$^+$				
1282.56	21/2$^+$	230.11 *11*	26 *5*	1052.32	19/2$^+$	M1,E2		0.18 *4*	
		422.69 *10*	100	859.98	17/2$^+$	E2		0.0230	B(E2)(W.u.)=3.9×10^2 *5* Mult.: From $\gamma(\theta)$ in Coul. ex. (1983Ch09,1984Va30).
1505.18	23/2$^+$	222.31 *24*	35 *3*	1282.56	21/2$^+$	M1,E2		0.20 *4*	
		452.88 *19*	100	1052.32	19/2$^+$	E2		0.0189	B(E2)(W.u.)=3.8×10^2 *5* Mult.: From $\gamma(\theta)$ in Coul. ex. (1983Ch09,1984Va30).
1769.61	25/2$^+$	264.4 *1*	25.7 *19*	1505.18	23/2$^+$				
		487.1 *1*	100	1282.56	21/2$^+$	E2			Mult.: From $\gamma(\theta)$ in Coul. ex. (1983Ch09,1984Va30).
2019.40	27/2$^+$	249.8 *1*	24.9 *19*	1769.61	25/2$^+$				
		514.2 *1*	100	1505.18	23/2$^+$				
2311.51	29/2$^+$	292.1 *1*	21.2 *22*	2019.40	27/2$^+$				
		541.9 *1*	100	1769.61	25/2$^+$				
2583.00	31/2$^+$	563.6 *1*	100	2019.40	27/2$^+$				
2893.1	33/2$^+$	581.6 *5*	100	2311.51	29/2$^+$				
3179.2	35/2$^+$	596.2 *5*	100	2583.00	31/2$^+$				
3498.1	37/2$^+$	605.0 *5*	100	2893.1	33/2$^+$				
3794?	(39/2$^+$)	615[#] *1*	100	3179.2	35/2$^+$				

[†] From ^{159}Gd β^- decay, Coulomb excitation, or (p,2nγ).

$^{159}_{65}Tb_{94}$-8

γ(^{159}Tb) (continued)

‡ 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.

Placement of transition in the level scheme is uncertain.

$^{159}_{65}$Tb$_{94}$-9

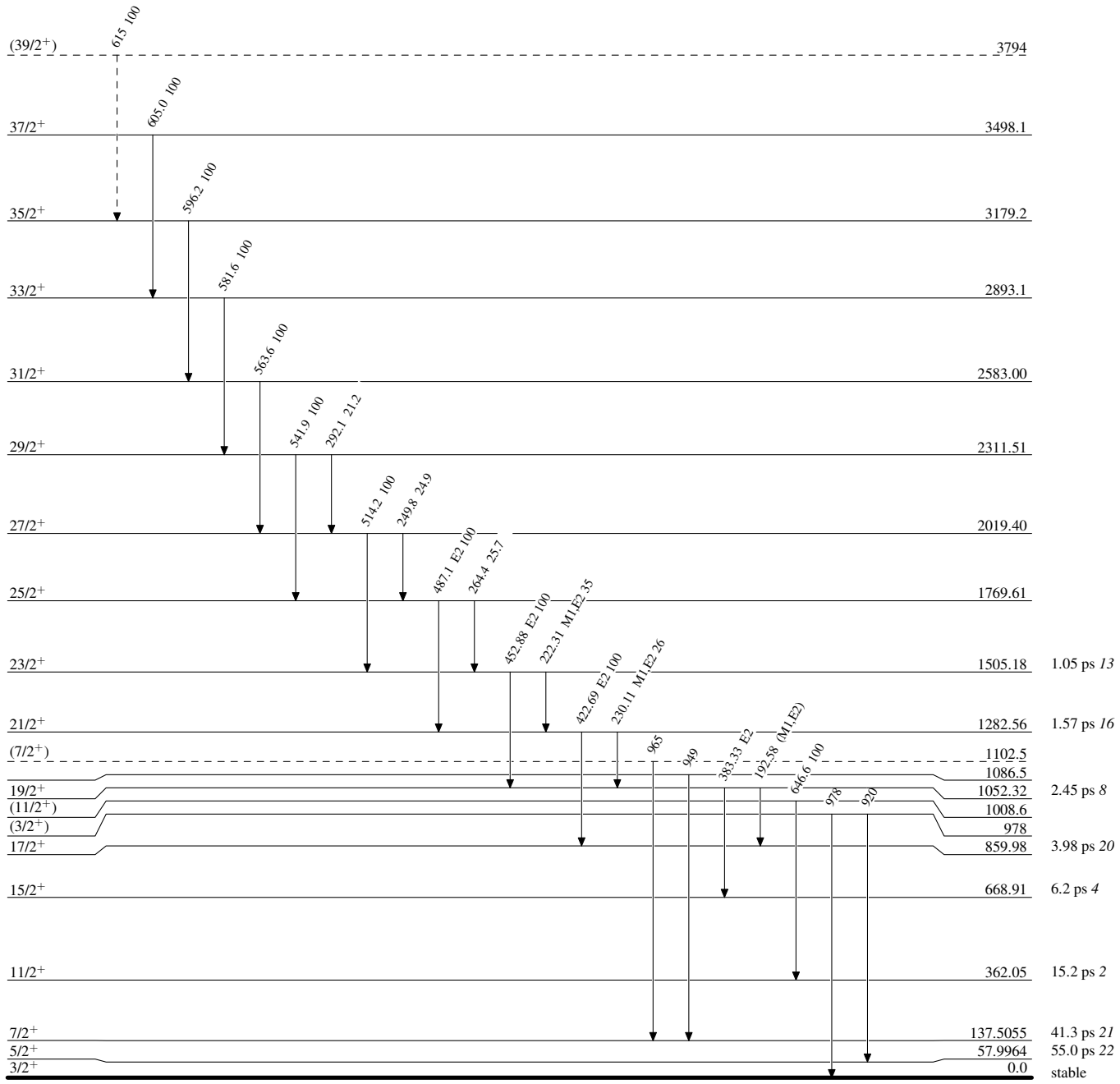
Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level

γ Decay (Uncertain)



$^{159}_{65}Tb_{94}$

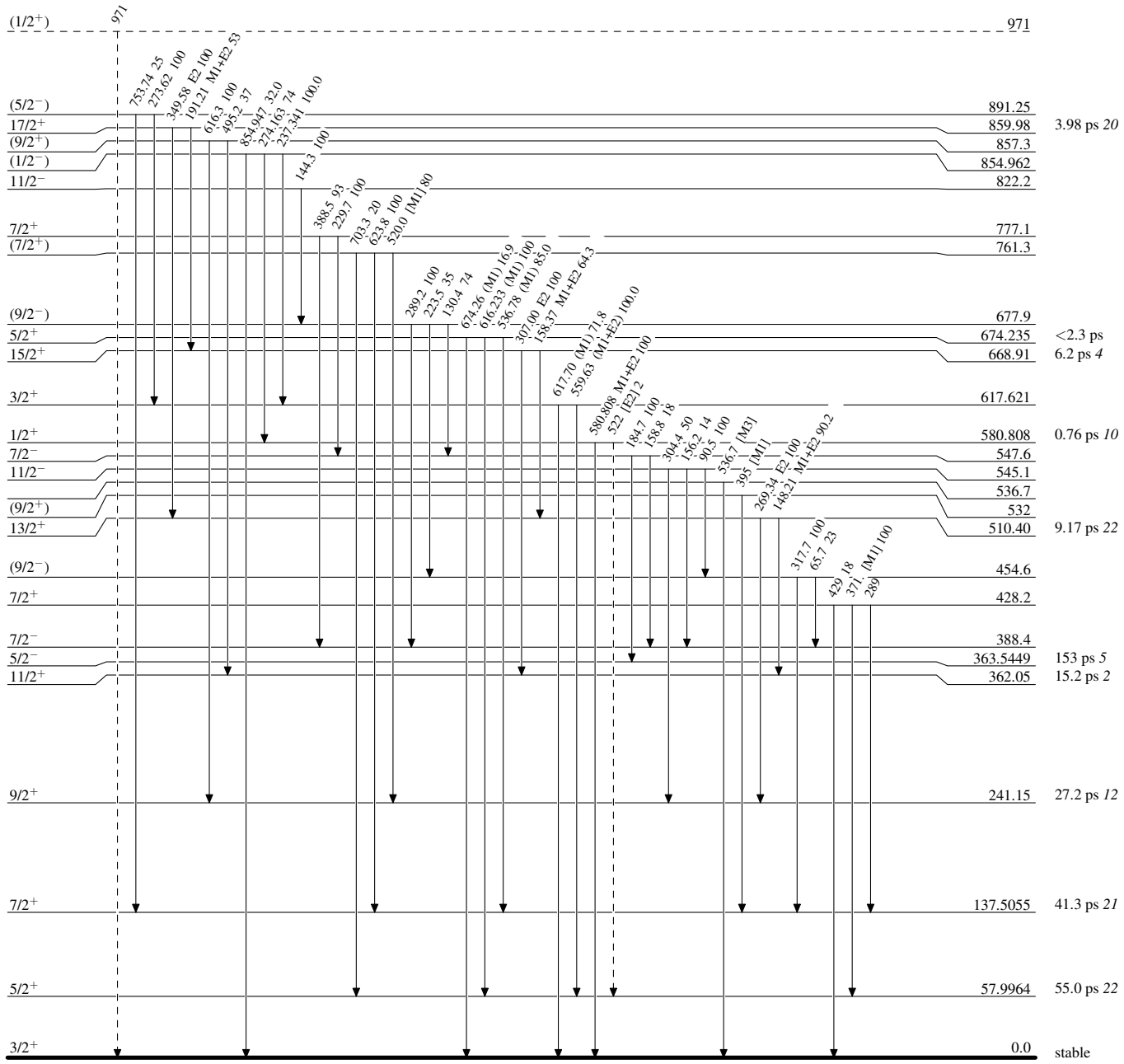
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

γ Decay (Uncertain)

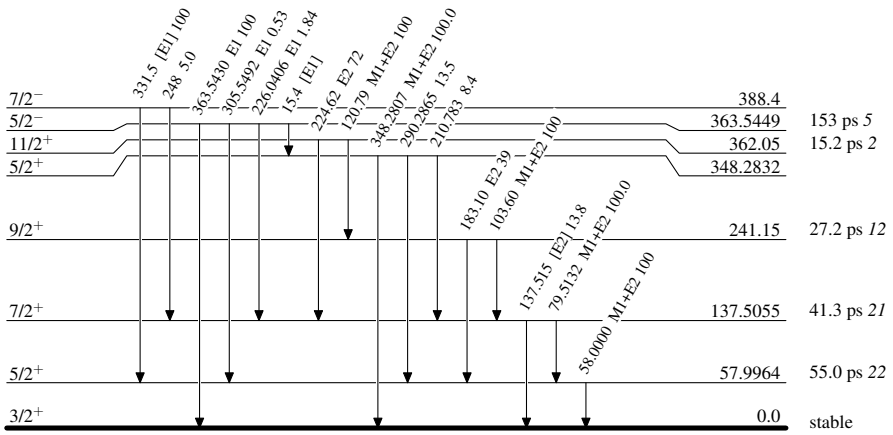


$^{159}_{65}Tb_{94}$

Adopted Levels, Gammas

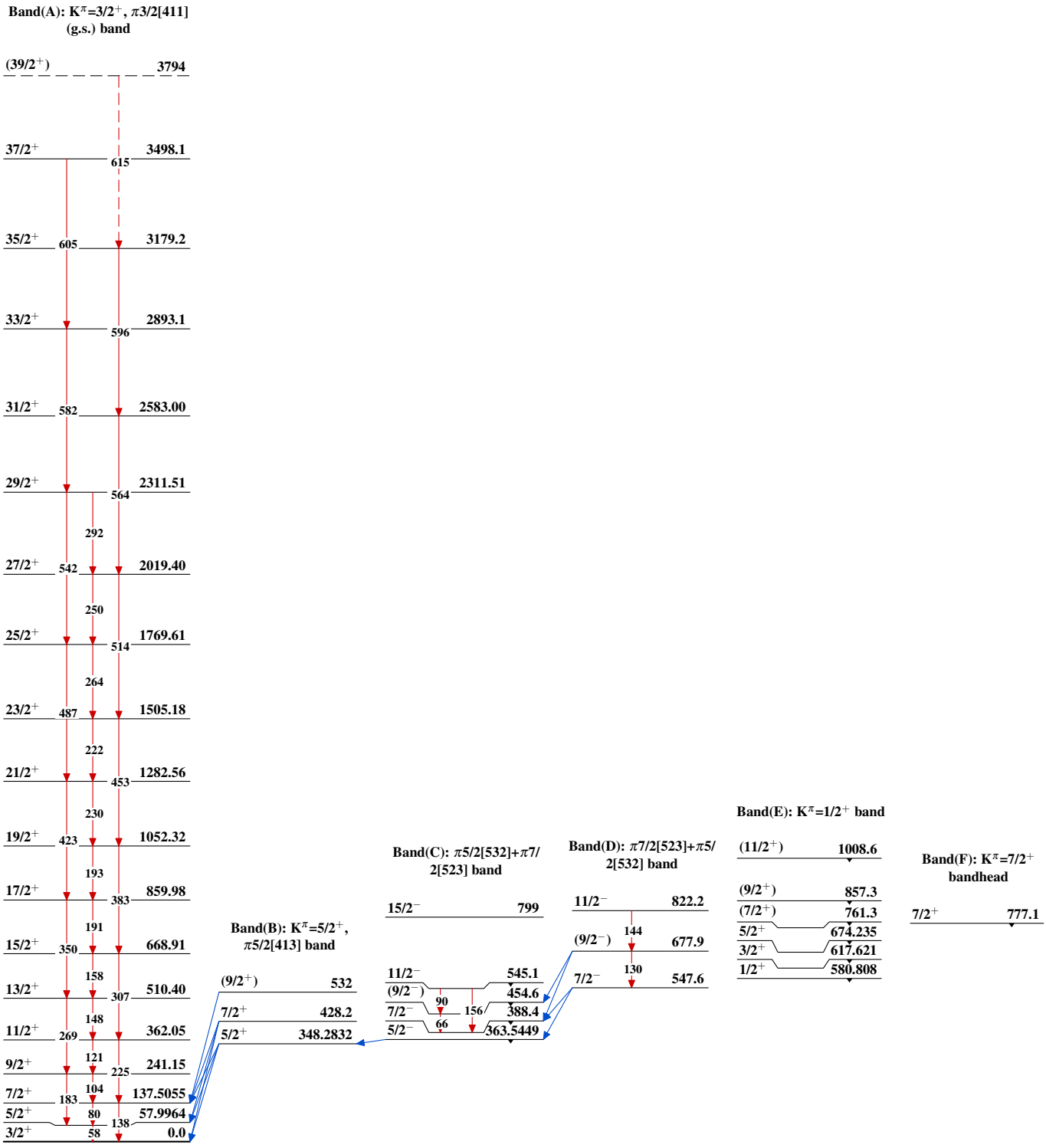
Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{159}_{65}Tb_{94}$

Adopted Levels, Gammas



Adopted Levels, Gammas (continued)

Band(I): $K^{\pi}=1/2^{+}$, $\pi 1/2[420]$ band

$(7/2^{+}\&9/2^{+})$ **1392**

$(3/2^{+}\&5/2^{+})$ **1218**

$(1/2^{+})$ **1156**

Band(H): Fragment of the $\pi 1/2[411]$ band

$(7/2^{+})$ **1049**

$(5/2^{+})$ **1018**

$(3/2^{+})$ **978**

Band(G): $K^{\pi}=1/2^{-}$, $\pi 1/2[541]$ band

$(1/2^{+}\&3/2^{-})$ **946** **$(1/2^{+}\&3/2^{-})$** **946**

$(5/2^{-})$ **891.25**

$(1/2^{-})$ **854.962**

$^{159}_{65}Tb_{94}$