Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 176, 1 (2021)	1-May-2021

Q(β^-)=1836.0 *11*; S(n)=6375.21 *13*; S(p)=6563.6 *8*; Q(α)=−179 *3* 2021Wa16
S(2n)=14508.2 *7*, S(2p)=15144.0 *23* (2021Wa16).
Additional information 1.
1987Be51 have given a description, within a rotor-plus-two-quasiparticle model, of the nuclear states in several doubly odd nuclides, one of which is ^{160}Tb. Their results point to considerable configuration mixing among some of the low-lying bands in ^{160}Tb. They also suggest configuration assignments that are different in some cases from those given here from 1974Ke01. 2007Bu29 provide very strong confirmations of the interpretations of 1974Ke01.

^{160}Tb Levels

NOTE: in most instances, especially above ≈600 keV, the association of a (d,p) peak with a given (n,γ) state is based solely on the near agreement of their reported energies.

Cross Reference (XREF) Flags

A	^{159}Tb(n,γ) E=th
B	^{159}Tb(d,p)
C	^{160}Gd(p,nγ)
D	^{161}Dy(t,α)

E(level)[†]	J$^\pi$[#]	$T_{1/2}$	XREF	Comments
0.0[a]	3$^-$	72.3 d *2*	ABC	%β^-=100 μ=+1.790 *7*; Q=+3.85 *5* $T_{1/2}$: weighted average of: 72.5 d *6* (1999Po32), 72.1 d *3* (1963Ho15), 73.0 d *6* (1957Th11), 72.3 d *5* (1954Ke35), 71 d *1* (1950Bu19), 73.5 d *10* (1946Bo25). Others: 2020Ka01, 1956Sm03, 1950Co17, 1948Kr07, 1948Co09, 1947In07. The result 96.67 d *+16−12* (2020Ka01) is not included in the weighted average because according to Fig. 1 the uncertainty of the decay constant should be about 15% (parameter B on the figure), therefore the correct result would be rather 97 d *+16−12*, which makes it an outlier. J$^\pi$: J=3, from atomic beam (1961Ca07). From configuration=(π 3/2[411] + ν 3/2[521]), π=−. Configuration is that expected from the Σ=1 coupling of the orbitals seen in the adjacent odd-A nuclides and is supported by the μ value of the g.s. and the analysis (by 1977Ke14) of the magnetic properties of the ΔJ=1 transitions within the g.s. band. μ: from 2014StZZ. These also list values of +1.702 *8* and 1.5 *6* for μ. Q: from 2016St14 and 2014StZZ; 2014StZZ also lists Q=3.56 *10*.
63.6856[d] *20*	1$^-$	60 ns *5*	AbC	XREF: b(63). $T_{1/2}$: from $\gamma\gamma$(t) in (n,γ),(p,nγ) (1978Sc10). J$^\pi$: from $\gamma(\theta)$ following n-capture by polarized Tb nuclei. E2 transition to g.s. Head of K^π=1$^-$ band.
64.1096[b] *20*	4$^+$[@]	≤2 ns	AbCD	XREF: b(63). $T_{1/2}$: from $\gamma\gamma$(t) in (n,γ),(p,nγ) (1978Sc10). J$^\pi$: head of a K^π=4$^+$ band; with this configuration assignment, state should be only weakly excited in (d,p), as observed.
78.8665[a] *15*	4$^-$		Ab	XREF: b(79). J$^\pi$: $\Delta\pi$=no component in transition to g.s. indicates π=−. Level energy consistent with that expected for the 4$^-$ member of the g.s. band. Large cross section in (d,p) agrees well with that predicted for the state with this configuration.
79.0925[e] *24*	(0)$^-$		Ab	XREF: b(79).

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Adopted Levels, Gammas (continued)

^{160}Tb Levels (continued)

E(level)[†]	J$^{\pi}$[#]	T$_{1/2}$	XREF	Comments
				J$^{\pi}$: only observed decay mode is to 1$^-$ level at 63.6 keV, consistent with J^{π}=0$^-$. Fed by M1 transition from 1$^-$ level at 133. Expected head of a K^{π}=0$^-$ band.
105.5760[d] *22*	2$^-$		AB	XREF: B(101). J$^{\pi}$: from $\gamma(\theta)$ following n-capture by polarized Tb nuclei. (d,p) cross section agrees well with theoretical prediction for the 2$^-$ member of band with this configuration. M1 transition (to 1$^-$ bandhead) is the only observed decay mode, and is reasonably interpreted as an intraband transition.
126.483[b] *6*	5$^+$		A D	XREF: D(129). J$^{\pi}$: M1 transition to 4$^+$ state, 5$^+$ from dσ/dΩ in (t,α) (doublet level). Rotational parameter, and hence energy-level spacing, consistent with values expected in this region.
133.2213[e] *25*	(1)$^-$		Ab	XREF: b(136). J$^{\pi}$: cross section of the 136-keV (d,p) peak (assumed to populate both the 133 and 139.5 levels, and possibly the 138.7 level also) agrees well with that expected for the sum of the (d,p) cross sections to the 1$^-$ and 2$^-$ members of a 0$^-$ band with this configuration. M1 transition to the 79 state as the sole mode of decay of this level supports: a J^{π}=1$^-$ assignment to this state; a 0$^-$ assignment to the 79 level; and the assumption that both states are members of the same band (the M1 transition being an intraband one).
138.7350[f] *23*	1$^+$[&]	5.7 ns *5*	AbCD	XREF: b(136)D(129). T$_{1/2}$: from $\gamma\gamma$(t) in (n,γ),(p,nγ) (1978Sc10). J$^{\pi}$: E1 transition to (0)$^-$ state, 1$^+$ from dσ/dΩ in (t,α) (doublet level); head of K^{π}=1$^+$ band.
139.4741[e] *24*	(2)$^-$		Ab	XREF: b(136). J$^{\pi}$: cross section of the 136-keV (d,p) peak (assumed to populate both the 133 and 139.5 levels, and possibly the 138.7 level also) agrees well with the theoretical predictions for 1$^-$ and 2$^-$ members of the band with this proposed configuration. (See also, the comment on the 133 level). The 75γ to the 1$^-$ state is (M1,E2).
156.4446[d] *24*	3$^-$		A	J$^{\pi}$: value as reported by 1970Bo32 from study of n-capture by polarized nuclei. Energy reasonable for 3$^-$ band member, with the two deexciting gammas, the only ones observed, being intraband transitions to the two lower-lying band members.
167.7535 *25*	2$^+$[@]		A D	J$^{\pi}$: also, strong M1 γ to 1$^+$; level energy reasonable for assignment as 2$^+$ member of the K^{π}=1$^+$ band.
168.7? *12*			A	
176.833[a] *3*	5$^-$		AB	J$^{\pi}$: (d,p) cross section in good agreement with that expected for the 5$^-$ member of the g.s. band. Level energy supports this interpretation, as do the deexciting gammas.
200.405 *4*	3$^+$[@]		AB D	J$^{\pi}$: also, M1 to 2$^+$.
222.629[g] *3*	0$^+$[@]		A d	XREF: d(232). J$^{\pi}$: doublet level assigned 0$^+$, here the expected head of a K^{π}=0$^+$ band, as well as 1$^+$, the next level of the band (predicted cross section for J=0, K^{π}=0$^+$ is 1/9 that of J=1 state).
232.780[g] *3*	(1)$^+$[@]		A d	XREF: d(232). J$^{\pi}$: see comment at the 222.6, 0$^+$ level, also (E1) transition to (0)$^-$ level.
236.977[e] *4*	3$^-$		AB	J$^{\pi}$: large (d,p) cross section agrees well with that expected for the 3$^-$ member of the band with this configuration. Strong M1,E2 γ to (2)$^-$ state is likely an intraband transition.
244.160[d] *3*	(4$^-$)		A	J$^{\pi}$: γ decay only to 2$^-$ and 3$^-$ members of K^{π}=1$^-$ band. From expected band structure.
257.541[c] *5*	(4$^-$)		AB	J$^{\pi}$: transitions to J^{π}=3$^-$,4$^-$,4$^+$,5$^+$ members of K^{π}=3$^-$ and 4$^+$ bands. Expected head of a K^{π}=4$^-$ band.
265.229[f] *4*	4$^+$[&]		A D	XREF: D(265). J$^{\pi}$: (E2) transition to 3$^+$, 4$^+$ from dσ/dΩ in (t,α) (doublet level).

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Adopted Levels, Gammas (continued)

^{160}Tb Levels (continued)

E(level)[†]	J^{π}[#]	XREF	Comments
268.818[g] 3	2^+	A D	XREF: D(265). J^{π}: E1 transition to $(1)^-$, 2^+ from dσ/dΩ in (t,α) (doublet level).
279[e] 2	(4^-)	B	J^{π}: from expected band structure. Measured (d,p) cross section supports assignment.
305 3		B	
318.357[g] 4	3^+[@]	A D	
322.297[d] 8	(5^-)	AB	J^{π}: from expected band structure. γ decay pattern (only to 3^- and 4^- members of the $K^{\pi}=1^-$ band) supports this assignment.
354.736[c] 11	(5^-)	AB	J^{π}: gammas to (4^-),4^+,5^+ states of bands having K=4 suggest K value is not small. Rotational parameter (A-value) implied by this assignment agrees well with that of the 1^- band formed from the opposite coupling of these two orbitals.
377.761[g] 6	4^+[@]	A D	
381.285[h] 6	(1^-)	AB	J^{π}: head of $K^{\pi}=1^-$ band. Large (d,p) cross sections to and decay patterns of 381 and 421 levels indicate presence of ν 1/2[521]. Rotational bands with $K^{\pi}=1^-$ and 2^- arise from coupling of this orbital with π 3/2[411], with the K=1 band expected to lie lower.
421.434[h] 5	(2^-)	AB	J^{π}: 2^- member of $K^{\pi}=1^-$ band. See comment on the 381 level.
426[i] 1	5^+[@]	D	
474 2		D	
478.224[j] 6	(1^+)	Ab	XREF: b(482). J^{π}: γ decay populates $(1)^+$,$(2)^+$ and $(3)^+$ members of $K^{\pi}=1^+$ band at 138 keV. Possible K-2 γ vibration built on this 1^+ band.
478.559 7	$(1^+,2^+)$	Ab	XREF: b(482). J^{π}: transitions to states with $J^{\pi}=(0^+)$ and $(3)^+$.
480.257[h] 6	(3^-)	Ab	XREF: b(482). J^{π}: from expected band structure.
484.317 9	1,2	Ab	XREF: b(482). J^{π}: γ decays to states with $J^{\pi}=1^-,2^-,(1)^+,2^+$.
503.543 7	$(1^+,2,3^-)$	A	J^{π}: γ's to $(1)^-$ and (3^+) levels.
508[&][i] 3	(6^+)[@]	D	
511.790 12		A	
515.0[‡] 2	2^-	AB	J^{π}: The largest peak in the (d,p) spectrum occurs for a level at this energy. The calculated (d,p) cross sections indicate that the largest (d,p) cross section expected at low energies in ^{160}Tb is for the bandhead of the $K^{\pi}=2^-$ band with the two-nucleon configuration (π 3/2[411] + ν 1/2[521]). This 2^- bandhead is expected to lie above the $K^{\pi}=1^-$ band formed from the opposite coupling of these two orbitals; and the head of this latter band has been located at 381 keV. The evaluator thus identifies the 515 level as this $K^{\pi}=2^-$ bandhead.
520.268[j] 7	(2^+)	A	J^{π}: γ decay to 156 and 236 levels ($J^{\pi}=3^-$) and to J=(2),(3) and (4) members of the $K^{\pi}=1^+$ band at 138 keV. Similarity of decay pattern to that of the 478 level suggests that this is a member of that band. See comment on the 478.2 level.
523[&][k] 2	(6^-)[@]	D	
532.733 9	$(1^-,2,3^-)$	AB	J^{π}: γ's to $(1)^-$ and 3^- levels.
552.967 10	$(2^-,3^+)$	A D	J^{π}: γ transitions to $(1)^+$ and 4^- levels.
558[h] 2	(4^-)	B	J^{π}: energy agrees with expected band structure.
571.554 14	(1)	AB	J^{π}: γ's to $(0)^-$,$(2)^-$,(0^+) and 2^+ levels.
572[k] 1	(7^-)[@]	D	
576.925 9		A	
589.005 11	$(1^-,2)$	A D	J^{π}: γ's to $(1)^+$,$(1)^-$ and 3^- levels.
592.741 11		A	
598.668 11		AB	
612 2		D	
620.7[‡] 2		AB	
637 3		D	
642 2		B	

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Adopted Levels, Gammas (continued)

^{160}Tb Levels (continued)

E(level)[†]	J$^{\pi}$[#]	XREF	Comments
656[k] *1*	(8$^-$)[@]	D	
660.087 *6*		Ab	XREF: b(662).
664.669 *18*	(1$^+$,2$^-$)	Ab	XREF: b(662). J$^{\pi}$: γ's to (0)$^-$ and (3)$^+$ levels.
678.2[‡] *3*		A	
684.398 *10*		Ab	XREF: b(685).
688 *2*		b D	XREF: b(685).
692.5[‡] *3*		A	
712.8[‡] *10*		AB D	XREF: B(709)D(714). the evaluator assumes that the 709-keV (d,p) peak results from population of this (n,γ) state.
729.9[‡] *6*		AB	XREF: B(728).
743 *1*		B D	XREF: D(744).
763.4 *4*		A	
765.471 *22*		Ab d	XREF: b(767)d(766).
767.967 *25*		Ab d	XREF: b(767)d(766).
785 *1*		B D	XREF: D(782).
791.1[‡] *20*		A	
798 *2*		B	
813.9[‡] *3*		A	
823.2[‡] *5*		AB D	XREF: B(821)D(822).
834 *2*		B	
846 *2*		B	
850.9[‡] *5*		A	
858.8[‡] *6*		Ab	XREF: b(860).
862.9[‡] *5*		Ab D	XREF: b(860)D(865).
880.2[‡] *10*		AB	XREF: B(878).
888 *3*		D	
905 *3*		B D	XREF: B(903)D(908).
913.9[‡] *3*		AB	XREF: B(915).
938 *1*		B	
947 *2*		D	
952.8[‡] *5*		A	
956? *2*		B	E(level): possibly unresolved peak consisting of the 952.8 and the 960.0 states observed in (n,γ).
960.0[‡] *6*		A	
976.1[‡] *7*		AB D	XREF: B(975)D(974).
1001.9[‡] *5*		AB D	XREF: B(1001)D(1004).
1006.8[‡] *7*		A D	XREF: D(1004).
1021.6[‡] *15*		AB	XREF: B(1020).
1028 *1*		D	
1039.5?[‡] *15*		A	
1051.7[‡] *8*		AB	XREF: B(1048).
1056.2[‡] *5*		A D	XREF: D(1055).
1060 *3*		B	
1068.1[‡] *4*		A	
1075 *2*		B	
1081 *1*		D	
1086.0[‡] *3*		AB	XREF: B(1086).
1103.9[‡] *7*		AB	XREF: B(1100).
1115.8[‡] *4*		AB	XREF: B(1114).
1124.8[‡] *4*		A	

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Adopted Levels, Gammas (continued)

^{160}Tb Levels (continued)

E(level)†	XREF	Comments
1129.4‡ 3	AB	XREF: B(1129).
1136.9‡ 3	A	
1146.5‡ 3	A	
1150.0‡ 4	AB	XREF: B(1150).
1155.9‡ 5	A	
1160 3	D	
1166 2	B	
1170.5‡ 4	A	
1175.1‡ 4	A	
1184 2	B	
1190.9‡ 4	A D	XREF: D(1192).
1198 2	B	
1252 2	D	
1280 2	D	
1294 2	D	
1346 3	D	
1397 2	D	

† For levels from datasets with γ rays: from least-squares fit to Eγ values; from the respective datasets for the levels from datasets without γ rays.

‡ Level populated by primary transitions in (n,γ), but 1974Ke01 do not assign secondary γ rays to its deexcitation.

\# In addition to the specific arguments given with each level, the listed assignments are based on the fact that this nuclide has a well-developed rotational band structure and utilize some of the features of the various expected rotational bands.

@ From ^{161}Dy(t,α) dataset (2007Bu29), from angular distributions, DWBA and Nilsson-model calculations which give predicted cross sections for members in a band (so called "fingerprint" method). Other specific arguments can be given with the individual levels.

& The shape of the angular distribution for 508+523 group in ^{161}Dy(t,α) dataset is consistent with J=6, K^π=5$^+$, but the total measured cross section is about four times larger than the predicted value. Probably there are additional levels in this energy region.

a Band(A): K$^\pi$=3$^-$ band. Configuration=(π 3/2[411] + ν 3/2[521]) A=9.91 keV, B=−3.4 eV (from 3$^-$, 4$^-$, and 5$^-$ levels).

b Band(B): K$^\pi$=4$^+$ band. Configuration=(π 3/2[411] + ν 5/2[642]) A=6.2 keV (from 4$^+$ and 5$^+$ levels).

c Band(C): K$^\pi$=4$^-$ band. Configuration=(π 3/2[411] + ν 5/2[523]) A=9.7 keV (from 4$^-$ and 5$^-$ levels).

d Band(D): K$^\pi$=1$^-$ band. Configuration=(π 3/2[411] − ν 5/2[523]) A=9.8 keV, B=−11 eV, A_2=−0.38 keV (from 1$^-$, 2$^-$, 3$^-$, and 4$^-$ levels).

e Band(E): K$^\pi$=0$^-$ band. Configuration=(π 3/2[411] − ν 3/2[521]) As commonly observed in doubly odd deformed nuclei, the odd-spin band members are shifted relative to the even-spin members ("Newby shift"). Here, the magnitude of this shift is 34 keV and its sign is such that the odd-J states appear shifted upward relative to the even-J states. A(even-J)=10.06 keV (from 0$^-$ and 2$^-$ levels); A(odd-J)=10.38 keV (from 1$^-$ and 3$^-$ levels).

f Band(F): K$^\pi$=1$^+$ band. Configuration=(π 3/2[411] − ν 5/2[642]) A=6.49 keV, B=+4.3 eV, A_2=−0.37 keV (from 1$^+$, 2$^+$, 3$^+$, and 4$^+$ levels).

g Band(G): K$^\pi$=0$^+$ band. Configuration=(π 5/2[413] − ν 5/2[642]) A=7.67 keV, B=+4.2 eV (from 0$^+$, 2$^+$, and 4$^+$ levels). These parameters predict energies for the 1$^+$ and 3$^+$ band members that differ from the observed values by 3 to 5 keV.

h Band(H): K$^\pi$=1$^-$ band. Configuration=(π 3/2[411] − ν 1/2[521]) A=9.7 keV, A_2=−0.15 keV (from 1$^-$, 2$^-$, and 3$^-$ levels).

i Band(I): K^π=5$^+$ band. Configuration=(ν 5/2[642] + π 5/2[413]).

j Band(J): K$^\pi$=1$^+$ band. Possible K-2 γ-vibration built on the K^π=1$^+$ band with configuration=(π 3/2[411]-ν 5/2[642]). A=10.5 keV (from 1$^+$ and 2$^+$ levels).

k Band(K): K^π=(5$^-$) band.

Adopted Levels, Gammas (continued)

$\gamma(^{160}Tb)$

E_i(level)	J^{π}_i	E_γ†	I_γ†	E_f	J^{π}_f	Mult.†	α‡	Comments
63.6856	1^-	63.6859 *20*	100	0.0	3^-	E2	14.93	α(K)=2.74 *4*; α(L)=9.39 *14*; α(M)=2.24 *4* α(N)=0.501 *7*; α(O)=0.0637 *9*; α(P)=0.0001548 *22* B(E2)(W.u.)=11.0 *10*
64.1096	4^+	64.1097 *20*	100	0.0	3^-	E1	0.976	α(K)=0.805 *12*; α(L)=0.1339 *19*; α(M)=0.0293 *4* α(N)=0.00660 *10*; α(O)=0.000927 *13*; α(P)=4.20×10^{-5} *6* B(E1)(W.u.)>0.00022
78.8665	4^-	78.8664 *15*	100	0.0	3^-	M1,E2	5.4 *11*	α(K)=2.82 *85*; α(L)=2.0 *15*; α(M)=0.46 *35* α(N)=0.104 *78*; α(O)=0.0137 *96*; α(P)=1.86×10^{-4} *88*
79.0925	$(0)^-$	15.413 *6*	100	63.6856	1^-	(M1)	84.8	α(L)=66.4 *10*; α(M)=14.53 *21* α(N)=3.36 *5*; α(O)=0.515 *8*; α(P)=0.0336 *5*
105.5760	2^-	41.8903 *10*	100	63.6856	1^-	M1	4.37	α(L)=3.42 *5*; α(M)=0.748 *11* α(N)=0.1729 *25*; α(O)=0.0266 *4*; α(P)=0.001739 *25*
126.483	5^+	62.370 *12*	100	64.1096	4^+	M1	8.57	α(K)=7.22 *11*; α(L)=1.063 *15*; α(M)=0.232 *4* α(N)=0.0537 *8*; α(O)=0.00826 *12*; α(P)=0.000542 *8*
133.2213	$(1)^-$	54.1287 *10*	100	79.0925	$(0)^-$	M1	12.82	α(K)=10.77 *15*; α(L)=1.611 *23*; α(M)=0.352 *5* α(N)=0.0814 *12*; α(O)=0.01251 *18*; α(P)=0.000819 *12*
138.7350	1^+	33.159 *1*	7.1 *3*	105.5760	2^-	E1	1.084	B(E1)(W.u.)=3.1×10^{-5} *6* α(L)=0.849 *12*; α(M)=0.187 *3* α(N)=0.0415 *6*; α(O)=0.00545 *8*; α(P)=0.000199 *3*
		59.6430 *10*	33 *7*	79.0925	$(0)^-$	E1	1.176	B(E1)(W.u.)=2.5×10^{-5} *7* α(K)=0.967 *14*; α(L)=0.1640 *23*; α(M)=0.0359 *5* α(N)=0.00807 *12*; α(O)=0.001128 *16*; α(P)=5.01×10^{-5} *7*
		75.0503 *20*	100 *21*	63.6856	1^-	E1	0.646	B(E1)(W.u.)=3.8×10^{-5} *11* α(K)=0.536 *8*; α(L)=0.0860 *12*; α(M)=0.0188 *3* α(N)=0.00424 *6*; α(O)=0.000603 *9*; α(P)=2.85×10^{-5} *4*
139.4741	$(2)^-$	(6.253 *3*)		133.2213	$(1)^-$			E_γ,I_γ: intensity imbalance in (n,γ) at this level indicates the existence of an unobserved depopulating transition, most likely to the 133 level. Eγ is from the level-energy difference.
		75.7895 *15*		63.6856	1^-	(M1,E2)	6.2 *13*	α(K)=3.13 *99*; α(L)=2.4 *18*; α(M)=0.56 *43* α(N)=0.125 *95*; α(O)=0.016 *12*; α(P)=2.1×10^{-4} *10* I_γ: since the intensity of the 6-keV γ also deexciting this level is not known, the relative branching associated with this γ is not known. Thus, no relative Iγ value is shown.
156.4446	3^-	50.8687 *10*	100 *19*	105.5760	2^-	(M1)	2.47	α(L)=1.93 *3*; α(M)=0.423 *6* α(N)=0.0976 *14*; α(O)=0.01501 *21*; α(P)=0.000983 *14* Mult.: reported by 1974Ke01 to be E1 or M1 from α(L2)exp. Placement in the level scheme suggests the latter alternative.
		92.765 *10*	8.6 *24*	63.6856	1^-			

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Adopted Levels, Gammas (continued)

$\gamma(^{160}Tb)$ (continued)

E_i(level)	J_i^π	E_γ †	I_γ †	E_f	J_f^π	Mult. †	α ‡	Comments
167.7535	2+	29.025 *3*	100 *4*	138.7350	1+	M1	12.94	α(L)=10.13 *15*; α(M)=2.21 *4* α(N)=0.512 *8*; α(O)=0.0786 *11*; α(P)=0.00514 *8*
		104.0651 *20*	69 *8*	63.6856	1−			
176.833	5−	97.967 *3*	96 *18*	78.8665	4−			
		176.833 *6*	100 *8*	0.0	3−			
200.405	3+	32.652 *4*	100 *5*	167.7535	2+	M1	9.13	α(L)=7.15 *10*; α(M)=1.563 *22* α(N)=0.361 *5*; α(O)=0.0555 *8*; α(P)=0.00363 *5*
		94.832 *5*	42 *9*	105.5760	2−			
222.629	0+	83.894 *6*	42 *13*	138.7350	1+			
		89.408 *2*	80 *13*	133.2213	(1)−			
		158.941 *5*	100 *7*	63.6856	1−			
232.780	(1)+	93.308 *3*	41 *4*	139.4741	(2)−			
		94.043 *3*	7.1 *16*	138.7350	1+			
		153.685 *4*	100 *10*	79.0925	(0)−	(E1)	0.0947	α(K)=0.0798 *12*; α(L)=0.01166 *17*; α(M)=0.00254 *4* α(N)=0.000579 *9*; α(O)=8.54×10^{-5} *12*; α(P)=4.70×10^{-6} *7*
236.977	3−	97.506 *3*	100 *9*	139.4741	(2)−	M1,E2	2.6 *3*	α(K)=1.6 *4*; α(L)=0.78 *49*; α(M)=0.18 *12* α(N)=0.041 *27*; α(O)=0.0055 *33*; α(P)=1.04×10^{-4} *45*
		131.399 *5*	4.7 *12*	105.5760	2−			
244.160	(4−)	87.7156 *10*	100 *10*	156.4446	3−			
		138.545 *20*	11 *4*	105.5760	2−			
257.541	(4−)	131.057 *5*	13.3 *22*	126.483	5+			
		178.673 *8*	9.4 *6*	78.8665	4−			
		193.434 *6*	100 *8*	64.1096	4+			
		257.538 *15*	4.7 *4*	0.0	3−			
265.229	4+	64.8237 *15*	100	200.405	3+	(E2)	13.90	α(K)=2.70 *4*; α(L)=8.62 *12*; α(M)=2.06 *3* α(N)=0.460 *7*; α(O)=0.0586 *9*; α(P)=0.0001495 *21*
268.818	2+	68.402 *12*	10 *3*	200.405	3+			
		101.066 *3*	13 *3*	167.7535	2+			
		112.374 *3*	20.8 *24*	156.4446	3−			
		135.595 *4*	100 *8*	133.2213	(1)−	E1	0.1325	α(K)=0.1115 *16*; α(L)=0.01648 *23*; α(M)=0.00359 *5* α(N)=0.000817 *12*; α(O)=0.0001199 *17*; α(P)=6.45×10^{-6} *9*
		163.242 *5*	24.1 *19*	105.5760	2−			
		205.123 *20*	2.1 *5*	63.6856	1−			
318.357	3+	117.956 *5*	6.1 *20*	200.405	3+			
		150.600 *5*	52 *4*	167.7535	2+			
		178.876 *6*	100 *9*	139.4741	(2)−			
322.297	(5−)	78.140 *8*	100 *5*	244.160	(4−)			
		165.843 *15*	48 *12*	156.4446	3−			
354.736	(5−)	97.196 *12*	59 *18*	257.541	(4−)			
		228.26 *3*	62 *7*	126.483	5+			
		290.619 *20*	100 *15*	64.1096	4+			
377.761	4+	108.940 *6*	24 *7*	268.818	2+			
		140.795 *12*	100 *8*	236.977	3−			
381.285	(1−)	213.51 *3*	3.6 *6*	167.7535	2+			
		241.812 *15*	7.4 *6*	139.4741	(2)−			
		242.558 *15*	4.7 *8*	138.7350	1+			
		248.052 *10*	100 *5*	133.2213	(1)−			

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

$\gamma(^{160}Tb)$ (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f
381.285	(1^-)	275.719 *10*	41 *3*	105.5760	2^-
		317.604 *12*	36 *3*	63.6856	1^-
421.434	(2^-)	184.463 *6*	45 *4*	236.977	3^-
		221.02 *3*	5.4 *7*	200.405	3^+
		264.986 *12*	10.8 *9*	156.4446	3^-
		282.66 *4*	4.8 *10*	138.7350	1^+
		288.185 *15*	49 *4*	133.2213	$(1)^-$
		315.853 *20*	20 *3*	105.5760	2^-
		357.739 *12*	100 *9*	63.6856	1^-
478.224	(1^+)	277.837 *15*	9.5 *10*	200.405	3^+
		310.472 *8*	42 *4*	167.7535	2^+
		339.492 *10*	100 *8*	138.7350	1^+
478.559	$(1^+,2^+)$	209.740 *8*	41 *4*	268.818	2^+
		255.944 *12*	40 *3*	222.629	0^+
		278.134 *25*	19 *4*	200.405	3^+
		310.78 *3*	15 *3*	167.7535	2^+
		339.82 *4*	30 *5*	138.7350	1^+
		372.964 *25*	55 *5*	105.5760	2^-
		414.872 *20*	100 *9*	63.6856	1^-
480.257	(3^-)	211.420 *20*	8.4 *13*	268.818	2^+
		215.021 *25*	9.6 *20*	265.229	4^+
		236.111 *12*	18.4 *14*	244.160	(4^-)
		243.264 *15*	100 *7*	236.977	3^-
		279.79 *6*	6.6 *21*	200.405	3^+
		312.536 *25*	10.9 *13*	167.7535	2^+
		323.802 *20*	13.6 *15*	156.4446	3^-
		340.793 *15*	50 *4*	139.4741	$(2)^-$
		347.06 *3*	12.5 *13*	133.2213	$(1)^-$
		374.662 *20*	72 *6*	105.5760	2^-
484.317	1,2	215.47 *3*	5.5 *16*	268.818	2^+
		316.580 *20*	13.0 *11*	167.7535	2^+
		344.85 *6*	4.9 *10*	139.4741	$(2)^-$
		345.583 *25*	19.7 *20*	138.7350	1^+
		351.095 *15*	100 *9*	133.2213	$(1)^-$
		378.713 *25*	88 *7*	105.5760	2^-
		420.645 *20*	58 *5*	63.6856	1^-
503.543	$(1^+,2,3^-)$	185.188 *8*	75 *7*	318.357	3^+
		234.72 *3*	15.2 *16*	268.818	2^+
		270.759 *12*	100 *9*	232.780	$(1)^+$
		370.34 *4*	19.1 *18*	133.2213	$(1)^-$
511.790		242.977 *15*	100 *8*	268.818	2^+
		373.03 *4*	63 *5*	138.7350	1^+
		406.18 *4*	23 *4*	105.5760	2^-
		448.113 *25*	46 *5*	63.6856	1^-
520.268	(2^+)	255.051 *15*	16.8 *14*	265.229	4^+
		283.275 *20*	26.5 *15*	236.977	3^-
		319.866 *10*	88 *8*	200.405	3^+
		352.513 *12*	100 *8*	167.7535	2^+
		363.805 *20*	65 *6*	156.4446	3^-
532.733	$(1^-,2,3^-)$	295.762 *15*	40 *4*	236.977	3^-
		364.98 *5*	6.6 *14*	167.7535	2^+
		399.499 *20*	57 *5*	133.2213	$(1)^-$
		427.168 *15*	100 *9*	105.5760	2^-
		532.702# *25*	85# *7*	0.0	3^-
552.967	$(2^-,3^+)$	284.155 *15*	72 *7*	268.818	2^+

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

$\gamma(^{160}Tb)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π
552.967	$(2^-,3^+)$	287.736 *20*	22.0 *22*	265.229	4^+
		308.83 *3*	11.5 *17*	244.160	(4^-)
		320.16[#] *3*	13[#] *3*	232.780	$(1)^+$
		396.40 *12*	13 *3*	156.4446	3^-
		413.49 *3*	50 *5*	139.4741	$(2)^-$
		447.387 *20*	100 *9*	105.5760	2^-
571.554	(1)	302.741 *20*	84 *7*	268.818	2^+
		348.924 *20*	100 *7*	222.629	0^+
		403.77 *4*	31 *4*	167.7535	2^+
		432.10 *6*	18 *4*	139.4741	$(2)^-$
		492.53 *15*	32 *7*	79.0925	$(0)^-$
576.925		258.566 *12*	29.3 *23*	318.357	3^+
		308.132 *20*	56 *5*	268.818	2^+
		376.49 *4*	34 *6*	200.405	3^+
		437.442 *15*	100 *8*	139.4741	$(2)^-$
589.005	$(1^-,2)$	320.16[#] *3*	12.0[#] *24*	268.818	2^+
		352.02 *3*	13.5 *16*	236.977	3^-
		356.233 *12*	100 *8*	232.780	$(1)^+$
		455.75 *4*	22.5 *24*	133.2213	$(1)^-$
592.741		274.368 *20*	27 *3*	318.357	3^+
		359.956 *20*	57 *5*	232.780	$(1)^+$
		453.269 *25*	96 *8*	139.4741	$(2)^-$
		459.536 *20*	100 *8*	133.2213	$(1)^-$
		529.06 *6*	74 *8*	63.6856	1^-
598.668		361.711 *15*	100.0 *9*	236.977	3^-
		398.31 *8*	25 *4*	200.405	3^+
		430.85 *4*	23 *3*	167.7535	2^+
		442.205 *25*	75 *6*	156.4446	3^-
		519.779 *25*	84 *6*	78.8665	4^-
		598.70 *8*	53 *7*	0.0	3^-
660.087		179.830 *12*	26 *3*	480.257	(3^-)
		181.868 *6*	81 *7*	478.224	(1^+)
		238.637 *15*	19 *3*	421.434	(2^-)
		278.806 *15*	70 *6*	381.285	(1^-)
		341.709 *15*	100 *7*	318.357	3^+
		554.58 *8*	42 *7*	105.5760	2^-
664.669	$(1^+,2^-)$	464.24 *3*	100 *9*	200.405	3^+
		496.91 *3*	20.1 *21*	167.7535	2^+
		525.21 *4*	34 *5*	139.4741	$(2)^-$
		526.00 *6*	27 *14*	138.7350	1^+
		585.60 *8*	28 *4*	79.0925	$(0)^-$
684.398		262.98 *4*	6.1 *9*	421.434	(2^-)
		303.130 *20*	12.7 *10*	381.285	(1^-)
		451.610 *12*	100 *8*	232.780	$(1)^+$
		544.95 *6*	15.2 *18*	139.4741	$(2)^-$
		545.63 *6*	16.7 *20*	138.7350	1^+
765.471		521.25 *6*	38 *4*	244.160	(4^-)
		532.702[#] *25*	100[#] *8*	232.780	$(1)^+$
		542.78 *8*	23 *4*	222.629	0^+
		626.10 *20*	27 *6*	139.4741	$(2)^-$
		632.34 *15*	25 *6*	133.2213	$(1)^-$
767.967		530.95 *8*	17 *4*	236.977	3^-
		600.20 *3*	100 *8*	167.7535	2^+
		611.60 *8*	25 *3*	156.4446	3^-
		634.77 *6*	34 *4*	133.2213	$(1)^-$

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Adopted Levels, Gammas (continued)

$\gamma(^{160}Tb)$ (continued)

† From (n,γ), except as noted.
‡ Additional information 2.
# Multiply placed with undivided intensity.

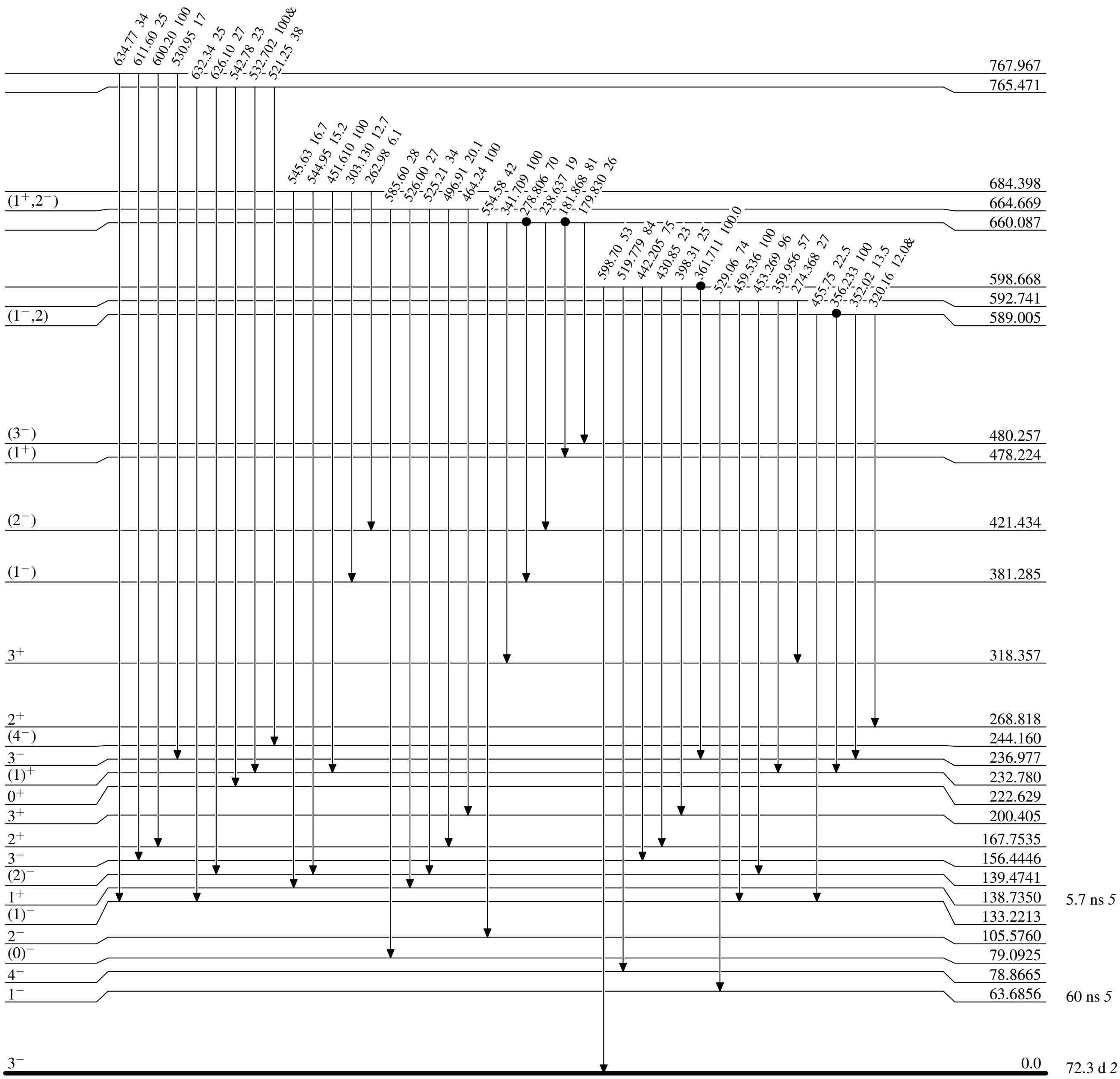
Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given

● Coincidence

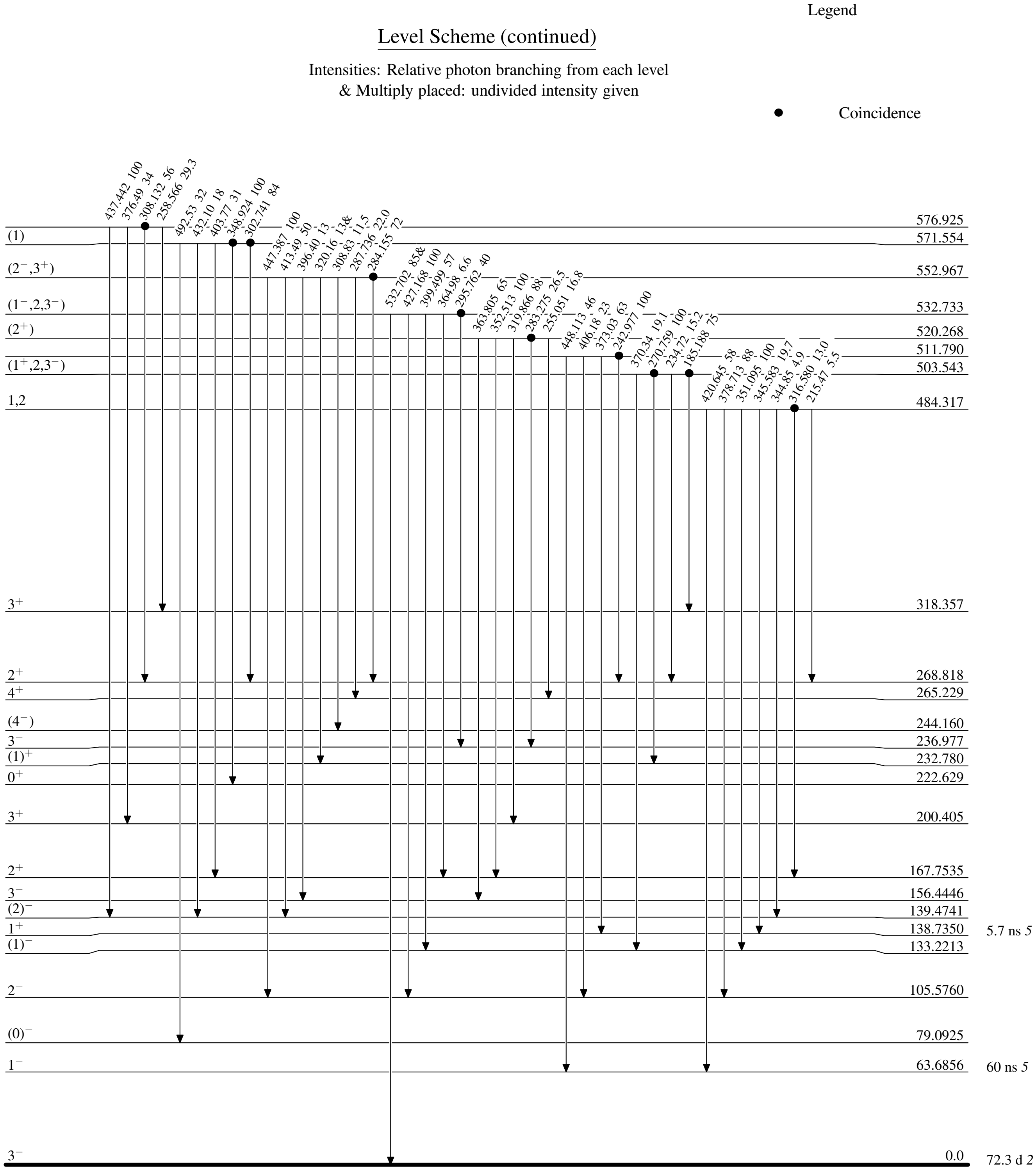


$^{160}_{65}Tb_{95}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given



$^{160}_{65}Tb_{95}$

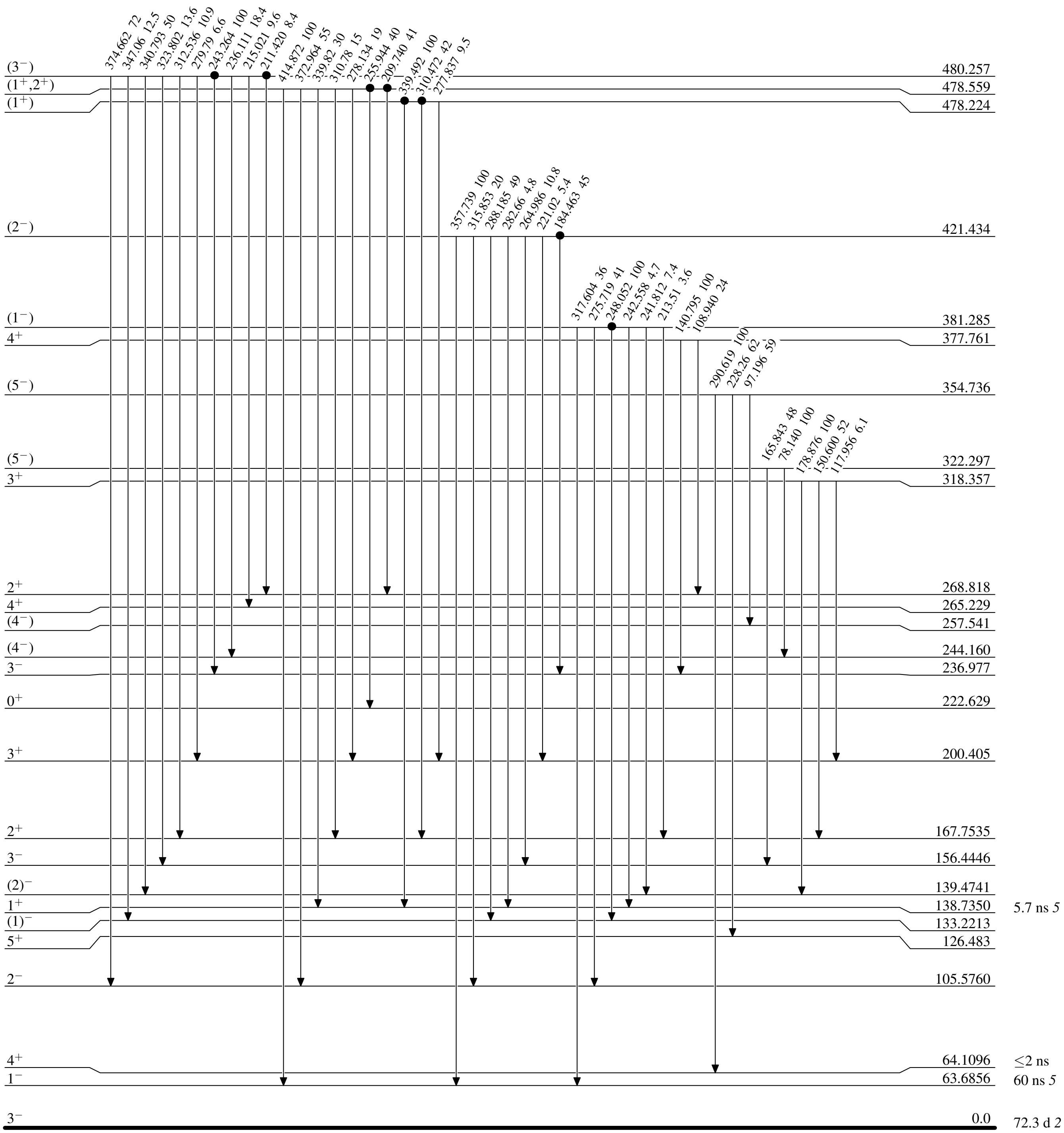
Adopted Levels, Gammas

Level Scheme (continued)

Legend

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given

● Coincidence



$^{160}_{65}Tb_{95}$

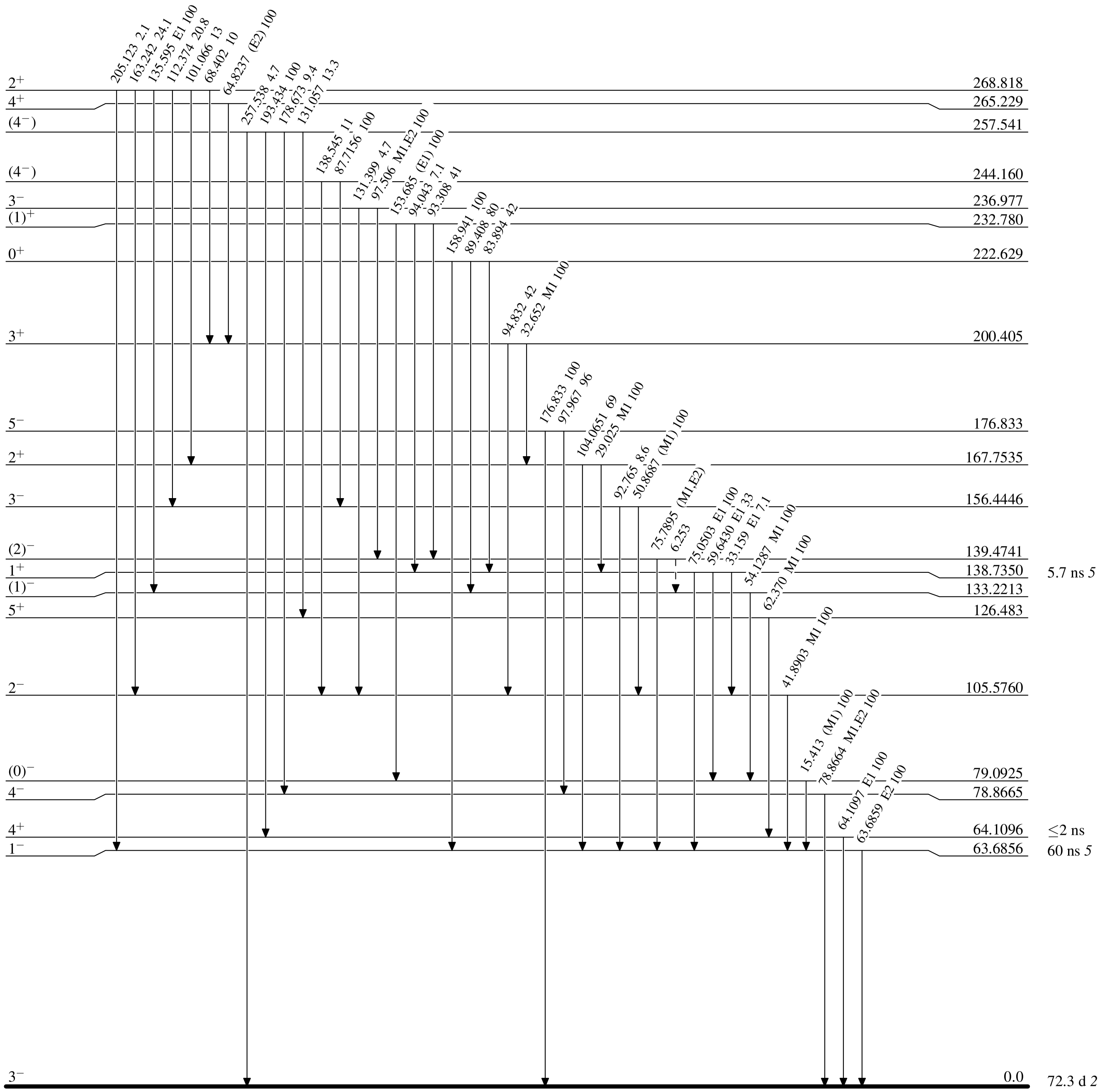
Adopted Levels, Gammas

Legend

Level Scheme (continued)

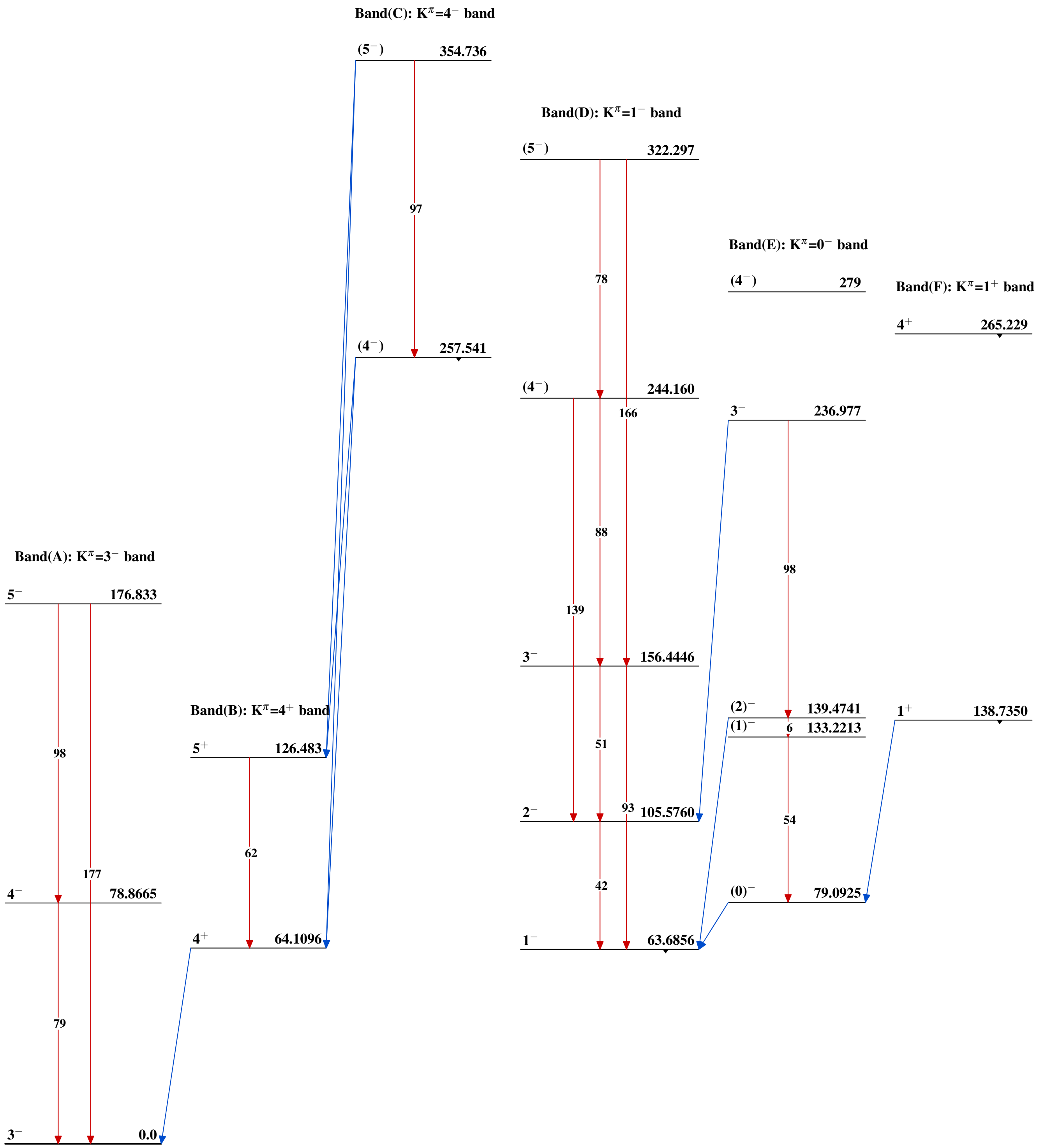
Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given

γ Decay (Uncertain)



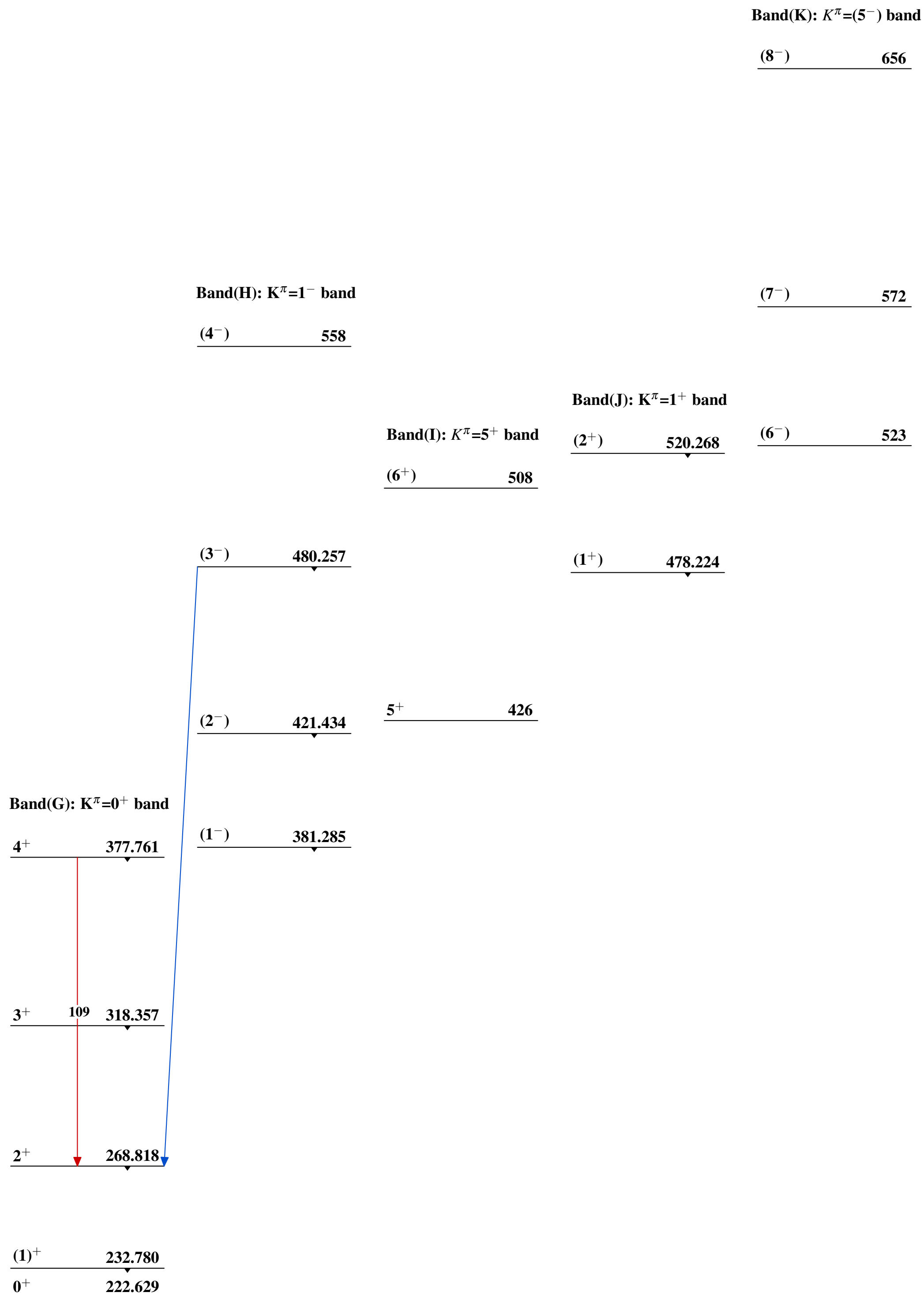
$^{160}_{65}Tb_{95}$

Adopted Levels, Gammas



$^{160}_{65}Tb_{95}$

Adopted Levels, Gammas (continued)



$^{160}_{65}Tb_{95}$