^{161}Er ε decay 1972Ka37,1972Wo08,1972Ha41

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

Parent: ^{161}Er: E=0; J$^{\pi}$=3/2^{-}; T$_{1/2}$=3.21 h *3*; Q(ε)=1994 *9*; %ε+%β^{+} decay=100.0

^{161}Er-J$^{\pi}$: Additional information 1.

^{161}Er-T$_{1/2}$: Additional information 2.

^{161}Er-Q(ε): Additional information 3.

Additional information 4.

Decay scheme is primarily from 1972Ka37 and 1972Wo08 and levels are as proposed by both authors, except where noted otherwise. Other major ce studies are 1972Ha41 and 1979DzZZ. Others: 1965St08, 1965Gr35, 1961Gr25, 1961Gr04, 1961Bj02, 1961Ab04, 1960Dn02, and 1959Ha09.

Since 2000, several abstracts, all from the same laboratory and describing further studies of the ^{161}Er decay scheme, have appeared. However, they are generally not detailed and have as yet not been published. The evaluator has not incorporated most of this information into this data file.

There are 39 γ's that are multiply placed and many levels that involve mostly γ's that are multiply placed. This limits the quantitative accuracy of many parameters of the level scheme.

2000KoZT: measured more precise Eγ values for the 74.6 and 76.2 γ's using an electrostatic spectrometer.

2002AdZX (Conference Abstract): describes a study of the ^{161}Er decay scheme using HPGE detectors and a mini-orange detector to measure γ radiation and conversion electrons. Report 265 γ rays in the ^{161}Er decay. Report new levels at 725.3, 989.7, 1035.9 and 1477.4 keV and propose γ-vibrational (presumably of K-2 type) bandheads at 592.8, 958.1, and 1100.8 keV (based, respectively, on 7/2[523], 7/2[404] (labelled as 7/2[402] in 2002AdZX) and 5/2[402]) and a β-vibrational bandhead based on 7/2[523] at 1129.0. In the absence of most of the details regarding this information, the evaluator has chosen not to include it in this evaluation.

2007VaZX searched for three-quasiparticle states of the form (ν 3/2[521],ν 5/2[523],π7/2[523]) in the region centered around 1.5 MeV excited via allowed-unhindered (au) β decay from ^{161}Er through conversion-electron studies of the high-energy γ radiation from mass-separated ^{161}Er sources. No evidence for such au transitions and, hence, for such excitations, was found in this study.

2008IbZZ (Conference Abstract): presumably a further analysis of the data of 2002AdZX by one of the authors of that study. Introduce new levels at 693.2, 859.6, 957.97 and 1603 keV. Do not confirm previously reported levels at 710, 1137 and 1325 keV, with the deexciting γ's placed elsewhere in the level scheme. In the absence of the details regarding these conclusions, the evaluator has not included this information in this data set, although the nonconfirmed levels have been shown here as questionable.

2008Eg01: report L2 and L3 conversion-electron lines for the 148.16 γ by scanning photographic plates exposed to ^{161}Er sources using a high-resolution automatic microscope system. Deduce M1 As the dominant multipolarity for this transition.

^{161}Ho Levels

Additional information 5.

E(level)[†]	J$^{\pi}$[#]	T$_{1/2}$	Comments
0.[b]	7/2^{-}	2.48 h *5*	T$_{1/2}$: from the Adopted values.
99.63[b] *3*	9/2^{-}		
211.16[c] *3*	1/2^{+}	6.76 s *7*	T$_{1/2}$: from the Adopted values.
221.95[ab] *11*	11/2^{-}		
222.44[c] *3*	3/2^{+}		
252.67[d] *3*	7/2^{+}		
298.67[e] *3*	3/2^{+}		
316.57[c] *4*	5/2^{+}		
353.29[c] *4*	7/2^{+}		
370.7[&d] *3*	9/2^{+}		
373.27[e] *6*	5/2^{+}		
423.92[f] *4*	1/2^{-}		J$^{\pi}$: assigned (1/2,5/2)$^{-}$ by 1972Wo08.

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^{161}Er ε decay 1972Ka37,1972Wo08,1972Ha41 (continued)

^{161}Ho Levels (continued)

E(level)[†]	Jπ[#]	Comments
446.83 *4*	5/2+	Jπ: assigned (5/2,7/2)+ by 1972Ka37 and assigned to 5/2[402] band by 1972Wo08.
458.88[&f] *4*	5/2−	
463.24[ae] *7*	7/2+	
525.93[f] *4*	3/2−	
554.12[&] *9*	(5/2−,7/2,9/2+)	Jπ: assigned (5/2,7/2)+ by 1972Ka37.
592.66[g] *4*	3/2−	
649.03[g] *10*	5/2−	
710.5?[‡] *4*		
760.47[h] *12*	5/2+	
826.61[i] *9*	5/2−	
1137.15?[‡@] *17*	(5/2,7/2)−	Jπ: no assignment in 1972Wo08.
1232.86[&] *14*	(3/2)+	
1240.08[@] *22*	(1/2,3/2,5/2)+	Jπ: no assignment in 1972Wo08.
1325.20?[‡@] *19*	(3/2,5/2)+	Jπ: no assignment in 1972Wo08.
1394.47[@] *16*	(1/2+,3/2)	Jπ: no assignment in 1972Wo08.
1396.95 *12*	3/2−	Jπ: no assignment in 1972Wo08; assigned (1/2,3/2)− in 1972Ka37.
1404.35[&] *15*	1/2,3/2	Jπ: assigned (1/2,3/2)− by 1972Ka37.
1457.67 *10*	(3/2−)	Jπ: assigned 1/2,3/2− by 1972Ka37 and (5/2−) by 1972Wo08.
1461.56 *13*	3/2−	
1488.34 *12*	3/2−	Jπ: no assignment in 1972Wo08; assigned (3/2,5/2)− by 1972Ka37.
1491.18 *13*	(3/2−)	Jπ: no assignment in 1972Wo08.
1524.64[&] *11*	(5/2,7/2)−	Jπ: assigned 5/2− by 1972Ka37.
1640.46 *14*	(5/2+)	Jπ: no assignment in 1972Ka37. Note that the γ multipolarities (1979DzZZ) suggest inconsistent parities (i.e., M1 to 3/2− and M1 to 3/2+).
1656.65 *10*	5/2−	
1675.32[@] *18*		
1691.40 *13*	5/2+	Jπ: assigned π=− by 1972Ka37 and π=+ by 1972Wo08.
1714.81 *17*	5/2−	Jπ: no assignment in 1972Wo08 or 1972Ka37.
1740.43 *14*	5/2−	Jπ: assigned (5/2) by 1972Wo08.
1745.88[@] *17*	(3/2+,5/2+)	Jπ: assigned (3/2,5/2) by 1972Wo08.
1776.44 *16*	(3/2,5/2)+	Jπ: no assignment in 1972Wo08.
1817.95[&] *22*	5/2+,7/2,9/2	Jπ: no assignment in 1972Ka37.
1829.97 *23*	3/2−,5/2	Jπ: no assignment in 1972Ka37; assigned (3/2,5/2) by 1972Wo08.
1848.0[@] *3*		
1868.7[@] *3*	3/2−,5/2,7/2−	Jπ: no assignment in 1972Wo08.

[†] Values are from least-squares fit to γ energies. Multiply placed γ′s are included at each location with the reported values and uncertainties.
[‡] Existence of this level has not confirmed by 2008IbZZ.
[#] Assignments are from ^{161}Ho Adopted Levels. Where the assignments of 1972Ka37 or 1972Wo08 differ, this is noted.
[@] Level given by 1972Wo08 only.
[&] Level given by 1972Ka37 only.
[a] Level given by 1972Ka37 and 1972Ha41, but not 1972Wo08.
[b] Band(A): 7/2[523] band.
[c] Band(B): 1/2[411] band.
[d] Band(C): 7/2[404] band.
[e] Band(D): 3/2[411] band.

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^{161}Er ε decay 1972Ka37,1972Wo08,1972Ha41 (continued)

^{161}Ho Levels (continued)

[f] Band(E): 1/2[541] band.
[g] Band(F): K^{π}=3/2^{-} γ-vibrational band based on the 7/2[523] g.s.
[h] Band(G): 5/2[413] band.
[i] Band(H): 5/2[532] band.

ε,β^{+} radiations

E(decay)†	E(level)	Iβ^{+} #	Iε#	Log *ft*	I(ε+β^{+})‡#	Comments
(337 *9*)	1656.65			5.57 *4*	3.2 *2*	εK=0.7937 *19*; εL=0.1579 *14*; εM+=0.0485 *5*
(503 *9*)	1491.18			6.11 *3*	2.2 *1*	εK=0.8106; εL=0.1454 *6*; εM+=0.04400 *20*
(506 *9*)	1488.34			6.20 *4*	1.8 *1*	εK=0.8108; εL=0.1452 *6*; εM+=0.04395 *19*
(532 *9*)	1461.56			6.23 *5*	1.9 *2*	εK=0.8124; εL=0.1440 *5*; εM+=0.04352 *17*
(536 *9*)	1457.67			5.88 *3*	4.3 *2*	εK=0.8127; εL=0.1439 *5*; εM+=0.04347 *17*
(597 *9*)	1396.95			6.34 *3*	1.9 *1*	εK=0.8157; εL=0.1416 *4*; εM+=0.04267 *13*
(1167 *9*)	826.61	0.0007 *2*	66 *4*	5.40 *3*	66 *4*	εK=0.8280; εL=0.1326; εM+=0.03947
(1468 *9*)	525.93	0.0015 *5*	1.0 *3*	7.4 *1*	1.0 *3*	av Eβ=218 *5*; εK=0.8292; εL=0.1305; εM+=0.03877
(1570 *9*)	423.92	0.0041 *7*	1.2 *2*	7.4 *1*	1.2 *2*	av Eβ=263 *5*; εK=0.8283; εL=0.1298; εM+=0.03854
(1695 *9*)	298.67	0.02 *3*	3 *3*		3 *3*	av Eβ=319 *5*; εK=0.8256; εL=0.1288; εM+=0.03821
(1772 *9*)	222.44	0.02 *3*	2 *3*		2 *3*	av Eβ=352 *5*; εK=0.8230; εL=0.1281; εM+=0.03799 E(decay): the positrons observed by 1965Gr35 are expected to populate the 211- and 222-keV levels. The observed end-point energy of 820 40 keV is slightly larger than the expected value of about 770 keV. I(ε+β^{+}): value deduced from intensity balance and depends completely on evaluator's choice of Iγ(11.4). I(ε+β^{+}): from the positron measurements of 1965Gr35, I(β^{+}) to 211- and 222-keV levels is 0.035% 17. From the theoretical capture-to-positron of 90 4, the capture intensity to these levels is 3.2% in reasonable agreement with the assigned value of 2% 3.

† Positron spectrum measured by 1965Gr35, who deduced the positron end-point energy of 820 40 keV and from positron to conversion-electron intensity ratio deduced I(β^{+})=0.035% 17.
‡ Values are calculated from γ intensity balances. Multiply placed γ's with undivided Iγ are included with their full intensity in each location. Only values with I(ε+β^{+})≥1.0% below 1 MeV and 1.5% above 1 MeV are included, since the multiple γ placement and the incompleteness of the decay scheme make the smaller values of limited usefulness.
# Absolute intensity per 100 decays.

γ(^{161}Ho)

Iγ normalization: value computed to give 100% feeding of the ground state by γ transitions. Because ΔJ,π=2,no, no ε feeding of the ground state is expected.
γγ-coincidence relations shown in the decay scheme are from 1972Ka37. Other: 1972Wo08.

E_γ[#]	I_γ[#@c]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[&]	δ[a]	α[d]	Comments
11.282 *5*	≈5.6	222.44	3/2+	211.16	1/2+	M1		258	α(L)=201 *3*; α(M)=45.0 *7*; α(N+..)=12.03 *17* α(N)=10.44 *15*; α(O)=1.512 *22*; α(P)=0.0841 *12* E_γ: from ce data (1996Go06). I_γ: reported value is ≈ 10 (1972Ka37), but this leads to an overpopulation of the 211 level by 14% of the decays, so evaluator has assigned an Iγ value of 5.6, which produces an intensity balance at the 211 level with no ε feeding of it. Mult.: from α(L1)exp/α(L2)exp/α(L3)exp=100/21 3/26 4 (1996Go06) and α(M1)exp/α(M2)exp/α(M3)exp=100/19 / 19 3 (1996Go06) and 100/21/17 (1972Ha41). δ: from ce ratios, 1996Go06 deduce δ < 0.078 if penetration included and δ=0.030 2 if penetration is excluded.
[x]28.2[b]									
[x]30.2[b]									
[x]34.9[b]									
36.7[b]		353.29	7/2+	316.57	5/2+	M1+E2	0.08	9.12	α(L)=7.11 *10*; α(M)=1.592 *23*; α(N+..)=0.422 *6* α(N)=0.367 *6*; α(O)=0.0517 *8*; α(P)=0.00252 *4* Mult.: from α(L1)exp/α(L2)exp/α(L3)exp=100/16/weak (1972Ha41).
[x]57.5[b]						M1+E2	0.16	13.10	α(K)=10.47 *15*; α(L)=2.04 *3*; α(M)=0.460 *7*; α(N+..)=0.1214 *17* α(N)=0.1061 *15*; α(O)=0.01470 *21*; α(P)=0.000665 *10* Mult.: From α(L1)exp/α(L2)exp=100/22 (1972Ha41).
[x]66.1[b]									
[x]73.6[b]									
74.560[‡] *10*	≈8	373.27	5/2+	298.67	3/2+	M1+E2	0.10	6.11	α(K)=5.07 *8*; α(L)=0.807 *12*; α(M)=0.179 *3*; α(N+..)=0.0478 *7* α(N)=0.0416 *6*; α(O)=0.00596 *9*; α(P)=0.000316 *5* E_γ: γ placement by evaluator based on placement from in-beam study. Mult.: from α(K)exp/α(L1)exp/α(L2)exp/α(L3)exp/α(M)exp = 100/19/≈ 2.1/weak/4 (1972Ha41) and α(K)exp=4.2 12 (1972Ka37).
76.246[‡] *9*	68 *35*	298.67	3/2+	222.44	3/2+	M1		5.70	α(K)=4.79 *7*; α(L)=0.715 *10*; α(M)=0.1579 *23*; α(N+..)=0.0423 *6* α(N)=0.0367 *6*; α(O)=0.00533 *8*; α(P)=0.000298 *5* I_γ: values are discrepant: 42 *4* (1972Ka37) and 93 *20* (1972Wo08). Mult.: from α(K)exp/α(L1)exp/α(L2)exp/α(M)exp = 100/20/2.1/5.7 (1972Ha41).
87.53 *3*	31 *4*	298.67	3/2+	211.16	1/2+	M1		3.83	α(K)=3.22 *5*; α(L)=0.479 *7*; α(M)=0.1058 *15*; α(N+..)=0.0283 *4* α(N)=0.0246 *4*; α(O)=0.00357 *5*; α(P)=0.000200 *3* Mult.: from weak L_2 and L_3 conversion lines.

γ(^{161}Ho) (continued)

E_γ[#]	I_γ[#@c]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[&]	δ[a]	α[d]	Comments
90.0 *1*	3.3 *10*	463.24	7/2$^+$	373.27	5/2$^+$	M1+E2	≈0.15	≈3.55	α(K)≈2.93; α(L)≈0.480; α(M)≈0.1069; α(N+..)≈0.0284 α(N)≈0.0247; α(O)≈0.00353; α(P)≈0.000182 Mult.: from α(K)exp/α(L1)exp/α(L2)exp/α(L3)exp/α(M)exp =100/16/≈ 2.2/weak/6 (1972Ha41).
94.13 *3*	75 *6*	316.57	5/2$^+$	222.44	3/2$^+$	M1+E2	0.15	3.12	α(K)=2.58 *4*; α(L)=0.418 *6*; α(M)=0.0931 *13*; α(N+..)=0.0248 *4* α(N)=0.0216 *3*; α(O)=0.00308 *5*; α(P)=0.0001595 *23* Mult.: from α(L1)exp/α(L3)exp/α(M)exp=100/6.5/23 (1972Ha41).
99.63 *3*	35 *9*	99.63	9/2$^-$	0.	7/2$^-$	M1+E2	0.16	2.64	α(K)=2.19 *3*; α(L)=0.355 *5*; α(M)=0.0790 *11*; α(N+..)=0.0210 *3* α(N)=0.0183 *3*; α(O)=0.00261 *4*; α(P)=0.0001353 *19* Mult.: from α(K)exp/α(L1)exp/α(L2)exp/α(L3)exp = 100/18/2.4/≈ 1.1/< 9 (1972Ha41). δ: from 1972Ha41 and supported by γ(θ) from in-beam study; but assigned E2 by 1972Ka37 from α(K)exp=1.1 4.
102.0 *1*	2 *1*	525.93	3/2$^-$	423.92	1/2$^-$	M1		2.47	α(K)=2.07 *3*; α(L)=0.308 *5*; α(M)=0.0680 *10*; α(N+..)=0.0182 *3* α(N)=0.01579 *23*; α(O)=0.00230 *4*; α(P)=0.0001286 *19* Mult.: from α(K)exp ≈ 2.5 (1972Ka37).
105.4 *1*	5.5 *10*	316.57	5/2$^+$	211.16	1/2$^+$	E2		2.32	α(K)=0.966 *14*; α(L)=1.039 *16*; α(M)=0.250 *4*; α(N+..)=0.0632 *10* α(N)=0.0564 *9*; α(O)=0.00672 *10*; α(P)=4.02×10^{-5} *6* Mult.: for 105.4+105.7 doublet α(K)exp/α(L2)exp=100/73 (1972Ha41) and α(K)exp=0.69 (1972Ka37) and from 1979DzZZ assignment for this γ.
105.7 *1*	2.5 *8*	458.88	5/2$^-$	353.29	7/2$^+$	E1		0.273	α(K)=0.228 *4*; α(L)=0.0356 *5*; α(M)=0.00785 *12*; α(N+..)=0.00204 *3* α(N)=0.00179 *3*; α(O)=0.000242 *4*; α(P)=1.048×10^{-5} *15* Mult.: for 105.4+105.7 doublet, α(K)exp/α(L2)exp=100/73 (1972Ha41) and α(K)exp=0.69 (1972Ka37) and from 1979DzZZ assignment for this γ.
107.3 *1*	4.0 *10*	554.12	(5/2$^-$,7/2,9/2$^+$)	446.83	5/2$^+$	[M1,E2]		2.15 *4*	α(K)=1.4 *5*; α(L)=0.6 *4*; α(M)=0.14 *9*; α(N+..)=0.037 *22* α(N)=0.033 *20*; α(O)=0.0041 *21*; α(P)=7.E−5 *4*
109.9 *1*	4.6 *10*	463.24	7/2$^+$	353.29	7/2$^+$	M1		1.99	α(K)=1.674 *24*; α(L)=0.248 *4*; α(M)=0.0549 *8*; α(N+..)=0.01469 *21* α(N)=0.01274 *19*; α(O)=0.00185 *3*; α(P)=0.0001038 *15* Mult.: from α(K)exp/α(L)exp=100/17 (1972Ha41).
[x]111.9[b]									
[x]119.9[b]									
122.3 *1*	1.5 *5*	221.95	11/2$^-$	99.63	9/2$^-$	(M1)		1.468	α(K)=1.234 *18*; α(L)=0.183 *3*; α(M)=0.0404 *6*; α(N+..)=0.01082 *16* α(N)=0.00938 *14*; α(O)=0.001364 *20*; α(P)=7.65×10^{-5} *11* Mult.: from γ(θ) from in-beam study and known parities.
125.4 *2*	1.0 *3*	423.92	1/2$^-$	298.67	3/2$^+$	[E1]		0.173	α(K)=0.1450 *22*; α(L)=0.0222 *4*; α(M)=0.00488 *8*; α(N+..)=0.001275 *19* α(N)=0.001115 *17*; α(O)=0.0001526 *23*; α(P)=6.83×10^{-6} *10*
[x]127.8[b]									
130.85 *3*	49 *3*	353.29	7/2$^+$	222.44	3/2$^+$	E2		1.055	α(K)=0.545 *8*; α(L)=0.392 *6*; α(M)=0.0941 *14*; α(N+..)=0.0238 *4*

^{161}Er ε decay 1972Ka37,1972Wo08,1972Ha41 (continued)

γ(^{161}Ho) (continued)

E_γ[#]	I_γ[#@c]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[&]	α[d]	Comments
								α(N)=0.0213 3; α(O)=0.00256 4; α(P)=2.34×10^{-5} 4 Mult.: from α(K)exp/α(L1)exp/α(L2)exp/α(L3)exp/α(M)exp = 100/12/39/37/21 (1972Ha41) and α(K)exp=0.55 14 (1972Ka37).
^{x}134.6[b]								
148.15 3	19 6	446.83	5/2$^+$	298.67	3/2$^+$	M1+E2	0.77 9	α(K)=0.55 17; α(L)=0.17 6; α(M)=0.039 16; α(N+..)=0.010 4 α(N)=0.009 4; α(O)=0.0011 4; α(P)=3.1×10^{-5} 14 Mult.: from α(K)exp=0.44 (1972Ka37) report mult=E2. However, from L1, L2 and L3 line intensities, 2008Eg01 conclude that the dominant mult is M1. The data, however, do not appear to provide a unique δ value for this transition.
150.7 2	3.4 12	373.27	5/2$^+$	222.44	3/2$^+$	M1	0.813	α(K)=0.684 10; α(L)=0.1010 15; α(M)=0.0223 4; α(N+..)=0.00598 9 α(N)=0.00518 8; α(O)=0.000754 11; α(P)=4.23×10^{-5} 7 Mult.: from α(K)exp=1.0 (1972Ka37) and 1.5 (1972Ha41).
152.6 1	10 2	525.93	3/2$^-$	373.27	5/2$^+$	E1	0.1027	α(K)=0.0862 13; α(L)=0.01292 19; α(M)=0.00284 4; α(N+..)=0.000745 11 α(N)=0.000651 10; α(O)=8.99×10^{-5} 13; α(P)=4.17×10^{-6} 6 Mult.: from the average α(K)exp(152+153) $\le$ 0.16 (1972Ka37) one or both of these γ's is E1 and from 1979DzZZ assignment.
153.0 1	4.2 8	252.67	7/2$^+$	99.63	9/2$^-$	(E1)	0.1020	α(K)=0.0856 12; α(L)=0.01282 18; α(M)=0.00282 4; α(N+..)=0.000740 11 α(N)=0.000646 10; α(O)=8.93×10^{-5} 13; α(P)=4.14×10^{-6} 6 Mult.: D assigned from $\gamma(\theta)$ from in-beam study. E1 from J^π values.
162.1 1	3.3 8	373.27	5/2$^+$	211.16	1/2$^+$	E2	0.497	α(K)=0.297 5; α(L)=0.1546 22; α(M)=0.0368 6; α(N+..)=0.00937 14 α(N)=0.00833 12; α(O)=0.001022 15; α(P)=1.336×10^{-5} 19 Mult.: from α(K)exp=0.46 (1972Ha41), which implies M1,E2; and then J$^\pi$'s require E2.
164.6 1	1.5 5	463.24	7/2$^+$	298.67	3/2$^+$	[E2]	0.472	α(K)=0.284 4; α(L)=0.1448 21; α(M)=0.0345 5; α(N+..)=0.00878 13 α(N)=0.00781 12; α(O)=0.000958 14; α(P)=1.282×10^{-5} 18
180.9 3	1.0 3	554.12	(5/2$^-$,7/2,9/2$^+$)	373.27	5/2$^+$	[M1,E2]	0.41 8	α(K)=0.31 10; α(L)=0.079 19; α(M)=0.018 5; α(N+..)=0.0047 12 α(N)=0.0042 11; α(O)=0.00055 10; α(P)=1.8×10^{-5} 8
^{x}185.3[b]								
201.47 3	92 4	423.92	1/2$^-$	222.44	3/2$^+$	E1	0.0493	α(K)=0.0416 6; α(L)=0.00609 9; α(M)=0.001338 19; α(N+..)=0.000352 5 α(N)=0.000307 5; α(O)=4.29×10^{-5} 6; α(P)=2.08×10^{-6} 3 Mult.: from α(K)exp=0.054 12 (1972Ka37), 0.013 +9-6 (1965Gr35).
209.36 3	78 16	525.93	3/2$^-$	316.57	5/2$^+$	E1	0.0446	α(K)=0.0376 6; α(L)=0.00550 8; α(M)=0.001208 17; α(N+..)=0.000318 5 α(N)=0.000278 4; α(O)=3.88×10^{-5} 6; α(P)=1.89×10^{-6} 3 Mult.: from α(K)exp=0.059 12 (1972Ka37).
211.15 3	1000 44	211.16	1/2$^+$	0.	7/2$^-$	E3	1.218	α(K)=0.454 7; α(L)=0.583 9; α(M)=0.1442 21; α(N+..)=0.0367 6 α(N)=0.0327 5; α(O)=0.00394 6; α(P)=2.55×10^{-5} 4 Mult.: from α(K)exp/α(L1)exp/α(L2)exp/α(L3)exp = 100/8/65/40 (1965Gr35) and α(K)exp/α(L)exp=0.74 5 (1965St08).
212.77 3	68 4	423.92	1/2$^-$	211.16	1/2$^+$	E1	0.0428	α(K)=0.0361 5; α(L)=0.00527 8; α(M)=0.001157 17; α(N+..)=0.000305 5 α(N)=0.000266 4; α(O)=3.72×10^{-5} 6; α(P)=1.82×10^{-6} 3 Mult.: from α(K)exp=0.047 23 (1972Ka37).

γ(^{161}Ho) (continued)

E_γ[#]	I_γ[#@c]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[&]	α[d]	Comments
219.4 *2*	6.2 *10*	592.66	3/2$^-$	373.27	5/2$^+$	[E1]	0.0395	α(K)=0.0333 *5*; α(L)=0.00485 *7*; α(M)=0.001066 *16*; α(N+..)=0.000281 *4* α(N)=0.000245 *4*; α(O)=3.44×10^{-5} *5*; α(P)=1.685×10^{-6} *24*
(221.9)	0.21	221.95	11/2$^-$	0.	7/2$^-$	(E2)	0.1731	α(K)=0.1183 *17*; α(L)=0.0423 *6*; α(M)=0.00996 *14*; α(N+..)=0.00255 *4* α(N)=0.00226 *4*; α(O)=0.000285 *4*; α(P)=5.74×10^{-6} *8* I_γ: not observed in this decay, but Iγ deduced by evaluator from ^{161}Ho Adopted Gammas data. Mult.: Q assigned from $\gamma(\theta)$ from in-beam study. E2 from J^π values.
^{x}225.3[b]								
^{x}231.5[b]								
236.43 *3*	42 *2*	458.88	5/2$^-$	222.44	3/2$^+$	E1	0.0326	α(K)=0.0275 *4*; α(L)=0.00399 *6*; α(M)=0.000875 *13*; α(N+..)=0.000231 *4* α(N)=0.000201 *3*; α(O)=2.83×10^{-5} *4*; α(P)=1.402×10^{-6} *20* Mult.: from α(K)exp=0.034 (1972Ka37).
^{x}237.2[b]								
^{x}247.2 *7*	1.0							
252.68 *3*	40 *2*	252.67	7/2$^+$	0.	7/2$^-$	E1	0.0275	α(K)=0.0232 *4*; α(L)=0.00335 *5*; α(M)=0.000736 *11*; α(N+..)=0.000194 *3* α(N)=0.0001693 *24*; α(O)=2.38×10^{-5} *4*; α(P)=1.192×10^{-6} *17* Mult.: from α(K)exp=0.036 (1972Ha41) and < 0.032 (1972Ka37).
271.1 *6*	1.0 *3*	370.7	9/2$^+$	99.63	9/2$^-$	[E1]	0.0230	α(K)=0.0194 *3*; α(L)=0.00279 *5*; α(M)=0.000613 *10*; α(N+..)=0.0001621 *25* α(N)=0.0001411 *22*; α(O)=1.99×10^{-5} *3*; α(P)=1.005×10^{-6} *15*
276.0 *1*	8.2 *10*	592.66	3/2$^-$	316.57	5/2$^+$	E1	0.0220	α(K)=0.0186 *3*; α(L)=0.00267 *4*; α(M)=0.000585 *9*; α(N+..)=0.0001548 *22* α(N)=0.0001348 *19*; α(O)=1.90×10^{-5} *3*; α(P)=9.62×10^{-7} *14* Mult.: from α(K)exp=0.022 9 (1972Ka37).
^{x}293.6[b]								
294.00 *4*	36 *2*	592.66	3/2$^-$	298.67	3/2$^+$	E1	0.0188	α(K)=0.01587 *23*; α(L)=0.00227 *4*; α(M)=0.000498 *7*; α(N+..)=0.0001318 *19* α(N)=0.0001147 *16*; α(O)=1.623×10^{-5} *23*; α(P)=8.27×10^{-7} *12* Mult.: from α(K)exp=0.020 7 (1972Ka37).
^{x}296.0[b]								
301 *1*	≈1.5	554.12	(5/2$^-$,7/2,9/2$^+$)	252.67	7/2$^+$	[M1,E2]	0.09 *3*	α(K)=0.08 *3*; α(L)=0.0141 *9*; α(M)=0.00318 *13*; α(N+..)=0.00084 *5* α(N)=0.00073 *4*; α(O)=0.000101 *11*; α(P)=4.4×10^{-6} *19*
303.50 *4*	28 *3*	525.93	3/2$^-$	222.44	3/2$^+$	E1	0.01735	α(K)=0.01467 *21*; α(L)=0.00209 *3*; α(M)=0.000460 *7*; α(N+..)=0.0001216 *17* α(N)=0.0001059 *15*; α(O)=1.499×10^{-5} *21*; α(P)=7.66×10^{-7} *11* Mult.: from α(K)exp=0.012 4 (1972Ka37).
^{x}305.1[b]								
^{x}309.1 *3*	5.9 *17*							
314.77 *4*	204 *8*	525.93	3/2$^-$	211.16	1/2$^+$	E1	0.01586	α(K)=0.01342 *19*; α(L)=0.00191 *3*; α(M)=0.000419 *6*; α(N+..)=0.0001110 *16* α(N)=9.66×10^{-5} *14*; α(O)=1.369×10^{-5} *20*; α(P)=7.03×10^{-7} *10* Mult.: from α(K)exp=0.017 3 (1972Ka37) and 0.011 2 from combination of Iγ of 1972Wo08 and I(e-) of 1965Gr35.

γ(^{161}Ho) (continued)

E_γ[#]	I_γ[#@c]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[&]	α[d]	Comments
x346.7 *2*	6					E1	0.01253	α(K)=0.01061 *15*; α(L)=0.001503 *22*; α(M)=0.000329 *5*; α(N+..)=8.73×10^{-5} *13* α(N)=7.60×10^{-5} *11*; α(O)=1.080×10^{-5} *16*; α(P)=5.60×10^{-7} *8* Mult.: From α(K)exp=0.009 4 (1972Ka37).
350.4 *2*	6.3 *9*	649.03	5/2$^-$	298.67	3/2$^+$	E1	0.01221	α(K)=0.01034 *15*; α(L)=0.001464 *21*; α(M)=0.000321 *5*; α(N+..)=8.51×10^{-5} *12* α(N)=7.40×10^{-5} *11*; α(O)=1.052×10^{-5} *15*; α(P)=5.47×10^{-7} *8* Mult.: from α(K)exp=0.009 4 (1972Ka37).
363.6 *4*	4.6 *8*	826.61	5/2$^-$	463.24	7/2$^+$	[E1]	0.01118	α(K)=0.00947 *14*; α(L)=0.001337 *19*; α(M)=0.000293 *5*; α(N+..)=7.77×10^{-5} *11* α(N)=6.76×10^{-5} *10*; α(O)=9.62×10^{-6} *14*; α(P)=5.02×10^{-7} *8*
370.6[f] *4*	1.1[f]	370.7	9/2$^+$	0.	7/2$^-$	(E1)	0.01068	α(K)=0.00905 *13*; α(L)=0.001276 *19*; α(M)=0.000280 *4*; α(N+..)=7.42×10^{-5} *11* α(N)=6.45×10^{-5} *10*; α(O)=9.19×10^{-6} *13*; α(P)=4.80×10^{-7} *7* I_γ: value deduced by evaluator from Iγ(271)/Iγ(370) ratio from in-beam study. Line is doublet with Iγ=5 *2*. Mult.: D assignment from γ(θ) from in-beam study; E1 from J$^\pi$'s.
370.6[f] *3*	4[f] *2*	592.66	3/2$^-$	222.44	3/2$^+$	[E1]	0.01068	α(K)=0.00905 *13*; α(L)=0.001276 *18*; α(M)=0.000280 *4*; α(N+..)=7.42×10^{-5} *11* α(N)=6.45×10^{-5} *10*; α(O)=9.19×10^{-6} *13*; α(P)=4.80×10^{-7} *7* I_γ: value deduced by evaluator. Line is doublet with Iγ=5 2.
376.6[†g] *2*	9.6 *20*	1137.15?	(5/2,7/2)$^-$	760.47	5/2$^+$	E1	0.01028	α(K)=0.00871 *13*; α(L)=0.001228 *18*; α(M)=0.000269 *4*; α(N+..)=7.14×10^{-5} *10* α(N)=6.21×10^{-5} *9*; α(O)=8.84×10^{-6} *13*; α(P)=4.63×10^{-7} *7* Mult.: from α(K)exp=0.005 2 (1972Ka37).
x421.7 *1*	29 *4*					E1	0.00788	α(K)=0.00669 *10*; α(L)=0.000936 *14*; α(M)=0.000205 *3*; α(N+..)=5.45×10^{-5} *8* α(N)=4.73×10^{-5} *7*; α(O)=6.77×10^{-6} *10*; α(P)=3.58×10^{-7} *5* Mult.: From α(K)exp=0.008 3 (1972Ka37) and 0.0063 27 (1972Wo08 for Iγ and 1965Gr35 for I(ce)).
x436.1 *11*	1.5							
446.9 *1*	33 *3*	446.83	5/2$^+$	0.	7/2$^-$	E1	0.00690	α(K)=0.00586 *9*; α(L)=0.000817 *12*; α(M)=0.000179 *3*; α(N+..)=4.75×10^{-5} *7* α(N)=4.13×10^{-5} *6*; α(O)=5.91×10^{-6} *9*; α(P)=3.15×10^{-7} *5* Mult.: from α(K)exp=0.009 3 (1972Ka37).
x449.1[b]								
454.3 *4*	3.6 *10*	554.12	(5/2$^-$,7/2,9/2$^+$)	99.63	9/2$^-$	[E1]	0.00665	α(K)=0.00564 *8*; α(L)=0.000786 *12*; α(M)=0.0001722 *25*; α(N+..)=4.58×10^{-5} *7* α(N)=3.98×10^{-5} *6*; α(O)=5.69×10^{-6} *8*; α(P)=3.03×10^{-7} *5*
x467.9 *3*	20 *3*					E2	0.0188	α(K)=0.01493 *21*; α(L)=0.00299 *5*; α(M)=0.000680 *10*; α(N+..)=0.000178 *3* α(N)=0.0001562 *22*; α(O)=2.12×10^{-5} *3*; α(P)=8.25×10^{-7} *12* Mult.: From α(K)exp=0.014 5 (1972Ka37).

From ENSDF

$^{161}_{67}$Ho$_{94}$-8

γ(^{161}Ho) (continued)

E_γ[#]	I_γ[#@c]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[&]	α[d]	Comments
488.8[†g] 4	6.0 15	710.5?		221.95	11/2−	M1	0.0341	α(K)=0.0288 4; α(L)=0.00413 6; α(M)=0.000908 13; α(N+..)=0.000244 4 α(N)=0.000211 3; α(O)=3.08×10^{-5} 5; α(P)=1.754×10^{-6} 25 If this placement is correct and the existence of the level is confirmed, then π=−. Mult.: from α(K)exp=0.032 15 (1972Ka37).
499.1[e†g] 5	2.4[e] 10	710.5?		211.16	1/2+			
499.1[e†g] 5	2.4[e] 10	1325.20?	(3/2,5/2)+	826.61	5/2−			
503.4 5	3.0 13	1640.46	(5/2+)	1137.15?	(5/2,7/2)−			
507.6 2	24 5	760.47	5/2+	252.67	7/2+	M1	0.0310	α(K)=0.0262 4; α(L)=0.00374 6; α(M)=0.000823 12; α(N+..)=0.000221 3 α(N)=0.000191 3; α(O)=2.79×10^{-5} 4; α(P)=1.591×10^{-6} 23 Mult.: from α(K)exp=0.026 9 (1972Ka37).
528.0 2	32 2	826.61	5/2−	298.67	3/2+	E1	0.00475	α(K)=0.00404 6; α(L)=0.000558 8; α(M)=0.0001221 18; α(N+..)=3.25×10^{-5} 5 α(N)=2.82×10^{-5} 4; α(O)=4.05×10^{-6} 6; α(P)=2.19×10^{-7} 3 Mult.: from α(K)exp=0.005 1 (1972Ka37).
[x]543.0[b]								
549.4 2	25 4	649.03	5/2−	99.63	9/2−	E2	0.01242	α(K)=0.01004 14; α(L)=0.00185 3; α(M)=0.000419 6; α(N+..)=0.0001101 16 α(N)=9.63×10^{-5} 14; α(O)=1.326×10^{-5} 19; α(P)=5.63×10^{-7} 8 Mult.: from α(K)exp=0.010 2 (1972Ka37).
554.2[e] 4	5[e] 2	554.12	(5/2−,7/2,9/2+)	0.	7/2−	[E1]	0.00427	α(K)=0.00364 6; α(L)=0.000501 7; α(M)=0.0001096 16; α(N+..)=2.92×10^{-5} 5 α(N)=2.53×10^{-5} 4; α(O)=3.64×10^{-6} 6; α(P)=1.97×10^{-7} 3
554.2[e] 4	5[e] 2	1691.40	5/2+	1137.15?	(5/2,7/2)−			
573.8 10	≈3	826.61	5/2−	252.67	7/2+	E1	0.00397	α(K)=0.00337 5; α(L)=0.000464 7; α(M)=0.0001015 15; α(N+..)=2.70×10^{-5} 4 α(N)=2.35×10^{-5} 4; α(O)=3.37×10^{-6} 5; α(P)=1.83×10^{-7} 3 Mult.: from 1979DzZZ, but no supporting data.
592.6 1	300 30	592.66	3/2−	0.	7/2−	E2	0.01030	α(K)=0.00838 12; α(L)=0.001497 21; α(M)=0.000337 5; α(N+..)=8.87×10^{-5} 13 α(N)=7.75×10^{-5} 11; α(O)=1.074×10^{-5} 15; α(P)=4.72×10^{-7} 7 Mult.: from α(K)exp=0.010 1 (1972Ka37) and 0.0062 18 (1965Gr35).
[x]625.7 4	8 2					E2	0.00904	α(K)=0.00738 11; α(L)=0.001289 19; α(M)=0.000289 4; α(N+..)=7.63×10^{-5} 11 α(N)=6.67×10^{-5} 10; α(O)=9.27×10^{-6} 13; α(P)=4.17×10^{-7} 6 Mult.: From 1979DzZZ, but no supporting data.
[x]634.4[b]								
649.0 2	65 8	649.03	5/2−	0.	7/2−	E2	0.00829	α(K)=0.00679 10; α(L)=0.001168 17; α(M)=0.000262 4; α(N+..)=6.91×10^{-5} 10

$^{161}_{67}$Ho$_{94}$-9

γ(^{161}Ho) (continued)

E_γ [#]	I_γ [#@c]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [&]	α [d]	Comments
								α(N)=6.03×10^{-5} *9*; α(O)=8.41×10^{-6} *12*; α(P)=3.85×10^{-7} *6* Mult.: from α(K)exp=0.010 2 (1972Ka37).
[x]662.5 *2*	11 *2*					M1	0.01578	α(K)=0.01336 *19*; α(L)=0.00189 *3*; α(M)=0.000416 *6*; α(N+..)=0.0001115 *16* α(N)=9.66×10^{-5} *14*; α(O)=1.412×10^{-5} *20*; α(P)=8.07×10^{-7} *12* Mult.: From α(K)exp=0.015 7 (1972Ka37).
[x]690.8 *2*	27 *3*					M1	0.01421	α(K)=0.01203 *17*; α(L)=0.001703 *24*; α(M)=0.000374 *6*; α(N+..)=0.0001003 *14* α(N)=8.69×10^{-5} *13*; α(O)=1.270×10^{-5} *18*; α(P)=7.27×10^{-7} *11* Mult.: From α(K)exp=0.012 5 (1972Ka37).
[x]719.0 *3*	7 *2*							
726.8 *4*	69 *10*	826.61	5/2$^-$	99.63	9/2$^-$	E2	0.00638	α(K)=0.00526 *8*; α(L)=0.000868 *13*; α(M)=0.000194 *3*; α(N+..)=5.13×10^{-5} *8* α(N)=4.47×10^{-5} *7*; α(O)=6.29×10^{-6} *9*; α(P)=3.00×10^{-7} *5* Mult.: from α(K)exp=0.0053 18 (1972Ka37).
[x]737.1 *2*	18 *4*					M1	0.01209	α(K)=0.01024 *15*; α(L)=0.001446 *21*; α(M)=0.000318 *5*; α(N+..)=8.52×10^{-5} *12* α(N)=7.38×10^{-5} *11*; α(O)=1.078×10^{-5} *16*; α(P)=6.18×10^{-7} *9* Mult.: From α(K)exp=0.010 4 (1972Ka37).
[x]745.4 *5*	4.3 *16*							
747.4 *6*	4.4 *16*	1396.95	3/2$^-$	649.03	5/2$^-$			
[x]767.1 *6*	3.5 *15*							
783.9[†g] *4*	4.4 *15*	1137.15?	(5/2,7/2)$^-$	353.29	7/2$^+$			
799.4[†g] *3*	12.1 *25*	1325.20?	(3/2,5/2)$^+$	525.93	3/2$^-$	E1	0.00201	α(K)=0.001711 *24*; α(L)=0.000231 *4*; α(M)=5.05×10^{-5} *7*; α(N+..)=1.347×10^{-5} *19* α(N)=1.168×10^{-5} *17*; α(O)=1.691×10^{-6} *24*; α(P)=9.41×10^{-8} *14* Mult.: from α(K)exp=0.0054 20 (1972Ka37).
804.4 *2*	23 *6*	1396.95	3/2$^-$	592.66	3/2$^-$	E2	0.00508	α(K)=0.00422 *6*; α(L)=0.000674 *10*; α(M)=0.0001501 *21*; α(N+..)=3.98×10^{-5} *6* α(N)=3.46×10^{-5} *5*; α(O)=4.90×10^{-6} *7*; α(P)=2.41×10^{-7} *4* Mult.: from α(K)exp=0.0061 15 (1972Ka37).
808.8[f] *3*	10[f]	1232.86	(3/2)$^+$	423.92	1/2$^-$			Mult.: assigned E2 (1972Ha41,1979DzZZ), but γ multiply placed.
808.8[f] *3*	16[f]	1457.67	(3/2$^-$)	649.03	5/2$^-$			Mult.: assigned E2 (1972Ka37,1979DzZZ), but γ multiply placed.
812.1[f] *3*	24[f]	1404.35	1/2,3/2	592.66	3/2$^-$			Mult.: assigned E2 by 1972Wo08 and 1979DzZZ, and M1 by 1972Ha41; but γ is multiply placed.
812.1[f] *4*	10[f]	1461.56	3/2$^-$	649.03	5/2$^-$			Mult.: assigned E2 by 1972Wo08 and 1979DzZZ, and M1 by 1972Ha41; but γ multiply placed.
826.6 *1*	525×10^1 *25*	826.61	5/2$^-$	0.	7/2$^-$	M1	0.00911	α(K)=0.00772 *11*; α(L)=0.001086 *16*; α(M)=0.000238 *4*; α(N+..)=6.39×10^{-5} *9* α(N)=5.54×10^{-5} *8*; α(O)=8.09×10^{-6} *12*; α(P)=4.65×10^{-7} *7* Mult.: from α(K)exp=0.0083 8 (1972Ka37) and 0.0072 16 (1965Gr35).

γ(^{161}Ho) (continued)

E_γ[#]	I_γ[#@c]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[&]	α[d]	Comments
[x]831.3 5	8 4							
839.4 4	8.7 19	1488.34	3/2⁻	649.03	5/2⁻	(M1)	0.00877	α(K)=0.00744 11; α(L)=0.001045 15; α(M)=0.000229 4; α(N+..)=6.15×10^{-5} 9 α(N)=5.33×10^{-5} 8; α(O)=7.79×10^{-6} 11; α(P)=4.47×10^{-7} 7 Mult.: from α(K)exp ≈ 0.01 (1972Ka37).
842.2 4	5.0 20	1491.18	(3/2⁻)	649.03	5/2⁻			
[x]859.2 7	2.7 16							
864.9 3	106 15	1457.67	(3/2⁻)	592.66	3/2⁻	E2(+M1)	0.0062 19	α(K)=0.0053 17; α(L)=0.00077 21; α(M)=0.00017 5; α(N+..)=4.5×10^{-5} 12 α(N)=3.9×10^{-5} 11; α(O)=5.7×10^{-6} 16; α(P)=3.1×10^{-7} 11 Mult.: from α(K)exp=0.0054 15 (1972Ka37).
868.8[e] 3	27[e] 3	1394.47	(1/2⁺,3/2)	525.93	3/2⁻			Mult.: assigned M1,E2 (1972Ka37), but γ multiply placed.
868.8[e] 3	27[e] 3	1461.56	3/2⁻	592.66	3/2⁻			Mult.: assigned M1,E2 (1972Ka37), but γ multiply placed.
871.2 5	5.7 20	1396.95	3/2⁻	525.93	3/2⁻			
875.8 3	26 3	1524.64	(5/2,7/2)⁻	649.03	5/2⁻	M1	0.00791	α(K)=0.00670 10; α(L)=0.000941 14; α(M)=0.000206 3; α(N+..)=5.54×10^{-5} 8 α(N)=4.80×10^{-5} 7; α(O)=7.01×10^{-6} 10; α(P)=4.03×10^{-7} 6 Mult.: from α(K)exp=0.0069 25 (1972Ka37).
878.6 5	18 3	1404.35	1/2,3/2	525.93	3/2⁻			
880.8 6	2.6 20	1640.46	(5/2⁺)	760.47	5/2⁺			
885.2[†g] 6	3.4 15	1137.15?	(5/2,7/2)⁻	252.67	7/2⁺			
895.7[f] 2	55[f]	1488.34	3/2⁻	592.66	3/2⁻			Mult.: assigned M1 (1972Ka37), but γ multiply placed.
895.7[f] 2	11[f]	1656.65	5/2⁻	760.47	5/2⁺			Mult.: assigned M1 (1972Ka37), but γ multiply placed.
898.2 6	4.5 30	1491.18	(3/2⁻)	592.66	3/2⁻			I_γ: discrepant values: 1.8 (1972Ka37) and 7.3 17 (1972Wo08).
[x]904.4 9	2.4 14							
913.3 9	1.8 18	1740.43	5/2⁻	826.61	5/2⁻			
923.0 7	2.4 12	1240.08	(1/2,3/2,5/2)⁺	316.57	5/2⁺			
931.7[f] 2	149[f]	1457.67	(3/2⁻)	525.93	3/2⁻			Mult.: assigned M1 (1972Ka37,1972Ha41,1972Wo08), but γ multiply placed.
931.7[f] 2	11[f]	1524.64	(5/2,7/2)⁻	592.66	3/2⁻			Mult.: assigned M1 (1972Ka37,1972Ha41,1972Wo08), but γ multiply placed.
935.6 6	7.2 22	1461.56	3/2⁻	525.93	3/2⁻			
937.3 6	4.6 20	1396.95	3/2⁻	458.88	5/2⁻	(M1)	0.00670	α(K)=0.00568 8; α(L)=0.000795 12; α(M)=0.0001745 25; α(N+..)=4.68×10^{-5} 7 α(N)=4.05×10^{-5} 6; α(O)=5.93×10^{-6} 9; α(P)=3.41×10^{-7} 5 Mult.: from α(K)exp=0.011 6 (1972Ka37).
941.0 3	11.0 15	1240.08	(1/2,3/2,5/2)⁺	298.67	3/2⁺	M1	0.00663	α(K)=0.00563 8; α(L)=0.000788 11; α(M)=0.0001728 25; α(N+..)=4.64×10^{-5} 7 α(N)=4.01×10^{-5} 6; α(O)=5.87×10^{-6} 9; α(P)=3.38×10^{-7} 5 Mult.: from 1979DzZZ, but no supporting data.
[x]948.5 6	22 1							

From ENSDF

$^{161}_{67}$Ho$_{94}$-11

γ(^{161}Ho) (continued)

E_γ[#]	I_γ[#@c]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[&]	α[d]	Comments
951.3[†g] 6	2.3 15	1325.20?	(3/2,5/2)$^+$	373.27	5/2$^+$			
954.7 6	2.5 15	1714.81	5/2$^-$	760.47	5/2$^+$			
962.4 4	13.3 19	1488.34	3/2$^-$	525.93	3/2$^-$	M1	0.00628	α(K)=0.00533 8; α(L)=0.000745 11; α(M)=0.0001635 23; α(N+..)=4.39×10^{-5} 7 α(N)=3.80×10^{-5} 6; α(O)=5.56×10^{-6} 8; α(P)=3.20×10^{-7} 5 Mult.: from 1979DzZZ, but no supporting data.
964.5 9	2.7 20	1491.18	(3/2$^-$)	525.93	3/2$^-$			
970.4[e] 4	10[e] 2	1394.47	(1/2$^+$,3/2)	423.92	1/2$^-$			Mult.: assigned M1 (1979DzZZ), but γ multiply placed.
970.4[e] 4	10[e] 2	1524.64	(5/2,7/2)$^-$	554.12	(5/2$^-$,7/2,9/2$^+$)			Mult.: assigned M1 (1979DzZZ), but γ multiply placed.
973.0 3	21 3	1396.95	3/2$^-$	423.92	1/2$^-$	M1	0.00612	α(K)=0.00519 8; α(L)=0.000725 11; α(M)=0.0001591 23; α(N+..)=4.27×10^{-5} 6 α(N)=3.70×10^{-5} 6; α(O)=5.41×10^{-6} 8; α(P)=3.11×10^{-7} 5 Mult.: from 1979DzZZ, but no supporting data.
980.2[f] 2	9[f]	1232.86	(3/2)$^+$	252.67	7/2$^+$			Mult.: assigned M1 (1979DzZZ), but γ multiply placed.
980.2[f] 2	9[f]	1404.35	1/2,3/2	423.92	1/2$^-$			Mult.: assigned M1 (1979DzZZ), but γ multiply placed.
980.2[f] 2	9[f]	1740.43	5/2$^-$	760.47	5/2$^+$			Mult.: assigned M1 (1979DzZZ), but γ multiply placed. J^π's suggest E1.
998.8[f] 2	3[f]	1457.67	(3/2$^-$)	458.88	5/2$^-$			Mult.: assigned M1 (1979DzZZ), but γ multiply placed.
998.8[f] 2	9[f]	1524.64	(5/2,7/2)$^-$	525.93	3/2$^-$			Mult.: assigned M1 (1979DzZZ), but γ multiply placed.
[x]1008.6 6	4 2					M1	0.00561	α(K)=0.00476 7; α(L)=0.000664 10; α(M)=0.0001457 21; α(N+..)=3.91×10^{-5} 6 α(N)=3.38×10^{-5} 5; α(O)=4.95×10^{-6} 7; α(P)=2.85×10^{-7} 4 Mult.: From average α(K)exp(1008+1010)=0.0074 (1972Ka37) and from 1979DzZZ assignment for this γ.
1010.8[e] 3	7[e] 1	1232.86	(3/2)$^+$	222.44	3/2$^+$			Mult.: assigned M1 (1979DzZZ), but γ multiply placed.
1010.8[e] 4	7[e] 1	1457.67	(3/2$^-$)	446.83	5/2$^+$			Mult.: assigned M1 (1979DzZZ), but γ multiply placed.
1018.3 4	3.4 15	1240.08	(1/2,3/2,5/2)$^+$	222.44	3/2$^+$	M1	0.00548	α(K)=0.00465 7; α(L)=0.000649 10; α(M)=0.0001423 20; α(N+..)=3.82×10^{-5} 6 α(N)=3.31×10^{-5} 5; α(O)=4.84×10^{-6} 7; α(P)=2.79×10^{-7} 4 Mult.: from 1979DzZZ, but no supporting data.
1021.4[e] 3	6[e] 1	1232.86	(3/2)$^+$	211.16	1/2$^+$			Mult.: assigned M1 (1979DzZZ), but γ multiply placed.
1021.4[e] 4	6[e] 1	1394.47	(1/2$^+$,3/2)	373.27	5/2$^+$			Mult.: assigned M1 (1979DzZZ), but γ multiply placed.
1029.4[e] 6	2.3[e] 12	1240.08	(1/2,3/2,5/2)$^+$	211.16	1/2$^+$			
1029.4[e] 8	2.3[e] 12	1488.34	3/2$^-$	458.88	5/2$^-$			
1038.1 5	4.6 12	1461.56	3/2$^-$	423.92	1/2$^-$			
1047.6 3	6.8 10	1640.46	(5/2$^+$)	592.66	3/2$^-$			Mult.: assigned M1 by 1979DzZZ, but J^π suggest E1.
1061.6 4	4.2 15	1524.64	(5/2,7/2)$^-$	463.24	7/2$^+$			
1065.0[f] 4	3[f]	1488.34	3/2$^-$	423.92	1/2$^-$			Mult.: assigned M1 (1979DzZZ), but γ multiply placed.
1065.0[f] 4	3[f]	1656.65	5/2$^-$	592.66	3/2$^-$			Mult.: assigned M1 (1979DzZZ), but γ multiply placed.
1077.8[e] 4	7.4[e] 12	1394.47	(1/2$^+$,3/2)	316.57	5/2$^+$			Mult.: assigned E1 (1979DzZZ), but γ multiply placed.

$^{161}_{67}$Ho$_{94}$-12

γ(^{161}Ho) (continued)

E_γ[#]	I_γ[#@c]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[&]	Comments
1077.8[e] *3*	7.4[e] *12*	1524.64	$(5/2,7/2)^-$	446.83	$5/2^+$		Mult.: assigned E1 (1979DzZZ), but γ multiply placed.
[x]1080.9						E1	E_γ: From 1979DzZZ.
1088.6 *5*	3.8 *10*	1461.56	$3/2^-$	373.27	$5/2^+$		
1098.2[e] *3*	20[e] *2*	1396.95	$3/2^-$	298.67	$3/2^+$		Mult.: assigned E1 (1979DzZZ), but γ multiply placed.
1098.2[e] *3*	20[e] *2*	1691.40	$5/2^+$	592.66	$3/2^-$		Mult.: assigned E1 (1979DzZZ), but γ multiply placed.
1102.6[e†g] *3*	16[e] *2*	1325.20?	$(3/2,5/2)^+$	222.44	$3/2^+$		Mult.: assigned E1 (1972Ka37), but γ multiply placed.
1102.6[e] *3*	16[e] *2*	1656.65	$5/2^-$	554.12	$(5/2^-,7/2,9/2^+)$		Mult.: assigned E1 (1972Ka37), but γ multiply placed.
[x]1106.6 *6*	2.3 *12*						
[x]1110.4 *6*	2.6 *10*						
1114.8[e] *4*	4.5[e] *14*	1488.34	$3/2^-$	373.27	$5/2^+$		
1114.8[e] *6*	4.5[e] *14*	1640.46	$(5/2^+)$	525.93	$3/2^-$		
1117.9 *3*	17.4 *20*	1491.18	$(3/2^-)$	373.27	$5/2^+$	E1	Mult.: from α(K)exp $\leq$ 0.0010 (1972Ka37).
1145.1 *3*	50 *10*	1461.56	$3/2^-$	316.57	$5/2^+$	E1	Mult.: from α(K)exp=0.0012 2 (1972Ka37).
1147.3 *5*	11 *2*	1740.43	$5/2^-$	592.66	$3/2^-$		
1158.9 *2*	44 *4*	1457.67	$(3/2^-)$	298.67	$3/2^+$	E1	Mult.: from α(K)exp=0.00097 15 (1972Ka37).
1162.8 *5*	1.9 *13*	1461.56	$3/2^-$	298.67	$3/2^+$		
1171.8[e] *3*	34[e] *3*	1394.47	$(1/2^+,3/2)$	222.44	$3/2^+$		
1171.8[e] *3*	34[e] *3*	1488.34	$3/2^-$	316.57	$5/2^+$		
1174.6[f] *3*	48[f]	1396.95	$3/2^-$	222.44	$3/2^+$		Mult.: assigned E1 (1979DzZZ), but γ multiply placed.
1174.6[f] *3*	53[f]	1491.18	$(3/2^-)$	316.57	$5/2^+$		Mult.: assigned E1 (1979DzZZ), but γ multiply placed.
[x]1180.9[b]							
1183.3[e] *5*	26[e] *2*	1394.47	$(1/2^+,3/2)$	211.16	$1/2^+$		Mult.: assigned E1 (1979DzZZ), but γ multiply placed.
1183.3[e] *4*	26[e] *2*	1776.44	$(3/2,5/2)^+$	592.66	$3/2^-$		Mult.: assigned E1 (1979DzZZ), but γ multiply placed.
1185.8 *4*	30 *4*	1396.95	$3/2^-$	211.16	$1/2^+$	E1	Mult.: from 1979DzZZ, but no supporting data.
1189.8 *5*	7.0 *15*	1488.34	$3/2^-$	298.67	$3/2^+$		
1193.2[e] *3*	46[e] *3*	1404.35	1/2,3/2	211.16	$1/2^+$		E_γ: placement conflicts; 1972Ka37 place a 1193 γ from 1404 and 1656 levels and 1972Wo08 place it from 1491 level only.
1193.2[e] *3*	46[e] *3*	1491.18	$(3/2^-)$	298.67	$3/2^+$		E_γ: placement conflicts; 1972Ka37 place a 1193 γ from 1404 and 1656 levels and 1972Wo08 place it from 1491 level only.
1193.2[e] *3*	46[e] *3*	1656.65	$5/2^-$	463.24	$7/2^+$		E_γ: placement conflicts; 1972Ka37 place a 1193 γ from 1404 and 1656 levels and 1972Wo08 place it from 1491 level only.
[x]1199.4 *5*	2.3 *10*						
[x]1202.4 *5*	2.0 *10*						
1209.8 *2*	32 *3*	1656.65	$5/2^-$	446.83	$5/2^+$	E1	Mult.: from α(K)exp $\leq$ 0.0009 (1972Ka37).
1228.2[e] *3*	9.9[e] *12*	1675.32		446.83	$5/2^+$		Mult.: assigned E1 (1979DzZZ), but γ multiply placed.
1228.2[e] *4*	9.9[e] *12*	1691.40	$5/2^+$	463.24	$7/2^+$		Mult.: assigned E1 (1979DzZZ), but γ multiply placed.
1236.8 *9*	1.4 *10*	1829.97	$3/2^-,5/2$	592.66	$3/2^-$		
1238.8 *4*	8.5 *10*	1461.56	$3/2^-$	222.44	$3/2^+$		
1247.2 *4*	22 *3*	1457.67	$(3/2^-)$	211.16	$1/2^+$	E1	Mult.: from α(K)exp=0.00035 17 (1965Gr35) and 1979DzZZ.
1250.4[f] *4*	31[f]	1461.56	$3/2^-$	211.16	$1/2^+$		
1250.4[f] *4*	2[f]	1776.44	$(3/2,5/2)^+$	525.93	$3/2^-$		

$^{161}_{67}$Ho$_{94}$-13

γ(^{161}Ho) (continued)

E$_\gamma$[#]	I$_\gamma$[#@c]	E$_i$(level)	J$^\pi_i$	E$_f$	J$^\pi_f$	Mult.[&]	Comments
1268.2[f] *3*	9[f]	1491.18	(3/2$^-$)	222.44	3/2$^+$		
1268.2[f] *3*	9[f]	1714.81	5/2$^-$	446.83	5/2$^+$		
1276.4[e] *4*	10[e] *2*	1488.34	3/2$^-$	211.16	1/2$^+$		
1276.4[e] *4*	10.0[e] *2*	1868.7	3/2$^-$,5/2,7/2$^-$	592.66	3/2$^-$		
1280.0 *3*	46 *3*	1491.18	(3/2$^-$)	211.16	1/2$^+$	(E1)	Mult.: from α(K)exp $\le$ 0.0011 (1972Ka37).
1283.6 *9*	2.0 *8*	1656.65	5/2$^-$	373.27	5/2$^+$		
1287.1 *5*	2.9 *8*	1640.46	(5/2$^+$)	353.29	7/2$^+$		
1293.6 *6*	1.8 *7*	1740.43	5/2$^-$	446.83	5/2$^+$		
1299.3 *6*	1.8 *9*	1745.88	(3/2$^+$,5/2$^+$)	446.83	5/2$^+$		
[x]1301.3 *4*	7						
1303.2 *4*	32 *4*	1656.65	5/2$^-$	353.29	7/2$^+$	(E1)	Mult.: from average α(K)exp(1301+1303)=0.00064 (1972Ka37).
[x]1313.9 *9*	2.2 *9*						
1318.2[e] *4*	9.1[e] *15*	1691.40	5/2$^+$	373.27	5/2$^+$		
1318.2[e] *4*	9.1[e] *15*	1776.44	(3/2,5/2)$^+$	458.88	5/2$^-$		
1324.8 *6*	1.9 *6*	1640.46	(5/2$^+$)	316.57	5/2$^+$		
[x]1333.3 *9*	0.9 *7*						
1338.2 *3*	20 *3*	1691.40	5/2$^+$	353.29	7/2$^+$		Mult.: from α(K)exp $\le$ 0.0008 (1972Ka37), mult=E1. This assignment is not included here and in the Adopted Gammas, because then decay of this γ to 7/2$^+$ conflicts with placement of other γ's to 1/2$^+$.
1341.4[e] *6*	6[e] *2*	1640.46	(5/2$^+$)	298.67	3/2$^+$		
1341.4[e] *5*	6[e] *2*	1714.81	5/2$^-$	373.27	5/2$^+$		
1342.9 *6*	4.5 *15*	1868.7	3/2$^-$,5/2,7/2$^-$	525.93	3/2$^-$		
1352.4 *6*	1.7 *9*	1776.44	(3/2,5/2)$^+$	423.92	1/2$^-$		
1358.2 *3*	52 *5*	1656.65	5/2$^-$	298.67	3/2$^+$	E1	Mult.: from α(K)exp $\approx$ 0.0009 (1972Ka37).
1361.4 *4*	11 *3*	1714.81	5/2$^-$	353.29	7/2$^+$		
1371.8 *6*	2.1 *9*	1745.88	(3/2$^+$,5/2$^+$)	373.27	5/2$^+$		
1374.9 *5*	5.2 *18*	1691.40	5/2$^+$	316.57	5/2$^+$		
1377.0 *5*	5.3 *15*	1675.32		298.67	3/2$^+$		
1383.2 *3*	11.4 *12*	1829.97	3/2$^-$,5/2	446.83	5/2$^+$		
1387.0 *4*	3.7 *12*	1740.43	5/2$^-$	353.29	7/2$^+$		
1392.8[e] *3*	7.1[e] *8*	1691.40	5/2$^+$	298.67	3/2$^+$		
1392.8[e] *3*	7.1[e] *8*	1745.88	(3/2$^+$,5/2$^+$)	353.29	7/2$^+$		
1404.4 *5*	1.5 *5*	1656.65	5/2$^-$	252.67	7/2$^+$		
1417.8 *3*	52 *5*	1640.46	(5/2$^+$)	222.44	3/2$^+$		Mult.: α(K)exp < 0.0015 (1972Ka37) suggests E1 or E2 and 1979DzZZ reports M1.
[x]1421.1 *4*	5.2 *13*						
1425.4 *4*	5.2 *10*	1524.64	(5/2,7/2)$^-$	99.63	9/2$^-$		
1429.2[e] *3*	27[e] *3*	1640.46	(5/2$^+$)	211.16	1/2$^+$		Mult.: assigned M1 (1979DzZZ), but γ multiply placed.
1429.2[e] *3*	27[e] *3*	1745.88	(3/2$^+$,5/2$^+$)	316.57	5/2$^+$		Mult.: assigned M1 (1979DzZZ), but γ multiply placed.
1434.5 *3*	17 *2*	1656.65	5/2$^-$	222.44	3/2$^+$		Mult.: assigned M1 by 1979DzZZ, but J^π's suggest E1.
1447.2[e] *5*	2.1[e] *6*	1745.88	(3/2$^+$,5/2$^+$)	298.67	3/2$^+$		
1447.2[e] *5*	2.1[e] *6*	1817.95	5/2$^+$,7/2,9/2	370.7	9/2$^+$		
1452.7 *4*	3.6 *10*	1675.32		222.44	3/2$^+$		

$^{161}_{67}$Ho$_{94}$-14

γ(^{161}Ho) (continued)

E_γ[#]	I_γ[#@c]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[&]	Comments
1456.4[e] 9	1.3[e] 8	1457.67	(3/2⁻)	0.	7/2⁻		
1456.4[e] 9	1.3[e] 8	1829.97	3/2⁻,5/2	373.27	5/2⁺		
1461.8 4	10.3 12	1461.56	3/2⁻	0.	7/2⁻		
1464.4[e] 3	20[e] 2	1675.32		211.16	1/2⁺		Mult.: assigned M1 (1979DzZZ), but γ multiply placed.
1464.4[e] 3	20[e] 2	1817.95	5/2⁺,7/2,9/2	353.29	7/2⁺		Mult.: assigned M1 (1979DzZZ), but γ multiply placed.
1469.0 4	7.8 12	1691.40	5/2⁺	222.44	3/2⁺		
1477.8 6	2.8 9	1776.44	(3/2,5/2)⁺	298.67	3/2⁺		
1480.6 4	5.6 11	1691.40	5/2⁺	211.16	1/2⁺		
1488.4[f] 4	13[f]	1488.34	3/2⁻	0.	7/2⁻		Mult.: assigned M1 (1979DzZZ), but γ multiply placed; J^π's suggest E2 for this γ.
1488.4[f] 4	1[f]	1740.43	5/2⁻	252.67	7/2⁺		Mult.: assigned M1 (1979DzZZ), but γ multiply placed; J^π's suggest E1 for this γ.
1492.2 3	13 2	1714.81	5/2⁻	222.44	3/2⁺	E1	Mult.: from 1979DzZZ, but no supporting data.
1495.2 9	1.0 7	1868.7	3/2⁻,5/2,7/2⁻	373.27	5/2⁺		
1517.8 5	4.0 10	1740.43	5/2⁻	222.44	3/2⁺		
1524.3[e] 8	3.3[e] 14	1524.64	(5/2,7/2)⁻	0.	7/2⁻		
1524.3[e] 7	3.3[e] 14	1745.88	(3/2⁺,5/2⁺)	221.95	11/2⁻		
[x]1525.4 9	5 3						
[x]1527.6 9	1.3 9						
1531.6[e] 6	1.2[e] 6	1829.97	3/2⁻,5/2	298.67	3/2⁺		
1531.6[e] 5	1.2[e] 6	1848.0		316.57	5/2⁺		
1534.6 5	1.3 5	1745.88	(3/2⁺,5/2⁺)	211.16	1/2⁺		
[x]1535.0 7	≈1						
1549.7 9	0.7 5	1848.0		298.67	3/2⁺		
1553.8 3	13.0 15	1776.44	(3/2,5/2)⁺	222.44	3/2⁺	E2,M1	Mult.: from α(K)exp ≈ 0.0015 (1972Ka37).
1565.6[e] 4	1.3[e] 4	1776.44	(3/2,5/2)⁺	211.16	1/2⁺		
1565.6[e] 4	1.3[e] 4	1817.95	5/2⁺,7/2,9/2	252.67	7/2⁺		
[x]1596.4 4	1.2 4						
[x]1613.8 3	1.5 4						
1625.4 4	1.1 4	1848.0		222.44	3/2⁺		
1640.5[e] 5	1.6[e] 5	1740.43	5/2⁻	99.63	9/2⁻		
1640.6[e] 4	1.6[e] 5	1640.46	(5/2⁺)	0.	7/2⁻		
1656.7 4	47 4	1656.65	5/2⁻	0.	7/2⁻		Mult.: assigned M1 by 1972Ka37, but E2 by 1972Wo08.
1691.7 9	0.7 7	1691.40	5/2⁺	0.	7/2⁻		
1714.7 5	2.3 8	1714.81	5/2⁻	0.	7/2⁻		
1740.0 3	34 3	1740.43	5/2⁻	0.	7/2⁻	M1	Mult.: from α(K)exp=0.0015 4 (1972Ka37).
1818.8 9	0.5 3	1817.95	5/2⁺,7/2,9/2	0.	7/2⁻		
1829.8 5	4.6 5	1829.97	3/2⁻,5/2	0.	7/2⁻		
1867.8 6	1.2 3	1868.7	3/2⁻,5/2,7/2⁻	0.	7/2⁻		

[†] The level from which this γ was placed has not been confirmed by 2008IbZZ, and this γ has been placed elsewhere In the level scheme by this author.

$\gamma(^{161}$Ho) (continued)

‡ Value from 2000KoZT, from K-conversion-electron energies measured using an electrostatic spectrometer.

Average of 1972Ka37 and 1972Wo08 values, unless noted otherwise.

@ Uncertainties are from 1972Wo08 if Iγ values of 1972Wo08 and 1972Ka37 are consistent. Otherwise deduced by evaluator from difference between their Iγ values.

& Assignments are taken from Adopted Gammas. However, unless otherwise noted, all assignments are based on the ce data of 1972Ka37 and/or the internal-conversion electron line intensity ratios of 1972Ha41 from ^{161}Er ε decay. The α(K)exp values of 1972Ka37 were normalized to 0.46 for the 211-keV E3 γ. Above about 300 keV, the relative K-shell conversion line intensities of 1972Ha41 are significantly higher than those of 1972Ka37 and give unrealistic α(K)exp values when combined with the adopted Iγ values. Therefore, these values of 1972Ha41 have not been used.

[a] From ^{161}Ho Adopted Gammas; however, all are from 1972Ha41, except for the 11-keV γ ray which is from 1996Go06.

[b] From ce data of 1972Ha41.

[c] For absolute intensity per 100 decays, multiply by 0.0122 *4*.

[d] 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.

[e] Multiply placed with undivided intensity.

[f] Multiply placed with intensity suitably divided.

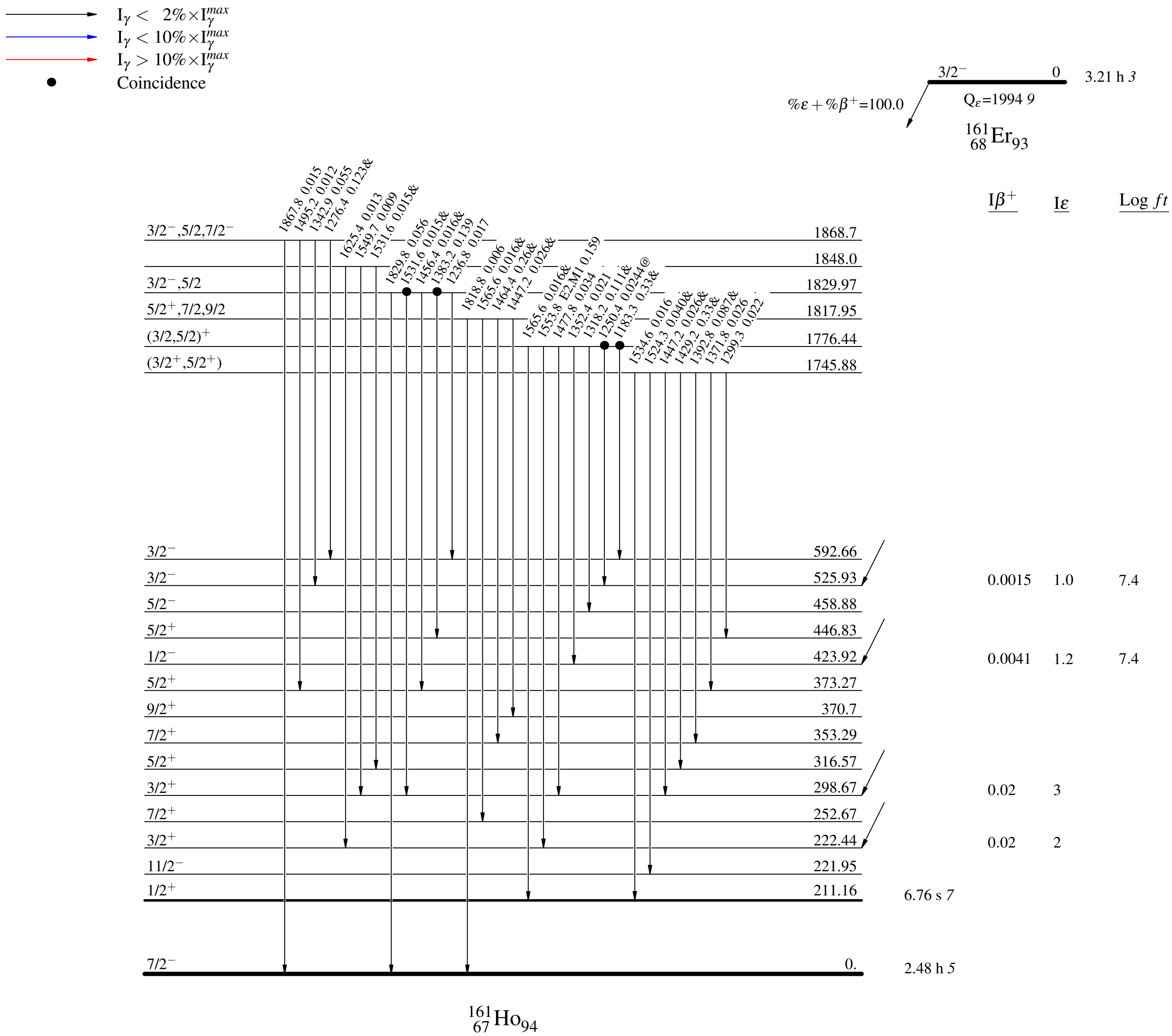
[g] Placement of transition in the level scheme is uncertain.

[x] γ ray not placed in level scheme.

$^{161}Er\ \varepsilon$ decay 1972Ka37,1972Wo08,1972Ha41

Decay Scheme

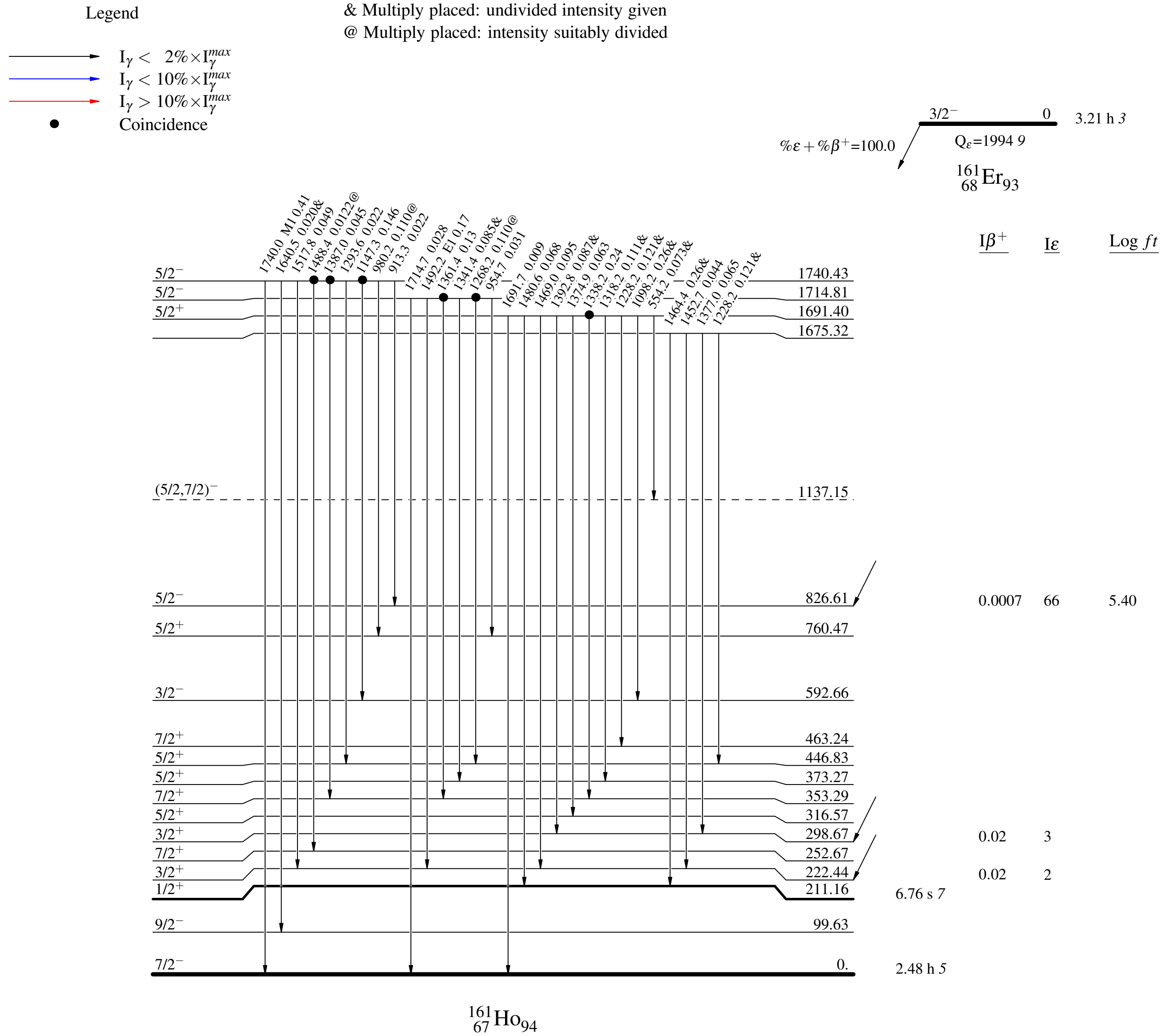
Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided



^{161}Er ε decay 1972Ka37,1972Wo08,1972Ha41

Decay Scheme (continued)

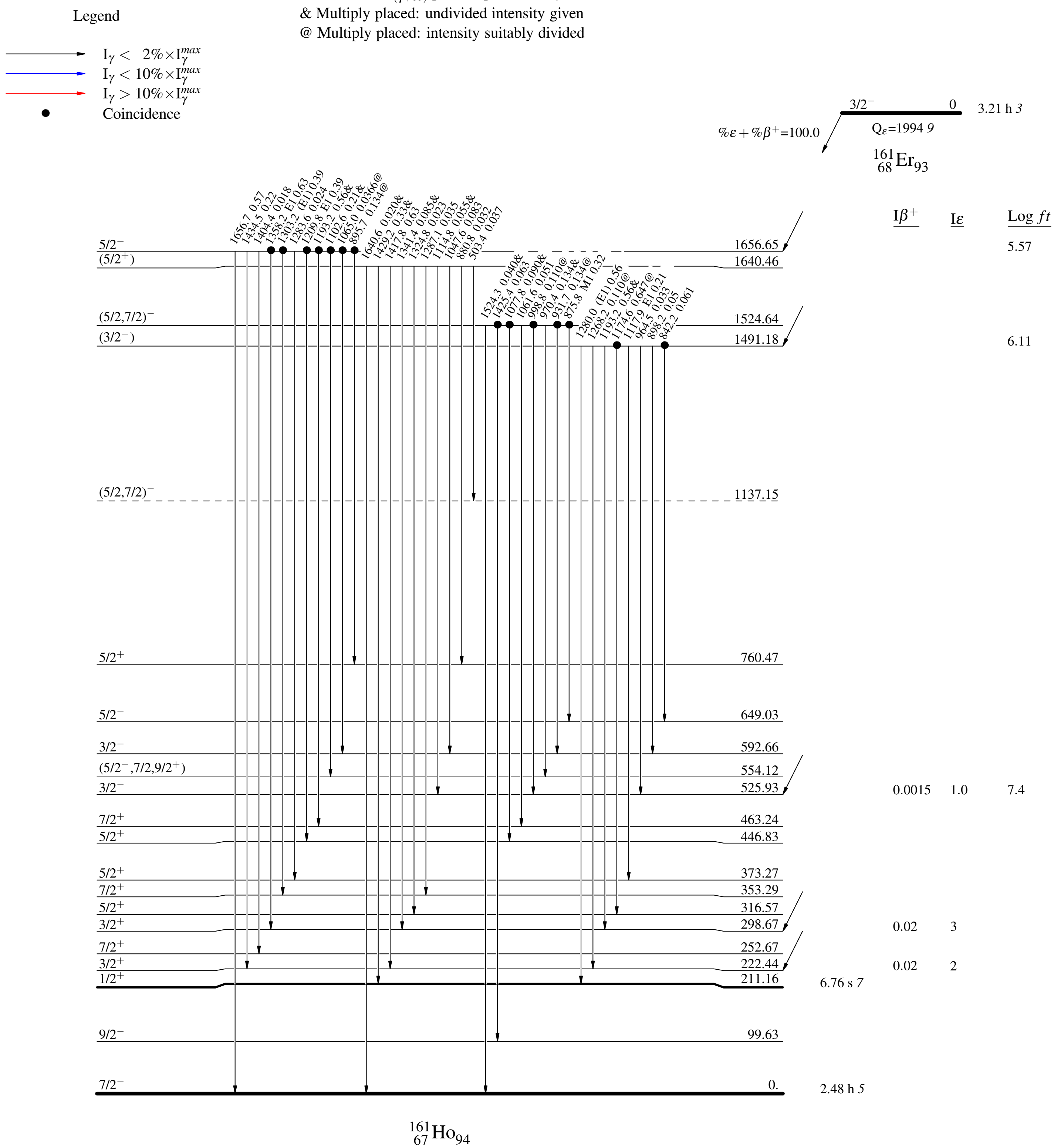
Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided



^{161}Er ε decay 1972Ka37,1972Wo08,1972Ha41

Decay Scheme (continued)

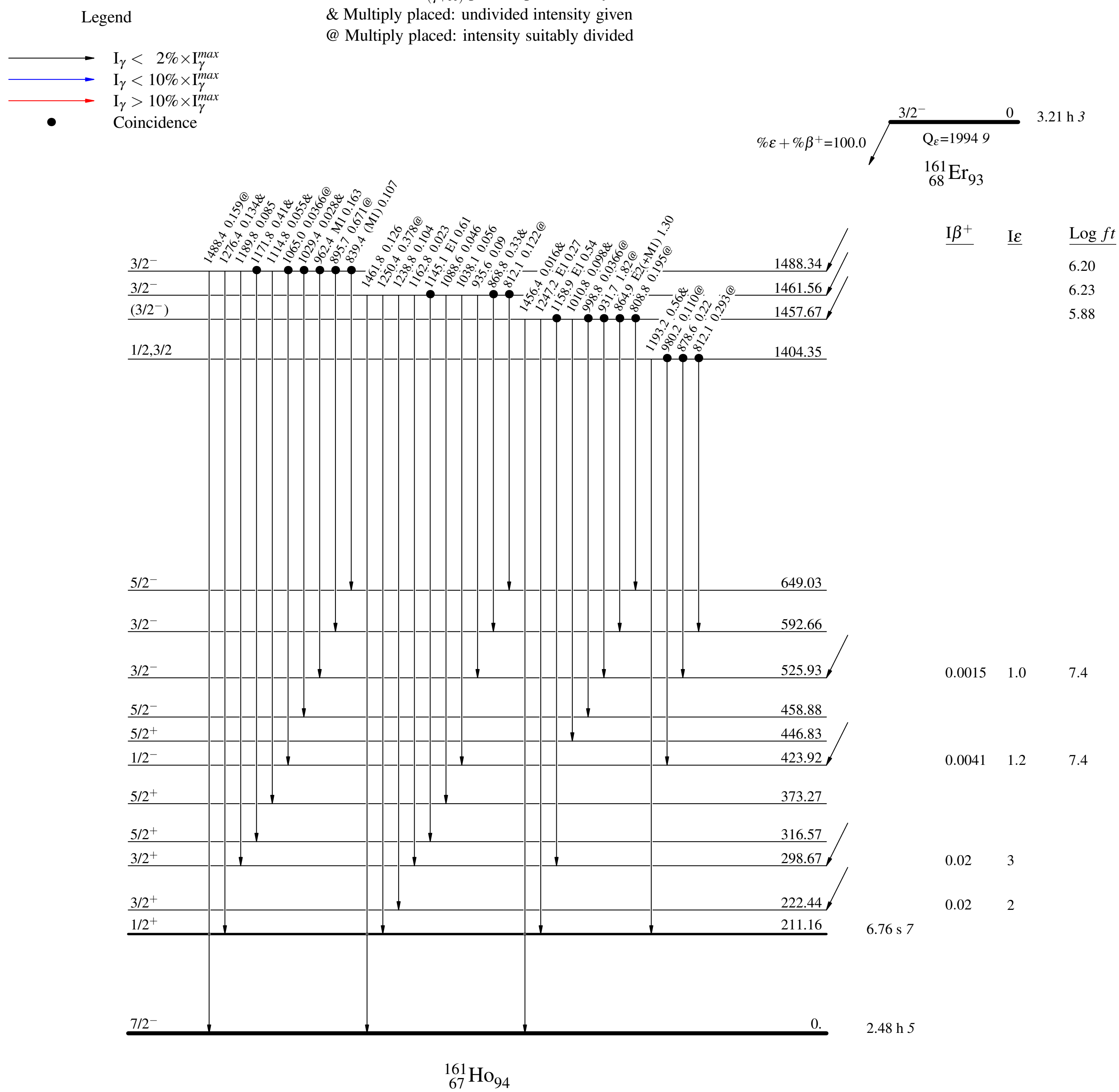
Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided



^{161}Er ε decay 1972Ka37,1972Wo08,1972Ha41

Decay Scheme (continued)

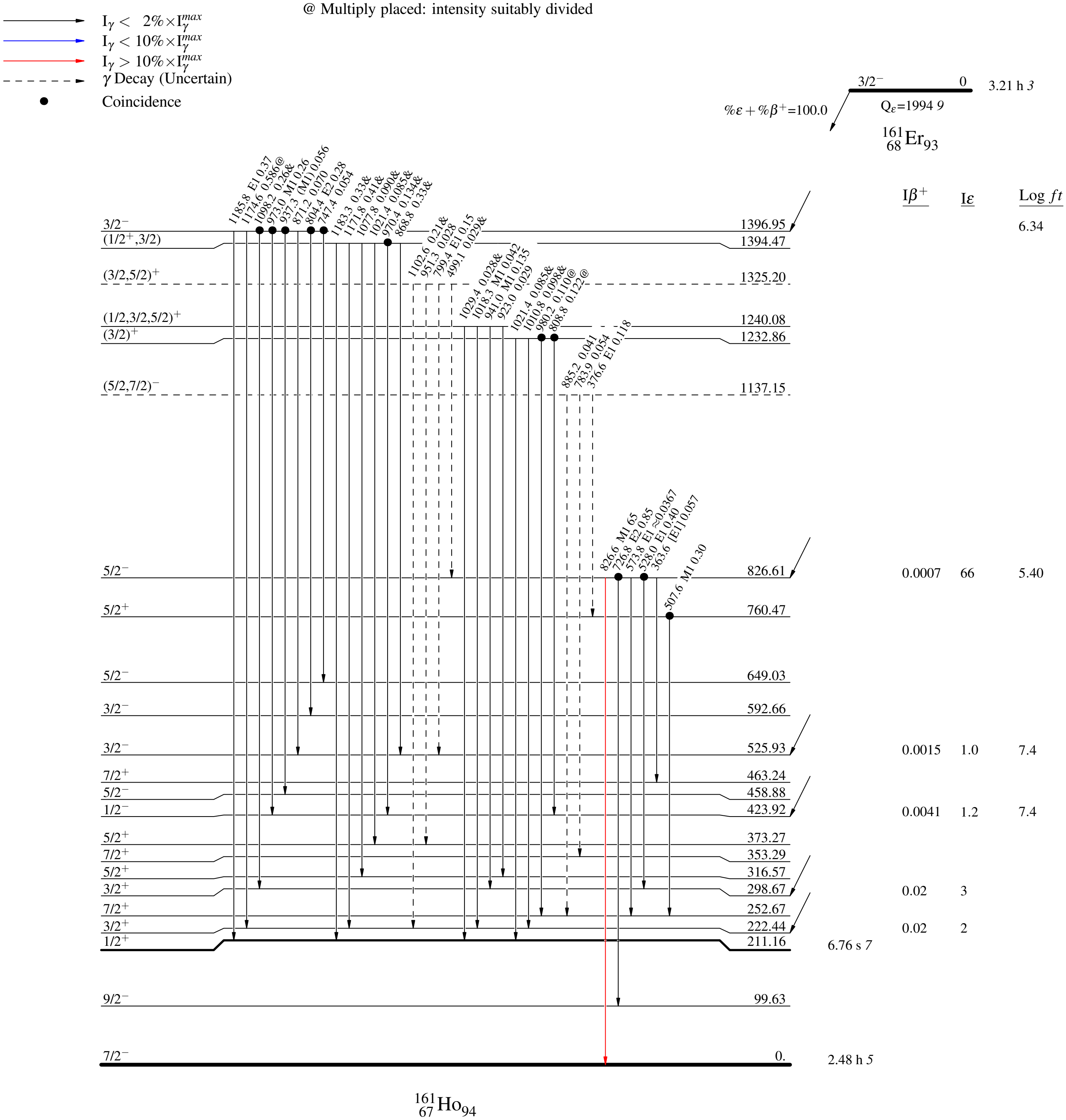
Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided



^{161}Er ε decay 1972Ka37,1972Wo08,1972Ha41

Decay Scheme (continued)

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided



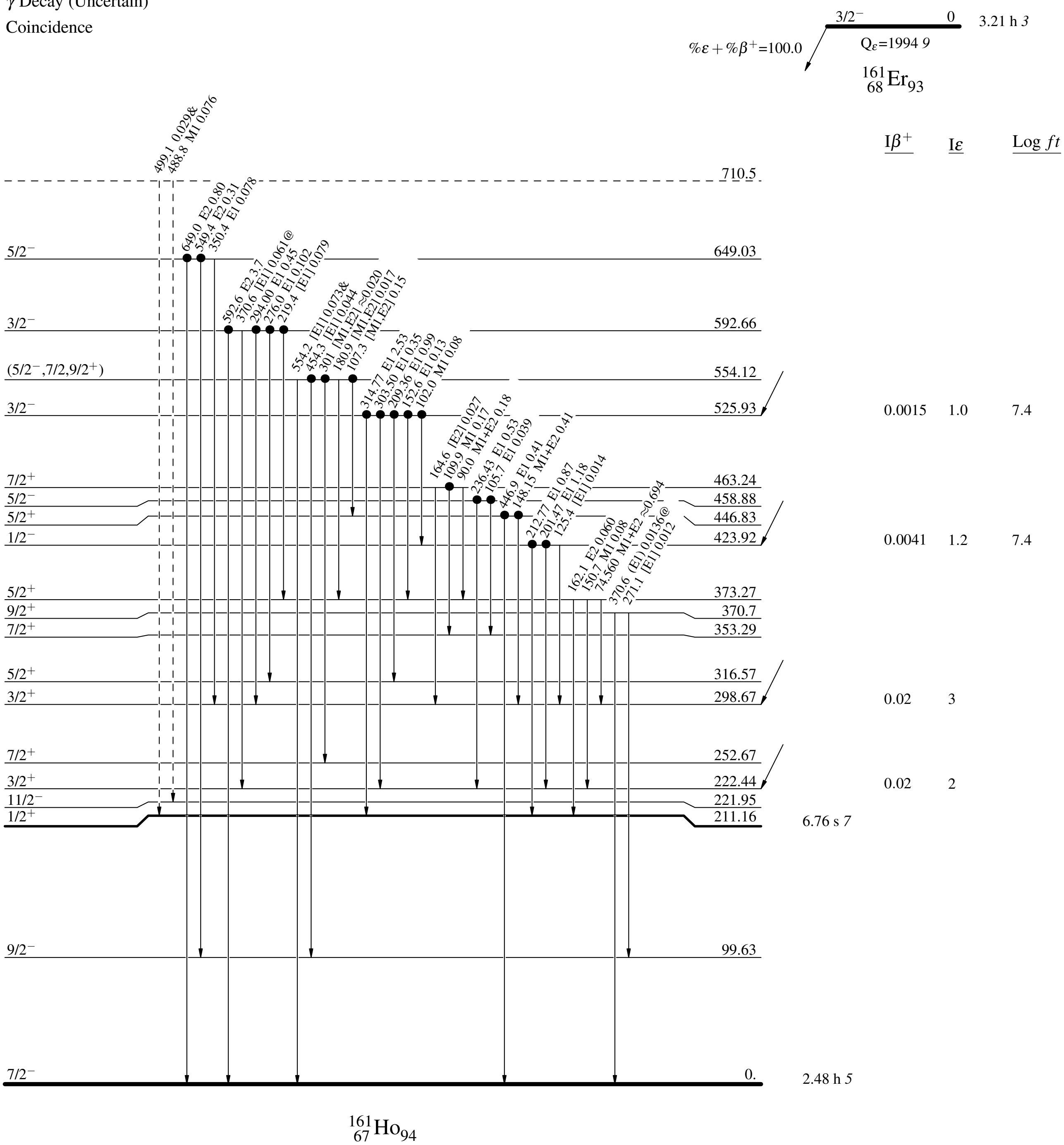
^{161}Er ε decay 1972Ka37,1972Wo08,1972Ha41

Decay Scheme (continued)

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

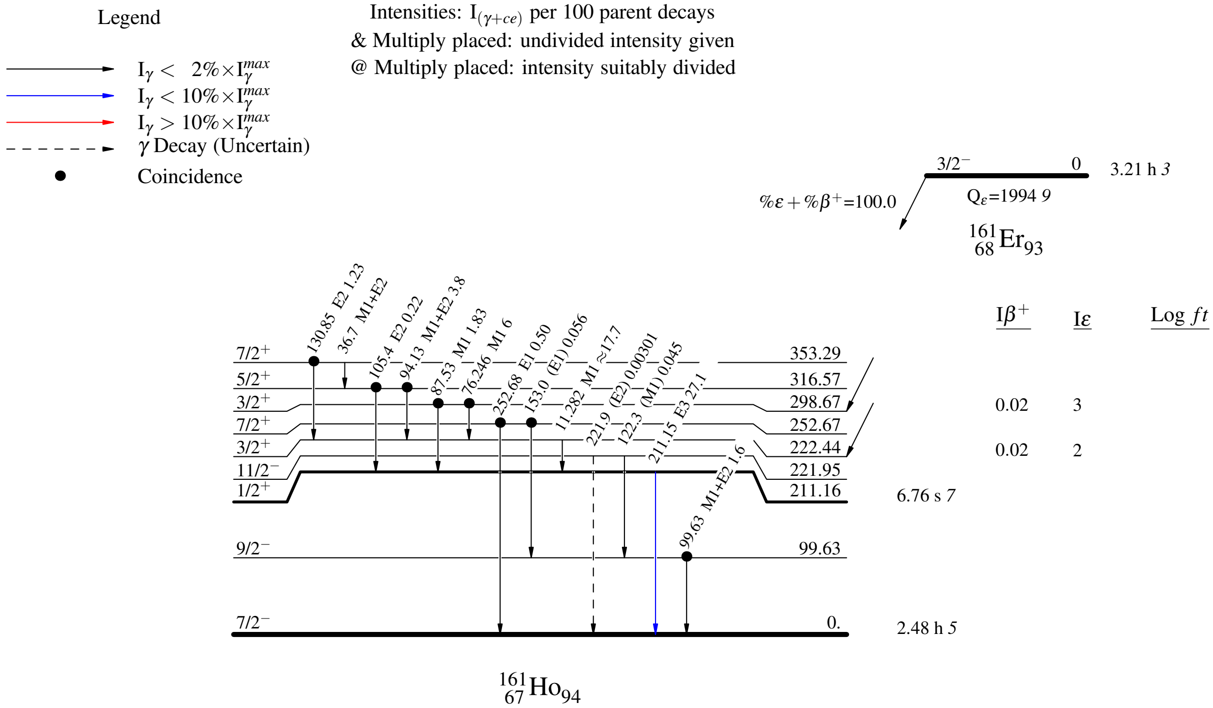
Legend

- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$
- γ Decay (Uncertain)
- Coincidence

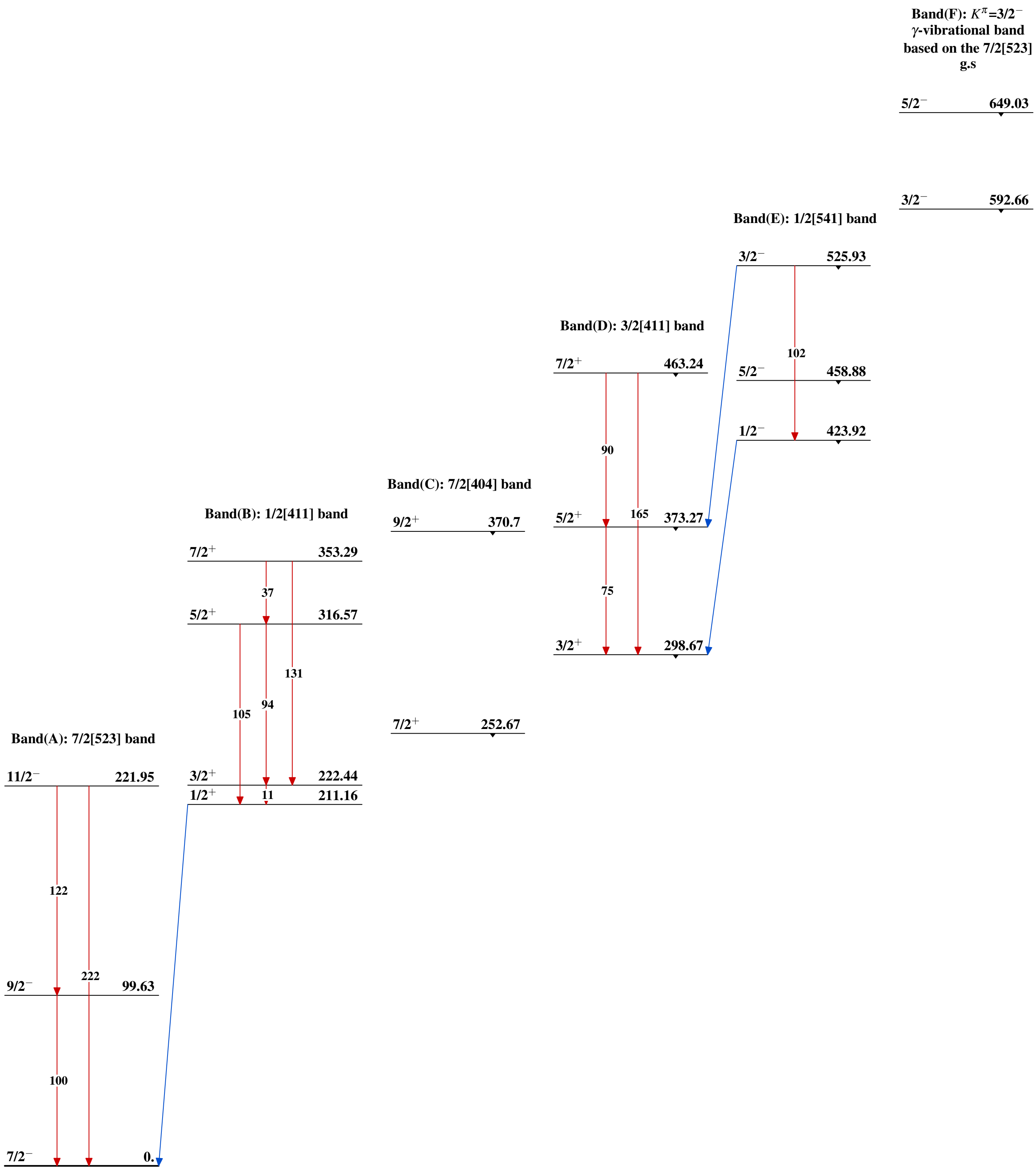


^{161}Er ε decay 1972Ka37,1972Wo08,1972Ha41

Decay Scheme (continued)

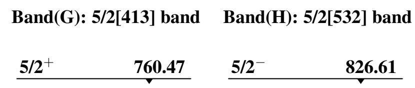


^{161}Er ε decay 1972Ka37,1972Wo08,1972Ha41



$^{161}_{67}Ho_{94}$

^{161}Er ε decay 1972Ka37,1972Wo08,1972Ha41 (continued)



$^{161}_{67}Ho_{94}$