$^{233}_{90}$Th

Δ: 38728.6 *20* **S$_n$:** 4786.35 *25* **S$_p$:** 7700 *100*
Q$_{\beta-}$: 1245.1 *14* **Q$_\alpha$:** 3870 *60*
σ$_\gamma$: 1500 *100* b , **σ$_f$:** 15 *2* b

Nuclear Bands

A 1/2[631]
B 5/2[622]
C 7/2[743]
D 5/2[633]
E 7/2[624]
F 3/2[631]
G 5/2[752]
H 1/2[501]
I 7/2[743]+2$^+$
J 5/2[622]+2$^+$
K 5/2[622]+0$^+$
L 1/2[631]+0$^+$
M Fission isomer

Levels and γ-ray branchings:

A **0**, 1/2$^+$, 22.3 *1* m, %β$^-$=100
B **6.04** *2*, (5/2)$^+$
C **6.06** *2*, (7/2)$^-$
A **16.86** *2*, 3/2$^+$
B **50.38** *2*, (7/2)$^+$ γ$_{6.0}$***44.364*** *6*
M1+E2: δ=0.23 *9*
A **54.546** *6*, 5/2$^+$ γ$_{17}$***37.697*** *8* (M1+E2)
γ$_{6.0}$***48.533*** *8* γ$_0$***54.545*** *3* E2
A **93.62** *2*, 7/2$^+$ γ$_{55}$***39.091*** *7* γ$_{17}$***76.740*** *4*
(E2)
B **107.34** *2*, (9/2$^+$) γ$_{50}$***56.960*** *4* (M1)
A **159.0** *10*, (9/2$^+$)
B **178** *2*, (11/2$^+$)
A **220** *2*, (11/2$^+$)
C **252.3** *5*, (15/2$^-$)
D **262.24** *2*, (5/2)$^+$ γ$_{50}$***211.869*** *6* (†$_\gamma$17 *3*)
M1 γ$_{6.0}$***256.190*** *4* (†$_\gamma$100 *12*) M1
E **279.40** *2*, (7/2)$^+$ γ$_{107}$***172.072*** *13* (†$_\gamma$23 *7*)
γ$_{50}$***229.017*** *7* (†$_\gamma$100 *14*) M1
A **297**, (13/2$^+$)
309.5 *20*, (1/2,3/2)
E **326.0** *10*, (9/2$^+$)
F **335.928** *3*, 3/2$^+$ γ$_{55}$***281.365*** *13* (†$_\gamma$20 *3*)
M1 γ$_{17}$***319.067*** *3* (†$_\gamma$92.9 *10*) M1
γ$_{6.0}$***329.879*** *7* (†$_\gamma$26 *3*) M1
γ$_0$***335.928*** *3* (†$_\gamma$100 *11*) M1
337.35 *6*, (5/2,7/2)$^+$ γ$_{50}$***286.2*** *4* (†$_\gamma$10 *10*)
γ$_{6.0}$***331.314*** *4* (†$_\gamma$100 *11*) M1
F **371.17** *2*, (5/2)$^+$ γ$_{94}$***277.549*** *10* (†$_\gamma$36 *6*)
M1 γ$_{55}$***316.642*** *7* (†$_\gamma$100 *10*) M1
γ$_{50}$***320.79*** *3* (†$_\gamma$13 *3*) M1
γ$_{17}$***354.313*** *4* (†$_\gamma$95 *12*) M1
γ$_{6.0}$***365.113*** *15* (†$_\gamma$11.8 *17*)
M1+E2: δ=1.3 *5*
E **388.5** *10*, (11/2$^+$)
D **388.5** *10*, (9/2$^+$)
405.8 *20*, 1/2,3/2,5/2$^+$
410.0 *15*
413.8 *20*, (1/2,3/2)
F **421.15** *2*, (7/2)$^+$ γ$_{107}$***313.814*** *17*
γ$_{94}$***327.527*** *9* (†$_\gamma$100 *11*)
M1+E2: δ=0.65 *35* γ$_{55}$***366.622*** *13*
(†$_\gamma$53 *8*) M1
443 *5* (?)
D **464** *3*, (11/2$^+$)
G **478.36** *17*, (5/2)$^-$ γ$_{6.1}$***472.300*** *5* M1
F **480.9** *10*, (9/2$^+$)
510 (?)
H **539.61** *2*, (1/2)$^-$ γ$_{17}$***522.757*** *6* (†$_\gamma$100 *11*)
E1 γ$_0$***539.599*** *9* (†$_\gamma$64 *7*) E1
I **572.70** *3*, (3/2)$^-$ γ$_{336}$***236.81*** *3* (†$_\gamma$3.2 *7*)
E1 γ$_{6.1}$***566.630*** *7* (†$_\gamma$100 *10*) E2
J **583.932** *8*, (1/2)$^+$ γ$_{6.0}$***577.888*** *6*
(†$_\gamma$100 *15*) (E2) γ$_0$***583.932*** *8* (†$_\gamma$57 *6*)
M1
H **586.135** *9*, 3/2$^-$ γ$_{55}$***531.582*** *11* (†$_\gamma$97 *11*)
(E1) γ$_{17}$***569.19*** *5* (†$_\gamma$24 *4*)
γ$_0$***586.140*** *7* (†$_\gamma$100 *11*) E1
599.29 *6* (?), (5/2$^-$) γ$_{17}$***582.44*** *7* (†$_\gamma$21 *6*)
γ$_{6.1}$***593.21*** *4* (†$_\gamma$100 *11*) (E2)
J **611.476** *12*, (3/2)$^+$ γ$_{55}$***556.931*** *19*
(†$_\gamma$77 *8*) M1 γ$_{50}$***561.088*** *17* (†$_\gamma$64 *7*)
γ$_{6.0}$***605.442*** *13* (†$_\gamma$100 *10*)
J **628.97** *2*, (5/2)$^+$ γ$_{107}$***521.66*** *3* (†$_\gamma$37 *14*)
(E2) γ$_{94}$***535.28*** *3* (†$_\gamma$34 *6*) E2
γ$_{55}$***574.37*** *9* (†$_\gamma$32 *5*) M1
γ$_{50}$***578.607*** *17* (†$_\gamma$100 *13*) (E1)
γ$_{17}$***612.10*** *3* (†$_\gamma$93 *12*) M1
γ$_{6.0}$***622.95*** *6* (†$_\gamma$49 *6*) (E2)
632.8 *20*, 1/2,3/2,5/2$^+$
645.5 *20*, 1/2,3/2
681.846 *19* (?), (1/2)$^-$ γ$_0$***681.846*** *19* E1
682.11 *3*, (3/2$^-$) γ$_{17}$***665.252*** *17*
(†$_\gamma$100 *10*) γ$_{6.1}$***676.02*** *9* (†$_\gamma$4.9 *14*)
691.2 *15*
695.6 *20*, 1/2,3/2,5/2$^+$
K **711.19** *18*, (5/2)$^+$ γ$_{50}$***660.49*** *13*
(†$_\gamma$100 *30*) γ$_{17}$***694.40*** *7* (†$_\gamma$100 *20*)
γ$_{6.0}$***705.158*** *20* E0+M1(+E2)
γ$_0$***711.18*** *6* (†$_\gamma$90 *18*)
L **713.72** *2*, 1/2$^+$ γ$_{17}$***696.85*** *4* (†$_\gamma$73 *11*)
γ$_0$***713.719*** *16* (†$_\gamma$100 *16*) E0+M1
L **721.84** *5*, 3/2$^+$ γ$_{540}$***182.12*** *3* (†$_\gamma$20 *7*)
γ$_{94}$***628.38*** *8* (†$_\gamma$47 *6*) (E2)
γ$_{17}$***704.98*** *3* (†$_\gamma$100 *15*) E0+M1(+E2)
γ$_0$***721.95*** *6* (†$_\gamma$38 *8*) M1+E2: δ=0.9 *5*
725.8 *10*
741.32 *4*, (3/2)$^-$ γ$_{540}$***201.677*** *20*
(†$_\gamma$46 *11*) M1+E2: δ=0.5 *5* γ$_{478}$***263.02*** *3*
(†$_\gamma$54 *7*) M1+E2: δ=0.5 *5* γ$_{371}$***370.15*** *5*
(†$_\gamma$31 *5*) γ$_{6.0}$***735.30*** *4* (†$_\gamma$100 *14*)

γ_{0}***741.22*** *10* (†$_{\gamma}$100 *14*)

749.9 *20*, 1/2,3/2

K **753.98** *5*, (7/2)$^{+}$ γ_{50}***703.61*** *4* (†$_{\gamma}$100 *30*) E0+M1(+E2) $\gamma_{6.1}$***747.76*** *14* (†$_{\gamma}$58 *24*)

768.18 *2*, 1/2^{+},3/2^{+} γ_{586}***182.12*** γ_{336}***432.25*** *2* (†$_{\gamma}$<69) M1+E2: δ=0.6 *4* γ_{17}***751.25*** *8* (†$_{\gamma}$100 *19*)

L **769.60** *2*, 5/2^{+} γ_{55}***715.06*** *3* (†$_{\gamma}$100 *17*) E0+M1(+E2) γ_{17}***752.62*** *6* (†$_{\gamma}$47 *8*) M1 γ_{0}***769.83*** *9* (†$_{\gamma}$33 *7*)

783.64 *8* (?), (1/2^{+},3/2^{+}) γ_{371}***412.47*** *7* (†$_{\gamma}$25 *4*) $\gamma_{6.0}$***777.71*** *13* (†$_{\gamma}$100 *28*)

796 *3*

803.41 *6*, (5/2)$^{+}$ γ_{371}***432.250*** γ_{262}***541.21*** *5* (†$_{\gamma}$18 *4*) γ_{17}***786.45*** *13* (†$_{\gamma}$25 *7*) M1 $\gamma_{6.0}$***797.25*** *6* (†$_{\gamma}$100 *20*) (M1)

814.74 *13*, 3/2^{+} γ_{17}***798.08*** *8* (†$_{\gamma}$63 *16*) (M1) $\gamma_{6.0}$***808.71*** *13* (†$_{\gamma}$92 *13*) M1+E2 γ_{0}***814.74*** *13* (†$_{\gamma}$100 *14*) M1+E2

830.5 *20*, (1/2,3/2)

839.66 *8*, (3/2^{-}) $\gamma_{6.0}$***833.63*** *7* (†$_{\gamma}$100 *14*) γ_{0}***839.5*** *5* (†$_{\gamma}$15 *3*)

842.26 *9*, (1/2,3/2)$^{+}$ γ_{611}***230.784*** *6* (†$_{\gamma}$64 *10*) M1+E2: δ=1.1 *5* γ_{584}***258.335*** *16* (†$_{\gamma}$73) γ_{371}***471.28*** *9* (†$_{\gamma}$55 *12*) γ_{336}***506.25*** *5* (†$_{\gamma}$64 *14*) γ_{262}***579.99*** *3* (†$_{\gamma}$100 *12*) (E2) γ_{17}***825.37*** *14* (†$_{\gamma}$73 *16*) γ_{0}***842.47*** *18* (†$_{\gamma}$41 *13*)

846 *3*

852.28 *17*, 1/2^{+},3/2,5/2^{+} γ_{262}***590.04*** *16* γ_{17}***835.05***

861.54 *11*, 1/2^{+},3/2^{+} γ_{584}***277.549*** γ_{17}***844.55*** *12* (†$_{\gamma}$62 *14*) γ_{0}***861.64*** *10* (†$_{\gamma}$100 *18*) M1

873.7 *15*, 1/2,3/2,5/2^{+}

884.94 *8*, 1/2^{+},3/2^{+},5/2^{+} γ_{336}***548.95*** *13* (†$_{\gamma}$34 *4*) M1 γ_{55}***830.41*** *7* (†$_{\gamma}$100 *15*) (E2)

891.4 *2*, 1/2,3/2

900 *3*

904.6 *5*, (1/2^{+},3/2^{+})

918.0 *10*, (1/2^{-},3/2^{-})

924.58 *20*, (3/2)$^{-}$ γ_{540}***384.94*** *3* (†$_{\gamma}$25 *6*) M1+E2: δ=1.0 *5* γ_{371}***553.39*** *3* (†$_{\gamma}$50 *9*) γ_{336}***588.72*** *12* (†$_{\gamma}$71 *13*) γ_{262}***661.88*** *6* (†$_{\gamma}$50 *9*) γ_{17}***907.42*** *13* (†$_{\gamma}$71 *13*) $\gamma_{6.0}$***918.68*** *7* (†$_{\gamma}$100 *15*)

947.2 *4*, (3/2^{-}) γ_{262}***684.97*** *4* (†$_{\gamma}$77 *10*) $\gamma_{6.1}$***940.53*** *12* (†$_{\gamma}$100 *19*) γ_{0}***947.2*** *4* (†$_{\gamma}$25 *4*)

954 *4*

957.5 *15* (?), (5/2^{+})

968.1 *2*, (1/2,3/2)$^{+}$ γ_{336}***632.47*** *9* (†$_{\gamma}$22 *6*) M1 γ_{55}***913.63*** *10* (†$_{\gamma}$50 *9*) γ_{17}***951.4*** *4* (†$_{\gamma}$20 *5*) (M1) γ_{0}***967.13*** *6* (†$_{\gamma}$100 *18*) M1(+E2)

973 *4*

984.2 *8*, (1/2^{+},3/2^{+})

991 *3*

1013.1 *3*, 1/2^{-},3/2^{-} γ_{586}***427.31*** *3* (†$_{\gamma}$11 *2*) (M1+E2) γ_{17}***996.1*** *3* (†$_{\gamma}$21 *7*) γ_{0}***1012.97*** *11* (†$_{\gamma}$100 *18*) E1

1026 *3*

1031.6 *2*, 1/2^{-},3/2^{-} γ_{17}***1014.85*** *11* (†$_{\gamma}$100 *18*) γ_{0}***1031.1*** *4* (†$_{\gamma}$10 *3*)

1040.0 *3*, (1/2,3/2)

1046 *4*

1051.5 *5*, (3/2)$^{-}$ γ_{55}***996.15*** γ_{17}***1034.27*** *7* (†$_{\gamma}$100 *24*) γ_{0}***1052.11*** *19* (†$_{\gamma}$56 *13*)

1061.43 *15*, (1/2^{+},3/2^{+}) γ_{17}***1044.68*** *13* (†$_{\gamma}$100 *19*) $\gamma_{6.0}$***1055.39*** *14* (†$_{\gamma}$100 *19*)

1074.0 *6*, (1/2^{-},3/2^{-})

1087.4 *5* (?), (1/2,3/2)

1101.7 *7*, (1/2^{+},3/2^{+})

1115.3 *7*, (1/2^{+},3/2^{+})

1132.11 *9*, (3/2)$^{+}$ γ_{262}***869.87*** *8* (†$_{\gamma}$100 *17*) M1+E2 γ_{50}***1081.4*** *4* (†$_{\gamma}$31 *8*) $\gamma_{6.0}$***1125.7*** *3* (†$_{\gamma}$65 *8*)

1151.72 *22*, (3/2,5/2)$^{+}$ γ_{371}***780.77*** *12* (†$_{\gamma}$23 *6*) M1+E2 γ_{55}***1097.2*** *3* (†$_{\gamma}$41 *6*) γ_{50}***1101.15*** *10* (†$_{\gamma}$100 *16*) $\gamma_{6.0}$***1145.66*** *21* (†$_{\gamma}$51 *12*) M1 γ_{0}***1151.7*** *4* (†$_{\gamma}$33 *8*)

1164 *4*

1171.2 *10*, 3/2^{-} γ_{55}***1117.7*** *3* (†$_{\gamma}$69 *23*) γ_{17}***1154.3*** *4* (†$_{\gamma}$50 *8*) $\gamma_{6.1}$***1164.2*** *3* (†$_{\gamma}$100 *12*)

1182.8 *6*, 1/2,3/2,5/2^{+}

1185.5 *4*, (3/2^{+}) γ_{336}***850.01*** *8* (†$_{\gamma}$100 *20*) γ_{94}***1091.1*** *7* (†$_{\gamma}$19 *7*) γ_{0}***1185.1*** *3* (†$_{\gamma}$87 *13*)

1212.5 *12* (?), 1/2,3/2,5/2^{+}

1219 *5*

1225.7 *7*, (1/2^{+},3/2^{+})

1238.2 *6*, 1/2,3/2,5/2^{+}

1256.7 *6*, 1/2^{-},3/2^{-}

1259.4 *5*, 1/2,3/2

1262.8 *6*, 1/2,3/2

1276.8 *5*, 1/2,3/2,5/2^{+}

1282.9 *6*, 1/2,3/2

1293.4 *4*, 1/2^{-},3/2^{-}

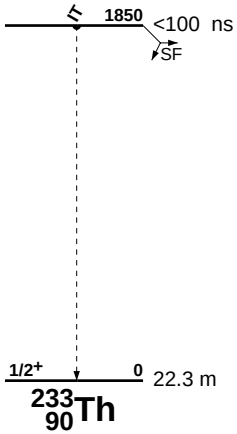
1304.8 *6*, (1/2^{+},3/2^{+})

1313.41 *8*, (3/2)$^{-}$ γ_{478}***835.05*** *7* M1+E2

1324.7 *4*, 1/2,3/2,5/2^{+}

1330.2 *6*, (1/2,3/2)

1338.1 *6*, $1/2^-,3/2^-$
1344 *5*
1350.7 *2*, $(3/2)^-$ γ_{478} ***872.34*** *15* M1
1367 *5*
1388.5 *10*, $(1/2^-,3/2^-)$
1395.2 *4*, 1/2,3/2
1402 *5*
1408.4 *3*, 1/2,3/2
1422.6 *4*, $1/2,3/2,5/2^+$
1430 *4*
1445.5 *10*, 1/2,3/2
1459.7 *6*, 1/2,3/2
1479.1 *4*, $1/2^-,3/2^-$
1491.0 *4*, $1/2,3/2,5/2^+$
1498.1 *4*, 1/2,3/2
1509.9 *4*, $1/2,3/2,5/2^+$
1517.4 *7*, $1/2,3/2,5/2^+$
1525.1 *4*, $1/2,3/2,5/2^+$
1532.7 *8*, (1/2,3/2)
1540.8 *5*, $1/2,3/2,5/2^+$
1554.7 *5*, $1/2,3/2,5/2^+$
1557.5 *5*, $1/2,3/2,5/2^+$
1580.2 *8*, (1/2,3/2)
1589.8 *10*, $1/2^-,3/2^-$
1601.3 *5*, $1/2,3/2,5/2^+$
1612.3 *5*, $1/2,3/2,5/2^+$
1638.0 *3*, 1/2,3/2
1653.6 *5*, $1/2,3/2,5/2^+$
1658.7 *4*, $1/2,3/2,5/2^+$
1668.3 *5*, $(1/2^+,3/2^+)$
1688.7 *13*, $1/2^+,3/2^+,5/2^+$
1699.3 *4*, 1/2,3/2
1716.5 *12*, $1/2(^-),3/2(^-)$
1727.7 *7*, 1/2,3/2
1730.6 *7*, $1/2,3/2,5/2^+$
1736.7 *7*, $1/2,3/2,5/2^+$
1741.2 *9*, $1/2,3/2,5/2^+$
1776.4 *8*, $1/2,3/2,5/2^+$
1796.8 *5*, $1/2,3/2,5/2^+$
1805.6 *5*, 1/2,3/2
1816.0 *5*, $1/2,3/2,5/2^+$
1842.0 *11* (?)
M **1850** *250*, <100 ns, %SF≤100
1859.7 *9*, $1/2,3/2,5/2^+$
1862.5 *7*, $1/2,3/2,5/2^+$
1894.9 *7*, $1/2,3/2,5/2^+$
1905.4 *4*, 1/2,3/2
1935.4 *5*, $1/2,3/2,5/2^+$
1944.4 *7*, $1/2^-,3/2^-$
1948.0 *6*, $1/2,3/2,5/2^+$
1961.4 *5*, 1/2,3/2
1964.2 *6*, $1/2,3/2,5/2^+$
1970.7 *10*, $1/2,3/2,5/2^+$
1979.0 *5*, 1/2,3/2
1991.0 *7*, $1/2,3/2,5/2^+$
1995.9 *7*, $1/2,3/2,5/2^+$
2002.1 *5*, $1/2,3/2,5/2^+$
2014.7 *7*, $1/2,3/2,5/2^+$
2026.4 *7*, $1/2,3/2,5/2^+$
2041.5 *6*, $1/2,3/2,5/2^+$
2046.6 *6*, $1/2,3/2,5/2^+$
2053.5 *4*, $1/2,3/2,5/2^+$
2066.3 *5*, 1/2,3/2
2069.6 *9*, $1/2,3/2,5/2^+$
2073.9 *4*, 1/2,3/2
2083.1 *5*, 1/2,3/2
2097.2 *6*, $1/2,3/2,5/2^+$
2114.5 *5*, $1/2,3/2,5/2^+$
2126.8 *4*, 1/2,3/2
2132.9 *4*, 1/2,3/2
2145.1 *5*, 1/2,3/2
2150.1 *7*, $1/2,3/2,5/2^+$
2156.2 *5*, $1/2,3/2,5/2^+$
2176.3 *6*, $1/2,3/2,5/2^+$
2179.6 *7*, $1/2,3/2,5/2^+$
2189.4 *4*, 1/2,3/2
2195.3 *6*, $1/2,3/2,5/2^+$
2228.1 *6*, $1/2,3/2,5/2^+$
2234.4 *6*, $1/2,3/2,5/2^+$
2240.9 *6*, $1/2,3/2,5/2^+$
2244.0 *7*, $1/2,3/2,5/2^+$
2261.5 *6*, $1/2,3/2,5/2^+$
2282.6 *6*, 1/2,3/2
2300.6 *6*, $1/2,3/2,5/2^+$


1850
<100 ns
SF
1/2+
0
22.3 m
233
90
Th