^{232}Th(n,γ) E=th 1979Je01,1974Ke13,1972Vo08

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	B. Singh, J. K. Tuli, E. Browne	NDS 170, 499 (2020)	8-Oct-2020

1979Je01 (also 1976JeZU thesis), 1972Vo08: High-Flux reactor at Grenoble; measured Eγ, Iγ, I(ce); secondary γ rays measured using GAMS curved-crystal spectrometer, ce measured using BILL beta spectrometer.

1974Ke13: measured Eγ, Iγ using Ge(Li) detectors and Fribourg pair spectrometer at the SAPHIR reactor facility in Wurenlingen (EIH).

^{233}Th Levels

E(level)	J^{π}‡	E(level)	J^{π}‡	E(level)	J^{π}‡
0.0	$1/2^+$	842.26 *9*	$(1/2,3/2)^+$	1554.7 *4*	$1/2,3/2,5/2^+$
6.04 *2*	$(5/2)^+$	852.28 *17*	$1/2^+,3/2,5/2^+$	1557.5 *4*	$1/2,3/2,5/2^+$
6.06 *2*	$(7/2)^-$	861.54 *11*	$1/2^+,3/2^+$	1589.8 *2*	$1/2^-,3/2^-$
16.86 *2*	$3/2^+$	884.94 *8*	$1/2^+,3/2^+,5/2^+$	1601.3 *4*	$1/2,3/2,5/2^+$
50.38 *2*	$(7/2)^+$	903.6?†	$(1/2^+,3/2^+)$	1612.3 *4*	$1/2,3/2,5/2^+$
54.546 *6*	$5/2^+$	919.1?† *6*	$(1/2^-,3/2^-)$	1638.0 *2*	1/2,3/2
93.62 *2*	$7/2^+$	924.58 *20*	$(3/2)^-$	1653.6 *4*	$1/2,3/2,5/2^+$
107.34 *2*	$(9/2^+)$	947.2 *4*	$(3/2^-)$	1658.7 *3*	$1/2,3/2,5/2^+$
262.24 *2*	$(5/2)^+$	968.1 *2*	$(1/2,3/2)^+$	1668.3 *4*	$(1/2^+,3/2^+)$
279.40 *2*	$(7/2)^+$	983.6 *2*	$(1/2^+,3/2^+)$	1699.3 *3*	1/2,3/2
309.5?†	(1/2,3/2)	1013.1 *3*	$1/2^-,3/2^-$	1715.7 *4*	$1/2^{(-)},3/2^{(-)}$
335.928 *3*	$3/2^+$	1031.6 *2*	$1/2^-,3/2^-$	1727.7 *6*	1/2,3/2
337.35 *6*	$(5/2,7/2)^+$	1040.1 *2*	(1/2,3/2)	1730.6 *6*	$1/2,3/2,5/2^+$
367.0?†		1051.5 *5*	$(3/2)^-$	1736.7 *6*	$1/2,3/2,5/2^+$
371.17 *2*	$(5/2)^+$	1061.43 *15*	$(1/2^+,3/2^+)$	1741.2 *8*	$1/2,3/2,5/2^+$
388.3?†	$(9/2^+)$	1073.7 *3*	$(1/2^-,3/2^-)$	1776.4 *7*	$1/2,3/2,5/2^+$
405.8?†	(1/2,3/2)	1132.11 *9*	$(3/2)^+$	1796.8 *4*	$1/2,3/2,5/2^+$
413.8?†	(1/2,3/2)	1151.72 *22*	$(3/2,5/2)^+$	1805.6 *4*	1/2,3/2
421.15 *2*	$(7/2)^+$	1171.2 *10*	$3/2^-$	1816.0 *4*	$1/2,3/2,5/2^+$
424.3?†		1182.8 *3*	$1/2,3/2,5/2^+$	1842.0?† *10*	
478.36 *3*	$(5/2)^-$	1185.5 *4*	$(3/2^+)$	1859.7 *8*	$1/2,3/2,5/2^+$
539.61 *2*	$(1/2)^-$	1238.2 *4*	$1/2,3/2,5/2^+$	1862.5 *6*	$1/2,3/2,5/2^+$
572.70 *3*	$(3/2)^-$	1256.2 *3*	$1/2^-,3/2^-$	1894.9 *6*	$1/2,3/2,5/2^+$
583.932 *8*	$(1/2)^+$	1259.4 *3*	1/2,3/2	1905.4 *3*	1/2,3/2
586.135 *9*	$3/2^-$	1263.2 *4*	1/2,3/2	1935.4 *4*	$1/2,3/2,5/2^+$
599.29? *6*	$(5/2^-)$	1276.8 *2*	$1/2,3/2,5/2^+$	1944.4 *6*	$1/2^-,3/2^-$
611.476 *12*	$(3/2)^+$	1283.2 *4*	1/2,3/2	1948.0 *5*	$1/2,3/2,5/2^+$
628.97 *2*	$(5/2)^+$	1313.41 *8*	$(3/2)^-$	1961.4 *4*	1/2,3/2
681.846? *19*	$(1/2)^-$	1324.7 *3*	$1/2,3/2,5/2^+$	1964.2 *5*	$1/2,3/2,5/2^+$
682.11 *3*	$(3/2^-)$	1337.8 *3*	$1/2^-,3/2^-$	1970.7 *9*	$1/2,3/2,5/2^+$
695.6?†	(1/2,3/2)	1350.7 *2*	$(3/2)^-$	1979.0 *4*	1/2,3/2
711.19 *3*	$(5/2)^+$	1388.0 *3*	$(1/2^-,3/2^-)$	1991.0 *6*	$1/2,3/2,5/2^+$
713.72 *2*	$1/2^+$	1395.2 *3*	1/2,3/2	1995.9 *6*	$1/2,3/2,5/2^+$
721.84 *5*	$3/2^+$	1408.4 *2*	1/2,3/2	2002.1 *4*	$1/2,3/2,5/2^+$
741.32 *4*	$(3/2)^-$	1422.6 *3*	$1/2,3/2,5/2^+$	2014.7 *6*	$1/2,3/2,5/2^+$
749.9?†	(1/2,3/2)	1444.6 *2*	1/2,3/2	2026.4 *6*	$1/2,3/2,5/2^+$
753.98 *5*	$(7/2)^+$	1459.7 *3*	1/2,3/2	2041.5 *5*	$1/2,3/2,5/2^+$
768.18 *2*	$(1/2,3/2)^+$	1491.0 *3*	$1/2,3/2,5/2^+$	2046.6 *5*	$1/2,3/2,5/2^+$
769.60 *2*	$5/2^+$	1498.3 *2*	1/2,3/2	2053.5 *3*	$1/2,3/2,5/2^+$
783.64? *8*	$(1/2^+,3/2^+)$	1509.9 *3*	$1/2,3/2,5/2^+$	2066.3 *4*	1/2,3/2
803.41 *6*	$(5/2)^+$	1517.4 *6*	$1/2,3/2,5/2^+$	2069.6 *8*	$1/2,3/2,5/2^+$
814.74 *13*	$3/2^+$	1525.1 *3*	$1/2,3/2,5/2^+$	2073.9 *3*	1/2,3/2
839.66? *8*	$(3/2^-)$	1540.8 *4*	$1/2,3/2,5/2^+$	2083.1 *4*	1/2,3/2

Continued on next page (footnotes at end of table)

^{232}Th(n,γ) E=th 1979Je01,1974Ke13,1972Vo08 (continued)

^{233}Th Levels (continued)

E(level)	J$^{\pi}$‡	Comments
2097.2 *5*	1/2,3/2,5/2$^+$	
2114.5 *4*	1/2,3/2,5/2$^+$	
2126.8 *3*	1/2,3/2	
2132.9 *3*	1/2,3/2	
2145.1 *4*	1/2,3/2	
2150.1 *6*	1/2,3/2,5/2$^+$	
2156.2 *4*	1/2,3/2,5/2$^+$	
2176.3 *5*	1/2,3/2,5/2$^+$	
2179.6 *6*	1/2,3/2,5/2$^+$	
2189.4 *3*	1/2,3/2	
2195.3 *5*	1/2,3/2,5/2$^+$	
2228.1 *5*	1/2,3/2,5/2$^+$	
2234.4 *5*	1/2,3/2,5/2$^+$	
2240.9 *5*	1/2,3/2,5/2$^+$	
2244.0 *6*	1/2,3/2,5/2$^+$	
2261.5 *5*	1/2,3/2,5/2$^+$	
2282.6 *5*	1/2,3/2	
2300.6 *5*	1/2,3/2,5/2$^+$	
(4786.39 *9*)	1/2$^+$	J$^{\pi}$: s-wave capture in ^{232}Th, 0$^+$ g.s. E(level): S(n)=4786.39 *9* (2017Wa10).

† Uncertain population.

‡ Listed values are from the Adopted Levels, where all data from different resonances and thermal capture have been considered. All the excited levels seen in thermal neutron capture are expected to be populated by dipole or weakly populated by E2 primary gammas; therefore, J^{π} of such levels could be 1/2, 3/2, or 5/2$^+$. The levels fed by strong primary gammas are not expected to be 5/2$^+$ states.

γ(^{233}Th)

E_γ [†‡]	I_γ [cf]	E_i(level)	J^π_i	E_f	J^π_f	Mult. [e]	δ	α [g]	Comments
37.697 *8*		54.546	5/2$^+$	16.86	3/2$^+$	(M1+E2)	>0.33		δ: deduced by 1979Je01 from their data; the given ce intensities of Ice(L3)=0.76 *42*, Ice(M3)=0.34 *11* alone are not sufficient to deduced the E2/M1 admixture. 0.0018≤Iγ<0.018 from Ice(L3)=0.76 *42* and 43.5<α(L3)≤432.
39.091 *7*	0.033 *10*	93.62	7/2$^+$	54.546	5/2$^+$	(M1(+E2))	<0.33	110 *48*	I$_\gamma$: deduced from Ice(M1)=0.32 *9* and α(M1)=9.7 *3*. δ: deduced by 1979Je01 from their data; only information given is the intensity of M1-ce line which is not sufficient to deduce the E2/M1 admixture.
44.364 *6*	0.07 *4*	50.38	(7/2)$^+$	6.04	(5/2)$^+$	M1+E2	0.23 *9*	69 *22*	I$_\gamma$: deduced from Ice(L1)=2.0 *6* and α(L1)=28.0 *12*. Mult.,δ: from L- and M-subshell ratios. Ice(L1)=2.0 *6*, Ice(L2)=0.92 *28*, Ice(L3)=1.5 *5* (doublet, uncorrected intensity), Ice(M1)=0.57 *12*, Ice(M2)=0.46 *14*.
48.533 *8*	0.067 *2*	54.546	5/2$^+$	6.04	(5/2)$^+$	(M1)		33.1	I$_\gamma$: deduced from Ice(L1)=1.5 *5* and α(L1)=22.4. Mult.: absence of L2, L3 ce lines.
54.545 *3*	0.085 *16*	54.546	5/2$^+$	0.0	1/2$^+$	E2		206.4	I$_\gamma$: deduced from Ice(L3)=5.8 *11* and α(L3)=68.0. Ice(L2)=5.7 *12*, Ice(L3)=5.8 *11*, Ice(M2)=1.8 *3*, Ice(M3)=1.6 *3*.
56.960 *4*	0.057 *12*	107.34	(9/2$^+$)	50.38	(7/2)$^+$	(M1)		20.8	I$_\gamma$: deduced from Ice(L1)=0.79 *17* and α(L1)=14.0. Ice(L1)=0.79 *17*, Ice(L2)=0.16 *6*, Ice(M1)=0.25 *13*.
[x]76.561 *7*						(M1+E2)			δ: 0.37 from L1/L2 (1979Je01). Ice(L1)=0.26 *7*, Ice(L2)=0.14 *4*.
76.740 *4*	0.046 *3*	93.62	7/2$^+$	16.86	3/2$^+$	(E2)		40.0	I$_\gamma$: deduced from Ice(L3)=0.55 *10*, Ice(L2)=0.79 *15* and α(L3)=12.4, α(L2)=16.1. Ice(M2)=0.15 4.
[x]107.120 *7*									Additional information 1. Ice(L1)=0.27 *6*.
[x]159.22[b] *5*	0.40[d] *12*								
172.072 *13*	0.07 *2*	279.40	(7/2)$^+$	107.34	(9/2$^+$)				
182.12[h] *3*	0.09 *3*	721.84	3/2$^+$	539.61	(1/2)$^-$	[E1]		0.119	
182.12[h]		768.18	(1/2,3/2)$^+$	586.135	3/2$^-$				
201.677 *20*	0.12 *3*	741.32	(3/2)$^-$	539.61	(1/2)$^-$	M1(+E2)	0.5 *5*	2.3 *4*	α(K)exp=1.77; α(L1)exp=0.25 Mult.: 1979Je01 quote M1. Ice(K)=0.21 *4*, Ice(L1)=0.030 *7*.
211.869 *6*	0.30 *4*	262.24	(5/2)$^+$	50.38	(7/2)$^+$	M1		2.345	α(K)exp=1.71; α(L1)exp=0.52 Ice(K)=0.52 *8*, Ice(L1)=0.16 *3*.
229.017 *7*	0.31 *5*	279.40	(7/2)$^+$	50.38	(7/2)$^+$	M1		1.89	α(K)exp=1.12; α(L1)exp=0.143 Mult.: 1979Je01 quote M1(+E2). Ice(K)=0.34 *5*, Ice(L1)=0.044 *13*.
230.784 *6*	0.14 *3*	842.26	(1/2,3/2)$^+$	611.476	(3/2)$^+$	M1+E2	1.1 *5*	1.1 *4*	α(K)exp=0.78 Ice(K)=0.105 *25*.

$^{233}_{90}$Th$_{143}$-3

γ(^{233}Th) (continued)

E_γ [†‡]	I_γ [cf]	E_i(level)	J^π_i	E_f	J^π_f	Mult. [e]	δ	α [g]	Comments
[x]232.13 *3*	0.08 *2*								
[x]233.279 *6*	0.14 *2*					M1		1.80	α(K)exp=1.38; α(L1)exp=0.101 Ice(K)=0.20 *4*, Ice(L1)=0.014 *6*.
236.808 *21*	0.12 *3*	572.70	(3/2)$^-$	335.928	3/2$^+$	E1		0.0641	α(K)exp<0.048 Ice(K)<0.012.
[x]249.677 *13*									Mult.: (M1) (1979Je01). Ice(K)=0.12 *3*.
256.190 *4*	1.77 *22*	262.24	(5/2)$^+$	6.04	(5/2)$^+$	M1		1.38	α(K)exp=0.97; α(L1)exp=0.160; α(L2)exp=0.021; α(M1)exp=0.031 Ice(K)=1.72 *26*, Ice(L1)=0.28 *7*, Ice(L2)=0.04 *2*, Ice(M1)=0.054 *9*.
258.335 *16*	0.16 *4*	842.26	(1/2,3/2)$^+$	583.932	(1/2)$^+$	[M1]		1.35	Only the K line of this transition was observed with Ice(K)=0.18 *5*. I_γ: deduced from Ice(K) and α(K)=1.08, if M1.
[x]260.22[b] *8*	0.05 *2*								
263.02 *3*	0.14 *2*	741.32	(3/2)$^-$	478.36	(5/2)$^-$	M1(+E2)	0.5 *5*	1.08 *20*	α(K)exp=0.88; α(L1)exp=0.067 Ice(K)=0.12 *3*, Ice(L1)=0.009 *4*.
[x]267.71[b] *20*	0.04 *2*								
[x]269.69[b] *9*	0.03 *2*								
277.549[h] *10*	0.27 *4*	371.17	(5/2)$^+$	93.62	7/2$^+$	M1		1.10	α(K)exp=0.79; α(L1)exp=0.26; α(L2)exp=0.066 Ice(K)=0.21 *4*, Ice(L1)=0.070 *12*, Ice(L2)=0.018 *3*.
277.549[hi]		861.54	1/2$^+$,3/2$^+$	583.932	(1/2)$^+$				
[x]278.19[b] *4*	0.17[d] *3*								
281.365 *13*	0.31 *4*	335.928	3/2$^+$	54.546	5/2$^+$	M1		1.06	α(K)exp=0.84 Ice(K)=0.26 *4*.
286.2[bi] *4*	0.05 *5*	337.35	(5/2,7/2)$^+$	50.38	(7/2)$^+$				
[x]297.08 *5*	0.09 *3*								α(K)exp=0.25 Mult.: M1+E2 from α(K)exp. Ice(K)=0.023 *23*.
[x]298.81[b] *15*	0.06 *2*								
[x]300.43 *2*									Mult.: (M1) (1979Je01). Ice(K)=0.13 *3*; assignment to ^{233}Th uncertain.
[x]306.91 *4*	0.08 *2*								
313.814[i] *17*	0.18 *4*	421.15	(7/2)$^+$	107.34	(9/2$^+$)	[M1]		0.788	I_γ: deduced from Ice(K)=0.113 *20* and α(K)=0.631, if M1.
316.642 *7*	0.76 *8*	371.17	(5/2)$^+$	54.546	5/2$^+$	M1		0.769	α(K)exp=0.59; α(L1)exp=0.070; α(M1)exp=0.025 Ice(K)=0.45 *7*, Ice(L1)=0.053 *9*, Ice(M1)=0.019 *6*.
319.067 *3*	1.43 *14*	335.928	3/2$^+$	16.86	3/2$^+$	M1		0.753	α(K)exp=0.61; α(L1)exp=0.086; α(L2)exp=0.012; α(M1)exp=0.018 Ice(K)=0.86 *13*, Ice(L1)=0.123 *21*, Ice(L2)=0.017 *3*, Ice(M1)=0.025 *4*.
320.79 *3*	0.10 *2*	371.17	(5/2)$^+$	50.38	(7/2)$^+$	M1		0.742	α(K)exp=0.80; α(L1)exp=0.066 Ice(K)=0.077 *13*, Ice(L1)=0.0060 *23*.

From ENSDF

$^{233}_{90}$Th$_{143}$-4

γ(^{233}Th) (continued)

E_γ[†‡]	I_γ[cf]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[e]	δ	α[g]	Comments
327.527 *9*	0.19 *2*	421.15	(7/2)$^+$	93.62	7/2$^+$	M1+E2	0.65 *35*	0.53 *11*	α(K)exp=0.42; α(L1)exp=0.085 Ice(K)=0.077 *15*, Ice(L1)=0.016 *3*.
329.879 *7*	0.40 *4*	335.928	3/2$^+$	6.04	(5/2)$^+$	M1		0.687	α(K)exp=0.51; α(L1)exp=0.034 Ice(K)=0.21 *3*, Ice(L1)=0.014 *3*.
331.314 *4*	0.54 *6*	337.35	(5/2,7/2)$^+$	6.04	(5/2)$^+$	M1		0.679	α(K)exp=0.49; α(L1)exp=0.071; α(M1)exp=0.016 Ice(K)=0.26 *4*, Ice(L1)=0.038 *8*, Ice(M1)=0.008 *3*.
335.928 *3*	1.54 *17*	335.928	3/2$^+$	0.0	1/2$^+$	M1		0.654	α(K)exp=0.55; α(L1)exp=0.086; α(L2)exp=0.013 Ice(K)=0.85 *13*, Ice(L1)=0.133 *20*, Ice(L2)=0.020 *4*.
[x]343.34 *5*	0.08 *2*								
[x]346.0[b] *3*	0.03 *2*								
[x]351.73[b] *10*	0.06 *2*								
354.313 *4*	0.72 *9*	371.17	(5/2)$^+$	16.86	3/2$^+$	M1		0.566	α(K)exp=0.46; α(L1)exp=0.055; α(M1)exp=0.026 Ice(K)=0.33 *5*, Ice(L1)=0.039 *8*, Ice(M1)=0.019 *4*.
[x]358.86 *4*	0.060 *12*								
[x]361.8[b] *2*	0.09[d] *3*								
365.113 *15*	0.09 *2*	371.17	(5/2)$^+$	6.04	(5/2)$^+$	M1+E2	1.3 *5*	0.26 *10*	α(K)exp=0.200 Ice(K)=0.017 *3*.
366.622 *13*	0.10 *2*	421.15	(7/2)$^+$	54.546	5/2$^+$	M1		0.516	α(K)exp=0.69 Ice(K)=0.070 *12*. Mult.: 1979Je01 quote M1(+E2).
370.15 *5*	0.08 *2*	741.32	(3/2)$^-$	371.17	(5/2)$^+$				
[x]381.36 *4*	0.10 *2*								
384.94 *3*	0.07 *2*	924.58	(3/2)$^-$	539.61	(1/2)$^-$	M1+E2	1.0 *5*	0.27 *11*	α(K)exp=0.201 Ice(K)=0.0140 *25*.
[x]402.53[b] *20*	0.07[d] *2*								
[x]405.439 *14*	0.19 *3*					(E2)		0.0731	α(K)exp=0.053 Ice(K)=0.010 *3*.
[x]409.90 *7*	0.020 *4*								
412.47[i] *7*	0.020 *4*	783.64?	(1/2$^+$,3/2$^+$)	371.17	(5/2)$^+$				
427.31 *3*	0.08 *2*	1013.1	1/2$^-$,3/2$^-$	586.135	3/2$^-$	(M1+E2)		0.108 *45*	α: α(K)exp=0.075 *31* suggests a large E2 admixture with %E2/%M1=5.2 *+61−28*; the uncertainty on the corresponding conversion coefficient is increased to include pure E2 multipolarity. Ice(K)=0.0060 *23*.
[x]431.38 *7*	0.08 *2*								
432.250[h] *20*	0.09 *2*	768.18	(1/2,3/2)$^+$	335.928	3/2$^+$	M1+E2	0.6 *4*	0.26 *6*	α(K)exp=0.191; α(L1)exp=0.083 Ice(K)=0.018 *3*, Ice(L1)=0.0080 *22*.
432.250[h]		803.41	(5/2)$^+$	371.17	(5/2)$^+$				
[x]449.31 *12*	0.050 *17*								
[x]455.50 *4*	0.070 *12*								
[x]456.27 *5*	0.09 *2*								
[x]456.68 *8*	0.060 *15*								

γ(^{233}Th) (continued)

E_γ [†‡]	I_γ [cf]	E_i(level)	J^π_i	E_f	J^π_f	Mult. [e]	α [g]	Comments
^{x}464.963 5	0.48 6					M1	0.271	α(K)exp=0.193; α(L1)exp=0.036 Ice(K)=0.092 14, Ice(L1)=0.017 3.
^{x}469.28 4	0.070 14							
471.28 9	0.12 3	842.26	(1/2,3/2)$^+$	371.17	(5/2)$^+$			
472.300 5	2.9 3	478.36	(5/2)$^-$	6.06	(7/2)$^-$	M1	0.260	α(K)exp=0.163; α(L1)exp=0.031; α(L2)exp=0.004; α(M1)exp=0.006 Ice(K)=0.48 8, Ice(L1)=0.091 14, Ice(L2)=0.011 2, Ice(M1)=0.017 3.
^{x}487.836 20	0.34 4					(M1+E2)	0.14 10	α(K)exp=0.074 Ice(K)=0.025 4.
506.25 5	0.14 3	842.26	(1/2,3/2)$^+$	335.928	3/2$^+$			
521.66 3	0.15 6	628.97	(5/2)$^+$	107.34	(9/2$^+$)	(E2)	0.0391	α(K)exp=0.052 Ice(K)=0.0080 21.
522.757 6	1.81 20	539.61	(1/2)$^-$	16.86	3/2$^+$	E1	0.0116	α(K)exp=0.009 Ice(K)=0.016 4.
^{x}526.63 3	0.15 2					(E2)		α(K)exp=0.036 Mult.: E2+M1 (1979Je01). Ice(K)=0.006 2.
^{x}529.91 5	0.13 3					(M1+E2)		α(K)exp=0.087 Ice(K)=0.011 4.
531.582 11	0.76 9	586.135	3/2$^-$	54.546	5/2$^+$	(E1)	0.0112	α(K)exp=0.014 Ice(K)=0.0100 25.
535.28 3	0.14 3	628.97	(5/2)$^+$	93.62	7/2$^+$	E2	0.0368	α(K)exp=0.027 Ice(K)=0.0040 19.
539.599 9	1.16 12	539.61	(1/2)$^-$	0.0	1/2$^+$	E1	0.0109	α(K)exp=0.003 Ice(K)=0.004 4.
541.21 5	0.08 2	803.41	(5/2)$^+$	262.24	(5/2)$^+$			
^{x}542.97 3	0.13 2							α(K)exp<0.029 Mult.: E1 or E2 from α(K)exp. Ice(K)<0.008.
^{x}548.179 12	0.77 9					(M1+E2)	0.10 7	α(K)exp=0.055 Ice(K)=0.042 7.
548.95 13	0.13 2	884.94	1/2$^+$,3/2$^+$,5/2$^+$	335.928	3/2$^+$	M1		α(K)exp=0.117 Ice(K)=0.016 4.
553.39 3	0.14 3	924.58	(3/2)$^-$	371.17	(5/2)$^+$			α(K)exp=0.025 Mult.: E1 or E2 from α(K)exp. Ice(K)=0.004 3.
556.931 19	0.76 8	611.476	(3/2)$^+$	54.546	5/2$^+$	M1	0.167	α(K)exp=0.102; α(L1)exp=0.019 Ice(K)=0.077 13, Ice(L1)=0.015 5.
561.088 17	0.63 7	611.476	(3/2)$^+$	50.38	(7/2)$^+$			
^{x}564.563 20	0.76 9					(E1)	0.0100	α(K)exp<0.013 Ice(K)<0.020.
566.630 7	3.8 4	572.70	(3/2)$^-$	6.06	(7/2)$^-$	E2	0.0323	α(K)exp=0.016; α(L1)exp=0.003; α(L2)exp=0.003 Ice(K)=0.062 10, Ice(L1)=0.012 3, Ice(L2)=0.012 3.

$^{233}_{90}$Th$_{143}$-6

γ(^{233}Th) (continued)

E_γ [†‡]	I_γ [cf]	E_i(level)	J^π_i	E_f	J^π_f	Mult. [e]	α [g]	Comments
569.19 *5*	0.19 *3*	586.135	3/2$^-$	16.86	3/2$^+$			
574.37 *9*	0.13 *2*	628.97	(5/2)$^+$	54.546	5/2$^+$	M1	0.154	α(K)exp=0.191; α(L1)exp=0.040 Ice(K)=0.025 *4*, Ice(L1)=0.0050 *21*.
577.888 *6*	1.8 *3*	583.932	(1/2)$^+$	6.04	(5/2)$^+$	(E2)	0.0309	α(K)exp=0.014 Mult.: E1 or E2 from α(K)exp; ΔJ^π requires E2. Ice(K)=0.027 *4*.
578.607 *17*	0.41 *6*	628.97	(5/2)$^+$	50.38	(7/2)$^+$	[E2]	0.0309	α(K)exp<0.012 Mult.: (E1) from α(K)exp. Ice(K)<0.010.
579.99 *3*	0.22 *3*	842.26	(1/2,3/2)$^+$	262.24	(5/2)$^+$	(E2)	0.0307	α(K)exp<0.022 Mult.: E1 or E2 from α(K)exp; ΔJ^π requires E2. Ice(K)<0.010.
582.44 *7*	0.16 *5*	599.29?	(5/2$^-$)	16.86	3/2$^+$			
^{x}583.068 *16*	0.53 *6*					(E2)	0.0303	α(K)exp=0.028 Ice(K)=0.015 *3*. Mult.: E2(+M1) (1979Je01).
583.932 *8*	1.02 *10*	583.932	(1/2)$^+$	0.0	1/2$^+$	M1	0.147	α(K)exp=0.128; α(L1)exp=0.025 Ice(K)=0.131 *20*, Ice(L1)=0.025 *5*.
^{x}585.56 *8*	0.16 *5*							
586.140 *7*	0.78 *9*	586.135	3/2$^-$	0.0	1/2$^+$	E1	0.00928	α(K)exp<0.004 Ice(K)<0.006.
588.72 *12*	0.20 *4*	924.58	(3/2)$^-$	335.928	3/2$^+$			
590.04 *16*	0.09 *3*	852.28	1/2$^+$,3/2,5/2$^+$	262.24	(5/2)$^+$			
593.21 *4*	0.77 *9*	599.29?	(5/2$^-$)	6.06	(7/2)$^-$	(E2)	0.0292	α(K)exp=0.018 Ice(K)=0.013 *4*.
^{x}595.34 *7*	0.16 *3*							
^{x}599.08 *4*	0.24 *4*					(E1)	0.0089	α(K)exp<0.012 Ice(K)<0.006.
^{x}602.23 *5*	0.21 *4*							α(K)exp<0.015 Mult.: E1 or E2 from α(K)exp. Ice(K)<0.006.
605.442 *13*	0.99 *10*	611.476	(3/2)$^+$	6.04	(5/2)$^+$			
612.10 *3*	0.38 *5*	628.97	(5/2)$^+$	16.86	3/2$^+$	M1	0.130	α(K)exp=0.098; α(L1)exp=0.030 Ice(K)=0.037 *6*, Ice(L1)=0.0110 *25*.
^{x}617.8[b] *5*	0.08[d] *6*							
622.95 *6*	0.20 *3*	628.97	(5/2)$^+$	6.04	(5/2)$^+$	(E2)	0.0262	α(K)exp<0.015 Mult.: E1 or E2 from α(K)exp. Ice(K)<0.006.
^{x}627.20 *3*	0.72 *10*					(E1)	0.0081	α(K)exp<0.004 Ice(K)<0.006.
628.38 *8*	0.21 *3*	721.84	3/2$^+$	93.62	7/2$^+$	(E2)	0.0258	α(K)exp=0.022 Ice(K)=0.005 *3*. Mult.: 1979Je01 quote E2(+M1).
^{x}629.79 *4*	0.16 *3*							

$^{233}_{90}Th_{143}$-7

γ(^{233}Th) (continued)

E_γ [†‡]	I_γ [cf]	E_i(level)	J^π_i	E_f	J^π_f	Mult. [e]	α [g]	$I_{(\gamma+ce)}$ [f]	Comments
[x]631.74 *7*	0.13 *3*								
632.47 *9*	0.09 *3*	968.1	(1/2,3/2)$^+$	335.928	3/2$^+$	M1	0.119		α(K)exp=0.146 Ice(K)=0.014 *3*.
[x]638.10 *9*	0.09 *2*								
[x]642.07 *8*	0.27 *4*					(E1)	0.0078		α(K)exp<0.012 Ice(K)<0.006.
[x]647.70 *9*	0.11 *2*								
[x]649.2[b] *4*	0.08[d] *3*								
[x]658.23 *9*	0.18 *4*								
[x]659.30 *8*	0.22 *4*								α(K)exp<0.014 Mult.: E1 or E2 from α(K)exp. Ice(K)<0.006.
660.49 *13*	0.10 *3*	711.19	(5/2)$^+$	50.38	(7/2)$^+$				
661.88[i] *6*	0.14 *3*	924.58	(3/2)$^-$	262.24	(5/2)$^+$				
665.252 *17*	1.42 *14*	682.11	(3/2$^-$)	16.86	3/2$^+$	[E1]	0.0073		Mult.: E2 from α(K)exp=0.012 listed by 1979Je01; however, E1 was assigned by them, and the level scheme also suggests the same. The I(ce) intensity given could be a misprint. Ice(K)=0.017 *4*.
[x]667.47 *4*	0.29 *5*					(M1)			α(K)exp=0.075 Ice(K)=0.022 *4*.
676.02[i] *9*	0.07 *2*	682.11	(3/2$^-$)	6.04	(5/2)$^+$				
681.846[i] *19*	1.62 *18*	681.846?	(1/2)$^-$	0.0	1/2$^+$	E1	0.0069		α(K)exp=0.006 Ice(K)=0.0090 *23*.
684.97 *4*	0.24 *3*	947.2	(3/2$^-$)	262.24	(5/2)$^+$				α(K)exp<0.013 Mult.: E1 or E2 from α(K)exp. Ice(K)<0.006.
[x]686.38 *10*	0.07 *2*								
[x]691.81 *10*	0.06 *2*					(M1)	0.094		α(K)exp=0.094 Ice(K)=0.0060 *24*.
694.40 *7*	0.10 *2*	711.19	(5/2)$^+$	16.86	3/2$^+$				
696.85 *4*	0.32 *5*	713.72	1/2$^+$	16.86	3/2$^+$				α(K)exp<0.010 Mult.: E1 or E2 from α(K)exp. Ice(K)<0.006.
[x]701.8[b] *4*	0.15[d] *3*								
703.61 *4*	0.12 *4*	753.98	(7/2)$^+$	50.38	(7/2)$^+$	E0+M1(+E2)	≈0.33		α(K)exp=0.200 Ice(K)=0.024 *5*. Mult.: if probable E2 contribution is ignored, then E0 admixture is about 17%. 1979Je01 deduced 20%.
704.978 *22*	0.45 *7*	721.84	3/2$^+$	16.86	3/2$^+$	E0+M1(+E2)		≈0.65	α(K)exp=0.82 I_γ: may include Iγ(705.158γ); in this case, if Iγ(705.158γ) is ≈0.11, then Iγ(704.978γ)≈0.34. $I_{(\gamma+ce)}$: from 1979Je01, as shown on their decay scheme.

$^{233}_{90}Th_{143}$-8

γ(^{233}Th) (continued)

E_γ [†‡]	I_γ [cf]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [e]	δ	α [g]	$I_{(\gamma+ce)}$ [f]	Comments
										1979Je01 deduced E0 contribution as 60%. Ice(K)=0.37 *9*.
705.158 *20*		711.19	(5/2)$^+$	6.04	(5/2)$^+$	E0+M1(+E2)			≈0.52	α(K)exp=0.58; α(L1)exp=0.30; α(L2)exp=0.033; α(M1)exp=0.067 Measured Ice: K:L1:L2:M1=0.26 *6*:0.135 *21*:0.015 *6*:0.030 *5*. I_γ: no photon intensity for this transition was listed by 1979Je01; however, 60% E0, 40% M1(+E2) admixture was deduced, presumably from their Ice and unlisted Iγ. The listed Iγ(704.978γ) might be Iγ(704.978γ)+Iγ(705.158γ). I(γ+ce)=0.52 shown on their decay scheme yields Iγ≈0.11. Ice(K)=0.26 *5*, Ice(L1)=0.135 *20*, Ice(L2)=0.015 *6*, Ice(M1)=0.030 *5*.
^{x}705.626 *17*	0.35 *6*					(M1)				α(K)exp=0.093 Ice(K)=0.033 *7*.
^{x}707.35 *6*	0.13 *3*									
711.18 *6*	0.09 *2*	711.19	(5/2)$^+$	0.0	1/2$^+$					
713.719 *16*	0.44 *7*	713.72	1/2$^+$	0.0	1/2$^+$	E0+M1	0.94 *26*	1.05 *22*		α(K)exp=0.81; α(L1)exp=0.173; α(M1)exp=0.036 α: from the measured Ice(K), Ice(L1) and Iγ. δ: the E0 admixture is 47 *12*%, if E2 admixture is negligible. Ice(K)=0.36 *5*, Ice(L1)=0.076 *11*, Ice(M1)=0.016 *3*.
^{x}714.38 *3*	0.24 *4*					(M1)				α(K)exp=0.096 Ice(K)=0.023 *7*.
715.058 *21*	0.36 *7*	769.60	5/2$^+$	54.546	5/2$^+$	E0+M1(+E2)		≈0.58		α(K)exp=0.43; α(L1)exp=0.102 Ice(K)=0.156 *25*, Ice(L1)=0.037 *6*. Mult.: measured Iγ and I(ce) suggest an E0 admixture of about 23%, if the probable E2 admixture is ignored. Ice(K)=0.156 *25*, Ice(L1)=0.037 *6*.
721.95 *6*	0.17 *4*	721.84	3/2$^+$	0.0	1/2$^+$	M1+E2	0.9 *5*	0.057 *18*		α(K)exp=0.040 Ice(K)=0.0070 *20*.
^{x}725.48 *3*	0.37 *5*					(M1+E2)		0.05 *3*		α(K)exp=0.036 Ice(K)=0.013 *3*.
735.30 *4*	0.26 *4*	741.32	(3/2)$^-$	6.04	(5/2)$^+$					
741.22 *10*	0.26 *4*	741.32	(3/2)$^-$	0.0	1/2$^+$					
747.76 *14*	0.07 *3*	753.98	(7/2)$^+$	6.04	(5/2)$^+$					
751.25 *8*	0.13 *3*	768.18	(1/2,3/2)$^+$	16.86	3/2$^+$					
752.62 *6*	0.17 *3*	769.60	5/2$^+$	16.86	3/2$^+$	M1		0.0754		α(K)exp=0.068 Ice(K)=0.012 *3*.

From ENSDF

γ(^{233}Th) (continued)

E_γ[†‡]	I_γ[cf]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[e]	α[g]	Comments
^{x}754.75 11	0.08 2							
^{x}764.98 11	0.14 3							
769.83 9	0.12 3	769.60	5/2$^+$	0.0	1/2$^+$			
777.71[i] 13	0.08 3	783.64?	(1/2$^+$,3/2$^+$)	6.04	(5/2)$^+$			
780.77 12	0.09 3	1151.72	(3/2,5/2)$^+$	371.17	(5/2)$^+$	M1+E2	0.042 26	α(K)exp=0.035 Mult.: M1 (1979Je01). Ice(K)=0.003 3.
786.45 13	0.11 3	803.41	(5/2)$^+$	16.86	3/2$^+$	M1	0.0672	α(K)exp=0.094 Ice(K)=0.010 3.
^{x}788.14 10	0.14 3							
^{x}793.89 9	0.16 5							
797.25 6	0.44 9	803.41	(5/2)$^+$	6.04	(5/2)$^+$	(M1)	0.0647	α(K)exp=0.029 I_γ: deduced from measured Ice(K)=0.023 5 and α(K)=0.052. Iγ(797.25)+Iγ(798.08)=0.80 12 was measured. Ice(K)=0.023 5.
798.08 8	0.31 8	814.74	3/2$^+$	16.86	3/2$^+$	(M1)	0.0672	α(K)exp=0.020; α(L1)exp=0.011 I_γ: deduced from measured Ice(K)=0.016 2 and α(K)=0.052. Ice(K)=0.016 4, Ice(L1)=0.009 3.
^{x}806.44 13	0.10 3					(M1+E2)	0.039 24	α(K)exp=0.033 Ice(K)=0.0030 15.
808.71 13	0.45 5	814.74	3/2$^+$	6.04	(5/2)$^+$	M1+E2		α(K)exp=0.041 Ice(K)=0.019 3.
814.74 13	0.49 7	814.74	3/2$^+$	0.0	1/2$^+$	M1+E2		α(K)exp=0.033 Ice(K)=0.016 3.
825.37 14	0.16 4	842.26	(1/2,3/2)$^+$	16.86	3/2$^+$			
^{x}826.77 7	0.35 6							α(K)exp=0.016 Mult.: (M1+E2) from α(K)exp. Ice(K)=0.006 6.
^{x}828.67 5	0.46 7							α(K)exp=0.017 Mult.: (M1+E2) from α(K)exp. Ice(K)=0.008 8.
830.41 7	0.38 6	884.94	1/2$^+$,3/2$^+$,5/2$^+$	54.546	5/2$^+$	(E2)		α(K)exp$<$0.009 Mult.: E1 or E2 from α(K)exp; ΔJ^π requires E2. Ice(K)$<$0.006.
^{x}832.09 8	0.40 6							α(K)exp=0.009 Mult.: E1 or E2 from α(K)exp. Ice(K)$<$0.006.
833.63 7	0.65 10	839.66?	(3/2$^-$)	6.04	(5/2)$^+$			α(K)exp$<$0.007 Mult.: E1 or E2 from α(K)exp. Ice(K)$<$0.010.
835.05[h]		852.28	1/2$^+$,3/2,5/2$^+$	16.86	3/2$^+$			
835.05[h] 7	0.56 9	1313.41	(3/2)$^-$	478.36	(5/2)$^-$	M1+E2		α(K)exp=0.034; α(L1)exp=0.017 Ice(K)=0.019 4, Ice(L1)=0.009 3.

γ(^{233}Th) (continued)

E_γ[†‡]	I_γ[cf]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[e]	α[g]	Comments
x836.65 *7*	0.34 *6*							α(K)exp<0.010 Mult.: E1 or E2 from α(K)exp. Ice(K)<0.006.
839.5[b] *4*	0.11[d] *3*	839.66?	$(3/2^-)$	0.0	$1/2^+$			
842.47 *18*	0.09 *3*	842.26	$(1/2,3/2)^+$	0.0	$1/2^+$			
844.55 *12*	0.15 *4*	861.54	$1/2^+,3/2^+$	16.86	$3/2^+$			
x846.93 *10*	0.29 *4*					(M1+E2)		α(K)exp=0.022 Ice(K)=0.0060 *24*.
850.01 *8*	0.16 *4*	1185.5	$(3/2^+)$	335.928	$3/2^+$			α(K)exp=0.022 Mult.: (M1+E2) from α(K)exp. Ice(K)=0.003 *3*.
x853.25 *9*	0.19 *4*							
x860.01 *15*	0.17 *4*							
861.64 *10*	0.24 *5*	861.54	$1/2^+,3/2^+$	0.0	$1/2^+$	M1		α(K)exp=0.058 Ice(K)=0.014 *3*.
869.87 *8*	0.26 *5*	1132.11	$(3/2)^+$	262.24	$(5/2)^+$	M1+E2	0.032 *20*	α(K)exp=0.022 Ice(K)=0.006 *3*.
872.34 *15*	0.41 *11*	1350.7	$(3/2)^-$	478.36	$(5/2)^-$	M1		α(K)exp=0.043 Ice(K)=0.018 *3*.
x875.03 *10*	0.21 *4*					(M1)		α(K)exp=0.043 Ice(K)=0.009 *3*.
x883.43 *20*	0.08 *3*							
x885.74 *13*	0.14 *4*					(M1)		α(K)exp=0.050 Ice(K)=0.007 *3*.
x890.36 *10*	0.26 *5*							
x891.74 *10*	0.34 *8*					(M1+E2)		α(K)exp=0.014 Ice(K)=0.005 *5*.
x903.3[b] *4*	0.06[d] *2*							
907.42 *13*	0.20 *4*	924.58	$(3/2)^-$	16.86	$3/2^+$			
913.63 *10*	0.20 *4*	968.1	$(1/2,3/2)^+$	54.546	$5/2^+$			
918.68 *7*	0.28 *5*	924.58	$(3/2)^-$	6.04	$(5/2)^+$			
x928.4[b] *5*	0.05[d] *2*							
940.53[i] *12*	0.31 *6*	947.2	$(3/2^-)$	6.06	$(7/2)^-$			E_γ: 941.2 from level scheme.
x942.83 *11*	0.33 *6*							
947.2[b] *4*	0.08[d] *2*	947.2	$(3/2^-)$	0.0	$1/2^+$			
951.4[b] *4*	0.09[d] *3*	968.1	$(1/2,3/2)^+$	16.86	$3/2^+$	(M1)		α(K)exp=0.063 Ice(K)=0.0050 *25*.
x956.99 *11*								α(K)exp=0.067 E_γ: from E(ce(K)) (1979Je01). Mult.: M1 from α(K)exp. Ice(K)=0.007 *3*.
x958.05 *11*								α(K)exp=0.086 Mult.: M1 from α(K)exp.

$^{233}_{90}$Th$_{143}$-11

γ(^{233}Th) (continued)

E_γ [†‡]	I_γ [cf]	E_i(level)	J^π_i	E_f	J^π_f	Mult. [e]	Comments
							Ice(K)=0.009 *3*. E_γ: from E(ce(K)) (1979Je01). Iγ(956.99γ)+Iγ(958.05γ)=0.10 *2*, measured by 1972Vo08.
967.13[i] *6*	0.40 *8*	968.1	(1/2,3/2)$^+$	0.0	1/2$^+$	M1(+E2)	α(K)exp=0.026 Ice(K)=0.0100 *22*.
[x]970.16 *9*	0.28 *5*						
[x]977.11 *17*	0.48 *9*					M1+E2	α(K)exp=0.015 Ice(K)=0.007 *3*.
[x]979.78[b] *24*	0.22[d] *3*						
[x]990.88 *27*	0.28 *5*					(M1)	α(K)exp=0.025 Ice(K)=0.007 *3*.
996.15[h] *23*	0.16 *5*	1013.1	1/2$^-$,3/2$^-$	16.86	3/2$^+$		
996.15[h]		1051.5	(3/2)$^-$	54.546	5/2$^+$		
[x]1001.9[b] *3*	0.11[d] *3*						
[x]1004.26 *13*	0.24 *5*						
1012.97 *11*	0.75 *14*	1013.1	1/2$^-$,3/2$^-$	0.0	1/2$^+$	E1	α(K)exp<0.003 Ice(K)<0.004.
1014.85 *11*	0.79 *15*	1031.6	1/2$^-$,3/2$^-$	16.86	3/2$^+$	(E1)	α(K)exp<0.005 Mult.: E1 or E2 from α(K)exp; E1 from ΔJ^π. Ice(K)<0.008.
[x]1022.6[b] *3*	0.47[d] *9*						
[x]1023.62 *5*	0.75 *16*						
1031.1[b] *4*	0.09[d] *3*	1031.6	1/2$^-$,3/2$^-$	0.0	1/2$^+$		
1034.27 *7*	0.39 *10*	1051.5	(3/2)$^-$	16.86	3/2$^+$		
1044.68 *13*	0.24 *5*	1061.43	(1/2$^+$,3/2$^+$)	16.86	3/2$^+$		
1052.11 *19*	0.22 *5*	1051.5	(3/2)$^-$	0.0	1/2$^+$		
1055.39 *14*	0.24 *5*	1061.43	(1/2$^+$,3/2$^+$)	6.04	(5/2)$^+$		
[x]1062.34 *12*	0.27 *5*					(M1)	α(K)exp=0.034 Ice(K)=0.0090 *22*.
[x]1064.3[b] *8*	0.06[d] *3*						
[x]1073.91 *7*	0.54 *8*						α(K)exp<0.007 Mult.: E1 or E2 from α(K)exp. Ice(K)<0.008.
1081.4[b] *4*	0.09[d] *3*	1132.11	(3/2)$^+$	50.38	(7/2)$^+$		
[x]1084.6[b] *5*	0.07[d] *3*						
1091.1[b] *7*	0.03[d] *2*	1185.5	(3/2$^+$)	93.62	7/2$^+$		
1097.2[b] *3*	0.18[d] *3*	1151.72	(3/2,5/2)$^+$	54.546	5/2$^+$		
1101.15 *10*	0.39 *7*	1151.72	(3/2,5/2)$^+$	50.38	(7/2)$^+$		α(K)exp=0.019 Mult.: (M1) from α(K)exp. Ice(K)=0.008 *8*.
[x]1105.5[b] *3*	0.14[d] *4*						

$^{233}_{90}$Th$_{143}$-12

γ(^{233}Th) (continued)

E_γ[†‡]	I_γ[cf]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[e]	Comments
[x]1109.4[b] *3*	0.14[d] *4*						
1117.7 *3*	0.18 *6*	1171.2	3/2$^-$	54.546	5/2$^+$		
1125.7[b] *3*	0.19[d] *3*	1132.11	(3/2)$^+$	6.04	(5/2)$^+$		
[x]1128.9[b] *3*	0.11[d] *3*						
[x]1133.75 *19*	0.24 *6*						
1145.66 *21*	0.20 *5*	1151.72	(3/2,5/2)$^+$	6.04	(5/2)$^+$	M1	α(K)exp=0.036 Ice(K)=0.007 *3*.
1151.7[b] *4*	0.15[d] *4*	1151.72	(3/2,5/2)$^+$	0.0	1/2$^+$		
1154.3[b] *4*	0.15[d] *3*	1171.2	3/2$^-$	16.86	3/2$^+$		
[x]1158.0[b] *3*	0.15[d] *3*						
1164.2[bi] *3*	0.26[d] *3*	1171.2	3/2$^-$	6.04	(5/2)$^+$		
[x]1166.8[b] *4*	0.12[d] *3*						
[x]1171.33 *15*	0.17[d] *3*					(M1)	α(K)exp=0.039 Ice(K)=0.0060 *26*.
[x]1176.53 *13*	0.26[d] *3*					(M1)	α(K)exp=0.028 Ice(K)=0.007 *3*.
1185.1[b] *3*	0.16[d] *3*	1185.5	(3/2$^+$)	0.0	1/2$^+$		
[x]1188.7[b] *6*	0.07[d] *3*						
[x]1196.5[b] *3*	0.26[d] *3*						
[x]1207.9[b] *5*	0.08[d] *3*						
[x]1212.2[b] *4*	0.10[d] *3*						
2485.7 *5*	0.60 *13*	(4786.39)	1/2$^+$	2300.6	1/2,3/2,5/2$^+$		
2503.7 *5*	0.70 *13*	(4786.39)	1/2$^+$	2282.6	1/2,3/2		
2524.8 *5*	0.59 *13*	(4786.39)	1/2$^+$	2261.5	1/2,3/2,5/2$^+$		
2542.4 *6*	0.49 *18*	(4786.39)	1/2$^+$	2244.0	1/2,3/2,5/2$^+$		
2545.4 *5*	0.57 *16*	(4786.39)	1/2$^+$	2240.9	1/2,3/2,5/2$^+$		
2551.9 *5*	0.60 *11*	(4786.39)	1/2$^+$	2234.4	1/2,3/2,5/2$^+$		
2558.2 *5*	0.47 *12*	(4786.39)	1/2$^+$	2228.1	1/2,3/2,5/2$^+$		
2591.0 *5*	0.50 *13*	(4786.39)	1/2$^+$	2195.3	1/2,3/2,5/2$^+$		
2596.9 *3*	0.79 *11*	(4786.39)	1/2$^+$	2189.4	1/2,3/2		
2606.7 *6*	0.53 *14*	(4786.39)	1/2$^+$	2179.6	1/2,3/2,5/2$^+$		
2610.0 *5*	0.61 *16*	(4786.39)	1/2$^+$	2176.3	1/2,3/2,5/2$^+$		
2630.1 *4*	0.57 *13*	(4786.39)	1/2$^+$	2156.2	1/2,3/2,5/2$^+$		
2636.2 *6*	0.41 *12*	(4786.39)	1/2$^+$	2150.1	1/2,3/2,5/2$^+$		
2641.2 *4*	0.79 *13*	(4786.39)	1/2$^+$	2145.1	1/2,3/2		
2653.4 *3*	1.00 *12*	(4786.39)	1/2$^+$	2132.9	1/2,3/2		
2659.5 *3*	0.98 *15*	(4786.39)	1/2$^+$	2126.8	1/2,3/2		
2671.8 *4*	0.66 *12*	(4786.39)	1/2$^+$	2114.5	1/2,3/2,5/2$^+$		
2689.1 *5*	0.45 *13*	(4786.39)	1/2$^+$	2097.2	1/2,3/2,5/2$^+$		

γ(^{233}Th) (continued)

E_γ[†‡]	I_γ[cf]	E_i(level)	J_i^π	E_f	J_f^π	E_γ[†‡]	I_γ[cf]	E_i(level)	J_i^π	E_f	J_f^π
2703.2[@] 4	0.84 15	(4786.39)	$1/2^+$	2083.1	1/2,3/2	3245.5 4	0.22 6	(4786.39)	$1/2^+$	1540.8	$1/2,3/2,5/2^+$
2712.4 3	0.84 15	(4786.39)	$1/2^+$	2073.9	1/2,3/2	3261.2 3	0.30 6	(4786.39)	$1/2^+$	1525.1	$1/2,3/2,5/2^+$
2716.7 8	0.37 15	(4786.39)	$1/2^+$	2069.6	$1/2,3/2,5/2^+$	3268.9 6	0.15 5	(4786.39)	$1/2^+$	1517.4	$1/2,3/2,5/2^+$
2720.0 4	0.95 17	(4786.39)	$1/2^+$	2066.3	1/2,3/2	3276.5 3	0.39 6	(4786.39)	$1/2^+$	1509.9	$1/2,3/2,5/2^+$
2732.8 3	0.66 14	(4786.39)	$1/2^+$	2053.5	$1/2,3/2,5/2^+$	3288.05 20	0.90 10	(4786.39)	$1/2^+$	1498.3	1/2,3/2
2739.7 5	0.43 14	(4786.39)	$1/2^+$	2046.6	$1/2,3/2,5/2^+$	3295.3 3	0.37 6	(4786.39)	$1/2^+$	1491.0	$1/2,3/2,5/2^+$
2744.8 5	0.49 13	(4786.39)	$1/2^+$	2041.5	$1/2,3/2,5/2^+$	3326.6 3	0.76 9	(4786.39)	$1/2^+$	1459.7	1/2,3/2
2759.9 6	0.36 12	(4786.39)	$1/2^+$	2026.4	$1/2,3/2,5/2^+$	3341.7 2	1.22 10	(4786.39)	$1/2^+$	1444.6	1/2,3/2
2771.6 6	0.34 12	(4786.39)	$1/2^+$	2014.7	$1/2,3/2,5/2^+$	3363.7 3	0.34 7	(4786.39)	$1/2^+$	1422.6	$1/2,3/2,5/2^+$
2784.2 4	0.58 13	(4786.39)	$1/2^+$	2002.1	$1/2,3/2,5/2^+$	3377.9 2	1.01 8	(4786.39)	$1/2^+$	1408.4	1/2,3/2
2790.4 6	0.31 10	(4786.39)	$1/2^+$	1995.9	$1/2,3/2,5/2^+$	3391.1 3	0.38 8	(4786.39)	$1/2^+$	1395.2	1/2,3/2
2795.3 6	0.40 15	(4786.39)	$1/2^+$	1991.0	$1/2,3/2,5/2^+$	3398.3 3	1.29 10	(4786.39)	$1/2^+$	1388.0	$(1/2^-,3/2^-)$
2807.3 4	0.88 14	(4786.39)	$1/2^+$	1979.0	1/2,3/2	3436.15 20	1.47 10	(4786.39)	$1/2^+$	1350.7	$(3/2)^-$
2815.6 9	0.27 13	(4786.39)	$1/2^+$	1970.7	$1/2,3/2,5/2^+$	3448.5 3	1.58 10	(4786.39)	$1/2^+$	1337.8	$1/2^-,3/2^-$
2822.0 5	0.68 19	(4786.39)	$1/2^+$	1964.2	$1/2,3/2,5/2^+$	3461.6 3	0.52 7	(4786.39)	$1/2^+$	1324.7	$1/2,3/2,5/2^+$
2824.9 4	1.02 19	(4786.39)	$1/2^+$	1961.4	1/2,3/2	3473.0 2	4.17 20	(4786.39)	$1/2^+$	1313.41	$(3/2)^-$
2838.3 5	0.50 15	(4786.39)	$1/2^+$	1948.0	$1/2,3/2,5/2^+$	3503.1 4	0.36 5	(4786.39)	$1/2^+$	1283.2	1/2,3/2
2841.9 6	0.36 15	(4786.39)	$1/2^+$	1944.4	$1/2^-,3/2^-$	3509.5 2	0.99 10	(4786.39)	$1/2^+$	1276.8	$1/2,3/2,5/2^+$
2850.9 4	0.48 12	(4786.39)	$1/2^+$	1935.4	$1/2,3/2,5/2^+$	3523.1 4	0.44 7	(4786.39)	$1/2^+$	1263.2	1/2,3/2
2880.9 3	0.70 10	(4786.39)	$1/2^+$	1905.4	1/2,3/2	3526.9 3	0.79 11	(4786.39)	$1/2^+$	1259.4	1/2,3/2
2891.4 6	0.31 8	(4786.39)	$1/2^+$	1894.9	$1/2,3/2,5/2^+$	3530.1 3	1.04 11	(4786.39)	$1/2^+$	1256.2	$1/2^-,3/2^-$
2923.8 6	0.35 11	(4786.39)	$1/2^+$	1862.5	$1/2,3/2,5/2^+$	3548.1 4	0.29 5	(4786.39)	$1/2^+$	1238.2	$1/2,3/2,5/2^+$
2926.6 8	0.24 10	(4786.39)	$1/2^+$	1859.7	$1/2,3/2,5/2^+$	3600.9 4	0.34 10	(4786.39)	$1/2^+$	1185.5	$(3/2^+)$
2944.3[ai] 10	0.12 7	(4786.39)	$1/2^+$	1842.0?		3603.5 3	0.56 9	(4786.39)	$1/2^+$	1182.8	$1/2,3/2,5/2^+$
2970.3 4	0.46 8	(4786.39)	$1/2^+$	1816.0	$1/2,3/2,5/2^+$	3615.3 3	0.32 5	(4786.39)	$1/2^+$	1171.2	$3/2^-$
2980.7 4	0.74 8	(4786.39)	$1/2^+$	1805.6	1/2,3/2	3635.3 3	0.42 5	(4786.39)	$1/2^+$	1151.72	$(3/2,5/2)^+$
2989.5 4	0.49 8	(4786.39)	$1/2^+$	1796.8	$1/2,3/2,5/2^+$	3654.2 5	0.20 4	(4786.39)	$1/2^+$	1132.11	$(3/2)^+$
3009.9 7	0.23 7	(4786.39)	$1/2^+$	1776.4	$1/2,3/2,5/2^+$	3712.6 3	0.32 5	(4786.39)	$1/2^+$	1073.7	$(1/2^-,3/2^-)$
3045.1 8	0.34 8	(4786.39)	$1/2^+$	1741.2	$1/2,3/2,5/2^+$	3725.2 3	0.59 6	(4786.39)	$1/2^+$	1061.43	$(1/2^+,3/2^+)$
3049.6 6	0.25 7	(4786.39)	$1/2^+$	1736.7	$1/2,3/2,5/2^+$	3735.6 2	0.73 7	(4786.39)	$1/2^+$	1051.5	$(3/2)^-$
3055.7 6	0.45 13	(4786.39)	$1/2^+$	1730.6	$1/2,3/2,5/2^+$	3746.2 3	0.62 6	(4786.39)	$1/2^+$	1040.1	(1/2,3/2)
3058.6 6	0.38 10	(4786.39)	$1/2^+$	1727.7	1/2,3/2	3755.1 2	0.73 7	(4786.39)	$1/2^+$	1031.6	$1/2^-,3/2^-$
3070.6 4	0.38 8	(4786.39)	$1/2^+$	1715.7	$1/2^{(-)},3/2^{(-)}$	3802.7 3	0.43 5	(4786.39)	$1/2^+$	983.6	$(1/2^+,3/2^+)$
3087.0 3	0.67 9	(4786.39)	$1/2^+$	1699.3	1/2,3/2	3839.2 4	0.13 3	(4786.39)	$1/2^+$	947.2	$(3/2^-)$
3118.0 4	0.41 8	(4786.39)	$1/2^+$	1668.3	$(1/2^+,3/2^+)$	3862.0 3	0.45 6	(4786.39)	$1/2^+$	924.58	$(3/2)^-$
3127.6 3	0.44 8	(4786.39)	$1/2^+$	1658.7	$1/2,3/2,5/2^+$	3867.2[ai] 6	0.09 4	(4786.39)	$1/2^+$	919.1?	$(1/2^-,3/2^-)$
3132.7 4	0.51 8	(4786.39)	$1/2^+$	1653.6	$1/2,3/2,5/2^+$	3882.9[&i]	<0.10	(4786.39)	$1/2^+$	903.6?	$(1/2^+,3/2^+)$
3148.3 2	1.60 10	(4786.39)	$1/2^+$	1638.0	1/2,3/2	3933.2 5	0.12 3	(4786.39)	$1/2^+$	852.28	$1/2^+,3/2,5/2^+$
3174.0 4	0.69 9	(4786.39)	$1/2^+$	1612.3	$1/2,3/2,5/2^+$	3946.4[@] 2	1.77 10	(4786.39)	$1/2^+$	839.66?	$(3/2^-)$
3184.9 4	0.66 9	(4786.39)	$1/2^+$	1601.3	$1/2,3/2,5/2^+$	3971.8 3	0.30 4	(4786.39)	$1/2^+$	814.74	$3/2^+$
3196.5 2	1.14 13	(4786.39)	$1/2^+$	1589.8	$1/2^-,3/2^-$	4016.6 3	0.23 4	(4786.39)	$1/2^+$	769.60	$5/2^+$
3228.9 4	0.44 8	(4786.39)	$1/2^+$	1557.5	$1/2,3/2,5/2^+$	4036.6[#i]	<0.08	(4786.39)	$1/2^+$	749.9?	(1/2,3/2)
3231.6 4	0.47 8	(4786.39)	$1/2^+$	1554.7	$1/2,3/2,5/2^+$	4045.1 2	0.76 8	(4786.39)	$1/2^+$	741.32	$(3/2)^-$

$^{233}_{90}Th_{143}$-14

^{232}Th(n,γ) E=th 1979Je01,1974Ke13,1972Vo08 (continued)

γ(^{233}Th) (continued)

E_γ [†‡]	I_γ [c f]	E_i(level)	J^π_i	E_f	J^π_f	Comments
4073.0 *2*	0.56 *3*	(4786.39)	1/2$^+$	713.72	1/2$^+$	
4090.9 [#i]	<0.08	(4786.39)	1/2$^+$	695.6?	(1/2,3/2)	
4104.6 *4*	0.15 *2*	(4786.39)	1/2$^+$	681.846?	(1/2)$^-$	
4174.8 *6*	0.08 *2*	(4786.39)	1/2$^+$	611.476	(3/2)$^+$	
4202.0 *2*	0.65 *6*	(4786.39)	1/2$^+$	583.932	(1/2)$^+$	
4213.8 *4*	0.13 *3*	(4786.39)	1/2$^+$	572.70	(3/2)$^-$	
4246.9 *2*	0.62 *6*	(4786.39)	1/2$^+$	539.61	(1/2)$^-$	
4362.2 [#i]	<0.08	(4786.39)	1/2$^+$	424.3?		
4372.7 [#i]	<0.08	(4786.39)	1/2$^+$	413.8?	(1/2,3/2)	
4380.7 [#i]	<0.08	(4786.39)	1/2$^+$	405.8?	(1/2,3/2)	
4398.2 [#i]	<0.08	(4786.39)	1/2$^+$	388.3?	(9/2$^+$)	Unlikely γ from 1/2$^+$ capture state to (9/2$^+$) level.
4419.5 [#i]	<0.08	(4786.39)	1/2$^+$	367.0?		
4450.4 *3*	0.39 *5*	(4786.39)	1/2$^+$	335.928	3/2$^+$	
4477.0 [#i]	<0.08	(4786.39)	1/2$^+$	309.5?	(1/2,3/2)	
4523.8 *5*	0.10 *2*	(4786.39)	1/2$^+$	262.24	(5/2)$^+$	
4769.6 *3*	0.33 *4*	(4786.39)	1/2$^+$	16.86	3/2$^+$	
4785.0 *6*	0.05 *2*	(4786.39)	1/2$^+$	0.0	1/2$^+$	

† Secondary Eγ values from 1979Je01 (ce by solenoidal spectrometer, γ by crystal spectrometer), unless otherwise noted. Primary Eγ values from 1974Ke13 (pair spectrometer), unless otherwise noted. Other measurements: 1972Vo08 (γ rays by crystal and Ge detector) for secondary γ rays; and 1969HoZY, 1968Wa13, 1967Ke17, 1958Gr01, 1956Bu51 for primary gamma rays.

‡ Secondary Eγ values are from 1979Je01 (γ using crystal spectrometer, and ce using solenoidal spectrometer), unless otherwise noted. Primary Eγ values are from 1974Ke13 (γ using a pair spectrometer), unless otherwise noted.

From 1972Vo08.

@ Possible doublet.

& Observed in one pair spectrum only and assumed to be due to an impurity. Energy from 1972Vo08.

a Uncertain transition.

b From 1972Vo08 (Ge, crystal); not seen by 1979Je01.

c Photon intensity per 100 thermal n-captures, measured by 1979Je01 for secondary γ rays, and by 1974Ke13 for primary transitions, unless otherwise noted.

d Iγ per 100 n-captures, measured by 1972Vo08. Absolute Iγ values obtained by using I(312γ from ^{233}Pa β^- decay)=34%. Intensities given here have been corrected for the adopted value of I(312γ)=38.6 *4*%.

e From ce measurements of 1979Je01. Ice values are per 100 thermal neutron captures.

f Intensity per 100 neutron captures.

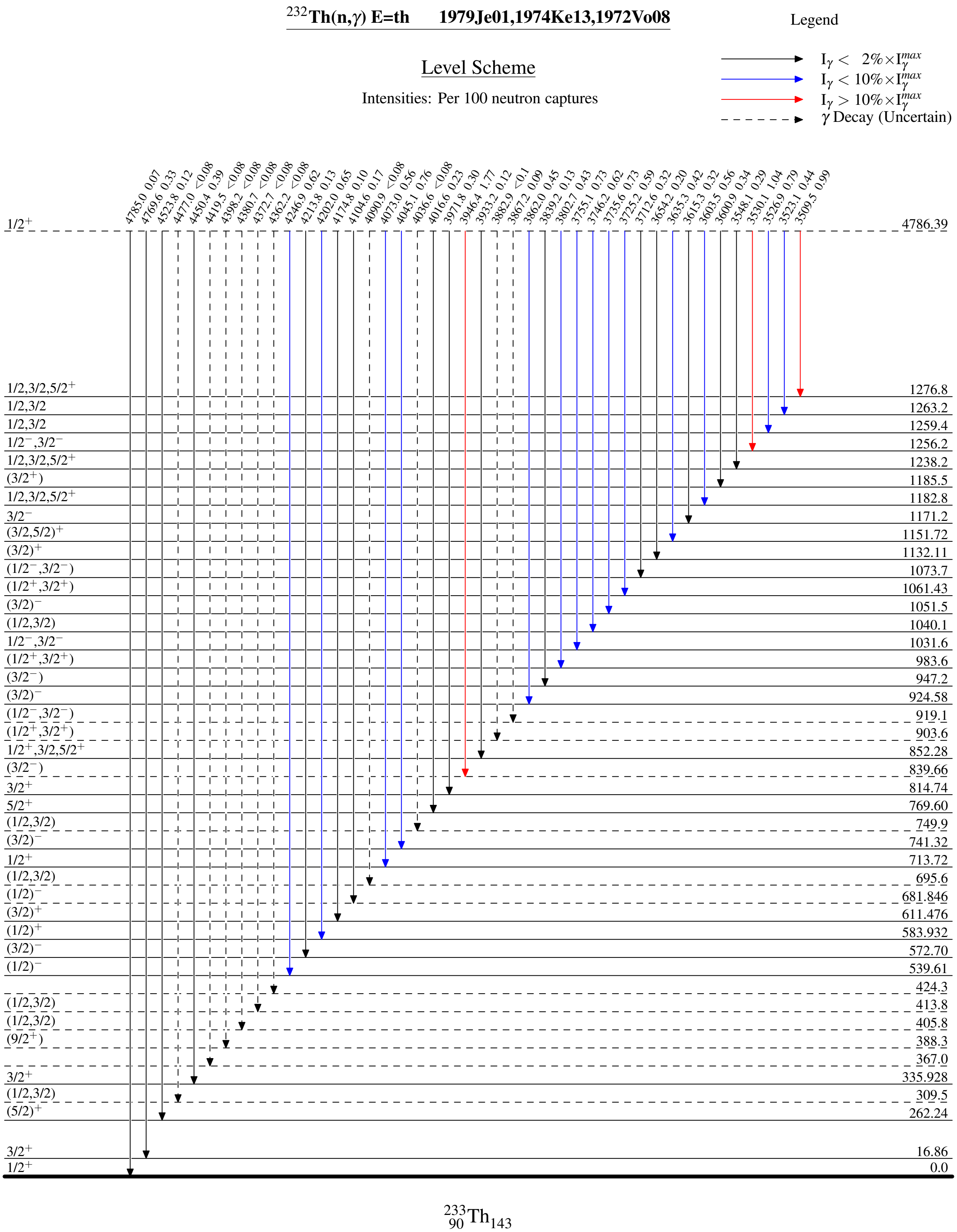
g Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

h Multiply placed.

i Placement of transition in the level scheme is uncertain.

x γ ray not placed in level scheme.

$^{233}_{90}Th_{143}$-15


^{232}Th(n,γ) E=th 1979Je01,1974Ke13,1972Vo08
Level Scheme
Intensities: Per 100 neutron captures
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)
$^{233}_{90}Th_{143}$

^{232}Th(n,γ) E=th 1979Je01,1974Ke13,1972Vo08

Legend

$I_\gamma < 2\% \times I_\gamma^{max}$

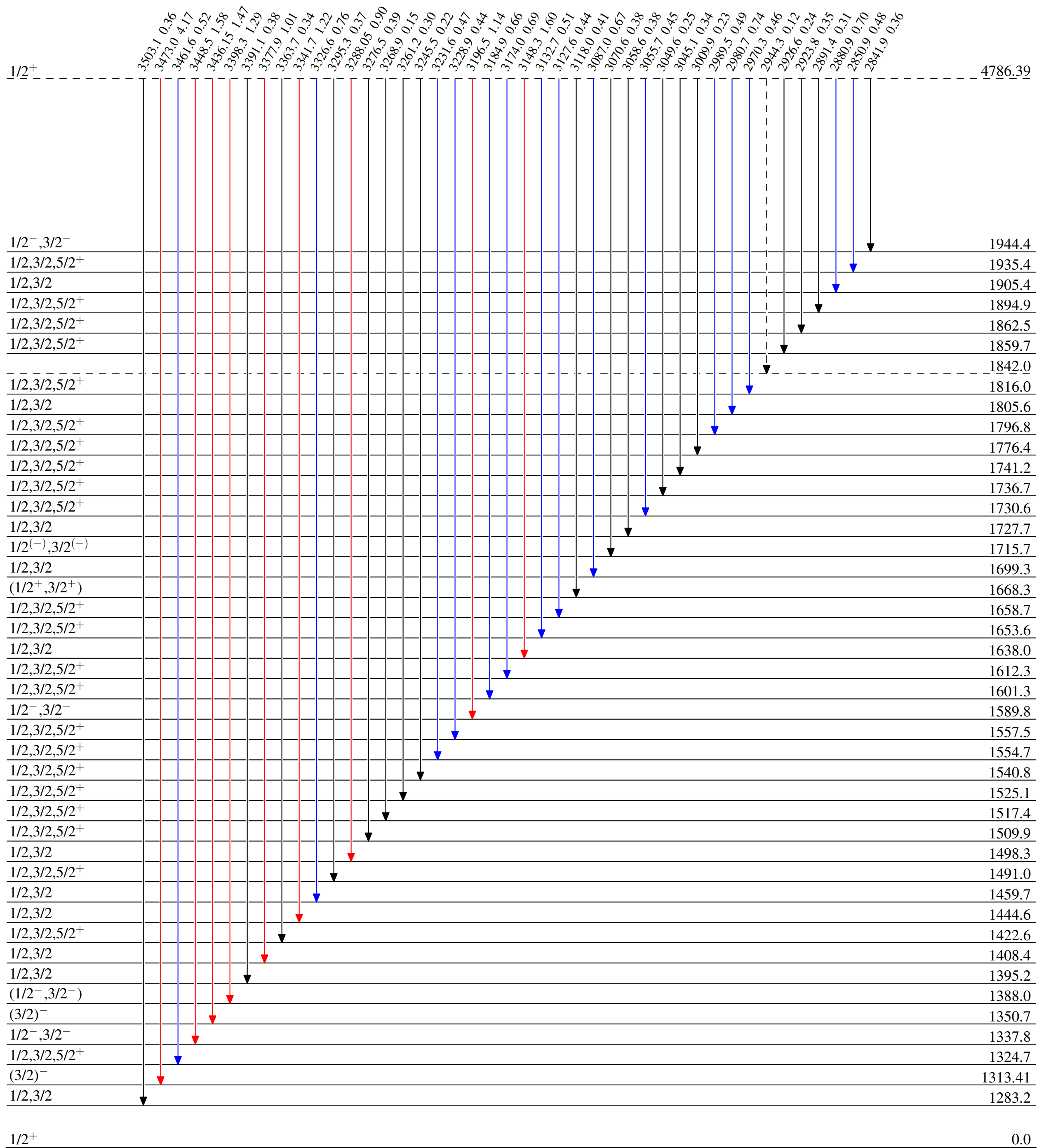
$I_\gamma < 10\% \times I_\gamma^{max}$

$I_\gamma > 10\% \times I_\gamma^{max}$

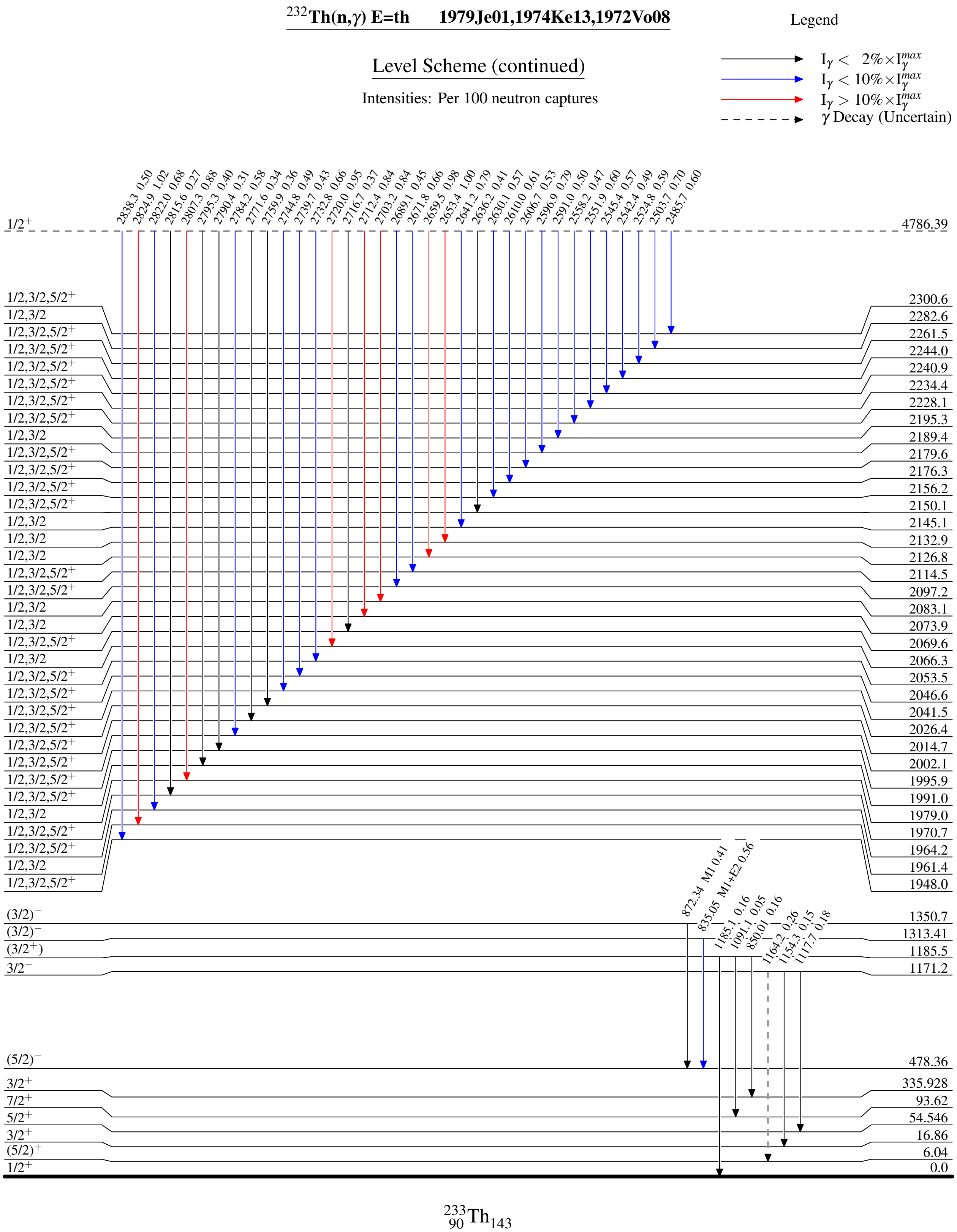
γ Decay (Uncertain)

Level Scheme (continued)

Intensities: Per 100 neutron captures



$^{233}_{90}Th_{143}$

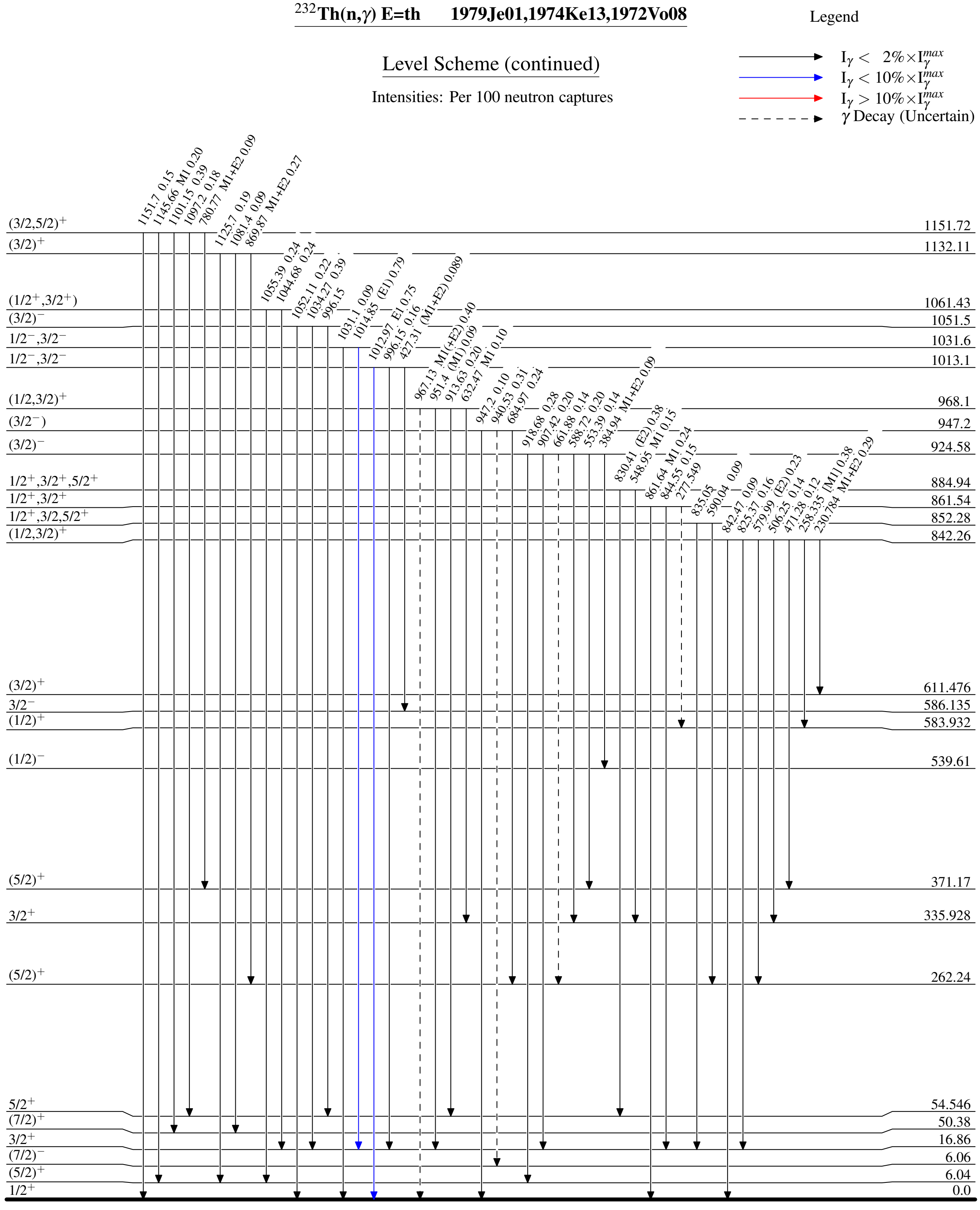


^{232}Th(n,γ) E=th 1979Je01,1974Ke13,1972Vo08
Level Scheme (continued)
Intensities: Per 100 neutron captures
Legend
$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$
γ Decay (Uncertain)
$^{233}_{90}Th_{143}$

^{232}Th(n,γ) E=th 1979Je01,1974Ke13,1972Vo08

Level Scheme (continued)

Intensities: Per 100 neutron captures



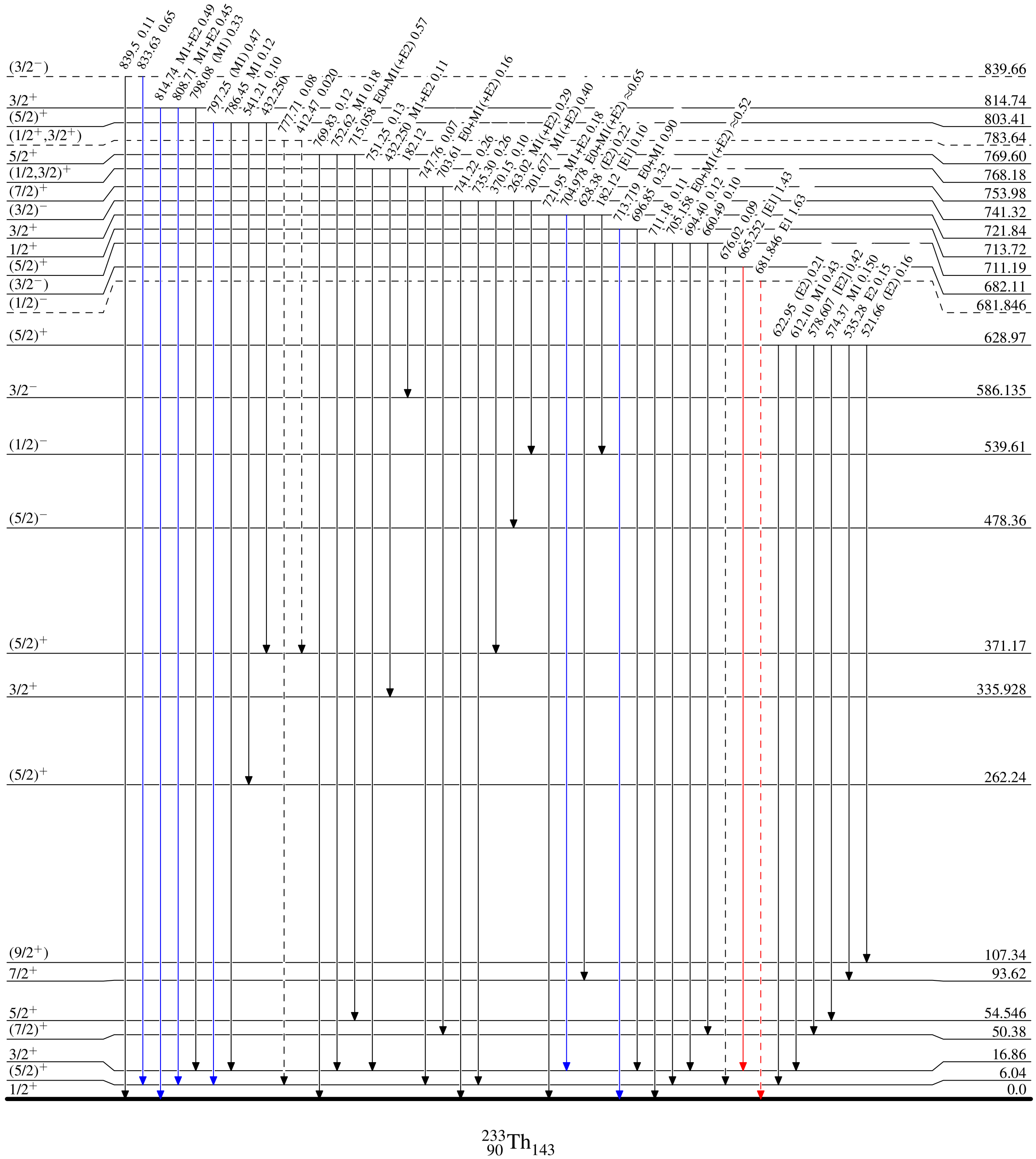
^{232}Th(n,γ) E=th 1979Je01,1974Ke13,1972Vo08

Level Scheme (continued)

Intensities: Per 100 neutron captures

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)



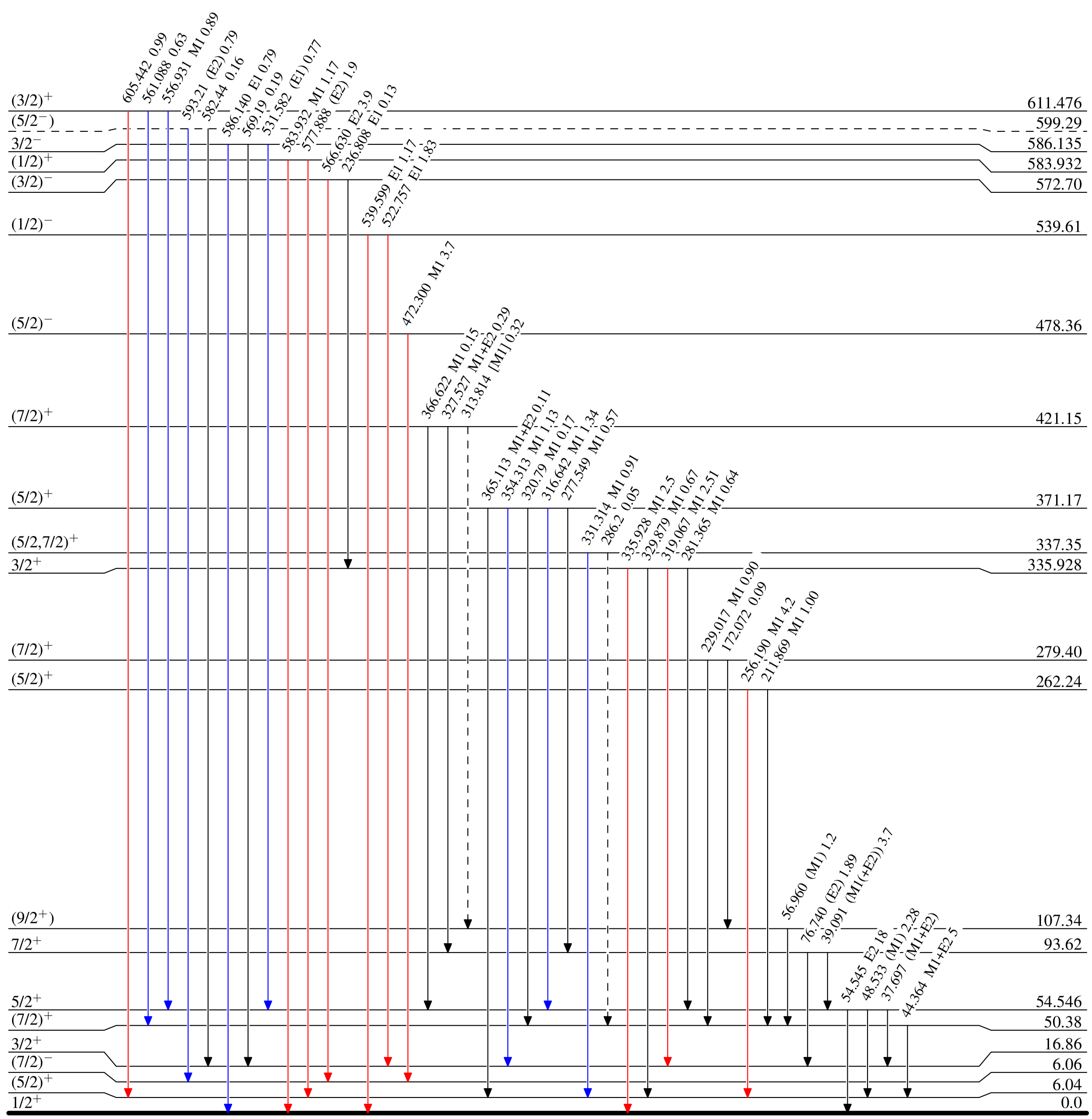
^{232}Th(n,γ) E=th 1979Je01,1974Ke13,1972Vo08

Level Scheme (continued)

Intensities: Per 100 neutron captures

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)



$^{233}_{90}Th_{143}$