^{164}Tm ε decay (1.95 min) 1990Ad07,1971De22

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh and Jun Chen[#]	NDS 147, 1 (2018)	30-Nov-2017

Parent: ^{164}Tm: E=0.0; $J^\pi=1^+$; $T_{1/2}$=1.95 min *10*; Q(ε)=4039 *24*; %ε+%$β^+$ decay=100.0

^{164}Tm-J^π,$T_{1/2}$: From ^{164}Tm Adopted Levels.

^{164}Tm-Q(ε): from 2017Wa10.

1990Ad07 (also 1992Gr24,1987AdZV): measured Eγ, Iγ, γγ coin, ce. 1992Gr24 reanalyzed the ce spectrum of 1990Ad07 and added 23 weak γ rays in the level scheme.

1971De22: measured Eγ, γ, γγ coin, ce, γγ(t).

Others:

1967Vr04: measured Eγ, γ, ce. About 90 γ rays reported up to 2532.

1965Ba40, 1965Ab04, 1960Gr31, 1960Da16, 1960Ab04: measured γ, ce, $T_{1/2}$.

1970Mo39: (ce)γ(t).

1963Ra15: $T_{1/2}$.

1961Bj02: γ, $T_{1/2}$.

1960Wi17: γ, $T_{1/2}$.

The decay scheme is taken mainly from 1990Ad07.

^{164}Er Levels

The 2476, 2570, 2846, 3135, 3162, 3213 and 3588 levels proposed by 1971De22 have been omitted due to lack of confirmation by 1990Ad07. The gamma rays deexciting these levels have either not been seen by 1990Ad07 or have been reassigned from other levels.

E(level)[†]	J^π[‡]	$T_{1/2}$	Comments
0.0	0^+		
91.396 *22*	2^+	1.48 ns *8*	$T_{1/2}$: from (ce)γ(t) (1970Mo39).
299.43 *3*	4^+		
860.23 *3*	2^+		
946.35 *6*	3^+		
1058.42 *9*	4^+		
1246.07 *5*	0^+		
1314.57 *4*	2^+		
1386.73 *4*	1^-		
1416.57 *5*	0^+		J^π: 1971De22 proposed 1^+.
1433.97 *5*	3^-		
1469.9? *3*	4^+		
1483.69 *5*	2^+		
1495.25[&] *17*			J^π: 1992Gr24 propose 2^-.
1568.72[@] *13*	(3^-)		Intensity balance at this level is not very satisfactory.
1577.74 *6*	1^-		
1631.35?[&] *20*			J^π: 1992Gr24 propose 3^-.
1702.20 *4*	0^+		
1715.26[&] *7*	(2^-)		J^π: 1992Gr24 propose 2^-.
1765.85 *4*	0^+		
1788.36 *6*	2^+		
1833.43 *4*	2^+		
1841.7?[@] *4*	(0^+)		
1861.47?[@] *19*	$(0,1,2)^+$		
1875.20? *6*	$1^{(+)}$		J^π: 1992Gr24 propose $(1,2)^+$.
1911.12 *6*	2^+		
1953.93 *6*	2^+		

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^{164}Tm ε decay (1.95 min) 1990Ad07,1971De22 (continued)

^{164}Er Levels (continued)

E(level)[†]	Jπ[‡]	Comments
1961.36[&] *8*		Jπ: 1992Gr24 propose 3⁻.
2022.50?[#] *8*		
2025.71 *6*	(2⁺)	
2032.13[@] *15*		
2035.69? *20*		
2069.66? *13*	(1⁻,2⁻)	Jπ: 1992Gr24 proposed 2⁺.
2168.2[@] *3*		
2172.96 *6*	0⁺	
2254.64[@] *12*		
2278.33 *6*	2⁺	
2444.52[@] *6*	(2⁺)	
2541.13[@] *14*	(1⁺,2⁺)	
2823.56?[@] *21*		
3028.78[@] *15*		
3407.94 *25*		
3534.51?[#] *7*	(2⁺)	
3629.69[@] *10*	2⁺	
3768.52[@] *13*	(1⁺,2⁺)	

[†] From least-squares fit to Eγ data. Uncertainties of the following γ rays were doubled due to their somewhat poor fits: 318γ from 1961 level, 666γ from 1911 level, 689γ and 1312γ from 2173 level, 1392γ from 1483 level, 1935γ from 2025 level, 2052γ from 3534 level, 2353 and 2521γ from 3768 level. With this adjustment, reduced χ^2=2.3 as compared to critical χ^2=1.3. Note that all the γ rays with uncertain placements were included in the fit.
[‡] From Adopted Levels.
[#] Level proposed by 1971De22 only.
[@] Level proposed by 1990Ad07 only.
[&] Level proposed by 1992Gr24 only.

ε,β⁺ radiations

The decay scheme seems fairly complete from total energy absorbed=4079 keV *105* (from RADLST code) as compared to Q(ε)=4039 keV *24*.

E(decay)	E(level)	Iβ⁺ [‡]	Iε[‡]	Log *ft*	I(ε+β⁺)[‡]	Comments
(270 *24*)	3768.52		0.37 *3*	4.3 *1*	0.37 *3*	εK=0.773 *9*; εL=0.173 *7*; εM+=0.0541 *23*
(409 *24*)	3629.69		0.50 *5*	4.6 *1*	0.50 *5*	εK=0.799 *3*; εL=0.1538 *22*; εM+=0.0472 *8*
(504[#] *24*)	3534.51?		0.16 *2*	5.3 *1*	0.16 *2*	εK=0.8075 *18*; εL=0.1476 *13*; εM+=0.0450 *5*
(631[#] *24*)	3407.94		0.090 *13*	5.7 *1*	0.090 *13*	εK=0.8143 *11*; εL=0.1425 *8*; εM+=0.0432 *3*
(1010[#] *24*)	3028.78		0.180 *21*	5.9 *1*	0.180 *21*	εK=0.8238 *4*; εL=0.1355 *3*; εM+=0.04066 *10*
(1215 *24*)	2823.56?		0.087 *18*	6.4 *1*	0.087 *18*	εK=0.8263 *3*; εL=0.13365 *19*; εM+=0.04000 *7*
(1498[#] *24*)	2541.13	0.00025 *6*	0.148 *20*	6.3 *1*	0.148 *20*	av Eβ=230 *11*; εK=0.8273 *2*; εL=0.13173 *17*; εM+=0.03933 *6*
(1594 *24*)	2444.52	0.0024 *5*	0.68 *6*	5.70 *5*	0.68 *6*	av Eβ=272 *11*; εK=0.8263 *4*; εL=0.13105 *18*; εM+=0.03911 *6*
(1761 *24*)	2278.33	0.0030 *5*	0.32 *4*	6.1 *1*	0.32 *4*	av Eβ=345 *11*; εK=0.8225 *9*; εL=0.12967 *24*;

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^{164}Tm ε decay (1.95 min) 1990Ad07,1971De22 (continued)

ε,β+ radiations (continued)

E(decay)	E(level)	Iβ+ ‡	Iε‡	Log *ft*	I(ε+β+)‡	Comments
						εM+=0.03866 *8*
(1784# *24*)	2254.64	0.00083 *14*	0.079 *9*	6.7 *1*	0.080 *9*	av Eβ=356 *11*; εK=0.8216 *10*; εL=0.12944 *24*; εM+=0.03859 *8*
(1866 *24*)	2172.96	0.023 *3*	1.52 *15*	5.49 *5*	1.54 *15*	av Eβ=392 *11*; εK=0.8182 *12*; εL=0.1286 *3*; εM+=0.03832 *9*
(1871# *24*)	2168.2	0.001 *1*	0.09 *3*	6.7 *2*	0.09 *3*	av Eβ=394 *11*; εK=0.8179 *13*; εL=0.1285 *3*; εM+=0.03830 *9*
(1969# *24*)	2069.66?	0.0058 *9*	0.25 *3*	6.3 *1*	0.26 *3*	av Eβ=437 *11*; εK=0.8123 *16*; εL=0.1273 *4*; εM+=0.03792 *10*
(2003# *24*)	2035.69?	0.0033 *6*	0.13 *2*	6.6 *1*	0.13 *2*	av Eβ=452 *11*; εK=0.8100 *18*; εL=0.1268 *4*; εM+=0.03778 *11*
(2007# *24*)	2032.13	0.0021 *3*	0.078 *9*	6.9 *1*	0.080 *9*	av Eβ=454 *11*; εK=0.8098 *18*; εL=0.1268 *4*; εM+=0.03776 *11*
(2013 *24*)	2025.71	0.023 *3*	0.87 *8*	5.80 *5*	0.89 *8*	av Eβ=456 *11*; εK=0.8093 *18*; εL=0.1267 *4*; εM+=0.03773 *11*
(2017# *24*)	2022.50?	0.0053 *9*	0.19 *3*	6.5 *1*	0.20 *3*	av Eβ=458 *11*; εK=0.8091 *18*; εL=0.1267 *4*; εM+=0.03772 *11*
(2078 *24*)	1961.36	0.0071 *11*	0.21 *3*	6.4 *1*	0.22 *3*	av Eβ=485 *11*; εK=0.8044 *21*; εL=0.1257 *4*; εM+=0.03744 *12*
(2085 *24*)	1953.93	0.019 *2*	0.56 *6*	6.0 *1*	0.58 *6*	av Eβ=488 *11*; εK=0.8038 *21*; εL=0.1256 *4*; εM+=0.03740 *12*
(2128 *24*)	1911.12	0.019 *2*	0.48 *5*	6.11 *5*	0.50 *5*	av Eβ=507 *11*; εK=0.8000 *23*; εL=0.1249 *5*; εM+=0.03719 *13*
(2164# *24*)	1875.20?	0.0097 *14*	0.22 *3*	6.5 *1*	0.23 *3*	av Eβ=523 *11*; εK=0.7966 *24*; εL=0.1243 *5*; εM+=0.03699 *14*
(2178# *24*)	1861.47?	0.0035 *8*	0.077 *16*	6.9 *1*	0.081 *17*	av Eβ=529 *11*; εK=0.7953 *25*; εL=0.1240 *5*; εM+=0.03692 *14*
(2197# *24*)	1841.7?	0.0042 *11*	0.086 *22*	6.9 *1*	0.090 *23*	av Eβ=537 *11*; εK=0.793 *3*; εL=0.1237 *5*; εM+=0.03681 *14*
(2206 *24*)	1833.43	0.015 *2*	0.30 *3*	6.34 *5*	0.32 *3*	av Eβ=541 *11*; εK=0.792 *3*; εL=0.1235 *5*; εM+=0.03676 *14*
(2251 *24*)	1788.36	0.042 *5*	0.75 *8*	5.97 *5*	0.79 *8*	av Eβ=561 *11*; εK=0.787 *3*; εL=0.1226 *5*; εM+=0.03650 *15*
(2273 *24*)	1765.85	0.076 *8*	1.26 *10*	5.75 *5*	1.34 *11*	av Eβ=571 *11*; εK=0.785 *3*; εL=0.1222 *5*; εM+=0.03636 *15*
(2337 *24*)	1702.20	0.108 *11*	1.52 *12*	5.69 *5*	1.63 *13*	av Eβ=599 *11*; εK=0.777 *4*; εL=0.1208 *6*; εM+=0.03595 *17*
(2544 *24*)	1495.25	0.011 *2*	0.099 *18*	6.9 *1*	0.11 *2*	av Eβ=690 *11*; εK=0.747 *4*; εL=0.1158 *7*; εM+=0.03442 *20*
(2555# *24*)	1483.69	0.013 *5*	0.11 *4*	6.9 *2*	0.12 *5*	av Eβ=696 *11*; εK=0.745 *4*; εL=0.1155 *7*; εM+=0.03433 *20*
(2605# *24*)	1433.97	0.0019 *7*	0.052 *18*	8.7[1u] *2*	0.054 *19*	av Eβ=728 *11*; εK=0.7974 *16*; εL=0.1285 *4*; εM+=0.03846 *11*
(2622 *24*)	1416.57	0.078 *8*	0.58 *5*	6.21 *5*	0.66 *6*	av Eβ=725 *11*; εK=0.734 *5*; εL=0.1136 *7*; εM+=0.03377 *21*
(2652 *24*)	1386.73	0.11 *1*	0.73 *8*	6.1 *1*	0.84 *9*	av Eβ=739 *11*; εK=0.729 *5*; εL=0.1127 *7*; εM+=0.03351 *22*
(2724 *24*)	1314.57	0.13 *1*	0.77 *7*	6.12 *5*	0.90 *8*	av Eβ=771 *11*; εK=0.715 *5*; εL=0.1106 *8*; εM+=0.03286 *22*
(2793 *24*)	1246.07	0.170 *17*	0.91 *8*	6.07 *5*	1.08 *10*	av Eβ=801 *11*; εK=0.702 *5*; εL=0.1084 *8*; εM+=0.03223 *23*
(3179 *24*)	860.23	<0.072	<0.21	>6.8	<0.28	av Eβ=974 *11*; εK=0.619 *6*; εL=0.0953 *9*; εM+=0.0283 *3*
(3948 *24*)	91.396	10 *1*	12† *1*	5.27 *5*	22 *2*	av Eβ=1324 *11*; εK=0.446 *5*; εL=0.0681 *8*;

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^{164}Tm ε decay (1.95 min) 1990Ad07,1971De22 (continued)

ε,β+ radiations (continued)

E(decay)	E(level)	Iβ+ ‡	Iε‡	Log *ft*	I(ε+β+)‡	Comments
						εM+=0.02021 *24*
(4039 *24*)	0.0	31 *2*	32† *2*	4.85 *4*	63 *3*	av Eβ=1365 *11*; εK=0.427 *5*; εL=0.0652 *8*; εM+=0.01934 *23* Eβ+=2940 *20* (1960Ab04).

† Iβ+(to g.s.)/Iβ+(to 91.4 level)=2.0 *2* (quoted by 1990Ad07 from A.S. Basina et al., JINR-R-1361 (1963)). Corresponding ratio is 3.0 *4* in the present evaluation.

‡ Absolute intensity per 100 decays.

Existence of this branch is questionable.

γ(^{164}Er)

Iγ normalization: From I(K x ray)/I(91.4γ)=8.8 *7* and I(γ±)/I(91.4γ)=10.7 *3* (1971De22), α(K)exp values for 91γ and 208γ, fluorescence yield and ce(K)/Ce(total).
I(Kα x ray):I(Kβ x ray):I(91.4γ)=(721 *70*):(158 *15*):100 (1971De22). I(γ±):I(91.4γ)=1071 *30*:100 (1971De22).
The following γ rays assigned (by 1971De22) to either ^{164}Yb decay or ^{164}Tm decay have now been assigned to ^{164}Yb decay: 154.41, 491.1, 543.54, 588.9, 637.1, 695.12, 887.3.
Additional information 1.

E_γ[#]	I_γ[@ g]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	α[†]	Comments
68.49[a] *14*		1314.57	2+	1246.07	0+	(E2)	13.09 *22*	α(K)=2.03 *3*; α(L)=8.47 *15*; α(M)=2.06 *4* α(N)=0.466 *8*; α(O)=0.0540 *10*; α(P)=0.0001027 *15* Mult.: from L1:L2≈1:1.
86.24[a] *12*		946.35	3+	860.23	2+	E2+M1	4.8 *5*	α(K)=2.6 *11*; α(L)=1.7 *12*; α(M)=0.4 *3* α(N)=0.09 *7*; α(O)=0.011 *7*; α(P)=0.00014 *9* Mult.: from L1:L2:L3=≈1:10:8. Additional information 19.
91.41 *3*	100	91.396	2+	0.0	0+	E2	4.14	α(K)=1.314 *19*; α(L)=2.17 *3*; α(M)=0.527 *8* α(N)=0.1193 *17*; α(O)=0.01395 *20*; α(P)=5.50×10^{-5} *8* α(L)exp=3.5 *15* (1960Ab04) Additional information 14. K:L1:L2:L3:M:N=1000:45:655:680:230:50 (1965Ab05); L1:L2:L3=12 *3*:110 *17*:110 *17* (1990Ad07).
[x]113.62[a] *18*								
136.1[e] *2*		1631.35?		1495.25				ce(K)=0.20 *7* (1992Gr24).
137.7[e] *2*		1715.26	(2−)	1577.74	1−			ce(K)=0.15 *6* (1992Gr24).
140.6[e] *2*		1386.73	1−	1246.07	0+			ce(K)≈0.05 (1992Gr24).
142.3[a] *3*	0.7 *3*	2168.2		2025.71	(2+)			I_γ: from 1987AdZV.
159.93[fa] *3*	0.4 *1*	1875.20?	1(+)	1715.26	(2−)	E1	0.0935	α(K)=0.0784 *11*; α(L)=0.01184 *17*; α(M)=0.00262 *4* α(N)=0.000602 *9*; α(O)=8.26×10^{-5} *12*; α(P)=3.77×10^{-6} *6* α(K)exp=0.12 *5*. ce(K)=0.05 *2* (1992Gr24).
168.9[e] *3*		1483.69	2+	1314.57	2+			ce(K)=0.15 *5* (1992Gr24).
170.6[e] *3*		1416.57	0+	1246.07	0+	(E0)		ce(K)=0.20 *7* (1992Gr24).
190.6[e] *3*		1577.74	1−	1386.73	1−			ce(K)=0.07 *3* (1992Gr24).
198.4[e] *3*		1058.42	4+	860.23	2+			ce(K)=0.05 *2* (1992Gr24).
208.04 *3*	17.5 *8*	299.43	4+	91.396	2+	E2	0.221	α(K)=0.1446 *21*; α(L)=0.0587 *9*; α(M)=0.01397 *20* α(N)=0.00318 *5*; α(O)=0.000394 *6*; α(P)=6.87×10^{-6} *10* α(K)exp=0.15 *2* (1990Ad07); α(K)exp=0.161 *16* (1971De22) K:L1:L2:L3=255 *35*:27 *5*:50 *9*:46 *9* (1990Ad07). Additional information 15.
218.5[a] *3*	0.6 *2*	1702.20	0+	1483.69	2+			

γ(^{164}Er) (continued)

E_γ[#]	I_γ[@ g]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	α[†]	$I_{(\gamma+ce)}$[g]	Comments
237.6[e] 3		1483.69	2+	1246.07	0+				ce(K)=0.04 2 (1992Gr24).
298.09[a] 21	0.8 2	2172.96	0+	1875.20?	1(+)	(M1)	0.1357		α(K)=0.1142 17; α(L)=0.01678 24; α(M)=0.00371 6; α(N)=0.000866 13 α(O)=0.0001255 18; α(P)=6.97×10^{-6} 10 Mult.: (M1,E2) from α(K)exp=0.09 3. But γ between 2172,0+ and 1875, J=1 suggests (M1). Additional information 68.
[x]302.4 7	0.2 1								
305.9[bai] 4	0.4 1	1875.20?	1(+)	1568.72	(3−)				
315.44 6	1.9 1	1702.20	0+	1386.73	1−	E1	0.01638		α(K)=0.01383 20; α(L)=0.00199 3; α(M)=0.000439 7 α(N)=0.0001015 15; α(O)=1.428×10^{-5} 20; α(P)=7.18×10^{-7} 10 α(K)exp=0.014 4 Additional information 43.
318.6[e] 3		2278.33	2+	1961.36					ce(K)≈0.003 (1992Gr24).
331.0[e] 3		1577.74	1−	1246.07	0+				ce(K)≈0.002 (1992Gr24).
339.4[a]	<0.1	2172.96	0+	1833.43	2+				
355.00[af] 22	1.0 1	2069.66?	(1−,2−)	1715.26	(2−)	M1,E2	0.064 22		α(K)=0.052 20; α(L)=0.0092 14; α(M)=0.0021 3 α(N)=0.00048 7; α(O)=6.7×10^{-5} 12; α(P)=3.0×10^{-6} 14 α(K)exp=0.046 15 Additional information 66.
358.0[a] 4	1.0 3	1841.7?	(0+)	1483.69	2+	E2	0.0409		α(K)=0.0311 5; α(L)=0.00763 11; α(M)=0.00177 3 α(N)=0.000406 6; α(O)=5.32×10^{-5} 8; α(P)=1.649×10^{-6} 24 α(K)exp=0.03 1 Additional information 56.
368.2[ei] 3		1314.57	2+	946.35	3+				ce(K)=0.008 3 (1992Gr24).
[x]369.77[a] 23	0.5 1								
377.77[a] 24	0.2 1	1861.47?	(0,1,2)+	1483.69	2+				
383.0[e] 4		1961.36		1577.74	1−				ce(K)≈0.003 (1992Gr24).
385.3[a] 7	0.2 1	1246.07	0+	860.23	2+	E2	0.0332		α(K)=0.0255 4; α(L)=0.00595 9; α(M)=0.001374 21 α(N)=0.000316 5; α(O)=4.17×10^{-5} 7; α(P)=1.369×10^{-6} 21 α(K)exp=0.025 20 Additional information 24.
387.7[a]	<0.1	1702.20	0+	1314.57	2+				
407.0[a] 1		2172.96	0+	1765.85	0+	E0		0.007 1	α(K)exp>0.06 Iγ<0.1, ce(K)=0.006 1. X(B(E0)/B(E2)(339γ))>0.017 (1990Ad07).
451.3[a]	<0.1	1765.85	0+	1314.57	2+				
454.6[a] 1	0.2 1	1314.57	2+	860.23	2+	E2	0.0211		α(K)=0.01661 24; α(L)=0.00348 5; α(M)=0.000798 12 α(N)=0.000184 3; α(O)=2.47×10^{-5} 4; α(P)=9.10×10^{-7} 13 α(K)exp=0.020 13 Additional information 27.

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γ(^{164}Er) (continued)

E_γ [#]	I_γ [@ g]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [‡]	α [†]	$I_{(\gamma+ce)}$ [g]	Comments
456.4 [a] 2		1702.20	0+	1246.07	0+	E0		0.022 4	α(K)exp>0.18; α(L)exp>0.03 Mult.: from α(K)exp and α(L)exp. Iγ<0.1, ce(K)=0.018 4, Ce(L1)=0.003 1. X(B(E0)/B(E2)(388γ))>0.09 (1990Ad07).
465.3 [e] 4		1961.36		1495.25					ce(K)=0.0025 10 (1992Gr24).
474.2 [a] 2	0.3 1	1788.36	2+	1314.57	2+	M1+E2+E0	0.10 4		α(K)exp=0.08 3 Additional information 49. X(B(E0)/B(E2))=0.11 3 (1990Ad07).
484.0 [e] 4		2444.52	(2+)	1961.36					ce(K)=0.0015 6 (1992Gr24).
519.76 [a] 21		1765.85	0+	1246.07	0+	E0		0.06 2	α(K)exp>0.5; α(L)exp>0.01 Iγ<0.1, ce(K)=0.050 15, ce(L)=0.001. X(B(E0)/B(E2)(451γ))>0.05 (1990Ad07).
524.52 9	0.9 2	1911.12	2+	1386.73	1−	E1	0.00503		α(K)=0.00427 6; α(L)=0.000595 9; α(M)=0.0001309 19 α(N)=3.04×10^{-5} 5; α(O)=4.33×10^{-6} 6; α(P)=2.29×10^{-7} 4 α(K)exp=0.0036 18 Additional information 58.
526.3 [ei] 4		1386.73	1−	860.23	2+				ce(K)≈0.0015 (1992Gr24).
546.9 [a] 3	1.0 2	1861.47?	(0,1,2)+	1314.57	2+	E2	0.01310		α(K)=0.01053 15; α(L)=0.00200 3; α(M)=0.000454 7 α(N)=0.0001049 15; α(O)=1.430×10^{-5} 21; α(P)=5.87×10^{-7} 9 α(K)exp=0.010 4 Additional information 57.
547.9 [e] 4		1495.25		946.35	3+				ce(K)≈0.0015 (1992Gr24).
561.5 3	0.6 1	860.23	2+	299.43	4+	E2	0.01228		α(K)=0.00989 14; α(L)=0.00185 3; α(M)=0.000421 6 α(N)=9.71×10^{-5} 14; α(O)=1.328×10^{-5} 19; α(P)=5.52×10^{-7} 8 α(K)exp=0.010 4 Additional information 16.
[x]568.9 [a] 4	0.5 1					M1+E2+E0	0.06 3		α(K)exp=0.05 2 Additional information 2.
572.9 [e] 4		1631.35?		1058.42	4+				ce(K)≈0.0010 (1992Gr24).
574.2 [e] 4		1433.97	3−	860.23	2+				ce(K)≈0.0010 (1992Gr24).
574.2 [e] 4		1961.36		1386.73	1−				ce(K)≈0.0010 (1992Gr24).
[x]575.3 [a] 4	0.4 1								
595.17 5	6.1 2	2172.96	0+	1577.74	1−	E1	0.00383		α(K)=0.00325 5; α(L)=0.000451 7; α(M)=9.90×10^{-5} 14 α(N)=2.30×10^{-5} 4; α(O)=3.29×10^{-6} 5; α(P)=1.756×10^{-7} 25 α(K)exp=0.0035 13 Additional information 69.
623.5 [e] 4		1483.69	2+	860.23	2+				ce(K)=0.0025 10 (1992Gr24).
635.10 [hfi] 25	1.6 [h] 2	1495.25		860.23	2+				
635.10 [hci] 25	1.6 [h] 2	2022.50?		1386.73	1−				
635.10 [h] 25	1.6 [h] 2	2069.66?	(1−,2−)	1433.97	3−				Mult.: M1+E2+E0 (1990Ad07) is based on α(K)exp=0.07 2. However, α(K)exp agrees with M2 also. Additional information 67.

γ(^{164}Er) (continued)

E_γ[#]	I_γ[@ g]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	δ[‡]	α[†]	Comments
[x]642.7[a] 4	0.5 1								
646.97 12	0.9 1	946.35	3+	299.43	4+	E2+M1	2.7 10	0.0099 13	α(K)=0.0081 12; α(L)=0.00137 13; α(M)=0.00031 3 α(N)=7.1×10^{-5} 7; α(O)=9.9×10^{-6} 11; α(P)=4.6×10^{-7} 8 α(K)exp=0.010 4 α(K)exp consistent with M1,E2. Additional information 20.
[x]652.5[a] 4	0.4 1								
666.5[ha] 3	0.5[h] 1	1911.12	2+	1246.07	0+	(E2)		0.00814	α(K)=0.00666 10; α(L)=0.001156 17; α(M)=0.000261 4 α(N)=6.03×10^{-5} 9; α(O)=8.36×10^{-6} 12; α(P)=3.75×10^{-7} 6 α(K)exp=0.007 3 Additional information 59.
666.5[ha] 3	0.5[h] 1	2541.13	(1+,2+)	1875.20?	1(+)	(E2)		0.00814	α(K)=0.00666 10; α(L)=0.001156 17; α(M)=0.000261 4 α(N)=6.03×10^{-5} 9; α(O)=8.36×10^{-6} 12; α(P)=3.75×10^{-7} 6 Additional information 83.
685.0[e] 4		1631.35?		946.35	3+				ce(K)=0.0015 6 (1992Gr24).
689.63 6	1.6 2	2172.96	0+	1483.69	2+	E2		0.00752	α(K)=0.00617 9; α(L)=0.001057 15; α(M)=0.000238 4 α(N)=5.51×10^{-5} 8; α(O)=7.65×10^{-6} 11; α(P)=3.48×10^{-7} 5 α(K)exp=0.0066 22 E_γ: level-energy difference=689.26. Additional information 70.
[x]691.9[a] 8	0.4 2								
711.2[bai] 4	0.4 1	2025.71	(2+)	1314.57	2+				
721.1[bai] 7	0.2 1	2035.69?		1314.57	2+				
729.3[ha] 4	0.5[h] 1	1788.36	2+	1058.42	4+				Mult.: M1+E2+E0 (1990Ad07) from α(K)exp=0.048 18 is in disagreement with the Adopted placement. Additional information 50.
729.3[haf] 4	0.5[h] 1	2444.52	(2+)	1715.26	(2−)				
753.4[a] 4	0.3 1	2823.56?		2069.66?	(1−,2−)				
758.85 9	0.7 1	1058.42	4+	299.43	4+	E2(+M1)	>+7	0.00618 15	α(K)=0.00510 13; α(L)=0.000841 13; α(M)=0.000189 4 α(N)=4.37×10^{-5} 9; α(O)=6.11×10^{-6} 13; α(P)=2.90×10^{-7} 8 α(K)exp=0.006 1 Additional information 22.
768.7[e]		1715.26	(2−)	946.35	3+				
768.92 4	20.0 13	860.23	2+	91.396	2+	E2(+M1)	>1.8	0.00725 11	α(K)=0.00604 9; α(L)=0.000943 14; α(M)=0.000210 3 α(N)=4.88×10^{-5} 7; α(O)=6.93×10^{-6} 10; α(P)=3.50×10^{-7} 5 α(K)exp=0.0047 10 Additional information 17.

^{164}Tm ε decay (1.95 min) 1990Ad07,1971De22 (continued)

γ(^{164}Er) (continued)

E_γ[#]	I_γ[@ g]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	δ[‡]	α[†]	$I_{(\gamma+ce)}$[g]	Comments
775.47[bai] 22	0.7 2	2541.13	(1$^+$,2$^+$)	1765.85	0$^+$					
780.1[a] 4	0.4 1	2025.71	(2$^+$)	1246.07	0$^+$					
786.06[a] 14	1.2 1	2032.13		1246.07	0$^+$					
794.6[a] 5	0.3 1	2278.33	2$^+$	1483.69	2$^+$	M1+E2+E0		0.058 30		α(K)exp=0.046 24 Additional information 74. X(B(E0)/B(E2))=0.47 22 (1990Ad07).
797.9[a] 3	0.5 1	2823.56?		2025.71	(2$^+$)					
842.06 5	5.8 3	1702.20	0$^+$	860.23	2$^+$	E2		0.00483		α(K)=0.00400 6; α(L)=0.000641 9; α(M)=0.0001434 20 α(N)=3.32×10^{-5} 5; α(O)=4.68×10^{-6} 7; α(P)=2.27×10^{-7} 4 α(K)exp=0.004 1 Additional information 44.
844.7[a] 1	≈0.3	2278.33	2$^+$	1433.97	3$^-$					Mult.: (E1,M2) from α(K)exp≈0.01. Additional information 75. E_γ: level-energy differenc=844.4.
854.9[e]		1715.26	(2$^-$)	860.23	2$^+$					
855.01 7	4.2 2	946.35	3$^+$	91.396	2$^+$	E2+M1	−2.8 7	0.0052 4		α(K)=0.0043 3; α(L)=0.00067 4; α(M)=0.000150 8 α(N)=3.47×10^{-5} 18; α(O)=4.9×10^{-6} 3; α(P)=2.47×10^{-7} 18 α(K)exp=0.004 2 Mult.: α(K)exp gives E2(+M1), δ>0.9. Additional information 21.
858.3[a]	<0.2	2172.96	0$^+$	1314.57	2$^+$					
860.29 4	16.7 6	860.23	2$^+$	0.0	0$^+$	E2		0.00461		α(K)=0.00383 6; α(L)=0.000609 9; α(M)=0.0001361 19 α(N)=3.16×10^{-5} 5; α(O)=4.45×10^{-6} 7; α(P)=2.18×10^{-7} 3 α(K)exp=0.0038 6 α(K)exp gives dominant E2 with δ(E2/M1)>60. Additional information 18.
862.7[e] 4		2823.56?		1961.36						ce(K)=0.0010 5 (1992Gr24).
[x]871.29[a] 19	0.5 1									
875.43[a] 19	0.5 1	2444.52	(2$^+$)	1568.72	(3$^-$)	(E1)		0.00176		α(K)=0.001499 21; α(L)=0.000203 3; α(M)=4.46×10^{-5} 7 α(N)=1.036×10^{-5} 15; α(O)=1.492×10^{-6} 21; α(P)=8.19×10^{-8} 12 α(K)exp=0.003 Additional information 80.
905.70 5	5.0 3	1765.85	0$^+$	860.23	2$^+$	E2		0.00413		α(K)=0.00344 5; α(L)=0.000540 8; α(M)=0.0001204 17 α(N)=2.79×10^{-5} 4; α(O)=3.94×10^{-6} 6;

^{164}Er$_{96}$-9

^{164}Tm ε decay (1.95 min) 1990Ad07,1971De22 (continued)

γ(^{164}Er) (continued)

E_γ[#]	I_γ[@ g]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	α[†]	$I_{(\gamma+ce)}$[g]	Comments
									α(P)=1.96×10^{-7} *3* α(K)exp=0.0035 *10* Additional information 46.
926.6[a] *4*	<0.3	2172.96	0$^+$	1246.07	0$^+$	E0		0.05 *1*	α(K)exp>0.13; α(L)exp>0.0023 Iγ<0.3, ce(K)=0.04 *1*, α(L)exp=0.007 *2*. X(B(E0)/B(E2)(858γ))>2.9 (1990Ad07).
[x]928.27[&] *9*	0.8[&] *1*								α(K)exp=0.0058 (1971De22) Mult.: α(K)exp implies M1+E2. Additional information 3.
[x]934.9 *5*	0.7 *1*					E2	0.00386 *6*		α=0.00386 *6*; α(K)=0.00322 *5*; α(L)=0.000501 *7*; α(M)=0.0001117 *16*; α(N+..)=2.98×10^{-5} *5* α(N)=2.59×10^{-5} *4*; α(O)=3.67×10^{-6} *6*; α(P)=1.83×10^{-7} *3* α(K)exp=0.0029 *11* Additional information 4.
963.9 *3*	0.5 *1*	2278.33	2$^+$	1314.57	2$^+$	M1+E2+E0	0.040 *20*		α(K)exp=0.032 *16* Additional information 76. X(B(E0)/B(E2))=0.7 *3* (1990Ad07).
967.8[a] *3*	0.5 *1*	1058.42	4$^+$	91.396	2$^+$	E2	0.00360		α(K)=0.00300 *5*; α(L)=0.000463 *7*; α(M)=0.0001031 *15* α(N)=2.39×10^{-5} *4*; α(O)=3.39×10^{-6} *5*; α(P)=1.709×10^{-7} *24* α(K)exp=0.0032 *12* Additional information 23.
973.4[a] *4*	0.3 *1*	1833.43	2$^+$	860.23	2$^+$				E_γ: uncertainty of 0.04 (1990Ad07) seems a misprint.
1015.15[h] *7*	2.4[h] *1*	1314.57	2$^+$	299.43	4$^+$	(E2)	0.00326		α(K)=0.00273 *4*; α(L)=0.000416 *6*; α(M)=9.24×10^{-5} *13* α(N)=2.15×10^{-5} *3*; α(O)=3.05×10^{-6} *5*; α(P)=1.552×10^{-7} *22* α(K)exp=0.0027 *8* Additional information 28.
1015.15[h] *7*	2.4[h] *1*	1875.20?	1$^{(+)}$	860.23	2$^+$				
1015.15[hf] *7*	2.4[h] *1*	1961.36		946.35	3$^+$				
1057.81[d] *5*	6.9 *3*	2444.52	(2$^+$)	1386.73	1$^-$	(E1)	0.00123		α(K)=0.001052 *15*; α(L)=0.0001416 *20*; α(M)=3.10×10^{-5} *5* α(N)=7.21×10^{-6} *10*; α(O)=1.040×10^{-6} *15*; α(P)=5.77×10^{-8} *8* α(K)exp≈0.0013 Additional information 81.
1093.4[a] *5*	0.5 *2*	1953.93	2$^+$	860.23	2$^+$	E2	0.00280		α(K)=0.00235 *4*; α(L)=0.000353 *5*; α(M)=7.83×10^{-5} *11* α(N)=1.82×10^{-5} *3*; α(O)=2.59×10^{-6} *4*; α(P)=1.339×10^{-7} *19* α(K)exp=0.0024 *15* Additional information 61.
1110.5[bai] *8*	0.3 *2*	2168.2		1058.42	4$^+$				
[x]1118.9[a] *9*	0.3 *2*								
1134.60 *6*	1.2 *1*	1433.97	3$^-$	299.43	4$^+$	E1	0.00109		α(K)=0.000927 *13*; α(L)=0.0001243 *18*; α(M)=2.72×10^{-5} *4* α(N)=6.33×10^{-6} *9*; α(O)=9.14×10^{-7} *13*; α(P)=5.09×10^{-8} *8*;

$^{164}_{68}Er_{96}$-10

γ(^{164}Er) (continued)

E_γ[#]	I_γ[@ g]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	α[†]	$I_{(\gamma+ce)}$[g]	Comments
									α(IPF)=4.89×10^{-6} *7* α(K)exp=0.0011 *3* Additional information 35.
1154.66 *5*	24.7 *8*	1246.07	0$^+$	91.396	2$^+$	E2	0.00251		α(K)=0.00211 *3*; α(L)=0.000313 *5*; α(M)=6.94×10^{-5} *10* α(N)=1.614×10^{-5} *23*; α(O)=2.30×10^{-6} *4*; α(P)=1.203×10^{-7} *17*; α(IPF)=1.714×10^{-6} *25* α(K)exp=0.0018 *4* Additional information 25.
1165.45 *5*	11.1 *5*	2025.71	(2$^+$)	860.23	2$^+$	E2	0.00247		α(K)=0.00207 *3*; α(L)=0.000307 *5*; α(M)=6.81×10^{-5} *10* α(N)=1.581×10^{-5} *23*; α(O)=2.26×10^{-6} *4*; α(P)=1.181×10^{-7} *17*; α(IPF)=2.31×10^{-6} *4* α(K)exp=0.0022 *6* Additional information 64.
1170.4[ba] *4*	<0.3	1469.9?	4$^+$	299.43	4$^+$	M1+E2+E0			α(K)exp>0.02 Additional information 37. X(B(E0)/B(E2))=1.0 *5* (1990Ad07).
1184.30 *5*	2.6 *3*	1483.69	2$^+$	299.43	4$^+$	E2	0.00239		α(K)=0.00201 *3*; α(L)=0.000297 *5*; α(M)=6.57×10^{-5} *10* α(N)=1.528×10^{-5} *22*; α(O)=2.18×10^{-6} *3*; α(P)=1.145×10^{-7} *16*; α(IPF)=3.68×10^{-6} *6* α(K)exp=0.0023 *9* Additional information 38.
1223.14 *5*	9.1 *3*	1314.57	2$^+$	91.396	2$^+$	M1+E2+E0	0.010 *3*		α(K)exp=0.008 *2* Additional information 29. X(B(E0)/B(E2))=0.33 *10* (1990Ad07).
[x]1238.3[a] *5*	0.5 *2*								
1246.1[a] *4*		1246.07	0$^+$	0.0	0$^+$	E0		0.16 *3*	α(K)exp>0.43; α(L)exp>0.06 Iγ<0.3, ce(K)=0.13 *3*, ce(L)=0.020 *5*. Additional information 26. X(B(E0)/B(E2)(1155γ))=0.26 *7* (1990Ad07).
1268.4[a] *5*	0.5 *2*	1568.72	(3$^-$)	299.43	4$^+$				
[x]1273.5[a] *6*	0.4 *2*								
1295.36 *5*	14.4 *4*	1386.73	1$^-$	91.396	2$^+$	E1	0.00092		α(K)=0.000733 *11*; α(L)=9.78×10^{-5} *14*; α(M)=2.14×10^{-5} *3* α(N)=4.97×10^{-6} *7*; α(O)=7.20×10^{-7} *10*; α(P)=4.03×10^{-8} *6*; α(IPF)=6.51×10^{-5} *10* α(K)exp=0.00071 *22* Additional information 31.
1312.25 *14*	5.4 *11*	2172.96	0$^+$	860.23	2$^+$	E2	0.00198		α(K)=0.001648 *23*; α(L)=0.000239 *4*; α(M)=5.29×10^{-5} *8* α(N)=1.229×10^{-5} *18*; α(O)=1.762×10^{-6} *25*; α(P)=9.39×10^{-8} *14*; α(IPF)=2.12×10^{-5} *3* α(K)exp=0.0016 *6* Additional information 71.
1314.3 *2*	5.1 *3*	1314.57	2$^+$	0.0	0$^+$	E2	0.00197		α(K)=0.001643 *23*; α(L)=0.000238 *4*; α(M)=5.27×10^{-5} *8* α(N)=1.225×10^{-5} *18*; α(O)=1.756×10^{-6} *25*; α(P)=9.36×10^{-8} *14*;

$^{164}_{68}$Er$_{96}$-11

^{164}Tm ε decay (1.95 min) 1990Ad07,1971De22 (continued)

γ(^{164}Er) (continued)

E_γ[#]	I_γ[@ g]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	α[†]	Comments
								α(IPF)=2.16×10^{-5} *3* α(K)exp=0.0017 *4* Additional information 30.
1325.17 *5*	11.6 *3*	1416.57	0$^+$	91.396	2$^+$	E2	0.00194	α(K)=0.001617 *23*; α(L)=0.000234 *4*; α(M)=5.18×10^{-5} *8* α(N)=1.204×10^{-5} *17*; α(O)=1.726×10^{-6} *25*; α(P)=9.22×10^{-8} *13*; α(IPF)=2.38×10^{-5} *4* α(K)exp=0.0017 *5* Additional information 33.
1342.59 *7*	2.1 *1*	1433.97	3$^-$	91.396	2$^+$	E1	0.00090	α(K)=0.000689 *10*; α(L)=9.18×10^{-5} *13*; α(M)=2.01×10^{-5} *3* α(N)=4.67×10^{-6} *7*; α(O)=6.76×10^{-7} *10*; α(P)=3.79×10^{-8} *6*; α(IPF)=9.12×10^{-5} *13* α(K)exp=0.0007 *2* Additional information 36.
1350.9[a] *5*	0.4 *2*	3629.69	2$^+$	2278.33	2$^+$			
1361.53[c] *5*	1.12 *5*	3534.51?	(2$^+$)	2172.96	0$^+$	(E2)	0.00185	α(K)=0.001536 *22*; α(L)=0.000222 *4*; α(M)=4.89×10^{-5} *7* α(N)=1.138×10^{-5} *16*; α(O)=1.633×10^{-6} *23*; α(P)=8.75×10^{-8} *13*; α(IPF)=3.19×10^{-5} *5* α(K)exp=0.006 *2* Additional information 84.
[x]1373.9[&] *9*	0.8[&] *2*							Additional information 5.
1378.5[&i] *4*	0.4[&] *2*	1469.9?	4$^+$	91.396	2$^+$			
1386.69 *5*	9.5 *5*	1386.73	1$^-$	0.0	0$^+$	E1	0.00088	α(K)=0.000651 *10*; α(L)=8.67×10^{-5} *13*; α(M)=1.90×10^{-5} *3* α(N)=4.41×10^{-6} *7*; α(O)=6.38×10^{-7} *9*; α(P)=3.59×10^{-8} *5*; α(IPF)=0.0001192 *17* α(K)exp=0.0006 *2* Additional information 32.
1392.48 *5*	2.1 *1*	1483.69	2$^+$	91.396	2$^+$	M1+E2+E0	0.021 *9*	α(K)exp=0.017 *7* Additional information 39. X(B(E0)/B(E2))=0.87 *25* (1990Ad07).
[x]1415.8 *10*	0.4 *3*							E$_\gamma$,I$_\gamma$: from 1971De22. A 1416.6 transition in ce data of 1990Ad07 is assigned as E0 from 1416, 0$^+$ level.
1416.6[a] *1*		1416.57	0$^+$	0.0	0$^+$	E0		Additional information 34. I$_\gamma$: 5.2 *2* for 1416.6+1417.77, but no photons are expected for 1416.6. ce(K)(1416.6)=0.021 *4*. X(B(E0)/B(E2)(1325γ))=0.14 *5* (1990Ad07).
1417.96 *8*	2.4 *2*	2278.33	2$^+$	860.23	2$^+$	E2	0.00173	α(K)=0.001422 *20*; α(L)=0.000204 *3*; α(M)=4.50×10^{-5} *7* α(N)=1.047×10^{-5} *15*; α(O)=1.504×10^{-6} *21*; α(P)=8.10×10^{-8} *12*; α(IPF)=4.68×10^{-5} *7* α(K)exp=0.00017 *5* I$_\gamma$: from 1971De22. Iγ=5.2 *2* (1990Ad07) for a doublet (1417.77+1416.6). Additional information 77.
1460.20[d] *16*	1.5 *2*	3028.78		1568.72	(3$^-$)			

$^{164}_{68}Er_{96}$-12

^{164}Tm ε decay (1.95 min) 1990Ad07,1971De22 (continued)

γ(^{164}Er) (continued)

E_γ[#]	I_γ[@ g]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	α[†]	Comments
[x]1466.0[a] *5*	0.4 *1*							
1477.1[a] *4*	0.8 *2*	1568.72	(3$^-$)	91.396	2$^+$			
1483.2 *3*	1.2 *5*	1483.69	2$^+$	0.0	0$^+$	E2	0.00161	α(K)=0.001307 *19*; α(L)=0.000186 *3*; α(M)=4.11×10^{-5} *6* α(N)=9.55×10^{-6} *14*; α(O)=1.374×10^{-6} *20*; α(P)=7.44×10^{-8} *11*; α(IPF)=6.66×10^{-5} *10* α(K)exp≈0.001 Additional information 40.
1486.27 *17*	6.1 *6*	1577.74	1$^-$	91.396	2$^+$	E1	0.00086	α(K)=0.000579 *9*; α(L)=7.68×10^{-5} *11*; α(M)=1.679×10^{-5} *24* α(N)=3.91×10^{-6} *6*; α(O)=5.66×10^{-7} *8*; α(P)=3.19×10^{-8} *5*; α(IPF)=0.000187 *3* α(K)exp=0.00057 *16* Additional information 41.
1489.15 *11*	6.4 *7*	1788.36	2$^+$	299.43	4$^+$	E2	0.00160	α(K)=0.001297 *19*; α(L)=0.000185 *3*; α(M)=4.07×10^{-5} *6* α(N)=9.48×10^{-6} *14*; α(O)=1.363×10^{-6} *19*; α(P)=7.39×10^{-8} *11*; α(IPF)=6.85×10^{-5} *10* α(K)exp=0.0012 *3* Additional information 51.
1533.93 *5*	2.1 *1*	1833.43	2$^+$	299.43	4$^+$	E2	0.00153	α(K)=0.001227 *18*; α(L)=0.0001741 *25*; α(M)=3.84×10^{-5} *6* α(N)=8.93×10^{-6} *13*; α(O)=1.286×10^{-6} *18*; α(P)=6.99×10^{-8} *10*; α(IPF)=8.35×10^{-5} *12* α(K)exp=0.0013 *2* Eγ=1583.9 (1990Ad07) is a misprint. Additional information 53.
1577.72 *8*	1.6 *1*	1577.74	1$^-$	0.0	0$^+$	(E1)	0.00087	α(K)=0.000523 *8*; α(L)=6.93×10^{-5} *10*; α(M)=1.516×10^{-5} *22* α(N)=3.53×10^{-6} *5*; α(O)=5.11×10^{-7} *8*; α(P)=2.89×10^{-8} *4*; α(IPF)=0.000254 *4* α(K)exp≈0.001 Additional information 42.
1584.0[d] *4*	0.4 *1*	2444.52	(2$^+$)	860.23	2$^+$			
1610.71 *5*	15.9 *5*	1702.20	0$^+$	91.396	2$^+$	E2	0.00143	α(K)=0.001120 *16*; α(L)=0.0001580 *23*; α(M)=3.48×10^{-5} *5* α(N)=8.10×10^{-6} *12*; α(O)=1.168×10^{-6} *17*; α(P)=6.38×10^{-8} *9*; α(IPF)=0.0001115 *16* α(K)exp=0.0013 *3* Additional information 45.
1623.9[ci] *3*	0.8 *1*	3534.51?	(2$^+$)	1911.12	2$^+$			Additional information 85.
1654.9 *4*	0.5 *2*	1953.93	2$^+$	299.43	4$^+$	E2	0.00139	α(K)=0.001066 *15*; α(L)=0.0001498 *21*; α(M)=3.30×10^{-5} *5* α(N)=7.68×10^{-6} *11*; α(O)=1.107×10^{-6} *16*; α(P)=6.07×10^{-8} *9*; α(IPF)=0.0001290 *19* α(K)exp=0.0011 *4* Additional information 62.
1661.2[af] *4*	0.6 *2*	1961.36		299.43	4$^+$			
1674.34 *5*	15.5 *5*	1765.85	0$^+$	91.396	2$^+$	E2	0.00137	α(K)=0.001043 *15*; α(L)=0.0001464 *21*; α(M)=3.22×10^{-5} *5* α(N)=7.50×10^{-6} *11*; α(O)=1.082×10^{-6} *16*; α(P)=5.94×10^{-8} *9*; α(IPF)=0.0001370 *20* α(K)exp=0.0011 *2* Additional information 47.

$^{164}_{68}Er_{96}$-13

^{164}Tm ε decay (1.95 min) 1990Ad07,1971De22 (continued)

γ(^{164}Er) (continued)

E_γ[#]	I_γ[@ g]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	α[†]	$I_{(\gamma+ce)}$[g]	Comments
1696.86 *6*	3.9 *2*	1788.36	2^+	91.396	2^+	M1+E2+E0	0.0048 *15*		α(K)exp=0.0038 *12* Additional information 52. X(B(E0)/B(E2))=0.64 *19* (1990Ad07).
1702.1[a] *4*	<0.3	1702.20	0^+	0.0	0^+	E0		0.009 *2*	α(K)exp>0.023; α(L)exp≈0.003 Iγ<0.3, ce(K)=0.007 *2*, ce(L)≈0.001. X(B(E0)/B(E2)(1611γ))=0.069 *23* (1990Ad07).
1714.1[d] *2*	0.78 *4*	3028.78		1314.57	2^+				
1742.09 *5*	3.3 *1*	1833.43	2^+	91.396	2^+	M1+E2+E0	0.0055 *19*		α(K)exp=0.0044 *15* Additional information 54. X(B(E0)/B(E2))=0.9 *3* (1990Ad07).
1750.2[a] *6*	0.3 *1*	1841.7?	(0^+)	91.396	2^+				
1765.8[a] *4*	<0.3	1765.85	0^+	0.0	0^+	E0		0.05 *1*	α(K)exp>0.13; α(L)exp>0.023 Iγ<0.3, ce(K)=0.04 *1*, ce(L)=0.007 *2*. Additional information 48. X(B(E0)/B(E2)(1674γ))=0.51 *15* (1990Ad07).
1783.6 *2*	1.0 *1*	1875.20?	$1^{(+)}$	91.396	2^+				
1788.4 *4*	0.6 *1*	1788.36	2^+	0.0	0^+				
1819.78 *9*	6.1 *3*	1911.12	2^+	91.396	2^+	M1+E2+E0	0.0036 *10*		α(K)exp=0.0029 *8* Additional information 60. X(B(E0)/B(E2))=0.65 *21* (1990Ad07).
1833.35 *16*	1.6 *2*	1833.43	2^+	0.0	0^+	E2	0.00125		α(K)=0.000882 *13*; α(L)=0.0001227 *18*; α(M)=2.70×10^{-5} *4* α(N)=6.28×10^{-6} *9*; α(O)=9.08×10^{-7} *13*; α(P)=5.02×10^{-8} *7*; α(IPF)=0.000206 *3* α(K)exp=0.0011 *4* Additional information 55.
1840.8[a] *7*	0.2 *1*	3407.94		1568.72	(3^-)				
1841.6[ai]		1841.7?	(0^+)	0.0	0^+	(E0)			E_γ: from table 4 of 1990Ad07. X(B(E0)/B(E2)(1750γ))=2.3 *7* (1990Ad07).
1862.52 *5*	7.7 *4*	1953.93	2^+	91.396	2^+	M1+E2+E0	0.0030 *8*		α(K)exp=0.0024 *6* Additional information 63. X(B(E0)/B(E2))=0.49 *16* (1990Ad07).
1869.3[hf] *10*	0.3[h] *2*	1961.36		91.396	2^+				
1869.3[ha] *10*	0.3[h] *2*	2168.2		299.43	4^+				
1875.5[i] *5*	0.9 *1*	1875.20?	$1^{(+)}$	0.0	0^+				
1876.9[a] *7*	0.5 *2*	2823.56?		946.35	3^+				
1894.4[a] *4*	0.4 *1*	3768.52	$(1^+,2^+)$	1875.20?	$1^{(+)}$				
[x]1900.5[&] *5*	0.50[&] *9*								Additional information 6.
1910.92[&i] *9*	0.75[&] *8*	1911.12	2^+	0.0	0^+				
[x]1932.8[a] *6*	0.6 *2*								
1934.96[h] *15*	2.5[h] *1*	2025.71	(2^+)	91.396	2^+	(E2)	0.00119		α(K)=0.000799 *12*; α(L)=0.0001106 *16*;

$^{164}_{68}Er_{96}$-14

^{164}Tm ε decay (1.95 min) 1990Ad07,1971De22 (continued)

γ(^{164}Er) (continued)

E_γ[#]	I_γ[@ g]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	α[†]	$I_{(\gamma+ce)}$[g]	Comments
									α(M)=2.43×10^{-5} *4* α(N)=5.66×10^{-6} *8*; α(O)=8.19×10^{-7} *12*; α(P)=4.55×10^{-8} *7*; α(IPF)=0.000252 *4* α(K)exp=0.0013 *5* Additional information 65.
1934.96[h] *15*	2.5[h] *1*	3768.52	(1$^+$,2$^+$)	1833.43	2$^+$	(E2)	0.00119		α(K)=0.000799 *12*; α(L)=0.0001106 *16*; α(M)=2.43×10^{-5} *4* α(N)=5.66×10^{-6} *8*; α(O)=8.19×10^{-7} *12*; α(P)=4.55×10^{-8} *7*; α(IPF)=0.000252 *4*
1944.5 *4*	0.65 *15*	2035.69?		91.396	2$^+$				
1955.20[d] *11*	1.2 *1*	2254.64		299.43	4$^+$				
1969.6[a] *5*	0.4 *1*	3028.78		1058.42	4$^+$				
1974.5[a] *5*	0.6 *1*	3407.94		1433.97	3$^-$				
1978.0 *2*	1.5 *1*	2069.66?	(1$^-$,2$^-$)	91.396	2$^+$				
[x]2010.7[&] *5*	0.25[&] *5*								Additional information 7.
2022.55[c] *8*	1.4 *2*	2022.50?		0.0	0$^+$				
2035.60 *23*	1.1 *2*	2035.69?		0.0	0$^+$				
2052.5[hci] *5*	0.4[h] *1*	3534.51?	(2$^+$)	1483.69	2$^+$				
2052.5[hbi] *5*	0.4[h] *1*	3629.69	2$^+$	1577.74	1$^-$				
2081.54 *14*	9.8 *5*	2172.96	0$^+$	91.396	2$^+$	E2	0.00114		α(K)=0.000700 *10*; α(L)=9.63×10^{-5} *14*; α(M)=2.11×10^{-5} *3* α(N)=4.92×10^{-6} *7*; α(O)=7.13×10^{-7} *10*; α(P)=3.98×10^{-8} *6*; α(IPF)=0.000321 *5* α(K)exp=0.0010 *3* Additional information 72.
2172.5[a] *4*		2172.96	0$^+$	0.0	0$^+$	E0		0.15 *4*	α(K)exp>0.4; α(L)exp>0.06 Iγ<0.3, ce(K)=0.12 *3*, ce(L)=0.020 *5*. Additional information 73. X(B(E0)/B(E2)(2081γ))=4.5 *15* (1990Ad07).
2186.4 *4*	0.5 *1*	2278.33	2$^+$	91.396	2$^+$	M1+E2+E0	0.025 *10*		α(K)exp=0.020 *8* Additional information 78. X(B(E0)/B(E2))=14 *6* (1990Ad07).
2278.09 *12*	1.1 *1*	2278.33	2$^+$	0.0	0$^+$	(E2)	0.00111		α(K)=0.000595 *9*; α(L)=8.13×10^{-5} *12*; α(M)=1.783×10^{-5} *25* α(N)=4.15×10^{-6} *6*; α(O)=6.02×10^{-7} *9*; α(P)=3.38×10^{-8} *5*; α(IPF)=0.000414 *6* α(K)exp≈0.0016 Additional information 79.
2353.0[hbi] *2*	1.8[h] *1*	2444.52	(2$^+$)	91.396	2$^+$				Additional information 82.
2353.0[hbi] *2*	1.8[h] *1*	3768.52	(1$^+$,2$^+$)	1416.57	0$^+$				
2383.61[d] *9*	6.0 *3*	3629.69	2$^+$	1246.07	0$^+$	E2	0.00111		α(K)=0.000549 *8*; α(L)=7.47×10^{-5} *11*; α(M)=1.639×10^{-5} *23* α(N)=3.82×10^{-6} *6*; α(O)=5.54×10^{-7} *8*; α(P)=3.12×10^{-8} *5*; α(IPF)=0.000464 *7*

$^{164}_{68}Er_{96}$-15

^{164}Tm ε decay (1.95 min) 1990Ad07,1971De22 (continued)

γ(^{164}Er) (continued)

E_γ [#]	I_γ [@ g]	E_i(level)	J_i^π	E_f	J_f^π	Comments
						α(K)exp=0.0014 *4* Additional information 86.
x2389.9 [a] *5*	0.3 *1*					
x2421.4 *3*	0.7 *1*					
2449.3 *2*	1.0 *1*	2541.13	(1+,2+)	91.396	2+	
x2476.5 [&] *5*	0.19 [&] *5*					Additional information 8.
x2484.1 *1*	1.7 *2*					
x2489.7 *2*	0.9 *2*					
x2518.2 [a] *14*	0.2 *2*					
2521.77 *14*	0.8 *1*	3768.52	(1+,2+)	1246.07	0+	
x2531.3 *5*	0.5 *2*					Additional information 9.
2570.9 *5*	0.6 *1*	3629.69	2+	1058.42	4+	
x2641.2 [&] *5*	0.6 [&] *1*					Additional information 10.
x2690.5 [&] *2*	0.32 [&] *6*					
x2763.0 [&] *5*	0.5 [&] *2*					
x2881.7 *5*	0.37 *7*					
x2958.7 [&] *5*	0.3 [&] *1*					
x3002.4 *3*	0.53 *5*					
x3021.9 [&] *5*	0.30 [&] *6*					
x3044.1 [&] *5*	0.3 [&] *1*					Additional information 11.
x3081.4 [&] *4*	0.22 [&] *4*					
x3101.3 [a] *14*	0.2 *1*					
3108.2 *4*	0.25 *5*	3407.94		299.43	4+	
x3121.5 [&] *5*	0.3 [&] *1*					Additional information 12.
x3126.5 [a] *16*	0.1 *1*					
x3134.7 *4*	0.37 *7*					Additional information 13.
3315.6 [&i] *5*	0.30 [&] *5*	3407.94		91.396	2+	

† Additional information 87.

‡ From Adopted Gammas. For many γ transitions in the present dataset, the assignments are based on ce data of 1990Ad07, α(K)exp values given under comments are deduced (by evaluators) from I(ce) of 1990Ad07 and Iγ values given here using α(K)(91.4γ,E2)=1.314, unless otherwise noted.

Weighted average of values from 1990Ad07 and 1971De22, unless otherwise noted.

@ Unweighted average of values from 1990Ad07 and 1971De22.

& From 1971De22. Since this γ is not confirmed by 1990Ad07, its assignment to ^{164}Tm decay is uncertain.

a γ or E0 transition from 1990Ad07 (or 1987AdZV) only. Four γ rays in the 2400 keV region are from 1987AdZV, these are missing in the list of 1990Ad07.

b Tentative placement (by evaluators) from level-energy difference.

c Placement from 1971De22.

$^{164}_{68}Er_{96}$-16

^{164}Tm ε decay (1.95 min) 1990Ad07,1971De22 (continued)

$\gamma(^{164}Er)$ (continued)

[d] Placement is different in 1971De22.
[e] From 1992Gr24 (reanalyzed data of 1990Ad07).
[f] Placement from 1992Gr24.
[g] For absolute intensity per 100 decays, multiply by 0.067 *5*.
[h] Multiply placed with undivided intensity.
[i] Placement of transition in the level scheme is uncertain.
[x] γ ray not placed in level scheme.

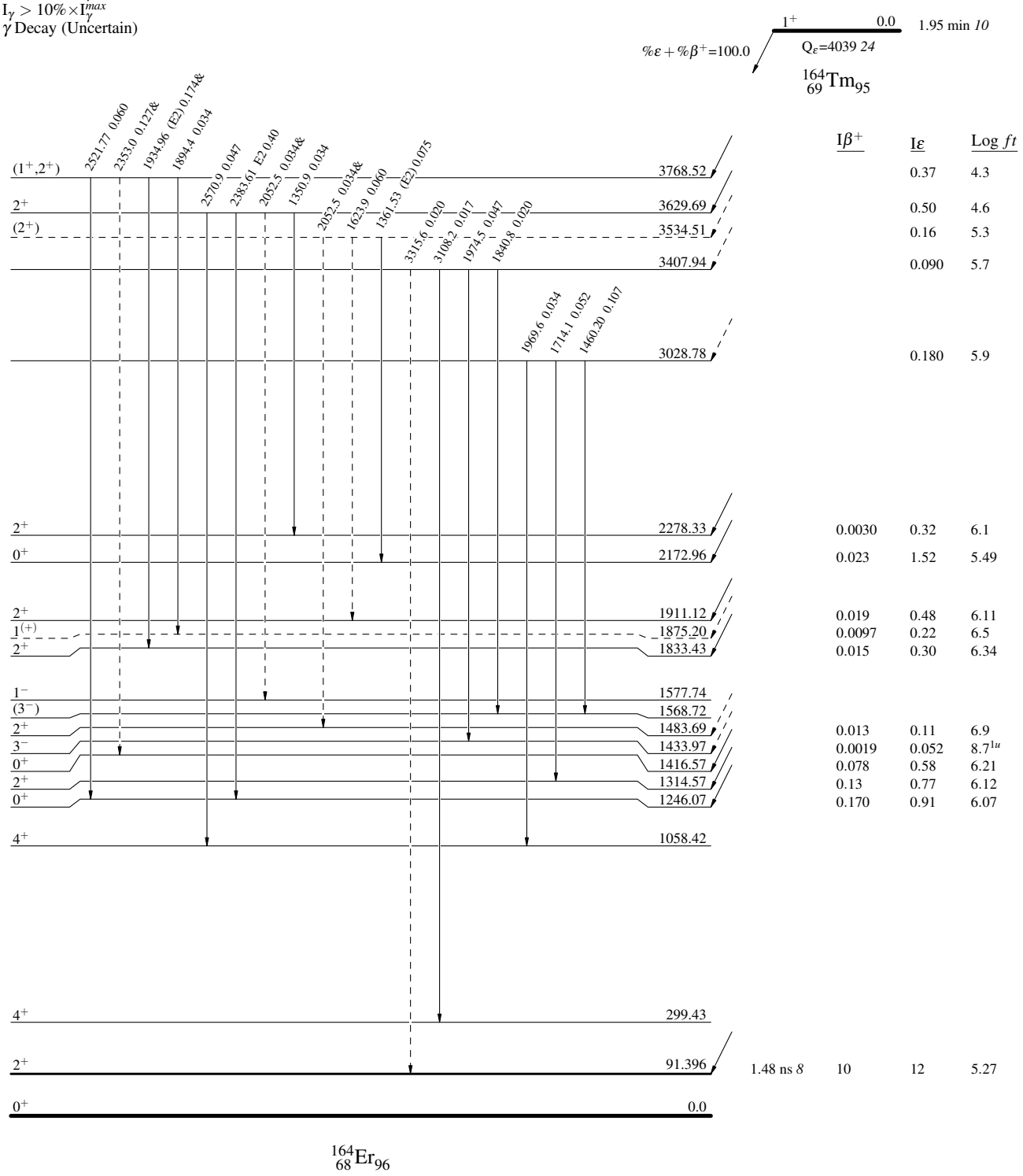
$^{164}_{68}Er_{96}$-17

^{164}Tm ε decay (1.95 min) 1990Ad07,1971De22

Decay Scheme

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

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)



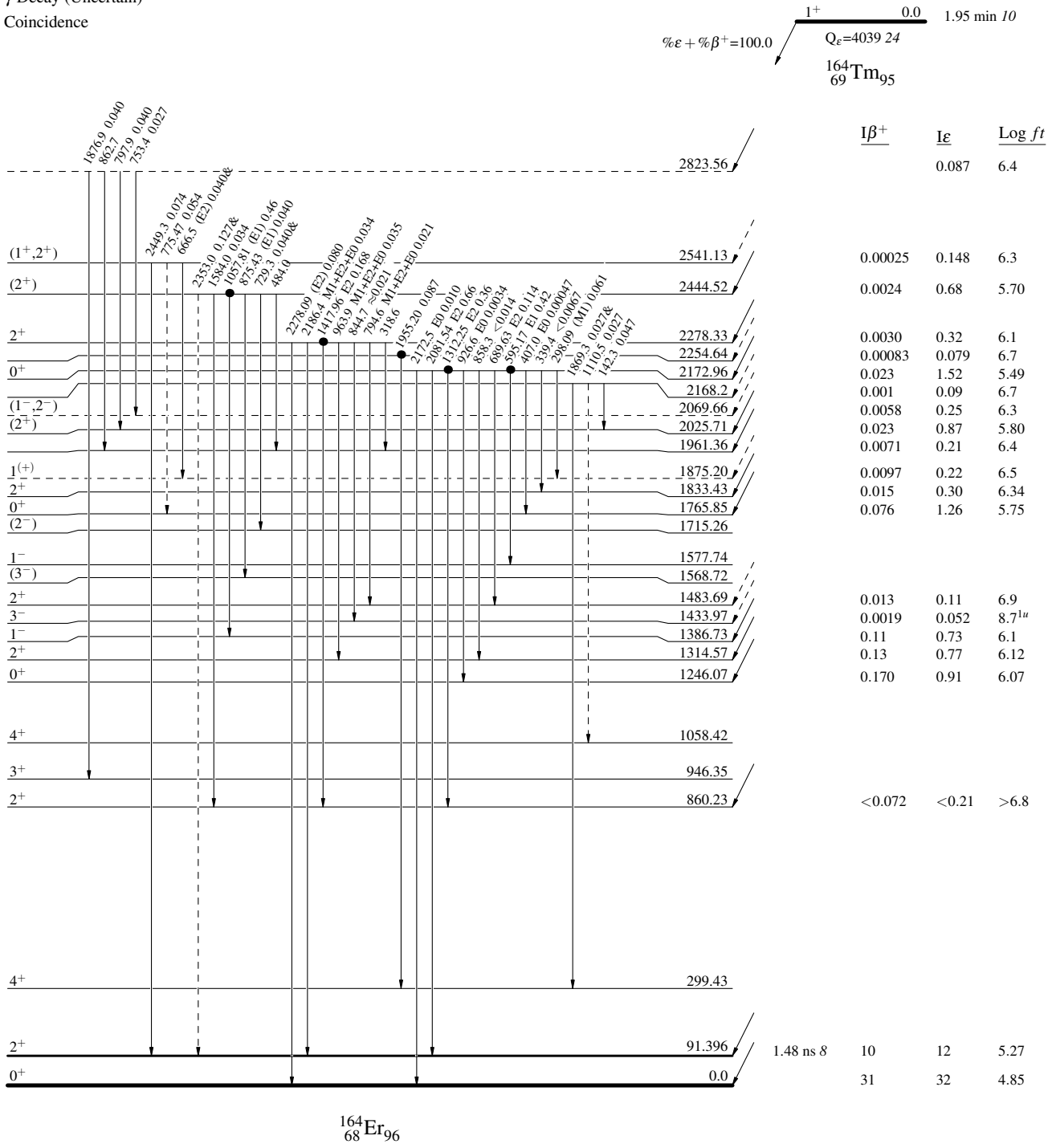
	Iβ+	Iε	Log *ft*
		0.37	4.3
		0.50	4.6
		0.16	5.3
		0.090	5.7
		0.180	5.9
	0.0030	0.32	6.1
	0.023	1.52	5.49
	0.019	0.48	6.11
	0.0097	0.22	6.5
	0.015	0.30	6.34
	0.013	0.11	6.9
	0.0019	0.052	8.7 1u
	0.078	0.58	6.21
	0.13	0.77	6.12
	0.170	0.91	6.07
	10	12	5.27

^{164}Tm ε decay (1.95 min) 1990Ad07,1971De22

Decay Scheme (continued)

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

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

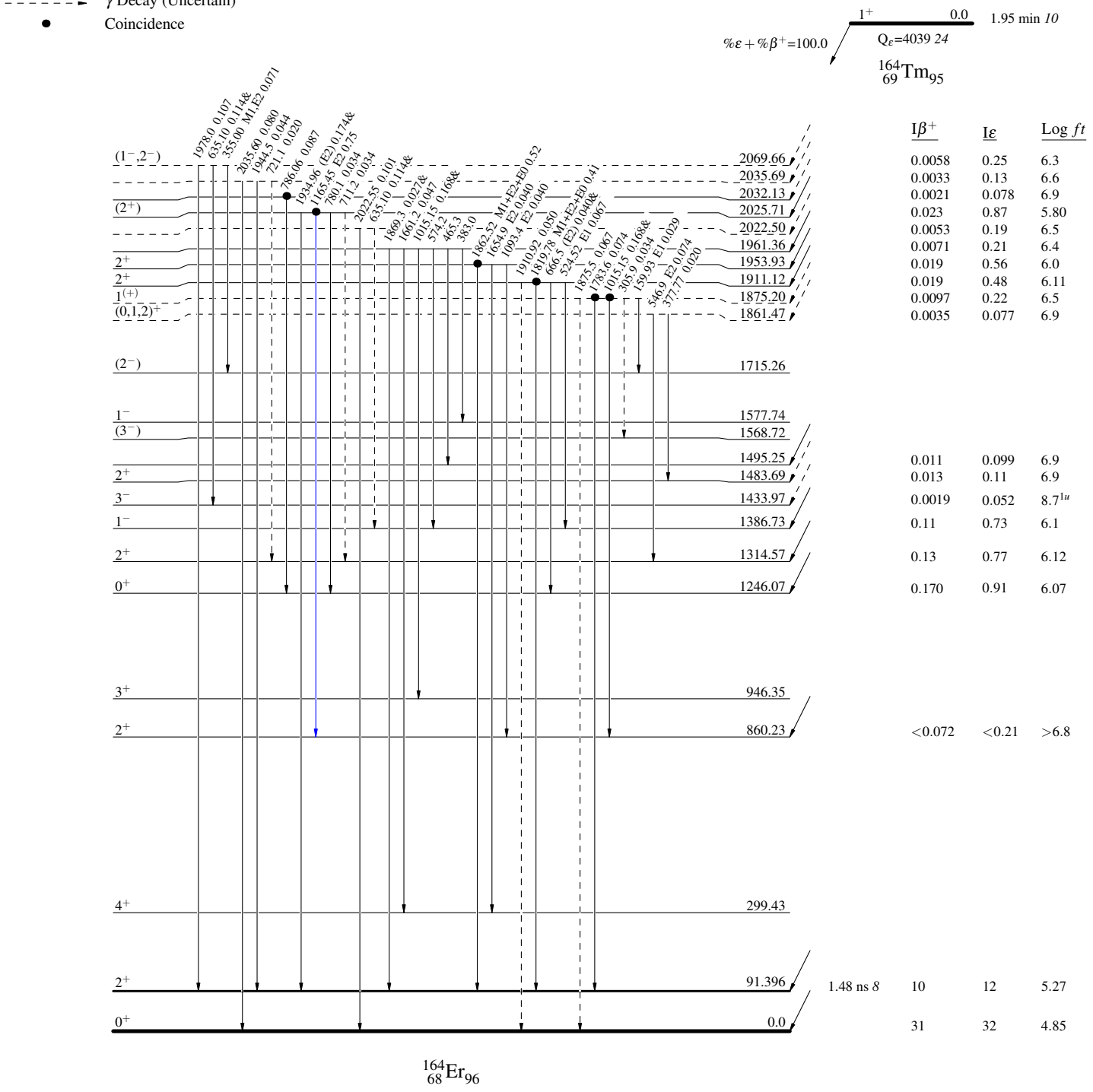


	Iβ+	Iε	Log ft
2823.56		0.087	6.4
2541.13	0.00025	0.148	6.3
2444.52	0.0024	0.68	5.70
2278.33	0.0030	0.32	6.1
2254.64	0.00083	0.079	6.7
2172.96	0.023	1.52	5.49
2168.2	0.001	0.09	6.7
2069.66	0.0058	0.25	6.3
2025.71	0.023	0.87	5.80
1961.36	0.0071	0.21	6.4
1875.20	0.0097	0.22	6.5
1833.43	0.015	0.30	6.34
1765.85	0.076	1.26	5.75
1715.26			
1577.74			
1568.72			
1483.69	0.013	0.11	6.9
1433.97	0.0019	0.052	8.7[1u]
1386.73	0.11	0.73	6.1
1314.57	0.13	0.77	6.12
1246.07	0.170	0.91	6.07
1058.42			
946.35			
860.23	<0.072	<0.21	>6.8
299.43			
91.396	10	12	5.27
0.0	31	32	4.85

^{164}Tm ε decay (1.95 min) 1990Ad07,1971De22

Decay Scheme (continued)

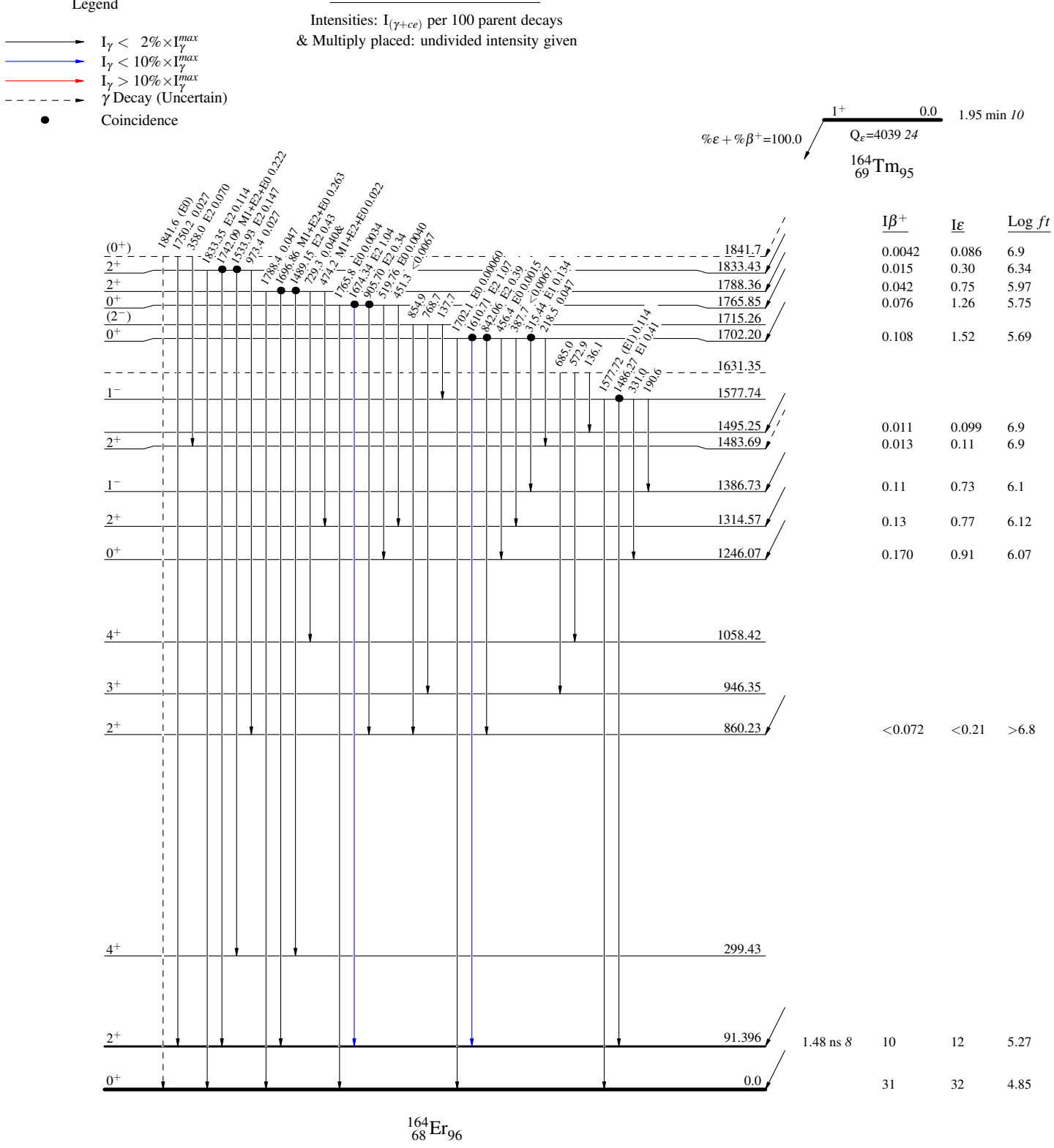
Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
& Multiply placed: undivided intensity given



^{164}Tm ε decay (1.95 min) 1990Ad07,1971De22

Decay Scheme (continued)

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

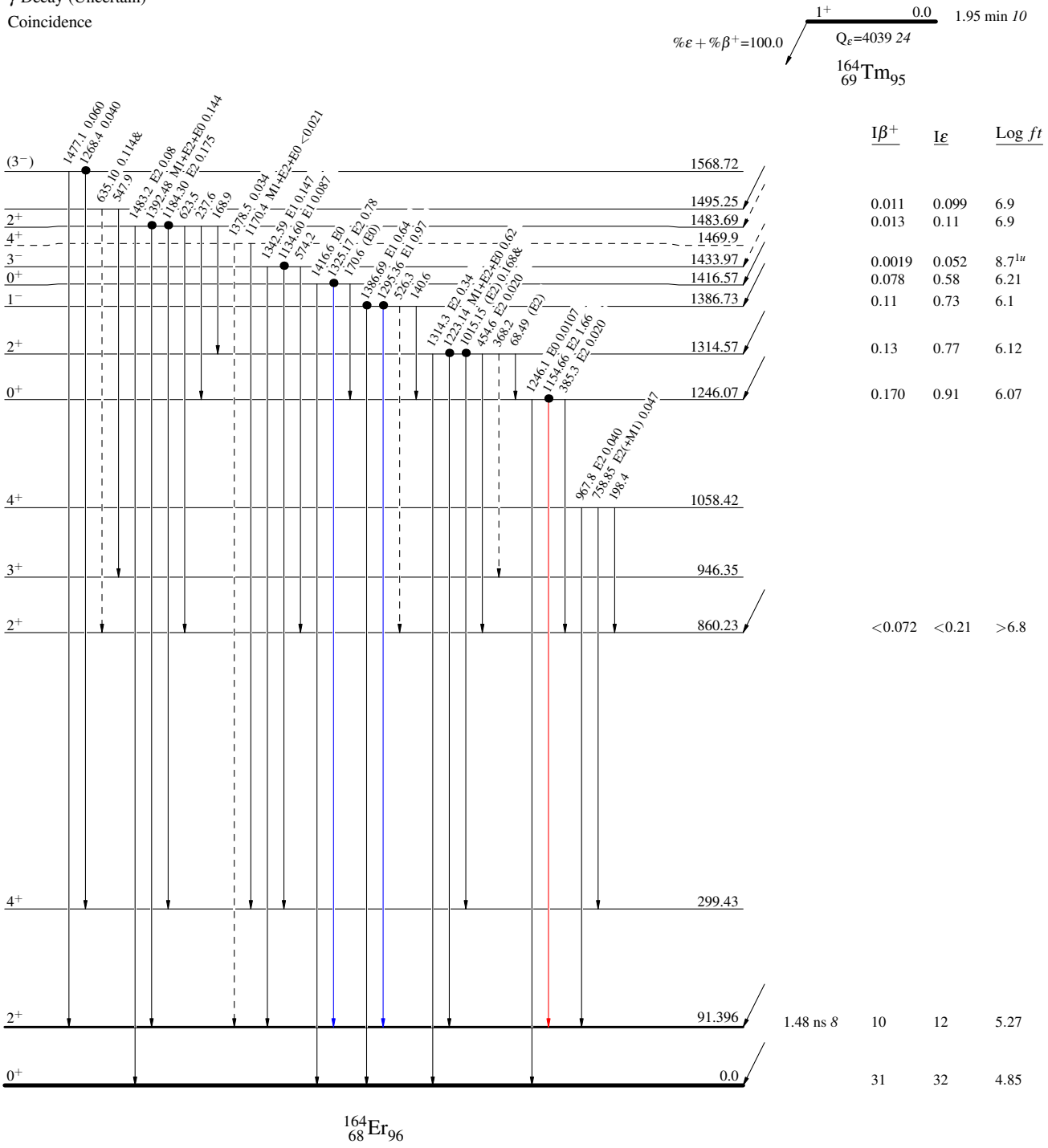


^{164}Tm ε decay (1.95 min) 1990Ad07,1971De22

Decay Scheme (continued)

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

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



	Iβ+	Iε	Log ft
1495.25	0.011	0.099	6.9
1483.69	0.013	0.11	6.9
1469.9			
1433.97	0.0019	0.052	8.7lu
1416.57	0.078	0.58	6.21
1386.73	0.11	0.73	6.1
1314.57	0.13	0.77	6.12
1246.07	0.170	0.91	6.07
860.23	<0.072	<0.21	>6.8
91.396	10	12	5.27
0.0	31	32	4.85

^{164}Tm ε decay (1.95 min) 1990Ad07,1971De22

Decay Scheme (continued)

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