^{238}U(n,γ) E=thermal 1978Bo12,1972Bo46,1984Ch05

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	E. Browne, J. K. Tuli	NDS 122, 293 (2014)	30-Jun-2013

Additional information 1.

1978Bo12: 99.98% depleted ^{238}U target. Measured Eγ, Iγ of secondary γ rays, $\gamma\gamma$ coin, conversion electrons. Detectors: curved-crystal spectrometer and Ge(Li) anti-Compton detector for γ rays, two Ge(Li) detectors for $\gamma\gamma$ coin measurements, and a magnetic spectrometer for detecting conversion electrons.

1972Bo46: >99.999% depleted ^{238}U target. Measured Eγ, Iγ (per 100 captured neutrons) of primary γ rays. Detector: Annihilation-pair Ge(Li) spectrometer.

1984Ch05: 99.999% depleted ^{238}U target. Polarized neutrons. Measured Eγ, Iγ (per 100 captured neutrons) of circularly polarized primary γ rays with Eγ=2400 – 4200 keV. Detectors: Ge(Li).

2007ChZX: Database of Prompt Gamma Rays from Slow Neutron Capture for Elemental Analysis. International Atomic Energy Agency. Evaluated Data.

^{239}U Levels

E(level)[‡]	J$^\pi$[#]	E(level)[‡]	J$^\pi$[#]	E(level)[‡]	J$^\pi$[#]
0	5/2$^+$	988.20 *6*	(5/2)$^+$	1383.5 *4*	
42.534 *7*	7/2$^+$	990.495 *19*	(3/2$^+$,5/2$^+$)	1399.5 *8*	
98.631 *16*	9/2$^+$	1005.7 *5*	(1/2,3/2,5/2)$^+$	1404.53 *21*	(1/2,3/2)$^+$
133.7991 *10*	1/2$^+$	1062.48 *6*	5/2$^+$	1416.9 *6*	
145.767 *6*	3/2$^+$	1066.81 *12*	1/2,3/2	1436.83 *21*	(1/2,3/2)$^+$
169.089? *10*	(7/2$^+$)	1149.7 *3*	(1/2$^+$,3/2$^+$)	1445.83 *21*	(1/2,3/2)$^+$
193.985 *5*	5/2$^+$	1152.80 *4*	(3/2$^+$,5/2)	1462.5 *3*	(1/2,3/2)$^+$
222.25? *3*	(7/2$^+$)	1155.052 *22*	1/2$^+$	1479.5 *5*	(1/2,3/2)$^+$
292.5872 *20*	(7/2$^-$)	1167.02 *3*	3/2$^+$	1481.53 *21*	(1/2,3/2)$^-$
539.283 *9*	(5/2)$^-$	1194.63 *5*	1/2$^-$	1493.6 *5*	1/2,3/2
687.854 *5*	(1/2)$^+$	1201.02 *6*	5/2$^+$	1494.9 *6*	1/2,3/2
715.835 *5*	3/2$^+$	1223.31 *3*	3/2	1504.5 *3*	(1/2,3/2)$^-$
726.108 *10*	(3/2)$^+$	1232.0 *7*	(1/2$^+$,3/2$^+$)	1509.9 *3*	1/2$^-$,3/2$^-$
734.65 *3*	(5/2$^+$)	1235.2 *5*	(1/2$^+$,3/2$^+$)	1512.9 *15*	(1/2,3/2)$^+$
739.380 *6*	1/2$^-$	1237.7 *7*	1/2$^+$,3/2$^+$	1520.33 *21*	1/2$^-$,3/2$^-$
746.054 *4*	3/2$^-$	1241.96 *6*	3/2$^-$	1573.2 *5*	1/2,3/2$^+$ [@]
757.151 *22*	(5/2)$^+$	1243.4[†] *5*		1586.3 *5*	3/2[@]
784.273 *14*	5/2$^-$	1260.3 *3*	(1/2,3/2)$^+$	1609.2 *5*	1/2,3/2$^+$ [@]
≈800?		1265.3 *8*	(5/2$^+$)	1614.7 *5*	3/2,(1/2)[@]
815.155 *6*	1/2$^-$	1270.6 *5*	(1/2$^+$,3/2$^+$)	1631.2 *5*	1/2,3/2[@]
823.708 *8*	3/2$^-$	1276.83 *21*	(1/2$^+$,3/2$^+$)	1684.7 *5*	1/2,3/2[@]
853.23 *4*	(3/2)$^+$	1306.22 *3*	1/2$^-$,3/2$^-$	1692.2 *5*	3/2,(1/2)[@]
888.1 *3*	5/2$^+$	1318.2 *3*	1/2,3/2	1717.0 *5*	3/2,(1/2)[@]
893.30 *10*	(5/2)$^+$	1320.5 *7*	1/2,3/2	1807.9 *5*	3/2[@]
932.90 *5*	(1/2)$^-$	1324.6 *3*	(1/2,3/2)$^-$	4806.454 *21*	1/2$^+$
961.85 *13*	(3/2$^-$)	1360.97 *3*	1/2$^-$,3/2$^-$		
965.637 *15*	3/2$^+$	1368.03 *21*	(1/2,3/2)$^+$		

† Not seen by 1984Ch05.

‡ From least-squares fit to Eγ.

From multipolarities of secondary γ rays (1978Bo12), and from the energy dependence of primary γ-ray intensities in average neutron resonance capture (1972Bo46), unless otherwise specified.

@ From γ-ray circular polarization in ^{238}U(n,γ) E=thermal (1984Ch05).

γ(^{239}U)

Iγ normalization: From 100/σ_0 = 100/2.680 *19* b (2006MuZX), where σ_0 is the neutron radiative capture cross section measured at 2200 min/s.
For Iγ from average resonance capture, see 1971Wa12, 1972Bo46, 1984Ch05. Other measurements: 1999Ho33, 1995Ra25, 1991Ka34, 1977Li13, 1975BoZF, 1971Ar47, 1965Ma17, 1966Sh16.

E_γ [#&]	I_γ [#&c]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [‡]	α [†]	$I_{(\gamma+ce)}$ [c]	Comments
(11.978 *CA*)		145.767	3/2$^+$	133.7991	1/2$^+$			32 *CA*	$I_{(\gamma+ce)}$: from intensity balance.
42.540 *8*	[b]	42.534	7/2$^+$	0	5/2$^+$	E2(+M1)			Mult.: from ce(L2)= 0.8 *2*, ce(L3)= 0.6 *2* (1978Bo12).
48.230 *17*		193.985	5/2$^+$	145.767	3/2$^+$	[E2+M1]		13 *CA*	$I_{(\gamma+ce)}$: from intensity balance. ce(L2)= 2.1 *5*.
60.185 *10*	0.0755[b]	193.985	5/2$^+$	133.7991	1/2$^+$	E2	148.1		α(L)=108.0 *16*; α(M)=29.9 *5*; α(N+..)=10.27 *15* α(N)=8.11 *12*; α(O)=1.86 *3*; α(P)=0.302 *5*; α(Q)=0.000827 *12* Mult.: from ce(L2):ce(M2):ce(M3)= 4.5 *3*: 2.1 *4*: 1.1 *2*: 1.0 *4* (1978Bo12).
127.301 *5*	0.0099 *20*	815.155	1/2$^-$	687.854	(1/2)$^+$				
133.799 *1*	0.38 *8*	133.7991	1/2$^+$	0	5/2$^+$	E2	3.72		α(K)=0.226 *4*; α(L)=2.54 *4*; α(M)=0.705 *10*; α(N+..)=0.243 *4* α(N)=0.191 *3*; α(O)=0.0440 *7*; α(P)=0.00726 *11*; α(Q)=4.04×10^{-5} *6* Mult.: from α(L2)exp= 1.6 *4*; ce(L1):ce(L2):ce(L3):ce(M1):ce(M2):ce(M3) :ce(N2):ce(N3):ce(O)= 2.6 *2*: 30.0 *3*: 18.5 *2*: 0.9 *1* : 5.7 *3*: 5.1 *1*: 2.0 *2*: 1.4 *1*: 0.60 *14* (1978Bo12).
169.089[e] *10*	0.012 *4*	169.089?	(7/2$^+$)	0	5/2$^+$				
193.956 *15*	0.0039 *20*	292.5872	(7/2$^-$)	98.631	9/2$^+$				
250.062[e] *7*	0.034 *12*	292.5872	(7/2$^-$)	42.534	7/2$^+$				
292.587 *2*	0.016 *6*	292.5872	(7/2$^-$)	0	5/2$^+$				
451.213 *23*	0.010 *4*	990.495	(3/2$^+$,5/2$^+$)	539.283	(5/2)$^-$				
^{x}466.7[@] *2*	0.0040[@] *10*								
478.79 *8*	0.012 *4*	1194.63	1/2$^-$	715.835	3/2$^+$	(E1)			Mult.: E1,E2, but decay scheme requires E1.
^{x}487.15[@] *25*	0.028[@] *8*					E1,E2			Mult.: from α(K)exp= 0.022 *7* (1978Bo12).
496.753 *11*	0.034 *8*	539.283	(5/2)$^-$	42.534	7/2$^+$	E1[a]	0.01367		α(K)=0.01103 *16*; α(L)=0.00199 *3*; α(M)=0.000477 *7*; α(N+..)=0.0001645 *23* α(N)=0.0001277 *18*; α(O)=3.07×10^{-5} *5*; α(P)=5.76×10^{-6} *8*; α(Q)=4.06×10^{-7} *6*
521.849 *7*	0.073 *3*	715.835	3/2$^+$	193.985	5/2$^+$	M1(+E2)			Mult.: from α(K)exp= 0.17 *5*; ce(K):ce(L1)= 0.86 *9*: 0.16 *2* (1978Bo12).
535.45 *5*	0.028 *6*	1223.31	3/2	687.854	(1/2)$^+$	E1,E2[a]			
537.26 *3*	0.0079 *20*	1360.97	1/2$^-$,3/2$^-$	823.708	3/2$^-$				

From ENSDF

$\gamma(^{239}$U) (continued)

E_γ[#&]	I_γ[#&c]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	α[†]	Comments
539.278 *11*	0.099 *20*	539.283	$(5/2)^-$	0	$5/2^+$	E1	0.01163	α(K)=0.00941 *14*; α(L)=0.001682 *24*; α(M)=0.000402 *6*; α(N+..)=0.0001388 *20* α(N)=0.0001077 *15*; α(O)=2.59×10^{-5} *4*; α(P)=4.87×10^{-6} *7*; α(Q)=3.48×10^{-7} *5* Mult.: from α(K)exp= 0.006 *2* (1978Bo12).
542.085 *12*	0.024 *6*	687.854	$(1/2)^+$	145.767	$3/2^+$			
^{x}542.338[@] *11*	0.036[@] *8*					M1(+E2)	0.12 *8*	α(K)=0.09 *7*; α(L)=0.021 *10*; α(M)=0.0050 *23*; α(N+..)=0.0018 *8* α(N)=0.0014 *7*; α(O)=0.00033 *16*; α(P)=6.E−5 *3*; α(Q)=4.E−6 *3* Mult.: from α(L1)exp= 0.027 *8* (1978Bo12).
552.069 *5*	0.207 *5*	746.054	$3/2^-$	193.985	$5/2^+$	E1	0.01111	α(K)=0.00899 *13*; α(L)=0.001603 *23*; α(M)=0.000383 *6*; α(N+..)=0.0001323 *19* α(N)=0.0001026 *15*; α(O)=2.47×10^{-5} *4*; α(P)=4.65×10^{-6} *7*; α(Q)=3.33×10^{-7} *5* Mult.: from α(K)exp= 0.009 *3* (1978Bo12).
554.054 *8*	0.085 *20*	687.854	$(1/2)^+$	133.7991	$1/2^+$	M1	0.189	α(K)=0.1507 *22*; α(L)=0.0287 *4*; α(M)=0.00693 *10*; α(N+..)=0.00241 *4* α(N)=0.00187 *3*; α(O)=0.000454 *7*; α(P)=8.75×10^{-5} *13*; α(Q)=6.98×10^{-6} *10* Mult.: from α(K)exp= 0.16 *4*; ce(K):ce(L1):ce(L2)= 0.69 *7*: 0.14 *2*: 0.040 *16* (1978Bo12).
554.10 *8*	0.028 *6*	1241.96	$3/2^-$	687.854	$(1/2)^+$	E1[a]	0.01103	α(K)=0.00893 *13*; α(L)=0.001591 *23*; α(M)=0.000380 *6*; α(N+..)=0.0001313 *19* α(N)=0.0001019 *15*; α(O)=2.45×10^{-5} *4*; α(P)=4.62×10^{-6} *7*; α(Q)=3.31×10^{-7} *5*
^{x}558.50[@] *15*	0.012[@] *4*					M1+E2	0.11 *8*	α(K)=0.09 *7*; α(L)=0.019 *10*; α(M)=0.0046 *22*; α(N+..)=0.0016 *8* α(N)=0.0013 *6*; α(O)=0.00030 *15*; α(P)=6.E−5 *3*; α(Q)=4.E−6 *3* Mult.: from α(K)exp= 0.07 *4* (1978Bo12).
562.027 *22*	0.032 *10*	784.273	$5/2^-$	222.25?	$(7/2^+)$	[E1]	0.01073	α(K)=0.00869 *13*; α(L)=0.001546 *22*; α(M)=0.000369 *6*; α(N+..)=0.0001276 *18* α(N)=9.90×10^{-5} *14*; α(O)=2.38×10^{-5} *4*; α(P)=4.49×10^{-6} *7*; α(Q)=3.22×10^{-7} *5*
563.17 *3*	0.014 *4*	757.151	$(5/2)^+$	193.985	$5/2^+$	M1+E2		Mult.: from α(K)exp= 0.12 *7* (1978Bo12).
580.340 *13*	0.043 *10*	726.108	$(3/2)^+$	145.767	$3/2^+$	M1+E2		Mult.: from α(K)exp= 0.10 *3* (1978Bo12).
582.034 *8*	0.016 *4*	715.835	$3/2^+$	133.7991	$1/2^+$	M1(+E2)		Mult.: from α(K)exp= 0.13 *4* (1978Bo12).
^{x}586.90[@] *11*	0.007[@] *2*					M1	0.1618	α(K)=0.1292 *19*; α(L)=0.0246 *4*; α(M)=0.00593 *9*; α(N+..)=0.00207 *3* α(N)=0.001597 *23*; α(O)=0.000388 *6*; α(P)=7.49×10^{-5} *11*; α(Q)=5.98×10^{-6} *9* Mult.: from α(K)exp= 0.19 *6* (1978Bo12).
588.88 *3*	0.024 *6*	734.65	$(5/2^+)$	145.767	$3/2^+$			
590.39 *3*	0.034 *12*	1306.22	$1/2^-,3/2^-$	715.835	$3/2^+$	E1	0.00977 *14*	α=0.00977 *14*; α(K)=0.00792 *11*; α(L)=0.001401 *20*;

From ENSDF

γ(^{239}U) (continued)

E_γ [#&]	I_γ [#&c]	E_i(level)	J^π_i	E_f	J^π_f	Mult. [‡]	α [†]	Comments
								α(M)=0.000334 *5*; α(N+..)=0.0001155 α(N)=8.96×10^{-5} *13*; α(O)=2.16×10^{-5} *3*; α(P)=4.07×10^{-6} *6*; α(Q)=2.94×10^{-7} *5* Mult.: from α(K)exp= 0.003 *3* (1978Bo12).
592.309 *13*	0.045 *12*	726.108	(3/2)$^+$	133.7991	1/2$^+$	M1+E2		Mult.: from α(K)exp= 0.095 *3* (1978Bo12).
593.612 *5*	0.108 *24*	739.380	1/2$^-$	145.767	3/2$^+$	E1[a]	0.00966 *14*	α=0.00966 *14*; α(K)=0.00783 *11*; α(L)=0.001386 *20*; α(M)=0.000331 *5*; α(N+..)=0.0001143 α(N)=8.86×10^{-5} *13*; α(O)=2.13×10^{-5} *3*; α(P)=4.03×10^{-6} *6*; α(Q)=2.91×10^{-7} *4*
[x]600.28 *1*	0.030 *8*					E1,E2[a]		
600.284 *10*	0.030 *8*	746.054	3/2$^-$	145.767	3/2$^+$	E1	0.00946 *14*	α=0.00946 *14*; α(K)=0.00767 *11*; α(L)=0.001355 *19*; α(M)=0.000323 *5*; α(N+..)=0.0001117 α(N)=8.66×10^{-5} *13*; α(O)=2.09×10^{-5} *3*; α(P)=3.94×10^{-6} *6*; α(Q)=2.86×10^{-7} *4* Mult.: from α(K)exp= 0.013 *4* (1978Bo12).
605.581 *9*	0.053 *12*	739.380	1/2$^-$	133.7991	1/2$^+$	E1[a]	0.00930 *13*	α=0.00930 *13*; α(K)=0.00755 *11*; α(L)=0.001331 *19*; α(M)=0.000318 *5*; α(N+..)=0.0001098 α(N)=8.51×10^{-5} *12*; α(O)=2.05×10^{-5} *3*; α(P)=3.87×10^{-6} *6*; α(Q)=2.81×10^{-7} *4*
611.38 *3*	0.014 *4*	757.151	(5/2)$^+$	145.767	3/2$^+$			
612.253 *5*	0.23 *5*	746.054	3/2$^-$	133.7991	1/2$^+$	[E1]	0.00911 *13*	α=0.00911 *13*; α(K)=0.00739 *11*; α(L)=0.001303 *19*; α(M)=0.000311 *5*; α(N+..)=0.0001074 α(N)=8.33×10^{-5} *12*; α(O)=2.01×10^{-5} *3*; α(P)=3.79×10^{-6} *6*; α(Q)=2.75×10^{-7} *4*
[x]620.97[e]	[b]							ce(K)= 0.05 *3*.
629.722 *9*	0.073 *20*	823.708	3/2$^-$	193.985	5/2$^+$	E1	0.00864 *12*	α=0.00864 *12*; α(K)=0.00701 *10*; α(L)=0.001232 *18*; α(M)=0.000294 *5*; α(N+..)=0.0001016 α(N)=7.87×10^{-5} *11*; α(O)=1.90×10^{-5} *3*; α(P)=3.59×10^{-6} *5*; α(Q)=2.62×10^{-7} *4* Mult.: from α(K)exp= 0.009 *5* (1978Bo12).
638.505 *12*	0.041 *12*	784.273	5/2$^-$	145.767	3/2$^+$	E1[a]	0.00842 *12*	α=0.00842 *12*; α(K)=0.00683 *10*; α(L)=0.001199 *17*; α(M)=0.000286 *4*; α(N+..)=9.88×10^{-5} *14* α(N)=7.66×10^{-5} *11*; α(O)=1.85×10^{-5} *3*; α(P)=3.49×10^{-6} *5*; α(Q)=2.55×10^{-7} *4*
[x]660.54 *25*	0.10 *3*							
[x]662.21 *14*	0.6 *2*							
669.385 *13*	0.0039 *20*	815.155	1/2$^-$	145.767	3/2$^+$			
673.307 *12*	0.010 *4*	715.835	3/2$^+$	42.534	7/2$^+$			
681.355 *9*	0.012 *4*	815.155	1/2$^-$	133.7991	1/2$^+$	E1,E2[a]		
687.853 *8*	0.028 *8*	687.854	(1/2)$^+$	0	5/2$^+$	(E2)[a]		
689.907 *11*	0.043 *10*	823.708	3/2$^-$	133.7991	1/2$^+$	E1[a]	0.00728 *11*	α=0.00728 *11*; α(K)=0.00592 *9*; α(L)=0.001031 *15*; α(M)=0.000246 *4*; α(N+..)=8.49×10^{-5} *12*

$^{239}_{92}U_{147}$-4

γ(^{239}U) (continued)

E_γ [#&]	I_γ [#&c]	E_i(level)	J^π_i	E_f	J^π_f	Mult. [‡]	Comments
							α(N)=6.58×10^{-5} *10*; α(O)=1.588×10^{-5} *23*; α(P)=3.01×10^{-6} *5*; α(Q)=2.22×10^{-7} *4*
715.832 *9*	0.022 *6*	715.835	3/2$^+$	0	5/2$^+$	E2,E1[a]	
[x]723.95 *5*	1.0 *3*						
[x]726.23 *8*	1.7 *4*						
[x]735.8 *3*	0.2 *1*						
[x]751.67 *25*	0.4 *1*						
[x]754.20 *25*	0.3 *1*						
[x]757.11 *25*	0.50 *13*					M1(+E2)	Mult.: from α(K)exp= 0.08 *4* (1978Bo12).
[x]758.92 *25*	0.3 *1*						
767.86 *21*	0.020 *6*	961.85	(3/2$^-$)	193.985	5/2$^+$	E1,E2[a]	
787.15 *7*	0.020 *6*	932.90	(1/2)$^-$	145.767	3/2$^+$	E1,E2[a]	
794.21 *8*	0.020 *6*	988.20	(5/2)$^+$	193.985	5/2$^+$	M1+E2	Mult.: from α(L1)exp= 0.012 *4* (1978Bo12).
799.12 *7*	0.079 *20*	932.90	(1/2)$^-$	133.7991	1/2$^+$		
819.868 *21*	0.010 *4*	965.637	3/2$^+$	145.767	3/2$^+$		
828.04 *21*	0.024 *6*	961.85	(3/2$^-$)	133.7991	1/2$^+$	E1,E2[a]	
831.837 *19*	0.053 *12*	965.637	3/2$^+$	133.7991	1/2$^+$	M1+E2	Mult.: from α(K)exp= 0.024 *7* (1978Bo12).
842.42 *8*	0.024 *6*	988.20	(5/2)$^+$	145.767	3/2$^+$	M1+E2	Mult.: from α(K)exp= 0.024 *8* (1978Bo12).
853.23 *4*	0.055 *12*	853.23	(3/2)$^+$	0	5/2$^+$	M1+E2	Mult.: from α(K)exp= 0.026 *8* (1978Bo12).
[x]858.75 *25*	0.20 *5*						
[x]860.23 *25*	0.6 *2*					M1(+E2)	Mult.: from α(K)exp= 0.050 *7* (1978Bo12).
[x]888.43 *9*	0.6 *2*						
893.30 *10*	0.016 *4*	893.30	(5/2)$^+$	0	5/2$^+$	M1+E2	Mult.: from α(K)exp= 0.026 *13* (1978Bo12).
[x]921.68 *25*	0.10 *3*						
961.06 *4*	0.0039 *20*	1155.052	1/2$^+$	193.985	5/2$^+$		
972.83 *25*		1167.02	3/2$^+$	193.985	5/2$^+$		E_γ: From 1978Bo12.
[x]983.42 *7*	1.3 *3*						
990.49 *3*	0.010 *4*	990.495	(3/2$^+$,5/2$^+$)	0	5/2$^+$	M1+E2	Mult.: from α(K)exp= 0.012 *10* (1978Bo12).
1007.03[d] *6*	0.0079[d] *20*	1152.80	(3/2$^+$,5/2)	145.767	3/2$^+$	E0+M1+E2	Mult.: from α(K)exp= 0.19 *6* (1978Bo12).
1007.03[d] *6*	0.0079[d] *20*	1201.02	5/2$^+$	193.985	5/2$^+$	E0+M1+E2	Mult.: from α(K)exp= 0.19 *6* (1978Bo12).
1021.25[d] *4*	0.0079[d] *20*	1155.052	1/2$^+$	133.7991	1/2$^+$	E0+M1	Mult.: from α(K)exp= 0.27 *8* (1978Bo12).
1021.25[d] *4*	0.0079[d] *20*	1167.02	3/2$^+$	145.767	3/2$^+$	E0+M1+E2	Mult.: from α(K)exp= 0.27 *8* (1978Bo12).
1029.32 *5*	0.037 *8*	1223.31	3/2	193.985	5/2$^+$	E1,E2[a]	
1048.85 *8*	0.012 *4*	1194.63	1/2$^-$	145.767	3/2$^+$		
[x]1053.77 *25*	0.5 *2*						
1060.82 *8*	0.016 *4*	1194.63	1/2$^-$	133.7991	1/2$^+$		
[x]1061.50 *25*	0.3 *1*					E0+M1+E2	Mult.: from α(K)exp= 1.0 *5* (1978Bo12).
1062.48 *6*	0.0079 *20*	1062.48	5/2$^+$	0	5/2$^+$	E0+M1+E2	Mult.: from α(K)exp= 0.24 *8* (1978Bo12).
1066.82 *12*	0.030 *6*	1066.81	1/2,3/2	0	5/2$^+$	M1+E2	Mult.: from α(K)exp= 0.015 *5* (1978Bo12). Mult.: from av res (n,γ) the 1066.8 level is 1/2$^-$ or 3/2$^-$ in contradiction to the mult assignment of 1978Bo12.
[x]1069.41[e] *25*	0.20 *5*					E0+M1+E2	Mult.: from α(K)exp= 0.22 *8* (1978Bo12).

$^{239}_{92}$U$_{147}$-5

γ(^{239}U) (continued)

E_γ [#&]	I_γ [#&c]	E_i(level)	J^π_i	E_f	J^π_f	Mult. [‡]	α [†]	Comments
1089.50 *5*	0.014 *4*	1223.31	3/2	133.7991	$1/2^+$	M1	0.0313	α(K)=0.0250 *4*; α(L)=0.00469 *7*; α(M)=0.001129 *16*; α(N+..)=0.000393 *6* α(N)=0.000304 *5*; α(O)=7.40×10^{-5} *11*; α(P)=1.427×10^{-5} *20*; α(Q)=1.145×10^{-6} *16* Mult.: from α(K)exp= 0.03 *1* (1978Bo12).
1110.27 *6*	0.010 *4*	1152.80	$(3/2^+,5/2)$	42.534	$7/2^+$			
^{x}1139.22 *25*	0.30 *8*					M1	0.0278	α(K)=0.0223 *4*; α(L)=0.00417 *6*; α(M)=0.001003 *14*; α(N+..)=0.000351 *5* α(N)=0.000270 *4*; α(O)=6.56×10^{-5} *10*; α(P)=1.267×10^{-5} *18*; α(Q)=1.017×10^{-6} *15*; α(IPF)=1.369×10^{-6} Mult.: from α(K)exp= 0.05 *3* (1978Bo12).
1149.8 *3*	0.010 *4*	1149.7	$(1/2^+,3/2^+)$	0	$5/2^+$			
1152.80 *6*	0.010 *4*	1152.80	$(3/2^+,5/2)$	0	$5/2^+$			
1155.05 *4*	0.010 *4*	1155.052	$1/2^+$	0	$5/2^+$			
^{x}1158.13 *25*	0.30 *8*							
1167.01 *4*	0.020 *6*	1167.02	$3/2^+$	0	$5/2^+$			
^{x}1172.03 *25*	0.40 *25*							
^{x}1174.45 *25*	0.20 *5*							
^{x}1189.94 *25*	0.40 *10*							
^{x}1192.74 *25*	0.6 *2*							
^{x}1196.50 *25*	0.8 *2*							
2998.5 *5*	0.012 *4*	4806.454	$1/2^+$	1807.9	3/2			
3089.4 *5*	0.0071 *24*	4806.454	$1/2^+$	1717.0	3/2,(1/2)			
3114.2 *5*	0.007 *3*	4806.454	$1/2^+$	1692.2	3/2,(1/2)			
3121.7 *5*	0.008 *3*	4806.454	$1/2^+$	1684.7	1/2,3/2			
3175.2 *5*	0.0067 *22*	4806.454	$1/2^+$	1631.2	1/2,3/2			
3191.7 *5*	0.0047 *16*	4806.454	$1/2^+$	1614.7	3/2,(1/2)			
3197.2 *5*	0.016 *6*	4806.454	$1/2^+$	1609.2	$1/2,3/2^+$			
3220.1 *5*	0.012 *4*	4806.454	$1/2^+$	1586.3	3/2			
3233.2 *5*	0.010 *3*	4806.454	$1/2^+$	1573.2	$1/2,3/2^+$			
3286.1 *2*	0.0040 *3*	4806.454	$1/2^+$	1520.33	$1/2^-,3/2^-$			
3293.5[@] *15*	0.00028[@] *10*	4806.454	$1/2^+$	1512.9	$(1/2,3/2)^+$			
3296.5[@] *3*	0.354[@] *18*	4806.454	$1/2^+$	1509.9	$1/2^-,3/2^-$			
3301.9[@] *3*	0.0015[@] *1*	4806.454	$1/2^+$	1504.5	$(1/2,3/2)^-$			
3311.5[@] *6*	0.0037[@] *10*	4806.454	$1/2^+$	1494.9	1/2,3/2			
3312.8 *5*	0.0040 *10*	4806.454	$1/2^+$	1493.6	1/2,3/2			
3324.9[@] *2*	0.00252[@] *14*	4806.454	$1/2^+$	1481.53	$(1/2,3/2)^-$			
3326.9[@] *5*	0.00024[@] *8*	4806.454	$1/2^+$	1479.5	$(1/2,3/2)^+$			
3343.9[@] *3*	0.00042[@] *6*	4806.454	$1/2^+$	1462.5	$(1/2,3/2)^+$			
3360.6[@] *2*	0.00156[@] *12*	4806.454	$1/2^+$	1445.83	$(1/2,3/2)^+$			
3369.6[@] *2*	0.00092[@] *10*	4806.454	$1/2^+$	1436.83	$(1/2,3/2)^+$			

$^{239}_{92}U_{147}$-6

γ(^{239}U) (continued)

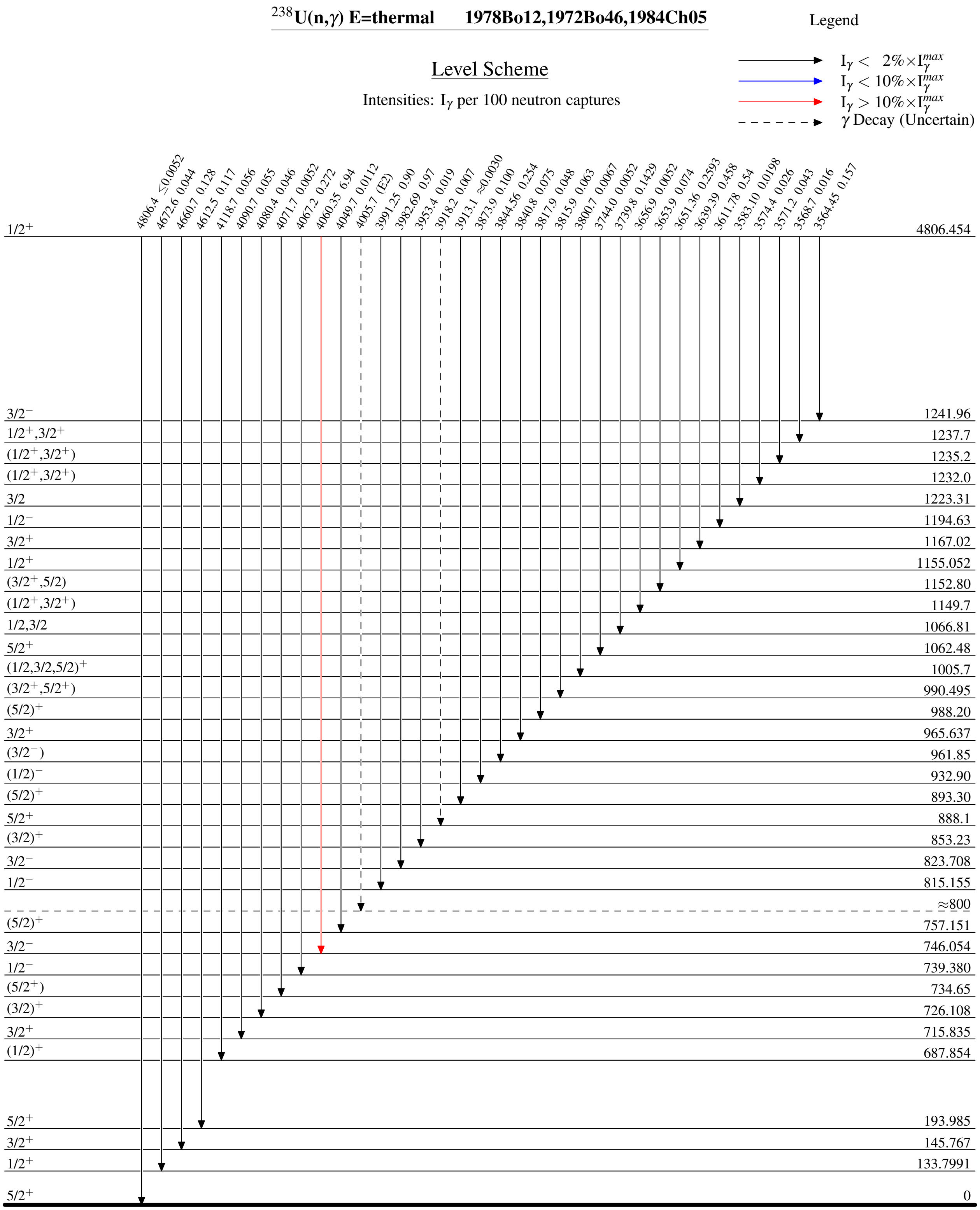
E_γ[#&]	I_γ[#&c]	E_i(level)	J^π_i	E_f	J^π_f
3389.5[@] *6*	0.00014[@] *6*	4806.454	1/2$^+$	1416.9	
3401.9[@] *2*	0.0025[@] *2*	4806.454	1/2$^+$	1404.53	(1/2,3/2)$^+$
3406.9[@] *8*	<0.00008[@]	4806.454	1/2$^+$	1399.5	
3422.9[@] *4*	0.00022[@] *8*	4806.454	1/2$^+$	1383.5	
3438.4[@] *2*	0.00234[@] *12*	4806.454	1/2$^+$	1368.03	(1/2,3/2)$^+$
3445.44 *6*	0.0045 *3*	4806.454	1/2$^+$	1360.97	1/2$^-$,3/2$^-$
3481.8[@] *3*	0.00084[@] *10*	4806.454	1/2$^+$	1324.6	(1/2,3/2)$^-$
3485.9[@] *7*	0.00084[@] *18*	4806.454	1/2$^+$	1320.5	1/2,3/2
3488.2[@] *3*	0.00278[@] *14*	4806.454	1/2$^+$	1318.2	1/2,3/2
3500.8[@] *3*	0.00086[@] *8*	4806.454	1/2$^+$	1306.22	1/2$^-$,3/2$^-$
3529.6[@] *2*	0.00166[@] *10*	4806.454	1/2$^+$	1276.83	(1/2$^+$,3/2$^+$)
3535.8[@] *5*	0.00066[@] *14*	4806.454	1/2$^+$	1270.6	(1/2$^+$,3/2$^+$)
3541.1[@] *8*	0.00054[@] *14*	4806.454	1/2$^+$	1265.3	(5/2$^+$)
3546.1[@] *3*	0.00094[@] *18*	4806.454	1/2$^+$	1260.3	(1/2,3/2)$^+$
3563.0 *5*		4806.454	1/2$^+$	1243.4	
3564.45 *9*	0.0042 *4*	4806.454	1/2$^+$	1241.96	3/2$^-$
3568.7[@] *7*	0.00042[@] *12*	4806.454	1/2$^+$	1237.7	1/2$^+$,3/2$^+$
3571.2[@] *5*	0.00116[@] *24*	4806.454	1/2$^+$	1235.2	(1/2$^+$,3/2$^+$)
3574.4[@] *7*	0.00070[@] *16*	4806.454	1/2$^+$	1232.0	(1/2$^+$,3/2$^+$)
3583.10 *7*	0.00053 *4*	4806.454	1/2$^+$	1223.31	3/2
3611.78 *9*	0.0146 *10*	4806.454	1/2$^+$	1194.63	1/2$^-$
3639.39 *6*	0.01228	4806.454	1/2$^+$	1167.02	3/2$^+$
3651.36 *6*	0.00695	4806.454	1/2$^+$	1155.052	1/2$^+$
3653.9[@] *8*	0.00198[@] *30*	4806.454	1/2$^+$	1152.80	(3/2$^+$,5/2)
3656.9[@] *5*	0.00014[@] *6*	4806.454	1/2$^+$	1149.7	(1/2$^+$,3/2$^+$)
3739.8 *6*	0.00383	4806.454	1/2$^+$	1066.81	1/2,3/2
3744.0[@] *2*	0.00014[@] *6*	4806.454	1/2$^+$	1062.48	5/2$^+$
3800.7[@] *5*	0.00018[@] *6*	4806.454	1/2$^+$	1005.7	(1/2,3/2,5/2)$^+$
3815.9[@] *5*	0.00168[@] *10*	4806.454	1/2$^+$	990.495	(3/2$^+$,5/2$^+$)
3817.9[@] *5*	0.00128[@] *8*	4806.454	1/2$^+$	988.20	(5/2)$^+$
3840.8[@] *4*	0.00202[@] *10*	4806.454	1/2$^+$	965.637	3/2$^+$
3844.56 *21*	0.0068 *5*	4806.454	1/2$^+$	961.85	(3/2$^-$)
3873.9[@] *2*	0.00268[@] *12*	4806.454	1/2$^+$	932.90	(1/2)$^-$
3913.1[@] *20*	≈0.00008[@]	4806.454	1/2$^+$	893.30	(5/2)$^+$
3918.2[@e] *10*	0.00020[@] *8*	4806.454	1/2$^+$	888.1	5/2$^+$
3953.4[@] *3*	0.00052[@] *8*	4806.454	1/2$^+$	853.23	(3/2)$^+$
3982.69 *5*	0.0259 *14*	4806.454	1/2$^+$	823.708	3/2$^-$

γ(^{239}U) (continued)

E_γ [#&]	I_γ [#&c]	E_i(level)	J^π_i	E_f	J^π_f	Mult. [‡]	Comments
3991.25 *5*	0.0241 *12*	4806.454	1/2$^+$	815.155	1/2$^-$		
4005.7[e]		4806.454	1/2$^+$	≈800?		(E2)	Detected in 1971Wa12. Iγ(≈4006)<3×10^{-3} (1978Bo12).
4049.7[@] *5*	0.00030[@] *6*	4806.454	1/2$^+$	757.151	(5/2)$^+$		
4060.35 *5*	0.186 *3*	4806.454	1/2$^+$	746.054	3/2$^-$		
4067.2 *2*	0.0073 *4*	4806.454	1/2$^+$	739.380	1/2$^-$		
4071.7[@] *7*	0.00014[@] *4*	4806.454	1/2$^+$	734.65	(5/2$^+$)		
4080.4[@] *2*	0.00124[@] *12*	4806.454	1/2$^+$	726.108	(3/2)$^+$		
4090.7[@] *2*	0.00148[@] *14*	4806.454	1/2$^+$	715.835	3/2$^+$		
4118.7[@] *2*	0.00150[@] *14*	4806.454	1/2$^+$	687.854	(1/2)$^+$		
4612.5[@] *2*	0.00313[@] *28*	4806.454	1/2$^+$	193.985	5/2$^+$		
4660.7[@] *2*	0.00342[@] *30*	4806.454	1/2$^+$	145.767	3/2$^+$		
4672.6[@] *2*	0.00118[@] *12*	4806.454	1/2$^+$	133.7991	1/2$^+$		
4806.4[@] *15*	≤0.00014[@]	4806.454	1/2$^+$	0	5/2$^+$		

[†] Additional information 2.
[‡] From conversion electron coefficients or sub-shell ratios. The scale of electron intensities was normalized to that of γ rays using the 133-keV E2 γ ray for Eγ<200 keV, and using the 539-, 552-, and 629-keV E1 γ rays for Eγ>480 keV. Authors estimated 20% to 30% uncertainties in Iγ (1978Bo12). Evaluator has used 25% for deducing uncertainties in experimental conversion coefficients.
[#] From 2007ChZX, unless otherwise specified. Iγ=σ_γ(Eγ) measured at 2200 min/s.
[@] From 1972Bo46. Iγ are on the same scale as values given in 2007ChZX for primary γ rays.
[&] Additional information 3.
[a] Deduced from upper limit of conversion electron intensity (1978Bo12).
[b] Only conversion electrons were detected. Given intensity is per 100 captured neutrons.
[c] For intensity per 100 neutron captures, multiply by 37.31 *27*.
[d] Multiply placed with undivided intensity.
[e] Placement of transition in the level scheme is uncertain.
[x] γ ray not placed in level scheme.

$^{239}_{92}$U$_{147}$-8



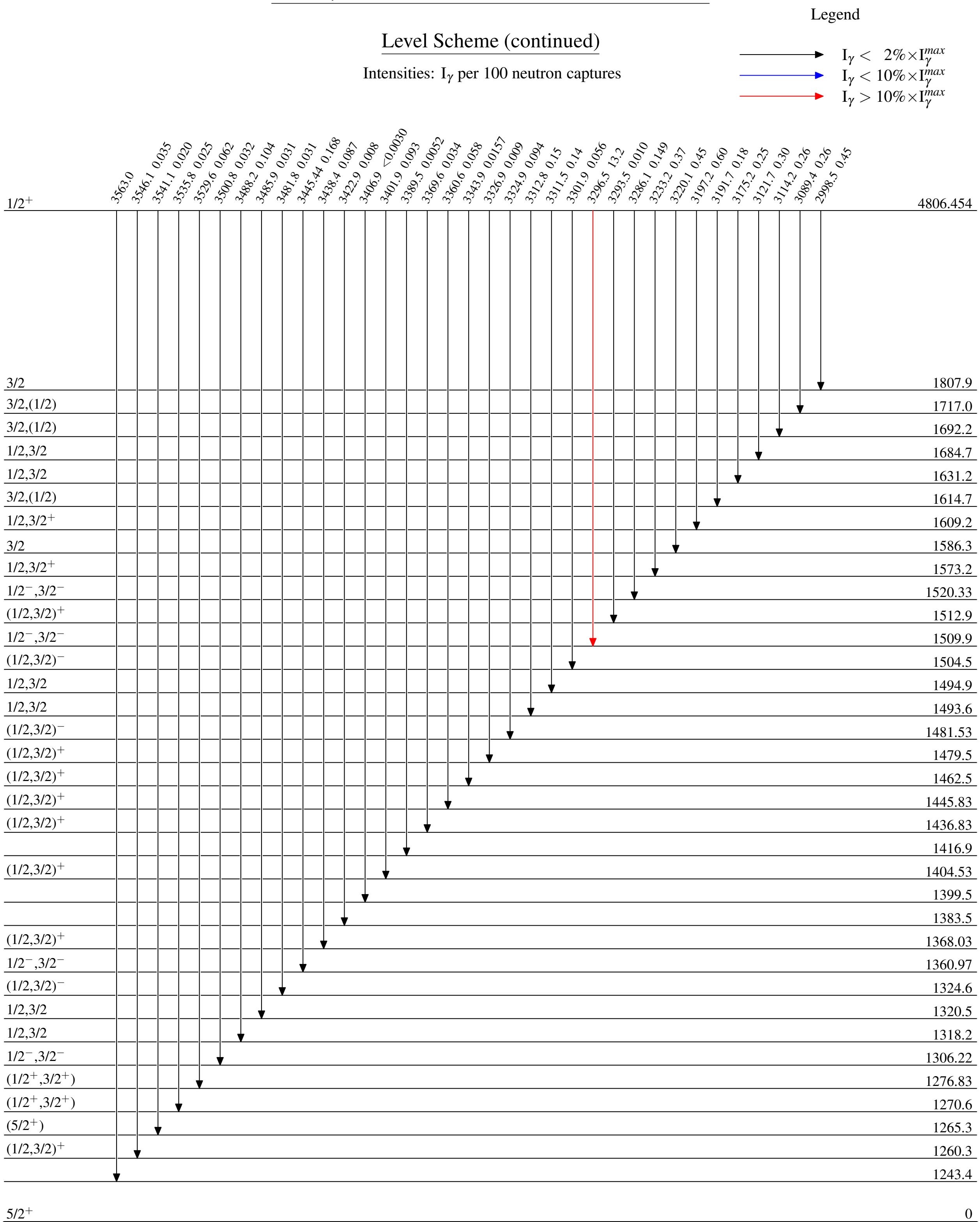
238U(n,γ) E=thermal 1978Bo12,1972Bo46,1984Ch05
Legend
Level Scheme
Intensities: Iγ per 100 neutron captures
Iγ < 2%×Iγmax
Iγ < 10%×Iγmax
Iγ > 10%×Iγmax
γ Decay (Uncertain)
4806.4 ≤0.0052
4672.6 0.044
4660.7 0.128
4612.5 0.117
4118.7 0.056
4090.7 0.055
4080.4 0.046
4071.7 0.0052
4067.2 0.272
4060.35 6.94
4049.7 0.0112
4005.7 (E2)
3991.25 0.90
3982.69 0.97
3953.4 0.019
3918.2 0.007
3913.1 ≈0.0030
3873.9 0.100
3844.56 0.254
3840.8 0.075
3817.9 0.048
3815.9 0.063
3800.7 0.0067
3744.0 0.0052
3739.8 0.1429
3656.9 0.0052
3653.9 0.074
3651.36 0.2593
3639.39 0.458
3611.78 0.54
3583.10 0.0198
3574.4 0.026
3571.2 0.043
3568.7 0.016
3564.45 0.157
1/2+ 4806.454
3/2− 1241.96
1/2+,3/2+ 1237.7
(1/2+,3/2+) 1235.2
(1/2+,3/2+) 1232.0
3/2 1223.31
1/2− 1194.63
3/2+ 1167.02
1/2+ 1155.052
(3/2+,5/2) 1152.80
(1/2+,3/2+) 1149.7
1/2,3/2 1066.81
5/2+ 1062.48
(1/2,3/2,5/2)+ 1005.7
(3/2+,5/2+) 990.495
(5/2)+ 988.20
3/2+ 965.637
(3/2−) 961.85
(1/2)− 932.90
(5/2)+ 893.30
5/2+ 888.1
(3/2)+ 853.23
3/2− 823.708
1/2− 815.155
≈800
(5/2)+ 757.151
3/2− 746.054
1/2− 739.380
(5/2+) 734.65
(3/2)+ 726.108
3/2+ 715.835
(1/2)+ 687.854
5/2+ 193.985
3/2+ 145.767
1/2+ 133.7991
5/2+ 0

$^{239}_{92}U_{147}$

$^{238}U(n,\gamma)$ E=thermal 1978Bo12,1972Bo46,1984Ch05

Level Scheme (continued)

Intensities: I_γ per 100 neutron captures



$^{239}_{92}U_{147}$

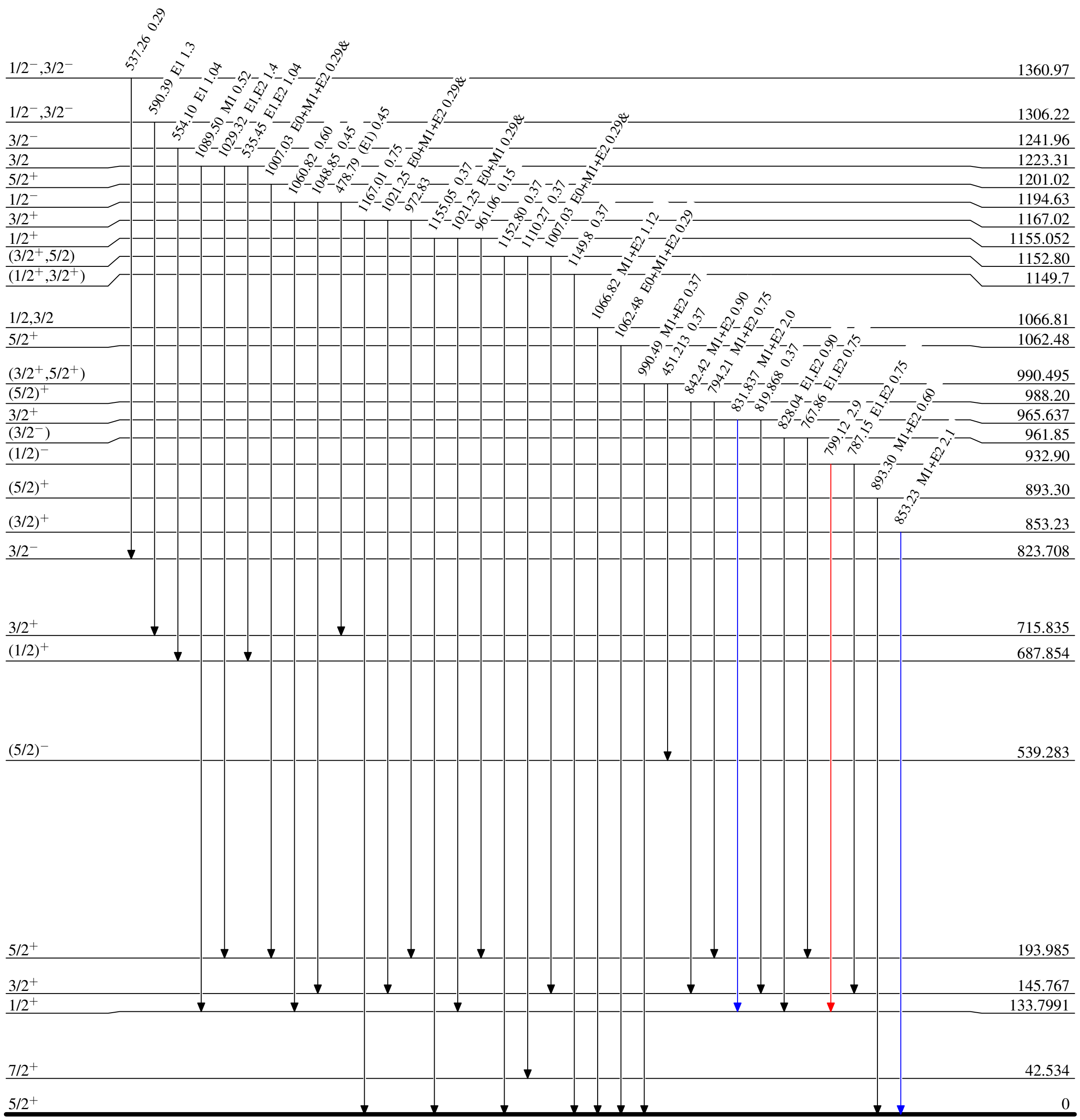
^{238}U(n,γ) E=thermal 1978Bo12,1972Bo46,1984Ch05

Level Scheme (continued)

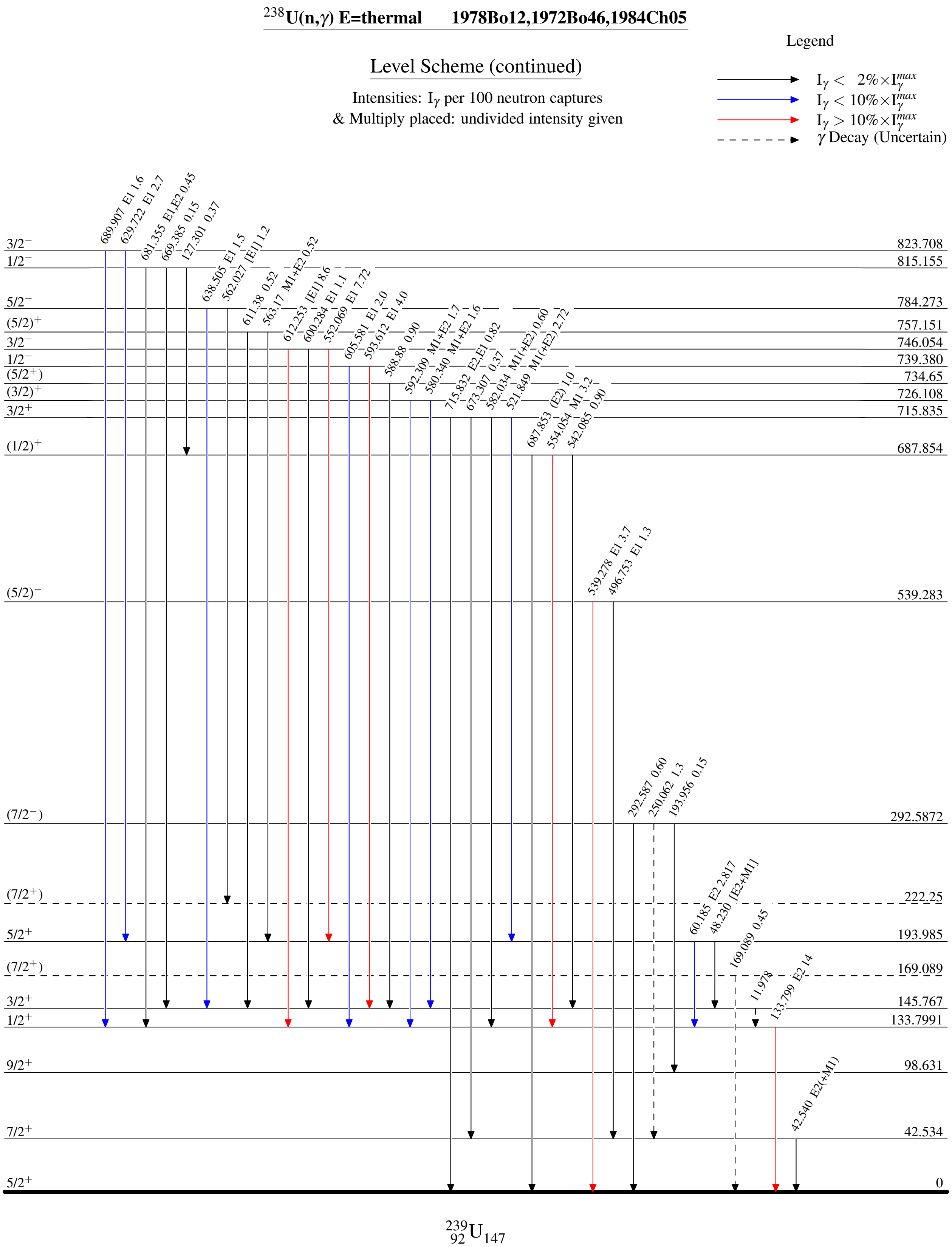
Intensities: I_γ per 100 neutron captures
& Multiply placed: undivided intensity given

Legend

$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$



$^{239}_{92}U_{147}$



^{238}U(n,γ) E=thermal 1978Bo12,1972Bo46,1984Ch05
Level Scheme (continued)
Intensities: I_γ per 100 neutron captures
& 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)
3/2− 823.708
1/2− 815.155
5/2− 784.273
(5/2)+ 757.151
3/2− 746.054
1/2− 739.380
(5/2+) 734.65
(3/2)+ 726.108
3/2+ 715.835
(1/2)+ 687.854
(5/2)− 539.283
(7/2−) 292.5872
(7/2+) 222.25
5/2+ 193.985
(7/2+) 169.089
3/2+ 145.767
1/2+ 133.7991
9/2+ 98.631
7/2+ 42.534
5/2+ 0
689.907 E1 1.6
629.722 E1 2.7
681.355 E1,E2 0.45
669.385 0.15
127.301 0.37
638.505 E1 1.5
562.027 [E1] 1.2
611.38 0.52
563.17 M1+E2 0.52
612.253 [E1] 8.6
600.284 E1 1.1
552.069 E1 7.72
605.581 E1 2.0
593.612 E1 4.0
588.88 0.90
592.309 M1+E2 1.7
580.340 M1+E2 1.6
715.832 E2,E1 0.82
673.307 0.37
582.034 M1(+E2) 0.60
521.849 M1(+E2) 2.72
687.853 (E2) 1.0
554.054 M1 3.2
542.085 0.90
539.278 E1 3.7
496.753 E1 1.3
292.587 0.60
250.062 1.3
193.956 0.15
60.185 E2 2.817
48.230 [E2+M1]
169.089 0.45
11.978
133.799 E2 14
42.540 E2(+M1)
$^{239}_{92}U_{147}$