Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	C. W. Reich	NDS 112,2497 (2011)	1-Jun-2011

Q(β^-)=−3.30×10^3 *3*; S(n)=7.21×10^3 *3*; S(p)=6108 *18*; Q(α)=1798 *11* 2012Wa38
Note: Current evaluation has used the following Q record $ −3310 *24* 7222 *27* 6110 *18* 1794 *11* 2009AuZZ.
2003Au03 report the following: for Q(β^-), 3310 *29*; for S(n), 7222 *26*; for S(p), 6110 *18*; and, for Q(α), 1794 *11*.
Additional information 1.
Data are primarily from ^{161}Tm ε decay and in-beam studies with additions from (d,t) study and ^{161}Er IT decay (7.5 μs).

^{161}Er Levels

Calculations of mixing of the wave functions for first few levels of rotational bands are given by 1995Dz02. For the levels assigned here, the calculated wave functions are all quite pure (i.e., ≥ 90% the assigned state).

Cross Reference (XREF) Flags

A	(HI,xnγ)	D	^{161}Er IT decay (7.5 μs)
B	^{161}Tm ε decay	E	^{160}Dy(α,3nγ)
C	^{162}Er(d,t)		

E(level)[†]	J$^\pi$[‡]	T$_{1/2}$	XREF	Comments
0[#]	3/2$^-$	3.21 h *3*	ABCDE	%ε+%β^+=100 μ=−0.365 *3*; Q=+1.361 *14* J$^\pi$: J from atomic-beam magnetic resonance (1969Ek01) and π from agreement of the measured μ with the value calculated for the assigned Nilsson orbital (1974Ba18, see also 1989Be04). T$_{1/2}$: from ^{161}Er ε decay, weighted average of 3.24 h *4* (1972Wo08), 3.1 h *1* (1963Ra15), 3.1 h *1* (1961Gr25), 3.2 h *1* (1961Bj02), 3.4 h *2* (1960Da23), and 3.17 h *17* (1960Dn02). Others: 3.5 (1954Mi01) and 3.05 (1955Ne01). μ: from 1989Ra17 evaluation and based on data from 1985 Proc. Symp. on Quantum Electronics, Bombay, India; other: −0.369 *3* from 1989Ra17 evaluation and based on data of 1972Ek03. The compilation by 2005St24 lists both values. Q: from 1989Ra17 evaluation and based on data of 1972Ek03; other: +1.35 *2* 1989Ra17 evaluation and based on data from 1985 Proc. Symp. on Quantum Electronics, Bombay, India. The compilation by 2005St24 lists both values.
59.501[@] *24*	5/2$^-$	≤0.15 ns	AB DE	J$^\pi$: from M1 component in γ to 3/2$^-$ level and expected band structure. T$_{1/2}$: from ^{161}Tm ε decay (1983Be17,1981AbZU); other: ≤0.17 ns from ^{161}Tm ε decay (1975VaYW,1979AlZU).
143.89[#] *3*	7/2$^-$	≤0.18 ns	ABCDE	J$^\pi$: from E2 γ to 3/2$^-$ level and expected band structure. T$_{1/2}$: from ^{161}Tm ε decay (1983Be17,1981AbZU,1980FrZQ); other: ≤0.2 ns from ^{161}Tm ε decay (1979AlZU).
172.06[&] *3*	5/2$^-$	0.35 ns *10*	BC E	XREF: E(?). J$^\pi$: from M1 components in γ's to 3/2$^-$ and 7/2$^-$ levels. T$_{1/2}$: from ^{161}Tm ε decay, combination of 0.25 ns *4* (1983Be17,1981AbZU) and 0.45 ns *5* (1979AlZU).
189.42[a] *3*	9/2$^+$	84 ns *10*	ABCDE	J$^\pi$: from E1 γ to 7/2$^-$ level and agreement of experimental and calculated (d,t) cross sections. T$_{1/2}$: from ^{161}Tm ε decay, combination of 93 ns *4* (1975Bu10) and 74 ns *3* (1979AlZU). Others: 70 ns *20* from (α,xnγ) (1970Hj02) and 70 ns (1972AnZL).
212.91[a] *3*	5/2$^+$	0.81 ns *6*	B	J$^\pi$: from E2 γ to 9/2$^+$ level and E1 to 3/2$^-$. T$_{1/2}$: from ^{161}Tm ε decay (1983Be17,1981AbZU).

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Adopted Levels, Gammas (continued)

^{161}Er Levels (continued)

E(level)[†]	J$^\pi$[‡]	$T_{1/2}$	XREF	Comments
217.34[b] *4*	7/2$^+$	0.55 ns *5*	B	J$^\pi$: from E1 γ's to 5/2$^-$ and 7/2$^-$ levels and M1 component in γ to 9/2$^+$. $T_{1/2}$: from ^{161}Tm ε decay (1983Be17,1981AbZU).
249.77[@] *3*	9/2$^-$		ABCDE	J$^\pi$: from E2 to 5/2$^-$ level, M1 to 7/2$^-$, and expected band structure.
266.44[&] *3*	7/2$^-$	0.21 ns *3*	BC E	XREF: E(?). J$^\pi$: from E2 γ to 3/2$^-$ level, M1 to 7/2$^-$, and expected band structure. $T_{1/2}$: from ^{161}Tm ε decay (1983Be17,1981AbZU); other: ≤0.30 ns from ^{161}Tm ε decay (1979AlZU).
267.45[a] *4*	13/2$^+$	2.0 ns *2*	AB DE	J$^\pi$: from E2 γ to 9/2$^+$ level and expected band structure. $T_{1/2}$: from ^{161}Tm ε decay, average of 1.9 ns *2* (1983Be17,1981AbZU) and 2.2 ns *2* (1979AlZU).
296.69[b] *4*	11/2$^+$		AB DE	J$^\pi$: from E2 γ to 7/2$^+$ level and M1 to 13/2$^+$.
369.48[c] *5*	3/2$^+$		BC	J$^\pi$: E1 γ to 3/2$^-$ level and M1 to 5/2$^+$ indicate J$^\pi$=3/2$^+$,5/2$^+$. Large (d,t) cross section indicates presence of 3/2$^+$,3/2[402].
388.46[#] *6*	11/2$^-$		ABC E	J$^\pi$: from E2 γ to 7/2$^-$ level, M1 to 9/2$^-$, and expected band structure.
390.20[&] *4*	9/2$^-$		B E	XREF: E(?). J$^\pi$: from E2 γ to 5/2$^-$ level, E1 to 9/2$^+$, and expected band structure.
396.44[d] *4*	11/2$^-$	7.5 μs *7*	ABCDE	%IT=100 J$^\pi$: from E2 γ to 7/2$^-$ level and E1 to 13/2$^+$. $T_{1/2}$: from ^{161}Er IT decay (1970Bo02). Other: 8 μs (1972AnZL) and, from in-beam study, 8.0 μs (1969BoZL).
463.11[f] *9*	3/2$^+$		BC	J$^\pi$: E1 γ to 3/2$^-$ level and M1 to 5/2$^+$ indicates J^π=3/2$^+$,5/2$^+$. Large value of this (d,t) cross section indicates presence of 3/2$^+$,3/2[402].
466.2[a] *1*	17/2$^+$		A E	J$^\pi$: from Q γ to 13/2$^+$ level and expected band structure.
481[g]	1/2$^+$		C	J$^\pi$: large (d,t) cross section (largest in spectrum) is strong evidence for 1/2$^+$,1/2[400].
496.28[f] *8*	5/2$^+$		BC	J$^\pi$: from M1 γ's to 5/2$^+$ and 7/2$^+$ levels and γ to 3/2$^-$.
508.85[b] *10*	15/2$^+$		A E	J$^\pi$: from Q γ to 11/2$^+$ level, γ to 13/2$^+$, and expected band structure.
522			C	
531.11[@] *23*	13/2$^-$		A E	J$^\pi$: from Q γ to 9/2$^-$ level, γ to 11/2$^-$, and expected band structure.
540	(11/2$^-$)		C	J$^\pi$: from interpretation of (d,t) data.
563			C	
578.5[e] *3*	13/2$^-$		A E	J$^\pi$: from γ to 11/2$^-$ level and expected band structure.
590.06[f] *12*	7/2$^+$		BC	J$^\pi$: from M1 γ's to 5/2$^+$ and 9/2$^+$ levels.
621			C	
635			C	
665			C	
704			C	
712			C	
724.84[h] *20*	(3/2$^-$)		BC	J$^\pi$: from γ's to 3/2$^-$ and 7/2$^-$ levels and proposed level structure.
726.0[#] *4*	15/2$^-$		A	J$^\pi$: from Q γ to 11/2$^-$ level and expected band structure.
738			C	
782.5[d] *4*	15/2$^-$		A E	J$^\pi$: from γ's to 13/2$^-$ and 11/2$^-$ levels and expected band structure.
783.5[a] *1*	21/2$^+$		A E	J$^\pi$: from Q γ to 17/2$^+$ level and expected band structure.
843.16[i] *21*	(5/2$^-$)		BC	J$^\pi$: from γ's to 3/2$^-$ and 9/2$^-$ levels and proposed level structure.
848.93[b] *13*	19/2$^+$		A E	J$^\pi$: from Q γ to 15/2$^+$ level, Dγ to 17/2$^+$, and expected band structure.
891.6[@] *4*	17/2$^-$		A	J$^\pi$: from Q γ to 13/2$^-$ level, D γ to 15/2$^+$ level and expected band structure.
1006.7[e] *5*	17/2$^-$		A E	J$^\pi$: from Dγ to 15/2$^-$ level, γ to 13/2$^-$ levels, and expected band structure.
1135.6[#] *4*	19/2$^-$		A	J$^\pi$: from γ to 15/2$^-$ level and expected band structure.
1208.6[a] *2*	25/2$^+$		A E	J$^\pi$: from Q γ to 21/2$^+$ level and expected band structure.
1249.5[d] *5*	19/2$^-$		A E	J$^\pi$: from γ's to 15/2$^-$ and 17/2$^-$ levels and expected band structure.

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Adopted Levels, Gammas (continued)

^{161}Er Levels (continued)

E(level)[†]	Jπ[‡]	XREF	Comments
1301.85[b] *15*	23/2+	A	Jπ: from Q γ to 19/2+ level, γ to 21/2+, and expected band structure.
1312.7[@] *3*	21/2−	A	Jπ: from Q γ to 17/2− level, D γ to 19/2+, and expected band structure.
1481.20? *19*	(5/2,7/2−)	B	Jπ: from γ′s to 3/2−, 7/2−, and 7/2+ levels.
1509.1[e] *6*	21/2−	A E	Jπ: from γ′s to 17/2− and 19/2− levels and expected band structure.
1589.7[#] *4*	23/2−	A	Jπ: from Q γ to 19/2− level, D γ to 21/2+, and expected band structure.
1727.1[a] *2*	29/2+	A E	Jπ: from Q γ to 25/2+ level and expected band structure.
1772.2[@] *3*	25/2−	A	Jπ: from Q γ to 21/2− level, D γ to 23/2+, and expected band structure.
1783.6[d] *6*	23/2−	A	Jπ: from γ′s to 19/2− and 21/2− levels and expected band structure.
1849.9[b] *3*	27/2+	A	Jπ: from Q γ to 23/2+ level, D γ to 25/2+ level, and expected band structure.
1960.25 *17*	(7/2−)	B	Jπ: from γ′s to (3/2−), 9/2− and 9/2+ levels.
2044.6[j] *3*	9/2+	B	Jπ: fed by allowed (possibly allowed-unhindered) ε transition from 7/2+ parent and γ to 11/2−.
2063.09? *21*	(5/2+,7/2)	B	Jπ: from γ′s to 5/2−, 7/2−, 5/2+, and 9/2+ levels.
2063.2[#] *4*	27/2−	A	Jπ: from Q γ to 23/2− level, D γ to 25/2+, and expected band structure.
2066.89? *17*	(5/2,7/2−)	B	Jπ: from γ′s 3/2−, 5/2+, 7/2−, and 7/2+ levels.
2071.2[e] *6*	25/2−	A	Jπ: from γ to 21/2− level, D γ to 23/2−, and expected band structure.
2256.7[@] *4*	29/2−	A	Jπ: from Q γ to 25/2− level, D γ to 27/2+ level, and expected band structure.
2325.96[a] *22*	33/2+	A	Jπ: from Q γ to 29/2+ level and expected band structure.
2369.0[d] *7*	27/2−	A	Jπ: from D γ to 25/2− level, γ to 25/2− level, and expected band structure.
2477.0[b] *4*	31/2+	A	Jπ: from Q γ to 27/2+ level and expected band structure.
2548.5[#] *3*	31/2−	A	Jπ: Q γ to 27/2− level, d γ to 29/2+ level, and expected band structure.
2674.1[e] *8*	29/2−	A	Jπ: from Q γ to 25/2− level, possible D γ to 27/2− level, and expected band structure.
2775.4[@] *5*	33/2−	A	Jπ: from Q γ to 29/2− level and expected band structure.
2980.1[d] *8*	31/2−	A	Jπ: d γ to 29/2− level, γ to 27/2− level, and expected band structure.
2991.36[a] *24*	37/2+	A	Jπ: from Q γ to 33/2+ level and expected band structure.
3066.9[#] *3*	35/2−	A	Jπ: Q γ to 31/2− level, d γ to 33/2+ level, and expected band structure.
3169.2[b] *5*	35/2+	A	Jπ: from γ to 31/2+ level and expected band structure.
3345.6[@] *6*	37/2−	A	Jπ: from γ to 33/2− level and expected band structure.
3565.7[d] *9*	35/2−	A	Jπ: from γ to 31/2− level and expected band structure.
3645.9[#] *4*	39/2−	A	Jπ: from Q γ to 35/2− level, D γ to 37/2+ level, and expected band structure.
3708.3[a] *3*	41/2+	A	Jπ: from γ to 37/2+ level and expected band structure.
3913.3[b] *7*	39/2+	A	Jπ: from γ to 35/2+ level and expected band structure.
3976.4[@] *8*	41/2−	A	Jπ: from Q γ to 37/2− level and expected band structure.
4297.7[#] *5*	43/2−	A	Jπ: from (Q) γ to 39/2− level and expected band structure.
4461.5[a] *3*	45/2+	A	Jπ: from Q γ to 41/2+ level and expected band structure.
4670.5[@] *9*	45/2−	A	Jπ: from γ to 41/2− level and expected band structure.
4691.3[b] *9*	43/2+	A	Jπ: from Q γ to 39/2+ level and expected band structure.
5020.4[#] *7*	47/2−	A	Jπ: from Q γ to 43/2− level and expected band structure.
5246.5[a] *4*	49/2+	A	Jπ: from Q γ to 45/2+ level and expected band structure.
5427.8[@] *11*	49/2−	A	Jπ: from Q γ to 45/2− level and expected band structure.
5808.4[#] *9*	51/2−	A	Jπ: from γ to 47/2− level and expected band structure.
6076.5[a] *7*	53/2+	A	Jπ: from γ to 49/2+ level and expected band structure.
6243.4[@] *12*	53/2−	A	Jπ: from γ to 49/2− level and expected band structure.
6656[#]	(55/2−)	A	Jπ: from γ to 51/2− level and expected band structure.
6957[a]	(57/2+)	A	Jπ: from γ to 53/2+ level and expected band structure.
7118[@]	(57/2−)	A	Jπ: from γ to 53/2− level and expected band structure.
7557[#]	(59/2−)	A	Jπ: from γ to (55/2−) level and expected band structure.
7873[a]	(61/2+)	A	Jπ: from γ to (57/2+) level and expected band structure.

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Adopted Levels, Gammas (continued)

^{161}Er Levels (continued)

E(level)[†]	Jπ[‡]	XREF	Comments
8039[@]	(61/2⁻)	A	Jπ: from γ to (57/2⁻) level and expected band structure.
8499[#]	(63/2⁻)	A	Jπ: from γ to (59/2⁻) level and expected band structure.
8808[a]	(65/2⁺)	A	Jπ: from γ to (61/2⁺) level and expected band structure.
8984[@]	(65/2⁻)	A	Jπ: from γ to (61/2⁻) level and expected band structure.
9458[#]	(67/2⁻)	A	Jπ: from γ to (63/2⁻) level and expected band structure.
9768[a]	(69/2⁺)	A	Jπ: from γ to (65/2⁺) level and expected band structure.
9938[@]	(69/2⁻)	A	Jπ: from γ to (65/2⁻) level and expected band structure.
10431[#]	(71/2⁻)	A	Jπ: from γ to (67/2⁻) level and expected band structure.
10770[a]	(73/2⁺)	A	Jπ: from γ to (69/2⁺) level and expected band structure.
10921[@]	(73/2⁻)	A	Jπ: from γ to (69/2⁻) level and expected band structure.
11433[#]	(75/2⁻)	A	Jπ: from γ to (71/2⁻) level and expected band structure.
11824[a]	(77/2⁺)	A	Jπ: from γ to (73/2⁺) level and expected band structure.
11953[@]	(77/2⁻)	A	Jπ: from γ to (73/2⁻) level and expected band structure.
12477[#]	(79/2⁻)	A	Jπ: from γ to (75/2⁻) level and expected band structure.
12934[a]	(81/2⁺)	A	Jπ: from γ to (77/2⁺) level and expected band structure.
13039[@]	(81/2⁻)	A	Jπ: from γ to (77/2⁻) level and expected band structure.
13571[#]	(83/2⁻)	A	Jπ: from γ to (79/2⁻) level and expected band structure.
14104[a]	(85/2⁺)	A	Jπ: from γ to (81/2⁺) level and expected band structure.
14183[@]	(85/2⁻)	A	Jπ: from γ to (81/2⁻) level and expected band structure.
14719[#]	(87/2⁻)	A	Jπ: from γ to (83/2⁻) level and expected band structure.
15339[a]	(89/2⁺)	A	Jπ: from γ to (85/2⁺) level and expected band structure.
15388[@]	(89/2⁻)	A	Jπ: from γ to (85/2⁻) level and expected band structure.
15924[#]	(91/2⁻)	A	Jπ: from γ to (87/2⁻) level and expected band structure.
16636[a]	(93/2⁺)	A	Jπ: from γ to (89/2⁺) level and expected band structure.
16658[@]	(93/2⁻)	A	Jπ: from γ to (89/2⁻) level and expected band structure.
17191[#]	(95/2⁻)	A	Jπ: from γ to (91/2⁻) level and expected band structure.
17991[@]	(97/2⁻)	A	Jπ: from γ to (93/2⁻) level and expected band structure.
17995[a]	(97/2⁺)	A	Jπ: from γ to (93/2⁺) level and expected band structure.
18521[#]	(99/2⁻)	A	Jπ: from γ to (95/2⁻) level and expected band structure.
19384[@]	(101/2⁻)	A	Jπ: from γ to (97/2⁻) level and expected band structure.
19397	(101/2⁻)	A	Jπ: from γ to (97/2⁻) level, γ from (105/2⁻) level, and expected band structure.
19416[a]	(101/2⁺)	A	Jπ: from γ to (97/2⁺) level and expected band structure.
19916[#]	(103/2⁻)	A	Jπ: from γ to (99/2⁻) level and expected band structure.
20844[@]	(105/2⁻)	A	Jπ: from γ to (101/2⁻) level and expected band structure.
20895[a]	(105/2⁺)	A	Jπ: from γ to (101/2⁺) level and expected band structure.
21376[#]	(107/2⁻)	A	Jπ: from γ to (103/2⁻) level and expected band structure.
22364?[@]	(109/2⁻)	A	Jπ: from γ to (105/2⁻) level and expected band structure.
22407[a]	(109/2⁺)	A	Jπ: from γ to (105/2⁺) level and expected band structure.
22901[#]	(111/2⁻)	A	Jπ: from γ to (107/2⁻) level and expected band structure.
23917?[a]	(113/2⁺)	A	Jπ: from γ to (109/2⁺) level and expected band structure.
24487[#]	(115/2⁻)	A	Jπ: from γ to (111/2⁻) level and expected band structure.
26143?[#]	(119/2⁻)	A	Jπ: from γ to (115/2⁻) level and expected band structure.

[†] From least-squares fit to γ-ray energies or from (d,t) study for levels below 6100 keV and from reported level energies above 6600 keV.

[‡] J^π and band assignments are based on γ multipolarities from ^{161}Tm ε decay and from γ-ray anisotropy ratios in heavy-ion

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Adopted Levels, Gammas (continued)

^{161}Er Levels (continued)

recation studies, agreement of experimental and calculated cross sections from (d,t), and expected rotational-band structure in in-beam studies.

[#] Band(A): 3/2[521] band, α=−1/2. A=11.96 keV, B=−0.4 eV, A_3=−8.9 eV, from energies of the 3/2, 5/2, 7/2, and 9/2 levels. Strength of E1 transitions to members of the π=+ band suggests the presence of octupole−correlation effects (2011Ch12, 2011Ch26).

[@] Band(a): 3/2[521] band, α=+1/2. See the comment for the α=−1/2 branch.

[&] Band(B): 5/2[523] band. A=13.07 keV, B=+16.7 eV.

[a] Band(C): Coriolis−mixed +π band, α=+1/2.

[b] Band(c): Coriolis−mixed +π band, α=−1/2.

[c] Band(D): 3/2[651] bandhead, with 3/2[402] mixture.

[d] Band(E): 11/2[505] band, α=−1/2. A=15.4 keV, B=−1.6 eV, from energies of 11/2, 13/2, and 15/2 levels.

[e] Band(e): 11/2[505] band, α=+1/2.

[f] Band(F): 3/2[402] band, with 3/2[651] mixture. Calculated band parameters are A=2.1 and B=+0.56, so they are not adopted.

[g] Band(G): 1/2[400] bandhead.

[h] Band(H): 3/2[532] bandhead.

[i] Band(I): 5/2[512] bandhead.

[j] Band(J): Possible $K^{\pi}=9/2^{+}$ bandhead. Conf is π7/2[404]+π7/2[523]-ν5/2[523], from population via a probable allowed-unhindered ε transition from π7/2[404].

Adopted Levels, Gammas (continued)

$\gamma(^{161}Er)$

E_i(level)	J_i^π	E_γ	I_γ[†]	E_f	J_f^π	Mult.[‡]	δ[#]	α[@]	Comments
59.501	5/2$^-$	59.51 *3*	100	0	3/2$^-$	M1+E2	0.14	12.82	B(M1)(W.u.)>0.048; B(E2)(W.u.)>1.3×10^2
143.89	7/2$^-$	84.40 *3*	100	59.501	5/2$^-$	M1+E2	0.23	4.69	B(M1)(W.u.)>0.029; B(E2)(W.u.)>1.1×10^2
		143.92 *8*	40	0	3/2$^-$	E2		0.779	B(E2)(W.u.)>60
172.06	5/2$^-$	28.18 *3*		143.89	7/2$^-$	M1+E2	0.08	24.1	B(M1)(W.u.)=0.0047 *17*; B(E2)(W.u.)=19 *7*
		112.56 *3*	60 *5*	59.501	5/2$^-$	M1+E2	0.14	2.03	B(M1)(W.u.)=0.0073 *23*; B(E2)(W.u.)=5.6 *17*
		172.05 *6*	100 *8*	0	3/2$^-$	M1+E2	0.18	0.605	B(M1)(W.u.)=0.0033 *11*; B(E2)(W.u.)=1.8 *6*
189.42	9/2$^+$	45.54 *3*	100	143.89	7/2$^-$	E1		0.495	B(E1)(W.u.)=1.93×10^{-5} *23*
212.91	5/2$^+$	23.49 *2*		189.42	9/2$^+$	E2		2.11×10^3	B(E2)(W.u.)=4.0×10^2 *9*
		40.86 *3*		172.06	5/2$^-$	E1		0.670	B(E1)(W.u.)=0.00017×10^{-4} *3*
		69.00 *10*	11 *2*	143.89	7/2$^-$	[E1]		0.860	B(E1)(W.u.)=2.0×10^{-5} *5*
		153.37 *8*	95 *8*	59.501	5/2$^-$	E1		0.1045	B(E1)(W.u.)=1.57×10^{-5} *23*
		212.88 *8*	100 *9*	0	3/2$^-$	E1		0.0442	B(E1)(W.u.)=6.2×10^{-6} *10*
217.34	7/2$^+$	27.92 *3*		189.42	9/2$^+$	M1+E2	0.10	28.0	B(M1)(W.u.)=0.053 *24*; B(E2)(W.u.)=3.4×10^2 *15*
		73.48 *3*	8 *3*	143.89	7/2$^-$	E1		0.731	B(E1)(W.u.)=1.1×10^{-5} *5*
		157.80 *8*	100 *9*	59.501	5/2$^-$	E1		0.0969	B(E1)(W.u.)=1.3×10^{-5} *4*
249.77	9/2$^-$	105.88 *2*	100 *9*	143.89	7/2$^-$	M1+E2	0.23	2.41	
		190.24 *6*	100 *9*	59.501	5/2$^-$	E2		0.298	I_γ: Discrepant values are Iγ(190)=157 from (α,3nγ) (1970Hj02), and Iγ(190)≤29 from ^{161}Er IT decay (7.5 μs) (1970Bo02).
266.44	7/2$^-$	16.70 *5*		249.77	9/2$^-$	M1+E2	0.06	130.3 *24*	B(M1)(W.u.)=0.021 *16*; B(E2)(W.u.)=1.3×10^2 *10*
		94.38 *3*	80 *29*	172.06	5/2$^-$	M1+E2	2.5	3.62	B(M1)(W.u.)=0.0017 *8*; B(E2)(W.u.)=5.8×10^2 *25*
		122.55 *5*	100 *8*	143.89	7/2$^-$	M1+E2	0.20	1.584	B(M1)(W.u.)=0.0066 *17*; B(E2)(W.u.)=8.7 *22*
		206.95 *5*	39 *12*	59.501	5/2$^-$	M1+E2	≤0.33	0.359 *9*	B(M1)(W.u.)>0.00031; B(E2)(W.u.)<0.88
		266.32 *10*	43 *5*	0	3/2$^-$	E2		0.0997	B(E2)(W.u.)=2.0 *6*
267.45	13/2$^+$	78.07 *4*	100	189.42	9/2$^+$	E2		7.69	B(E2)(W.u.)=216 *23*
296.69	11/2$^+$	29.26 *2*		267.45	13/2$^+$	M1+E2	0.07	20.2	
		46.86 *5*		249.77	9/2$^-$	E1		0.457	
		79.35 *4*	29 *10*	217.34	7/2$^+$	E2		7.21	
		107.22 *5*	100 *14*	189.42	9/2$^+$	M1+E2	1.2	2.29	
369.48	3/2$^+$	156.52 *8*	51 *5*	212.91	5/2$^+$	M1+E2	0.36	0.772	
		197.38 *8*	9 *4*	172.06	5/2$^-$	(E1)		0.0538	
		310.1 *1*	21 *3*	59.501	5/2$^-$	E1		0.0170 *8*	
		369.5 *1*	100 *9*	0	3/2$^-$	E1		0.0111 *8*	
388.46	11/2$^-$	138.68 *7*	55 *6*	249.77	9/2$^-$	M1+E2	0.23	1.109	I_γ: discrepant value is Iγ(138)=22 from (α,3nγ) (1970Hj02).
		244.57 *8*	100 *10*	143.89	7/2$^-$	E2		0.1305	
390.20	9/2$^-$	123.80 *6*	33 *10*	266.44	7/2$^-$	M1+E2	0.52	1.501 *22*	
		140.40 *7*	40 *6*	249.77	9/2$^-$	M1+E2	0.44	1.044	
		172.92 *7*	52 *14*	217.34	7/2$^+$	(E1)		0.0761	
		200.75 *5*	79 *17*	189.42	9/2$^+$	E1		0.0515	
		218.10 *6*	100 *10*	172.06	5/2$^-$	E2		0.189	
		246.2 *3*	≤10	143.89	7/2$^-$	(M1)		0.227	

From ENSDF

$^{161}_{68}Er_{93}$-6

Adopted Levels, Gammas (continued)

γ(^{161}Er) (continued)

E_i(level)	J_i^π	E_γ	I_γ [†]	E_f	J_f^π	Mult.[‡]	δ[#]	α[@]	Comments
396.44	11/2$^-$	99.76 *4*	49 *5*	296.69	11/2$^+$	E1		0.327	B(E1)(W.u.)=3.6×10^{-9} *6*
		128.90 *7*	61 *5*	267.45	13/2$^+$	E1		0.1657	B(E1)(W.u.)=2.1×10^{-9} *3*
		146.65 *8*	100 *7*	249.77	9/2$^-$	M1+E2	0.23	0.945	B(M1)(W.u.)=2.1×10^{-7} *3*; B(E2)(W.u.)=0.00026 *4*
		207.12 *6*	49 *6*	189.42	9/2$^+$	E1		0.0475	B(E1)(W.u.)=4.0×10^{-10} *7* I_γ: discrepant value is Iγ(207)=91 from (α,3nγ) study (1970Hj02), but Iγ(207)=50(13) in ^{161}Er IT decay.
		252.50 *10*	32 *3*	143.89	7/2$^-$	E2		0.1179	B(E2)(W.u.)=0.000108 *15*
463.11	3/2$^+$	250.2 *1*	100 *11*	212.91	5/2$^+$	M1		0.218	
		403.5 *2*	23 *4*	59.501	5/2$^-$				
		463.6 *4*	55 *7*	0	3/2$^-$	E1		0.0066 *1*	
466.2	17/2$^+$	198.7 *1*	100	267.45	13/2$^+$	Q			
496.28	5/2$^+$	278.90 *10*	98 *12*	217.34	7/2$^+$	M1		0.1622	
		283.4 *1*	100 *12*	212.91	5/2$^+$	M1+E2	0.80	0.1268	
		436.8 *6*	18 *6*	59.501	5/2$^-$				
		496.3 *5*	12 *5*	0	3/2$^-$				
508.85	15/2$^+$	212.2 *1*	100 *5*	296.69	11/2$^+$	Q			
		241.3 *3*	51 *8*	267.45	13/2$^+$	D			
531.11	13/2$^-$	142.5 *5*	17 *5*	388.46	11/2$^-$				
		281.3 *3*	100 *15*	249.77	9/2$^-$	Q			
578.5	13/2$^-$	182.1 *3*	100	396.44	11/2$^-$	D			
590.06	7/2$^+$	372.6 *2*	100 *10*	217.34	7/2$^+$	M1		0.0750	
		377.1 *2*	47 *6*	212.91	5/2$^+$	M1		0.0726	
		400.8 *2*	68 *8*	189.42	9/2$^+$	M1		0.0619	
724.84	(3/2$^-$)	458.3 *6*	32 *12*	266.44	7/2$^-$				
		552.9 *5*	37 *9*	172.06	5/2$^-$				
		581.0 *5*	26 *9*	143.89	7/2$^-$				
		665.2 *5*	32 *11*	59.501	5/2$^-$				
		724.8 *5*	100 *12*	0	3/2$^-$				
726.0	15/2$^-$	337.5 *5*	100	388.46	11/2$^-$	Q			
782.5	15/2$^-$	204.0 *3*	100 *16*	578.5	13/2$^-$	D			
		386.0 *5*	40 *12*	396.44	11/2$^-$	(Q)			
783.5	21/2$^+$	317.4 *1*	100	466.2	17/2$^+$	Q			
843.16	(5/2$^-$)	577.0 *5*	26 *10*	266.44	7/2$^-$				
		593.7 *5*	67 *19*	249.77	9/2$^-$				
		670.6 *5*	48 *17*	172.06	5/2$^-$				
		699.0 *5*	60 *26*	143.89	7/2$^-$				
		784.1 *5*	100 *14*	59.501	5/2$^-$				
		842.9 *5*	48 *12*	0	3/2$^-$				
848.93	19/2$^+$	340.1 *1*	100 *5*	508.85	15/2$^+$	Q			
		382.5 *3*	26 *4*	466.2	17/2$^+$	D			
891.6	17/2$^-$	165.5 *5*	7 *2*	726.0	15/2$^-$				

From ENSDF

$^{161}_{68}Er_{93}$-7

Adopted Levels, Gammas (continued)

γ(^{161}Er) (continued)

E_i(level)	J_i^π	E_γ	I_γ[†]	E_f	J_f^π	Mult.[‡]	Comments
891.6	17/2$^-$	360.3 *3*	100	531.11	13/2$^-$	[E2]	
		382.8 *5*	11.2 *2*	508.85	15/2$^+$	[E1]	I_γ: From the γ-ray "line list" of 2011Ch12, Iγ=13 *4* is computed.
1006.7	17/2$^-$	224.1 *5*	100 *29*	782.5	15/2$^-$	D	
		428.2 *5*	81 *26*	578.5	13/2$^-$		
1135.6	19/2$^-$	409.5 *5*	100	726.0	15/2$^-$		
1208.6	25/2$^+$	425.0 *1*	100	783.5	21/2$^+$	Q	
1249.5	19/2$^-$	242.7 *5*	72 *21*	1006.7	17/2$^-$	D	
		467.1 *5*	100 *31*	782.5	15/2$^-$		
1301.85	23/2$^+$	452.9 *1*	100 *5*	848.93	19/2$^+$	Q	
		518.5 *3*	22 *3*	783.5	21/2$^+$		
1312.7	21/2$^-$	177.0 *5*	5 *2*	1135.6	19/2$^-$		
		421.2 *3*	100	891.6	17/2$^-$	[E2]	
		464.0 *5*	17.1 *6*	848.93	19/2$^+$	[E1]	I_γ: From the γ-ray "line list" of 2011Ch12, Iγ=30 *8* is computed.
1481.20?	(5/2,7/2$^-$)	891.0 *5*	38 *17*	590.06	7/2$^+$		
		984.5 *5*	69 *17*	496.28	5/2$^+$		
		1215.0 *7*	24 *14*	266.44	7/2$^-$		
		1268.3 *5*	36 *17*	212.91	5/2$^+$		
		1308.5 *5*	100 *14*	172.06	5/2$^-$		
		1337.8 *5*	43 *21*	143.89	7/2$^-$		
		1422.1 *5*	≤43	59.501	5/2$^-$		
		1481.5 *7*	29 *14*	0	3/2$^-$		
1509.1	21/2$^-$	259.7 *5*	36 *12*	1249.5	19/2$^-$		
		502.3 *5*	100 *32*	1006.7	17/2$^-$		
1589.7	23/2$^-$	454.1 *5*	100	1135.6	19/2$^-$	[E2]	
		806.3 *5*	71 *20*	783.5	21/2$^+$	[E1]	I_γ: From the γ-ray "line list" of 2011Ch12, Iγ=60 *20* is computed.
1727.1	29/2$^+$	518.5 *1*	100	1208.6	25/2$^+$	Q	
1772.2	25/2$^-$	459.6 *3*	100	1312.7	21/2$^-$	[E2]	
		470.5 *5*	19.1 *4*	1301.85	23/2$^+$	[E1]	I_γ: From the γ-ray "line list" of 2011Ch12, Iγ=22 *7* is computed.
1783.6	23/2$^-$	274.5 *5*	53 *13*	1509.1	21/2$^-$		
		534.2 *5*	100 *33*	1249.5	19/2$^-$		
1849.9	27/2$^+$	548.1 *3*	100 *15*	1301.85	23/2$^+$	Q	
		641.2 *5*	8.5 *25*	1208.6	25/2$^+$	D	
1960.25	(7/2$^-$)	1235.7 *4*	23 *2*	724.84	(3/2$^-$)		
		1569.9 *5*	25 *3*	390.20	9/2$^-$		
		1693.5 *4*	24 *3*	266.44	7/2$^-$		
		1743.8 *5*	10 *3*	217.34	7/2$^+$		
		1748.0 *5*	12 *3*	212.91	5/2$^+$		
		1769.5 *6*	10 *3*	189.42	9/2$^+$		
		1788.0 *3*	100 *9*	172.06	5/2$^-$		
2044.6	9/2$^+$	1648.1 *3*	100	396.44	11/2$^-$		
2063.09?	(5/2$^+$,7/2)	1796.0 *8*	≤8	266.44	7/2$^-$		
		1845.7 *4*	100 *10*	217.34	7/2$^+$		

From ENSDF

$^{161}_{68}Er_{93}$-8

Adopted Levels, Gammas (continued)

γ(^{161}Er) (continued)

E_i(level)	J_i^π	E_γ	I_γ[†]	E_f	J_f^π	Mult.[‡]	Comments
2063.09?	(5/2$^+$,7/2)	1850.0[&] *3*	≤256[&]	212.91	5/2$^+$		
		1873.4 *7*	15 *8*	189.42	9/2$^+$		
		1891.9 *5*	62 *15*	172.06	5/2$^-$		
2063.2	27/2$^-$	473.5 *5*	63 *27*	1589.7	23/2$^-$	[E2]	I_γ: From the γ-ray "line list" of 2011Ch12, Iγ=78 *22* is computed.
		854.5 *5*	100	1208.6	25/2$^+$	[E1]	
2066.89?	(5/2,7/2$^-$)	1341.5 *5*	29 *9*	724.84	(3/2$^-$)		
		1800.0 *5*	18 *4*	266.44	7/2$^-$		
		1850.0[&] *3*	≤201[&]	217.34	7/2$^+$		
		1854.7 *4*	100 *10*	212.91	5/2$^+$		
		1894.1 *4*	87 *10*	172.06	5/2$^-$		
		1922.8 *5*	≤12	143.89	7/2$^-$		
		2007.1 *6*	13 *5*	59.501	5/2$^-$		
		2067.1 *9*	≤7	0	3/2$^-$		
2071.2	25/2$^-$	287.4 *5*	38 *12*	1783.6	23/2$^-$	D	
		562.0 *5*	100 *31*	1509.1	21/2$^-$		
2256.7	29/2$^-$	406.7 *5*	19.3 *6*	1849.9	27/2$^+$	[E1]	I_γ: From the γ-ray "line list" of 2011Ch12, Iγ=24 *7* is computed.
		484.4 *3*	100	1772.2	25/2$^-$	[E2]	
2325.96	33/2$^+$	598.9 *1*	100	1727.1	29/2$^+$	Q	
2369.0	27/2$^-$	297.5 *5*	21 *5*	2071.2	25/2$^-$	D	
		585.6[a] *5*	≈100[a]	1783.6	23/2$^-$		
2477.0	31/2$^+$	627.1 *3*	100	1849.9	27/2$^+$	Q	
2548.5	31/2$^-$	485.3 *5*	45 *22*	2063.2	27/2$^-$	[E2]	I_γ: From the γ-ray "line list" of 2011Ch12, Iγ=51 *16* is computed.
		821.5 *3*	100	1727.1	29/2$^+$	[E1]	
2674.1	29/2$^-$	305.0[b] *5*	≈24	2369.0	27/2$^-$	D	
		603.0 *5*	100 *29*	2071.2	25/2$^-$	Q	
2775.4	33/2$^-$	518.7 *3*	100	2256.7	29/2$^-$	Q	
2980.1	31/2$^-$	306.0 *5*	≈83	2674.1	29/2$^-$	D	R_{ADO}=0.8 *3*.
		611.0 *5*	≈100	2369.0	27/2$^-$		
2991.36	37/2$^+$	665.4 *1*	100	2325.96	33/2$^+$	Q	
3066.9	35/2$^-$	518.5 *3*	100	2548.5	31/2$^-$	[E2]	
		740.9 *3*	95 *11*	2325.96	33/2$^+$	[E1]	I_γ: From the γ-ray "line list" of 2011Ch12, Iγ=96 *14* is computed.
3169.2	35/2$^+$	692.2 *3*	100	2477.0	31/2$^+$		
3345.6	37/2$^-$	570.2 *3*	100	2775.4	33/2$^-$	Q	
3565.7	35/2$^-$	585.6[a] *5*	100[a]	2980.1	31/2$^-$		
3645.9	39/2$^-$	579.0 *3*	100	3066.9	35/2$^-$	[E2]	
		654.6 *5*	37.3 *31*	2991.36	37/2$^+$	[E1]	I_γ: From the γ-ray "line list" of 2011Ch12, Iγ=27 *9* is computed.
3708.3	41/2$^+$	716.9 *1*	100	2991.36	37/2$^+$		
3913.3	39/2$^+$	744.1 *5*	100	3169.2	35/2$^+$		
3976.4	41/2$^-$	630.8 *5*	100	3345.6	37/2$^-$	Q	
4297.7	43/2$^-$	651.8 *3*	100	3645.9	39/2$^-$	(Q)	
4461.5	45/2$^+$	753.2 *1*	100	3708.3	41/2$^+$	Q	

From ENSDF

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Adopted Levels, Gammas (continued)

γ(^{161}Er) (continued)

E_i(level)	J_i^π	E_γ	I_γ †	E_f	J_f^π	Mult.‡
4670.5	45/2$^-$	694.1 *5*	100	3976.4	41/2$^-$	
4691.3	43/2$^+$	778.0 *5*	100	3913.3	39/2$^+$	Q
5020.4	47/2$^-$	722.7 *5*	100	4297.7	43/2$^-$	Q
5246.5	49/2$^+$	785.0 *3*	100	4461.5	45/2$^+$	Q
5427.8	49/2$^-$	757.3 *5*	100	4670.5	45/2$^-$	Q
5808.4	51/2$^-$	788.0 *5*	100	5020.4	47/2$^-$	
6076.5	53/2$^+$	830.0 *5*	100	5246.5	49/2$^+$	
6243.4	53/2$^-$	815.6 *5*	100	5427.8	49/2$^-$	
6656	(55/2$^-$)	848	100	5808.4	51/2$^-$	
6957	(57/2$^+$)	880	100	6076.5	53/2$^+$	
7118	(57/2$^-$)	875	100	6243.4	53/2$^-$	
7557	(59/2$^-$)	901	100	6656	(55/2$^-$)	
7873	(61/2$^+$)	916	100	6957	(57/2$^+$)	
8039	(61/2$^-$)	921	100	7118	(57/2$^-$)	
8499	(63/2$^-$)	942	100	7557	(59/2$^-$)	
8808	(65/2$^+$)	935	100	7873	(61/2$^+$)	
8984	(65/2$^-$)	945	100	8039	(61/2$^-$)	
9458	(67/2$^-$)	959	100	8499	(63/2$^-$)	
9768	(69/2$^+$)	960	100	8808	(65/2$^+$)	
9938	(69/2$^-$)	954	100	8984	(65/2$^-$)	
10431	(71/2$^-$)	973	100	9458	(67/2$^-$)	
10770	(73/2$^+$)	1002	100	9768	(69/2$^+$)	
10921	(73/2$^-$)	983	100	9938	(69/2$^-$)	
11433	(75/2$^-$)	1002	100	10431	(71/2$^-$)	
11824	(77/2$^+$)	1055	100	10770	(73/2$^+$)	
11953	(77/2$^-$)	1032	100	10921	(73/2$^-$)	
12477	(79/2$^-$)	1044	100	11433	(75/2$^-$)	
12934	(81/2$^+$)	1110	100	11824	(77/2$^+$)	
13039	(81/2$^-$)	1086	100	11953	(77/2$^-$)	
13571	(83/2$^-$)	1094	100	12477	(79/2$^-$)	
14104	(85/2$^+$)	1170	100	12934	(81/2$^+$)	
14183	(85/2$^-$)	1144	100	13039	(81/2$^-$)	
14719	(87/2$^-$)	1148	100	13571	(83/2$^-$)	
15339	(89/2$^+$)	1234	100	14104	(85/2$^+$)	
15388	(89/2$^-$)	1205	100	14183	(85/2$^-$)	
15924	(91/2$^-$)	1205	100	14719	(87/2$^-$)	
16636	(93/2$^+$)	1297	100	15339	(89/2$^+$)	
16658	(93/2$^-$)	1270	100	15388	(89/2$^-$)	
17191	(95/2$^-$)	1267	100	15924	(91/2$^-$)	
17991	(97/2$^-$)	1333	100	16658	(93/2$^-$)	
17995	(97/2$^+$)	1359	100	16636	(93/2$^+$)	
18521	(99/2$^-$)	1330	100	17191	(95/2$^-$)	
19384	(101/2$^-$)	1393	100	17991	(97/2$^-$)	
19397	(101/2$^-$)	1405	100	17991	(97/2$^-$)	
19416	(101/2$^+$)	1421	100	17995	(97/2$^+$)	
19916	(103/2$^-$)	1394	100	18521	(99/2$^-$)	
20844	(105/2$^-$)	1447		19397	(101/2$^-$)	
		1460		19384	(101/2$^-$)	
20895	(105/2$^+$)	1479	100	19416	(101/2$^+$)	
21376	(107/2$^-$)	1460	100	19916	(103/2$^-$)	
22364?	(109/2$^-$)	1521[b]	100	20844	(105/2$^-$)	
22407	(109/2$^+$)	1512	100	20895	(105/2$^+$)	
22901	(111/2$^-$)	1525	100	21376	(107/2$^-$)	
23917?	(113/2$^+$)	1510[b]	100	22407	(109/2$^+$)	
24487	(115/2$^-$)	1586	100	22901	(111/2$^-$)	
26143?	(119/2$^-$)	1657[b]	100	24487	(115/2$^-$)	

† In their heavy-ion study, 2011Ch12 place special emphasis on measurement of the E1/E2 branching ratios from selected levels. These are the values listed here. The values obtained from their γ spectrum are also listed for comparison with these specifically measured ones.

‡ For levels below 400 keV, multipolarities of the γ rays are from ce data from ^{161}Tm ε decay (both 1975Ad08 and 1980Ab18). For levels above 400 keV, multipolarities are generally from the γ-ray anisotropy-ratio (R_{ADO}) data of 2011Ch12 from a heavy-ion study.

Evaluator's combination of data from ^{161}Tm ε decay (1975Ad08,1980Ab18). No uncertainties are given since they cannot be computed from the available data.

@ 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.

& Multiply placed with undivided intensity.

a Multiply placed with intensity suitably divided.

b Placement of transition in the level scheme is uncertain.

From ENSDF

$^{161}_{68}Er_{93}$-10

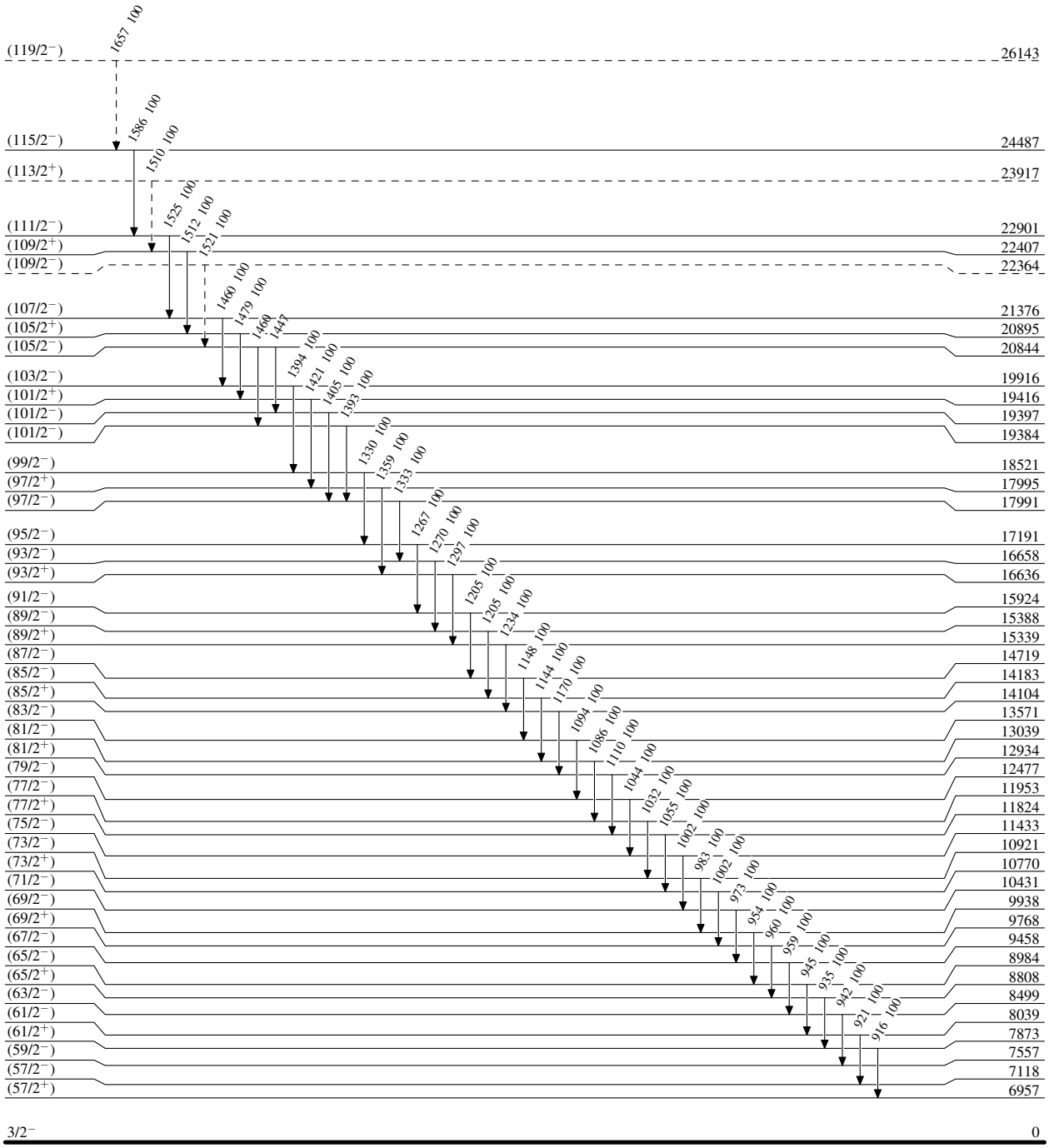
Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level

γ Decay (Uncertain)



$^{161}_{68}Er_{93}$

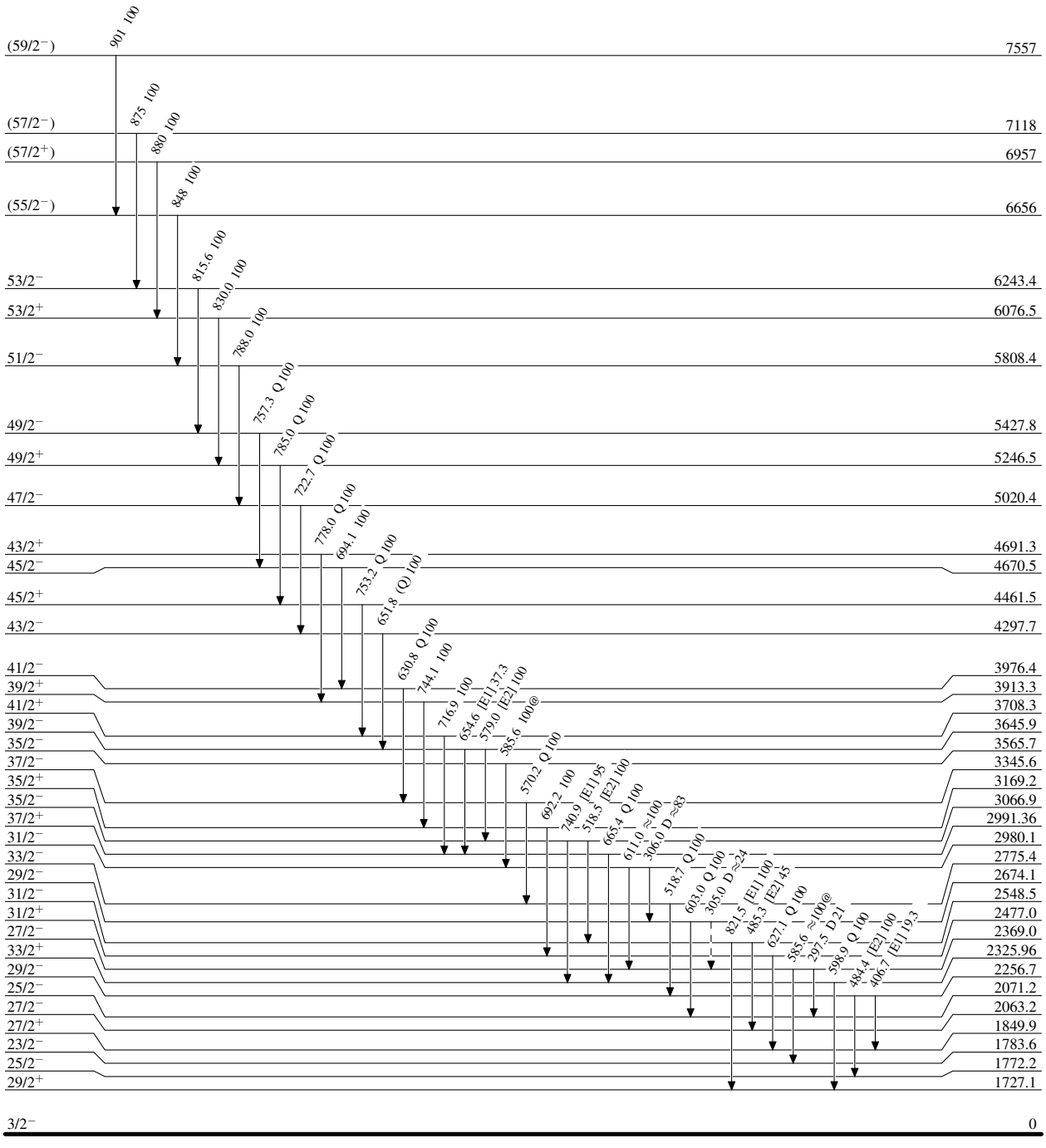
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level
@ Multiply placed: intensity suitably divided

- - - - - - ► γ Decay (Uncertain)

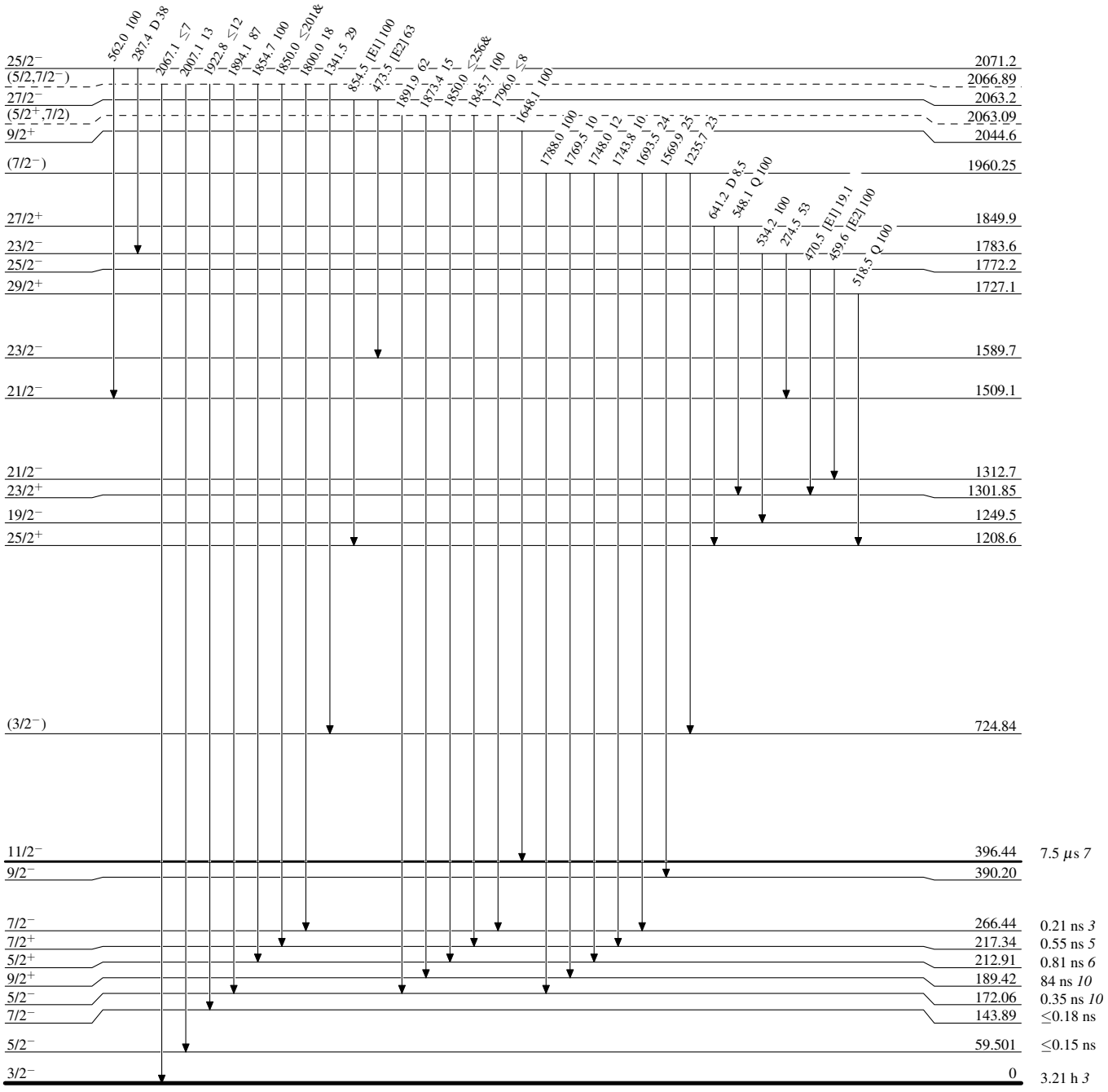


$^{161}_{68}Er_{93}$

Adopted Levels, Gammas

Level Scheme (continued)

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

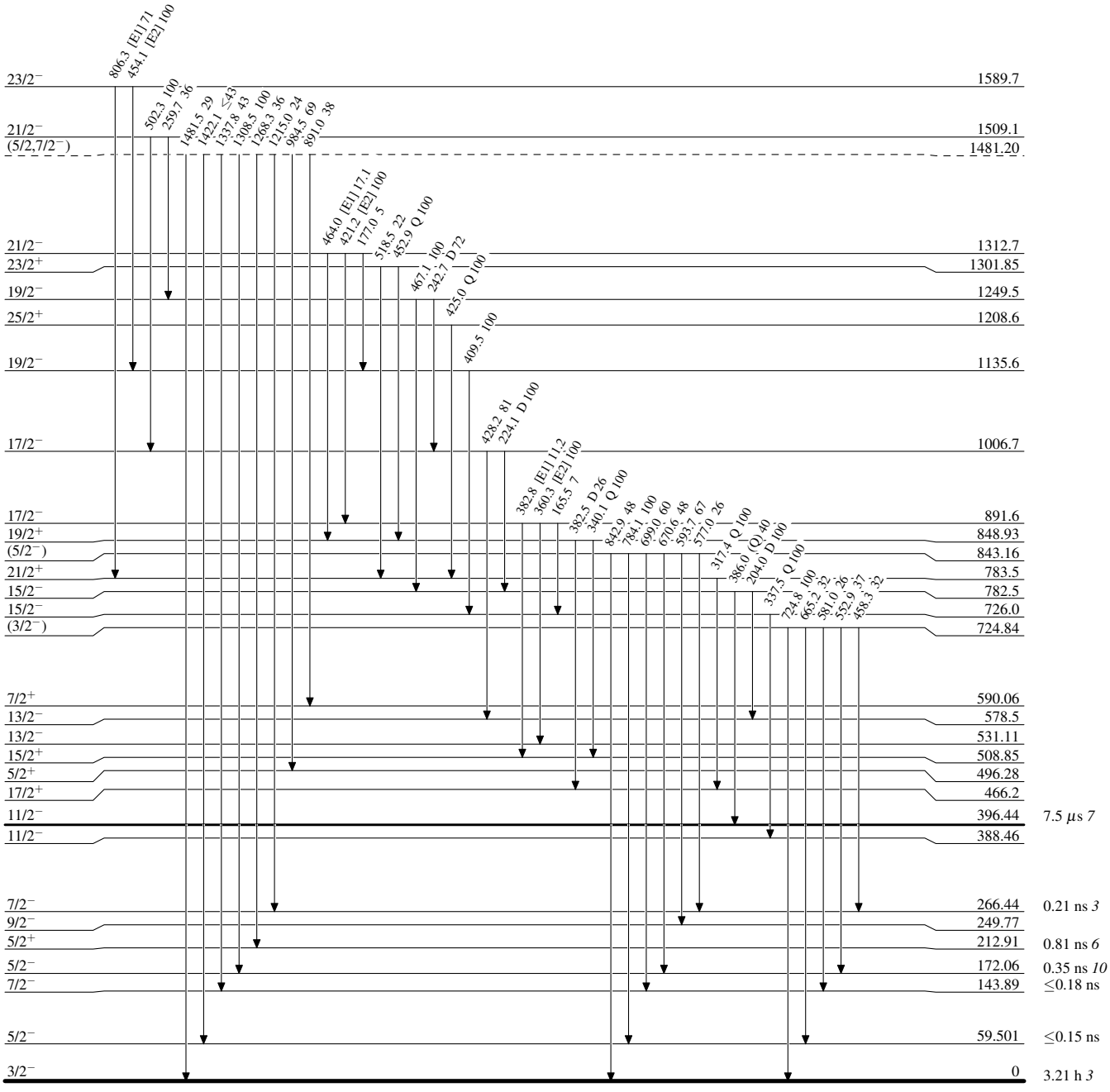


$^{161}_{68}Er_{93}$

Adopted Levels, Gammas

Level Scheme (continued)

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

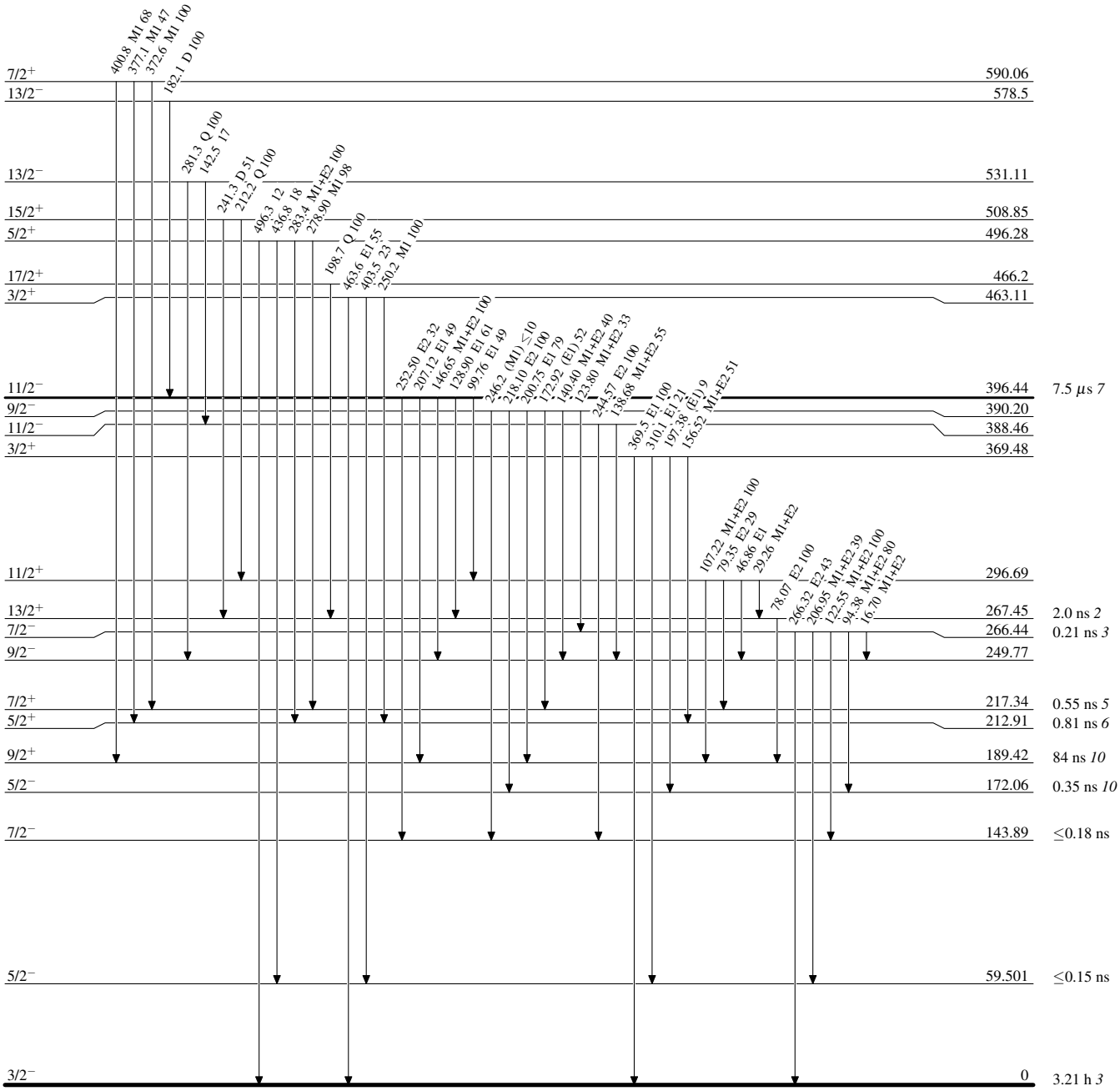


$^{161}_{68}Er_{93}$

Adopted Levels, Gammas

Level Scheme (continued)

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

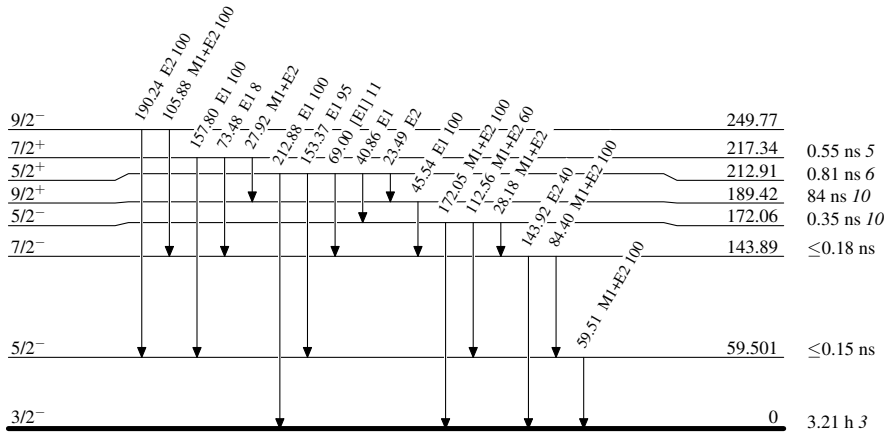


$^{161}_{68}Er_{93}$

Adopted Levels, Gammas

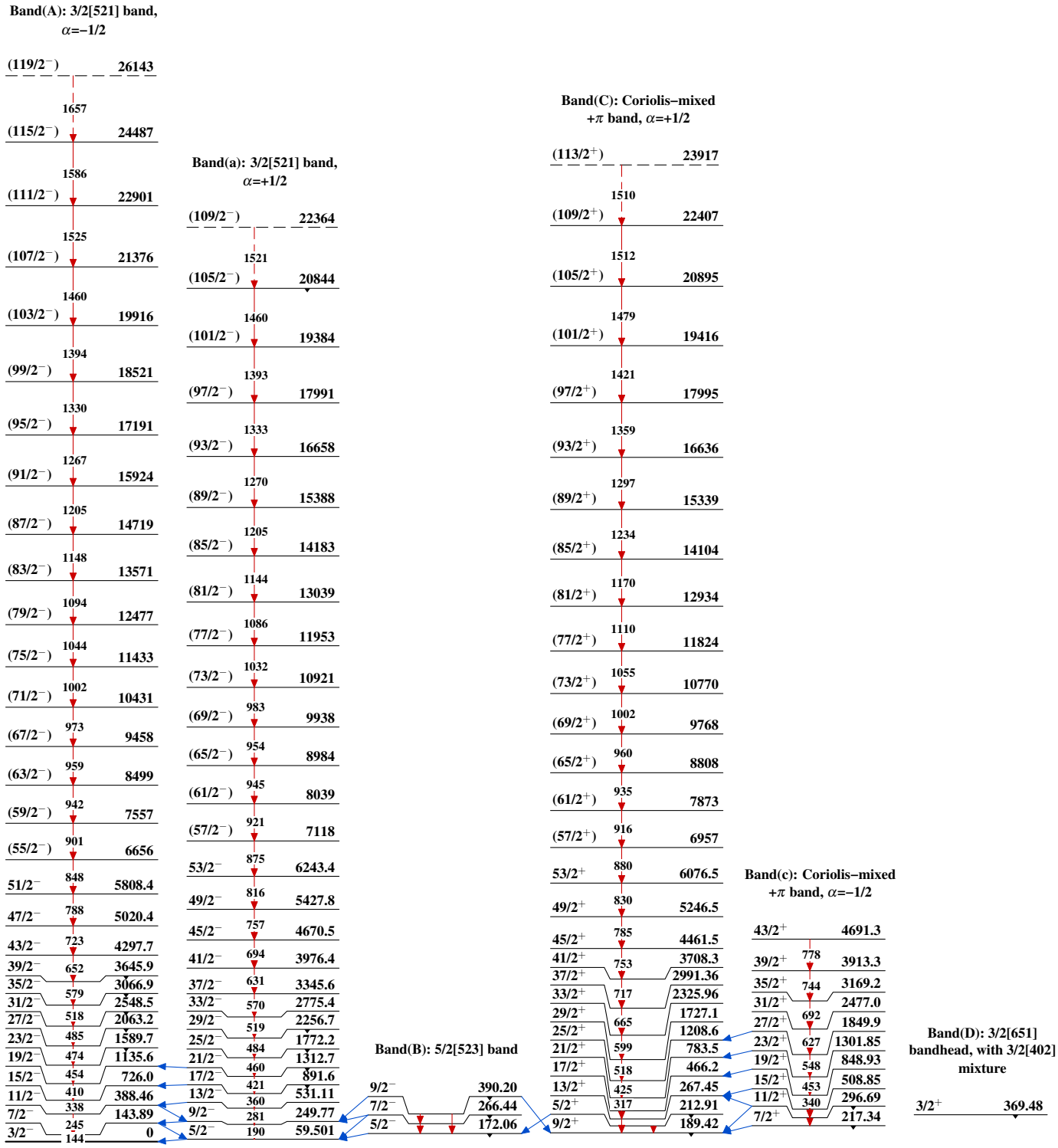
Level Scheme (continued)

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



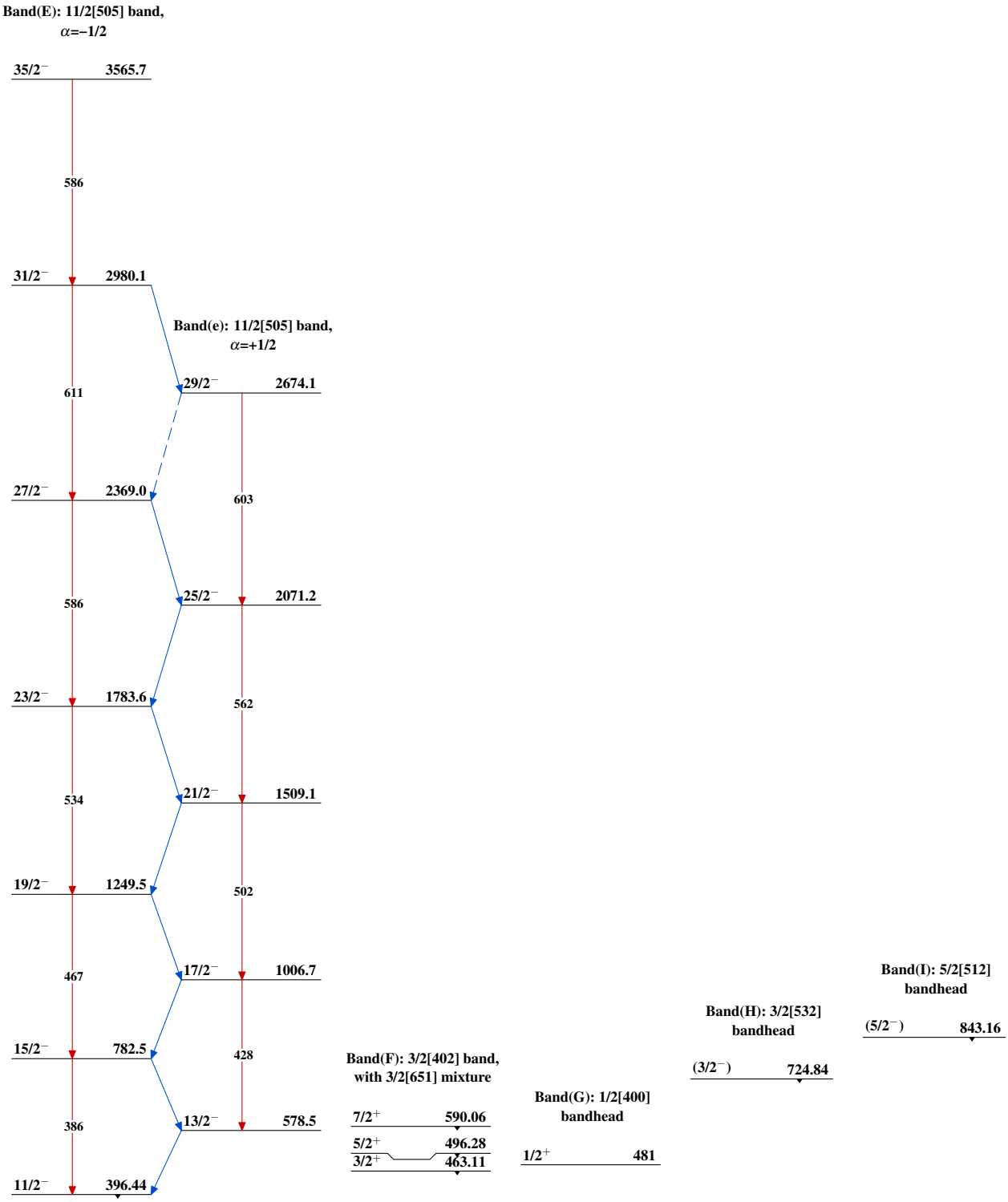
$^{161}_{68}Er_{93}$

Adopted Levels, Gammas



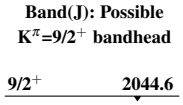
$^{161}_{68}Er_{93}$

Adopted Levels, Gammas (continued)



$^{161}_{68}Er_{93}$

Adopted Levels, Gammas (continued)



$^{161}_{68}Er_{93}$