^{152}Tm IT decay (294 ns) 1986Mc14

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	M. J. Martin	NDS 114, 1497 (2013)	31-Aug-2013

Parent: ^{152}Tm: E=2554.9+x; J^π=(17^+); $T_{1/2}$=294 ns *12*; %IT decay=100.0
Production: ^{94}Mo(^{60}Ni,pnγ) E=240-250 MeV.
Measured: γ, γ(t), (Tm K x ray)γ, $\gamma\gamma$.

^{152}Tm Levels

E(level)	J^π†	$T_{1/2}$	Comments
0.0+x	(9)$^+$‡		
114.4+x	(8)$^+$		
656.9+x	(9^+)		
1018.2+x	(10^+)		
1169.6+x	(11^-)		J^π: octupole excitation on configuration=($\pi h_{11/2}$)$^{+5}$($\nu f_{7/2}$). $T_{1/2}$: less than a few ns.
1405.3+x	(12^-)		
1449.8+x	11^+‡		
1934.7+x	(13^-)		
2131.3+x	13^+‡		
2272.1+x	(15^-)		
2345.1+x			
2451.4+x	15^+‡		
2554.9+x	17^+‡	294 ns *12*	

† With the exception of the 0.0+x and 114.34+x levels, the assignments are as given by 1986Mc14 and are based on shell-model configurations and analogy with ^{150}Ho. For the levels mentioned, the evaluator has assigned J in parens, and, based on arguments given in Adopted Levels, has assigned π outside parens.
‡ Configuration=(π,$h_{11/2}$)$^{+5}$(ν,$f_{7/2}$).

γ(^{152}Tm)

Iγ normalization: From ΣI(γ+ce) to g.s.)=100.

E_γ	I_γ#	E_i(level)	J^π_i	E_f	J^π_f	Mult.†	α@	Comments
(73.0)		2345.1+x		2272.1+x	(15^-)	[M1,E2]	9.2 *15*	α(K)=4.1 *24*; α(L)=4 *3*; α(M)=0.9 *8*; α(N+..)=0.24 *18* α(N)=0.21 *17*; α(O)=0.025 *18*; α(P)=0.00024 *16* $I_{(\gamma+ce)}$: From the requirement of an intensity balance at the 2345.1+x level, I(γ+ce)=I(γ+ce)(106.5γ)=9.0 *13*. From an intensity balance at the 2272.1+x level, I(γ+ce)=I(γ+ce)(337.4γ)−I(γ+ce)(179.5γ)=5.0 *16*.
103.5 *1*	31 *3*	2554.9+x	17^+	2451.4+x	15^+	(E2)	2.69	α(K)=0.969 *14*; α(L)=1.320 *20*; α(M)=0.323 *5*; α(N+..)=0.0820 *12* α(N)=0.0734 *11*; α(O)=0.00854 *13*; α(P)=4.05×10^{-5} *6* Mult.: An intensity balance at the 2451.4+x level, using I(γ+ce)(106.5γ)+I(γ+ce)(179.5γ)= I(γ+ce)(337.4γ), gives α=3.0 *4*. Theory values are 2.81 and 2.69 for M1 and E2, respectively. The proposed level scheme requires ΔJ=2.
106.5 *2*	7 *1*	2451.4+x	15^+	2345.1+x		(E1)‡	0.283	α(K)=0.234 *4*; α(L)=0.0376 *6*; α(M)=0.00838 *13*;

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^{152}Tm IT decay (294 ns) 1986Mc14 (continued)

$\gamma(^{152}Tm)$ (continued)

E_γ	I_γ[#]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[†]	α[@]	Comments
								α(N+..)=0.00219 *4* α(N)=0.00192 *3*; α(O)=0.000256 *4*; α(P)=1.054×10^{-5} *16* Mult.: An intensity balance at the 2272.1+x level, given mult(337.4γ)=E2, requires mult=E1 for both the 106.5γ and the 179.5γ.
114.4 *1*	11 *1*	114.4+x	(8)$^+$	0.0+x	(9)$^+$	M1,E2	1.98 *14*	α(K)=1.3 *5*; α(L)=0.6 *3*; α(M)=0.13 *8*; α(N+..)=0.034 *18* α(N)=0.030 *17*; α(O)=0.0037 *18*; α(P)=7.E−5 *4* Mult.: From an intensity balance at the 114.4+x level, I(γ+ce)=I(γ+ce)(542.6γ), which yields α=2.2 *4*. Theory values are 2.11 (M1) and 1.85 (E2).
151.5 *1*	72 *6*	1169.6+x	(11$^-$)	1018.2+x	(10$^+$)	E1	0.1111	α(K)=0.0929 *13*; α(L)=0.01428 *21*; α(M)=0.00317 *5*; α(N+..)=0.000836 *12* α(N)=0.000732 *11*; α(O)=9.94×10^{-5} *14*; α(P)=4.39×10^{-6} *7* α(L)=0.0144; α(M)=0.00318; α(N+..)=0.00089 Mult.: From an intensity balance at the 1018.2+x level, I(γ+ce)=I(γ+ce)(361.4γ)+ I(γ+ce)(1018.2γ), which yields α=0.14 *11*. Theory values are 0.111 (E1), 0.951 (M1), and 0.673 (E2).
179.5 *2*	13 *1*	2451.4+x	15$^+$	2272.1+x	(15$^-$)	(E1)[‡]	0.0712	α(K)=0.0596 *9*; α(L)=0.00902 *13*; α(M)=0.00200 *3*; α(N+..)=0.000529 *8* α(N)=0.000463 *7*; α(O)=6.34×10^{-5} *9*; α(P)=2.88×10^{-6} *5* Mult.: An intensity balance at the 2272.1+x level, given mult(337.4γ)=E2, requires mult=E1 for both the 106.5γ and the 179.5γ.
235.7 *1*	70 *4*	1405.3+x	(12$^-$)	1169.6+x	(11$^-$)	M1,E2	0.22 *7*	α(K)=0.17 *7*; α(L)=0.0366 *18*; α(M)=0.0084 *7*; α(N+..)=0.00222 *14* α(N)=0.00195 *14*; α(O)=0.000260 *4*; α(P)=1.0×10^{-5} *5* Mult.: From an intensity balance at the 1169.6+x level, I(γ+ce)=I(γ+ce)(151.5γ)+ I(γ+ce)(1169.6γ)-I(γ+ce)(764.9γ), which yields α=0.23 *12*, consistent only with M1 or E2, with α=0.279 and 0.152, respectively.
320.1 *1*	100 *5*	2451.4+x	15$^+$	2131.3+x	13$^+$	[E2]	0.0588	α(K)=0.0432 *6*; α(L)=0.01206 *17*; α(M)=0.00283 *4*; α(N+..)=0.000737 *11* α(N)=0.000652 *10*; α(O)=8.34×10^{-5} *12*; α(P)=2.24×10^{-6} *4*
337.4 *1*	18 *1*	2272.1+x	(15$^-$)	1934.7+x	(13$^-$)	[E2]	0.0504	α(K)=0.0374 *6*; α(L)=0.01000 *14*; α(M)=0.00234 *4*; α(N+..)=0.000611 *9* α(N)=0.000539 *8*; α(O)=6.94×10^{-5} *10*; α(P)=1.96×10^{-6} *3*
361.4 *1*	45 *2*	1018.2+x	(10$^+$)	656.9+x	(9$^+$)	[M1,E2]	0.065 *24*	α(K)=0.053 *22*; α(L)=0.0094 *16*; α(M)=0.0021 *3*; α(N+..)=0.00057 *9* α(N)=0.00050 *8*; α(O)=6.9×10^{-5} *14*; α(P)=3.1×10^{-6} *15*
529.6 *1*	17 *1*	1934.7+x	(13$^-$)	1405.3+x	(12$^-$)	[M1,E2]	0.024 *9*	α(K)=0.020 *8*; α(L)=0.0032 *9*; α(M)=0.00071 *18*; α(N+..)=0.00019 *5* α(N)=0.00017 *5*; α(O)=2.3×10^{-5} *7*; α(P)=1.2×10^{-6} *5*

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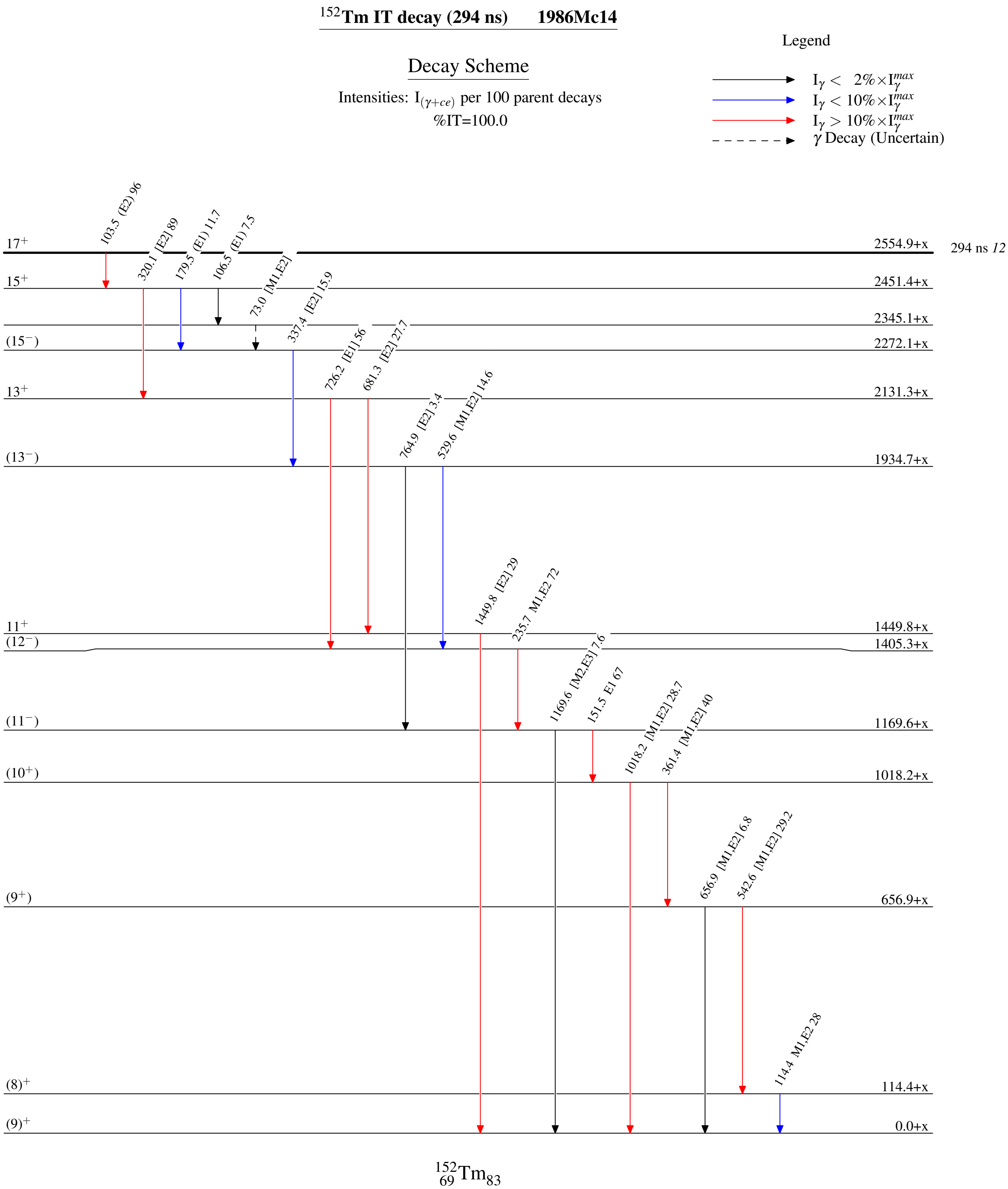
^{152}Tm IT decay (294 ns) 1986Mc14 (continued)

$\gamma(^{152}Tm)$ (continued)

E_γ	I_γ [#]	E_i(level)	J^π_i	E_f	J^π_f	Mult. [†]	α [@]	Comments
542.6 *1*	34 *2*	656.9+x	(9$^+$)	114.4+x	(8)$^+$	[M1,E2]	0.022 *9*	α(K)=0.018 *8*; α(L)=0.0030 *8*; α(M)=0.00067 *17*; α(N+..)=0.00018 *5* α(N)=0.00016 *4*; α(O)=2.2×10^{-5} *7*; α(P)=1.1×10^{-6} *5*
656.9 *2*	8 *1*	656.9+x	(9$^+$)	0.0+x	(9)$^+$	[M1,E2]	0.014 *5*	α(K)=0.012 *5*; α(L)=0.0018 *6*; α(M)=0.00040 *11*; α(N+..)=0.00011 *3* α(N)=9.E−5 *3*; α(O)=1.3×10^{-5} *4*; α(P)=7.E−7 *3*
681.3 *1*	32 *2*	2131.3+x	13$^+$	1449.8+x	11$^+$	[E2]	0.00809	α(K)=0.00660 *10*; α(L)=0.001161 *17*; α(M)=0.000263 *4*; α(N+..)=6.99×10^{-5} *10* α(N)=6.11×10^{-5} *9*; α(O)=8.40×10^{-6} *12*; α(P)=3.71×10^{-7} *6*
726.2 *1*	67 *5*	2131.3+x	13$^+$	1405.3+x	(12$^-$)	[E1]	0.00265	α(K)=0.00225 *4*; α(L)=0.000312 *5*; α(M)=6.87×10^{-5} *10*; α(N+..)=1.84×10^{-5} *3* α(N)=1.601×10^{-5} *23*; α(O)=2.28×10^{-6} *4*; α(P)=1.215×10^{-7} *17*
764.9 *3*	3 *1*	1934.7+x	(13$^-$)	1169.6+x	(11$^-$)	[E2]	0.00624	α(K)=0.00513 *8*; α(L)=0.000863 *13*; α(M)=0.000195 *3*; α(N+..)=5.18×10^{-5} *8* α(N)=4.53×10^{-5} *7*; α(O)=6.28×10^{-6} *9*; α(P)=2.89×10^{-7} *4*
1018.2 *1*	34 *2*	1018.2+x	(10$^+$)	0.0+x	(9)$^+$	[M1,E2]	0.0049 *15*	α(K)=0.0041 *13*; α(L)=0.00060 *17*; α(M)=0.00013 *4*; α(N+..)=3.6×10^{-5} *10* α(N)=3.1×10^{-5} *9*; α(O)=4.5×10^{-6} *13*; α(P)=2.4×10^{-7} *8*
1169.6 *3*	9 *1*	1169.6+x	(11$^-$)	0.0+x	(9)$^+$	[M2,E3]	0.008 *3*	α(K)=0.0068 *25*; α(L)=0.0011 *4*; α(M)=0.00024 *7*; α(N+..)=6.6×10^{-5} *19* α(N)=5.7×10^{-5} *16*; α(O)=8.1×10^{-6} *25*; α(P)=4.2×10^{-7} *16*; α(IPF)=6.29×10^{-7} *11*
1449.8 *2*	35 *3*	1449.8+x	11$^+$	0.0+x	(9)$^+$	[E2]	1.75×10^{-3}	α(K)=0.001433 *20*; α(L)=0.000207 *3*; α(M)=4.60×10^{-5} *7*; α(N+..)=6.80×10^{-5} *10* α(N)=1.073×10^{-5} *15*; α(O)=1.532×10^{-6} *22*; α(P)=8.11×10^{-8} *12*; α(IPF)=5.57×10^{-5} *8*

[†] From α deduced from intensity balance arguments. Values in square brackets are based on the J^π assignments.
[‡] Deduced from the balance of Iγ at 2272.1+x level.
[#] For absolute intensity per 100 decays, multiply by 0.84 *4*.
[@] 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.



152Tm IT decay (294 ns) 1986Mc14
Decay Scheme
Intensities: I(γ+ce) per 100 parent decays
%IT=100.0
Legend
Iγ < 2%×Iγmax
Iγ < 10%×Iγmax
Iγ > 10%×Iγmax
γ Decay (Uncertain)
17+ 2554.9+x 294 ns 12
15+ 2451.4+x
2345.1+x
(15−) 2272.1+x
13+ 2131.3+x
(13−) 1934.7+x
11+ 1449.8+x
(12−) 1405.3+x
(11−) 1169.6+x
(10+) 1018.2+x
(9+) 656.9+x
(8)+ 114.4+x
(9)+ 0.0+x
103.5 (E2) 96
320.1 [E2] 89
179.5 (E1) 11.7
106.5 (E1) 7.5
73.0 [M1,E2]
337.4 [E2] 15.9
726.2 [E1] 56
681.3 [E2] 27.7
764.9 [E2] 3.4
529.6 [M1,E2] 14.6
1449.8 [E2] 29
235.7 M1,E2 72
1169.6 [M2,E3] 7.6
151.5 E1 67
1018.2 [M1,E2] 28.7
361.4 [M1,E2] 40
656.9 [M1,E2] 6.8
542.6 [M1,E2] 29.2
114.4 M1,E2 28
152 69 Tm 83