Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	NDS 110, 1 (2009)	20-Nov-2008

Q(β^-)=−9.2×10^3 *3*; S(n)=12353 (syst) *197*; S(p)=230 *9*; Q(α)=2559 *20* 2017Wa10
Q(ε)=7.49×10^3 *3*; S(2n)=23033 (syst) *197*; S(2p)=3704 *9*; Q(εp)=3884 *16* 2017Wa10
Additional information 1.
Additional information 2.
Theoretical calculations (levels, moments, etc.): 2000Ma90, 1993To07, 1992Di05, 1982We12, 1981La26.

^{151}Tm Levels

Cross Reference (XREF) Flags

A	^{151}Tm IT decay (0.451 μs)	E	^{155}Lu α decay (68 ms)
B	^{151}Tm IT decay (24 ns)	F	^{155}Lu α decay (138 ms)
C	^{151}Yb ε decay (1.6 s):mixed	G	^{155}Lu α decay (2.69 ms)
D	^{152}Lu εp decay (0.7 s)		

E(level)†	J$^\pi$‡	$T_{1/2}$	XREF	Comments
0.0	(11/2$^-$)	4.17 s *11*	ABCDE G	%ε+%β^+=100 $T_{1/2}$: from weighted average of 4.3 s *2* (1990Ak01) and 4.13 s *11* (1988Ba02) other: 3.8 s *8* (1982No13).
0.0+x	(1/2$^+$)	6.6 s *20*	C F	%ε+%β^+=100 E(level): x=50 keV *50* (estimated from syst by 1990Ak01). $T_{1/2}$: from weighted average of 8 s *2* (1990Ak01) and 5.2 s *20* (1988Ba02). Other:≈11 s (1987ElZX).
108.4+x	(3/2$^+$)		C	
582.6+x	(5/2$^+$)		C	
1074.0 *6*			C	
1102.7+x	(7/2$^+$)		C	
1477.60 *10*	(15/2$^-$)		AB	
1489.83 *18*	(15/2$^+$)		AB	
1905.64? *13*	(19/2$^+$)		AB	E(level): the energy of this level is uncertain because the ordering of the 415-393 cascade is tentative.
2176.48 *19*	(19/2$^-$)		AB	
2299.55 *20*	(23/2$^+$)		AB	
2515.27 *20*	(23/2$^-$)		AB	
2655.67 *22*	(27/2$^-$)	0.451 μs *34*	AB	%IT=100 $T_{1/2}$: from $\gamma\gamma$(t); weighted average of 470 ns *50* (1982He08), 420 ns *40* (1982No13) and 466 ns *34* (1987McZZ).
3555.6 *3*			B	
3981.4 *4*			B	
3987.9 *3*	(31/2$^-$)		B	
4407.2 *3*			B	
4612.7 *3*	(35/2$^-$)		B	
5858.3 *4*	(37/2)		B	J$^\pi$: (dipole) transition to (35/2$^-$).
6908.5 *4*		24 ns *4*	B	$T_{1/2}$: from γ(t) (1987McZZ). It is assumed that this is the isomer; however, there is a possibility that a very low energy isomeric transition has not been observed.

† From least-squares fit to Eγ's. From systematics the ground state is expected to be the $s_{1/2}$ single proton state and the $h_{11/2}$ state to be the isomer. However, this has not been established experimentally.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{151}Tm Levels (continued)

‡ From shell-model considerations. The negative parity states are well described by $\pi h^5_{11/2}$ yrast levels. The positive parity levels are assumed to have an $h_{11/2}$ proton coupled to a 3^-, 5^-, 7^- core. The 0+x ($1/2^+$), 108+x ($3/2^+$), 583+x ($5/2^+$) and 1103+x ($7/2^+$) levels are interpreted as the $s_{1/2}$, $d_{3/2}$, $d_{5/2}$, $g_{7/2}$ single proton states, respectively.

$\gamma(^{151}Tm)$

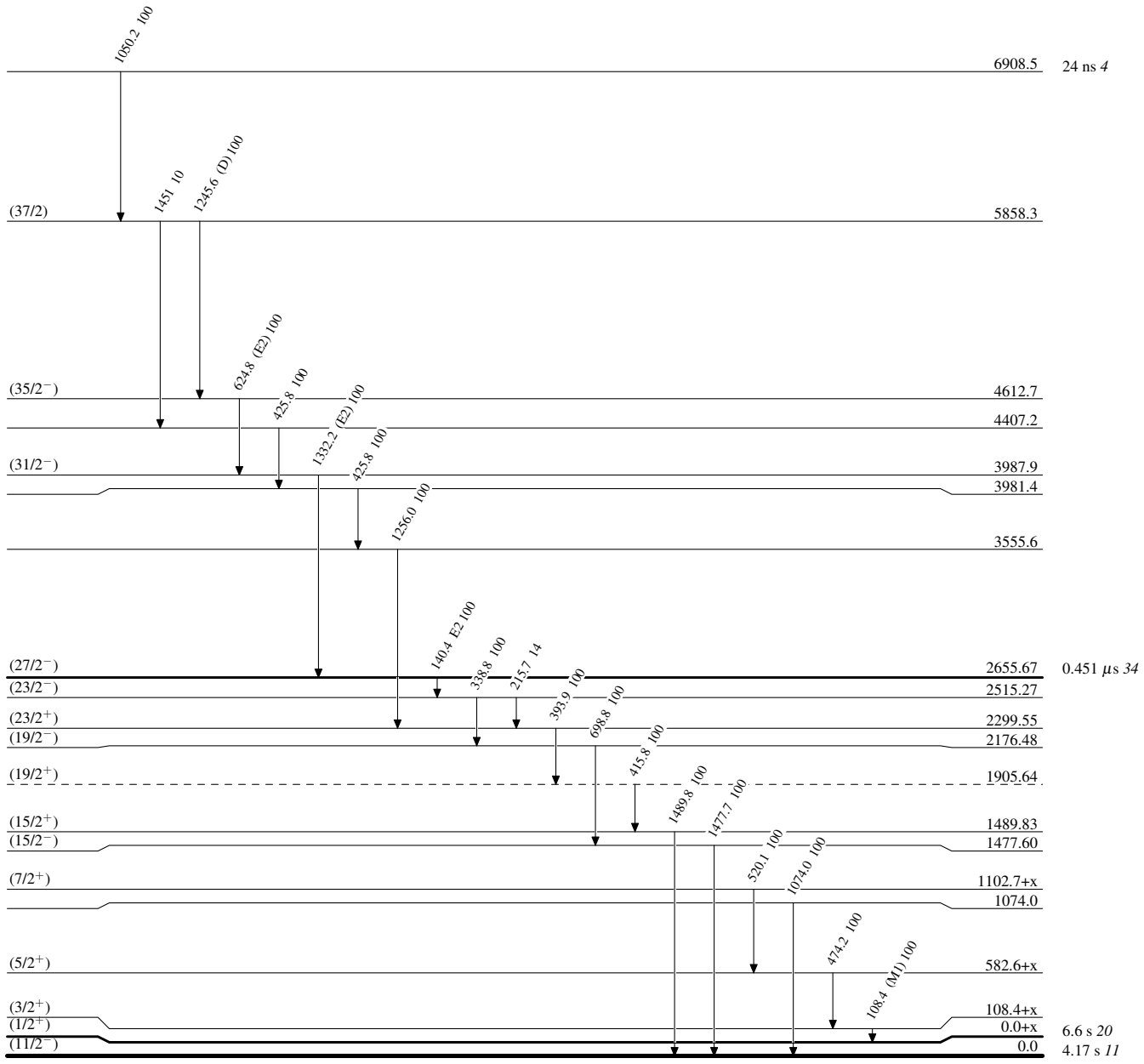
E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.	α&	Comments
108.4+x	($3/2^+$)	108.4 *1*	100	0.0+x	($1/2^+$)	(M1)	2.46	Mult.: from α(K)exp in ^{151}Yb ε decay.
582.6+x	($5/2^+$)	474.2 *2*	100	108.4+x	($3/2^+$)	#		
1074.0		1074.0 *6*	100	0.0	($11/2^-$)			
1102.7+x	($7/2^+$)	520.1 *2*	100	582.6+x	($5/2^+$)	#		
1477.60	($15/2^-$)	1477.7 *1*	100	0.0	($11/2^-$)			
1489.83	($15/2^+$)	1489.8 *2*	100	0.0	($11/2^-$)			
1905.64?	($19/2^+$)	415.8‡ *1*	100	1489.83	($15/2^+$)			
2176.48	($19/2^-$)	698.8 *2*	100	1477.60	($15/2^-$)			
2299.55	($23/2^+$)	393.9‡ *1*	100	1905.64?	($19/2^+$)			
2515.27	($23/2^-$)	215.7 *2*	14 *1*	2299.55	($23/2^+$)			
		338.8 *1*	100 *5*	2176.48	($19/2^-$)			
2655.67	($27/2^-$)	140.4 *1*	100	2515.27	($23/2^-$)	E2	0.90	B(E2)(W.u.)=0.257 *14* Mult.: from α(exp) determined from intensity balance.
3555.6		1256.0 *2*	100	2299.55	($23/2^+$)			
3981.4		425.8[a] *3*	100	3555.6				
3987.9	($31/2^-$)	1332.2 *1*	100	2655.67	($27/2^-$)	(E2)@		
4407.2		425.8[a] *3*	100	3981.4				
4612.7	($35/2^-$)	624.8 *1*	100	3987.9	($31/2^-$)	(E2)@		
5858.3	(37/2)	1245.6 *2*	100 *6*	4612.7	($35/2^-$)	(D)@		
		1451 *1*	10 *6*	4407.2				
6908.5		1050.2 *2*	100	5858.3	(37/2)			

† From ^{151}Yb ε decay for low-spin (J≤7/2) states and from IT decays for high-spin (J>7/2)states.
‡ Ordering of 415-393 cascade is tentative.
# From isotonic systematics, probable mult=M1.
@ From $\gamma(\theta)$ in IT decay.
& 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.
[a] Multiply placed.

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level



$^{151}_{69}Tm_{82}$