Туре	Author	History Citation	Literature Cutoff Date		
Full Evaluation	N. Nica	NDS 170, 1 (2020)	16-Aug-2020		
$Q(\beta^{-})=-6770 SY; S(n)=10320 60; S(p)=762 12; Q(n)$ The uncertainty for the systematic value from 2017	$(\alpha) = 5248.3$ Wall is 200	15 2017Wa10) keV for Q($β^-$).			

¹⁵³Tm Levels

Proton emission has been observed (1988Wi05) from excited levels of ¹⁵³Tm from 4 to 6 MeV following the ε + β + decay of ¹⁵³Yb and occurs in 0.008% 2 of the decays of ¹⁵³Yb.

Cross Reference (XREF) Flags

A	¹⁵³ Yb ε decay (4.2 s)
D	1541 1

В	¹⁵⁴ Lu ε p decay
С	¹⁵⁷ Lu α decay
D	$(HI,xn\gamma)$

- ¹⁵⁷Lu α decay (HI,xn γ)

E(level) [†]	$J^{\pi \ddagger \#}$	T _{1/2}	XREF	Comments
0.0 ^c	(11/2 ⁻)	1.48 s <i>1</i>	ABCD	$%\alpha$ =91 3; %ε+%β ⁺ =9 3 μ=6.93 11; Q=+0.5 10 %α: From 1989K002 based on assumption that a 1091-keV γ represents 85% of the decays of the 11/2 ⁻ level of ¹⁴⁹ Ho; others: %α=90 +10-20 (1977Ha48), %α=80 10 (1979Be52), %α=95 +5-8 (1979Ho10). The 1991Ry01 evaluation recommends 95%.
				 J^π: Based on systematics, α decay pattern, model calculations and configuration assignments in (HI,xnγ) dataset (1994Zh18). T_{1/2}: From α(t) (1988ScZV); other: 1.7 s 2 (1989Ko02). μ,Q: From 2014StZZ (μ) and 2016St14 (Q) based on value in 2000Ba16 (also 2000Se22 and 2002BaZX), by laser resonance ionization spectroscopy.
				$<$ r ² > ^{1/2} =5.064 fm <i>19</i> (2013An02, evaluation) $\Delta <$ r ² >(153-169)=1.62 fm ² <i>3</i> (2000Ba16) where the uncertainty includes only the statistical component.
43.2 2	$(1/2^+)$	2.5 s 2	A	$\%\alpha = 92 3; \%\varepsilon + \%\beta^+ = 8 3$ Configuration = $\pi S_{1/2}$
				J ^{π} : Based on systematics, α decay pattern, model calculations and configuration assignments in (HI,xn γ) dataset (1994Zh18). T _{1/2} : From α (t) (1988scZV). $%\alpha$: From 1989Ko02 and based on certain assumptions concerning γ intensities. Gross β -decay calculations of 1973Ta30 suggest $\%\epsilon \approx 5$ and thus $\%\alpha \approx 95$. The
				isomeric decay is expected to be negligible.
134.9 2	$(3/2^+)$ $(5/2^+)$		A	Configuration= $\pi d_{3/2}$.
547.4 <i>1</i>	$(7/2^{-}, 9/2^{-})$		A	$\cos(1)/(1-\pi)^{1/2}$
674.1 <i>1</i>	(7/2 ⁻ ,9/2 ⁻)		Α	
790.7 ^c 804 7 3	$(15/2^{-})$		D	
843.3 <i>3</i>			A	
887.2 2			Α	
892.2 <i>3</i> 908 7 1			A A	
938.9 4			A	
961.5 2			Α	
1020.2 <i>3</i> 1101.7 <i>2</i>			A A	

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Adopted Levels, Gammas (continued)

E(level) [†]	J ^{π‡#}	XREF	E(level) [†]	$J^{\pi \ddagger \#}$	XREF	E(level) [†]	$J^{\pi \ddagger \#}$	XREF
1134.0 <i>1</i>		A	3088.8 <mark>&</mark>	$(31/2^+)$	D	5179.9	(41/2)	D
1152.1 4		Α	3249.2 ^d	$(29/2^{-})$	D	5317.3	(41/2)	D
1327.3 5		Α	3423.2	$(31/2^+)$	D	5349.3	(43/2)	D
1364.6 <i>1</i>		Α	3608.1 ^C	$(31/2^{-})$	D	5579.9	(43/2)	D
1438.9 ^c	$(19/2^{-})$	D	3635.5 ^d	$(31/2^{-})$	D	5956.4	(45/2)	D
1456.0 2		Α	3659.9	$(31/2^+)$	D	6077.9	(47/2)	D
1616.9 4		Α	3912.1 ^d	$(33/2^{-})$	D	6127.9 ^a	$(47/2^+)$	D
1775.6 2		Α	3995.7 ^a	$(35/2^+)$	D	6195.6 ^d	$(47/2^{-})$	D
1785.9 ^C	$(23/2^{-})$	D	4130.9 ^c	$(35/2^{-})$	D	6666.7 ^b	$(51/2^+)$	D
1853.9 2		Α	4149.2	$(37/2^+)$	D	6900.4 ^d	$(51/2^{-})$	D
1879.3 ^d	$(25/2^{-})$	D	4187.1 ^d	$(37/2^{-})$	D	7206.5	(49/2)	D
2035.0 4		Α	4335.2 ^c	$(39/2^{-})$	D	7352.9	(51/2)	D
2039.3 <i>3</i>		Α	4541.0 ^b	$(39/2^+)$	D	7723.8	(53/2)	D
2239.9 <mark>d</mark>	$(27/2^{-})$	D	4704.3	(39/2)	D	7976.4	(55/2)	D
2811.5 [@]	$(27/2^+)$	D	4873.4	(41/2)	D	8134.5	(55/2)	D
3016.5 [@]	$(29/2^+)$	D	4918.7 ^d	$(43/2^{-})$	D	9168.8	(57/2)	D

¹⁵³Tm Levels (continued)

[†] From individual data sets.

[‡] Based on individual data sets from γ decay patterns and expected band structure. The sequence of levels in a cascade assigned in (HI,xn γ) do not have the common "band" sequence of J values.

[#] Due to the fact that no specific measurements of γ -ray multipolarities or other J^{π} assignment measurements were done all J^{π} values are adopted tentatively.

^(a) Member of configuration= $(\pi h_{11/2}^5)(\nu f_{7/2}^2)(\nu i_{13/2}) + (3^- \text{ octupole vibration on } \nu f_{7/2}^2).$

[&] Configuration= $(\pi h_{11/2}^5)(\nu f_{7/2})(\nu i_{13/2})$.

^{*a*} Member of configuration= $(\pi h_{11/2}^4)(\pi d_{3/2}) (\nu f_{7/2}^2)$. ^{*b*} Member of configuration= $(\pi h_{11/2}^4)(\pi d_{3/2}) (\nu f_{7/2})(\nu h_{9/2})$.

^c Seq.(A): conf= $(\pi h_{11/2}^5)(\nu f_{7/2}^2)$.

^d Seq.(B): conf= $(\pi h_{11/2}^5)(\nu f_{7/2})(\nu h_{9/2})$.

$\gamma(^{153}\text{Tm})$

E _i (level)	\mathbf{J}_i^{π}	E_{γ}	I_{γ}	\mathbf{E}_{f}	\mathbf{J}_f^{π}
134.9	$(3/2^+)$	91.8 <i>1</i>	100	43.2	$(1/2^+)$
504.5	$(5/2^+)$	369.6 1	100	134.9	$(3/2^+)$
547.4	$(7/2^{-}, 9/2^{-})$	547.4 1	100	0.0	$(11/2^{-})$
674.1	$(7/2^{-}, 9/2^{-})$	126.7 2	3.6 7	547.4	$(7/2^{-}, 9/2^{-})$
		674.1 <i>1</i>	100 8	0.0	$(11/2^{-})$
790.7	$(15/2^{-})$	790.7		0.0	$(11/2^{-})$
804.7		669.8 2	100	134.9	$(3/2^+)$
843.3		708.4 2	100	134.9	$(3/2^+)$
887.2		752.3 1	100	134.9	$(3/2^+)$
892.2		757.3 2	100	134.9	$(3/2^+)$
908.7		361.3 <i>1</i>	100	547.4	$(7/2^{-}, 9/2^{-})$
938.9		264.8 <i>3</i>	100	674.1	$(7/2^{-}, 9/2^{-})$
961.5		826.6 1	100	134.9	$(3/2^+)$
1020.2		515.7 2	100	504.5	$(5/2^+)$
1101.7		427.6 2	24 5	674.1	$(7/2^{-}, 9/2^{-})$
		554.3 2	40 6	547.4	$(7/2^{-}, 9/2^{-})$

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Adopted Levels, Gammas (continued)

γ ⁽¹⁵³Tm) (continued)</sup>

E _i (level)	\mathbf{J}_i^{π}	Eγ	I_{γ}	E_f	${ m J}_f^\pi$
1101.7		597.3 2	97 10	504.5	$(5/2^+)$
		966.7 2	100 10	134.9	$(3/2^+)$
1134.0		586.6 1	100	547.4	$(7/2^{-}, 9/2^{-})$
1152.1		1017.2.3	100	134.9	$(3/2^+)$
1327.3		1192.4.4	100	134.9	$(3/2^+)$
1364.6		690.7.3	48 7	674 1	$(7/2^{-} 9/2^{-})$
1001.0		817.2.1	100 10	547.4	$(7/2^{-},9/2^{-})$
		1364.6 2	52 7	0.0	$(1/2^{-})^{-}$
1438.9	$(19/2^{-})$	648.2		790.7	$(15/2^{-})$
1456.0		781.6 2	20 3	674.1	$(7/2^{-}, 9/2^{-})$
		908.8 2	100 8	547.4	$(7/2^{-}, 9/2^{-})$
1616.9		942.8 <i>3</i>	100	674.1	$(7/2^{-}, 9/2^{-})$
1775.6		1101.5 2	100 10	674.1	$(7/2^{-}, 9/2^{-})$
		1228.2 2	100 10	547.4	$(7/2^{-}, 9/2^{-})$
1785.9	$(23/2^{-})$	347.0		1438.9	$(19/2^{-})$
1853.9		1179.7 2	78 20	674.1	$(7/2^{-}, 9/2^{-})$
		1306.6 2	100 14	547.4	$(7/2^{-}, 9/2^{-})$
		1853.7 4	49 10	0.0	$(11/2^{-})$
1879.3	$(25/2^{-})$	93.4		1785.9	$(23/2^{-})$
2035.0		1900.1 <i>3</i>	100	134.9	$(3/2^+)$
2039.3		1534.8 2	100 13	504.5	$(5/2^+)$
		1904.4 2	57 6	134.9	$(3/2^+)$
2239.9	$(27/2^{-})$	360.5		1879.3	$(25/2^{-})$
2811.5	$(27/2^+)$	932.1		1879.3	$(25/2^{-})$
3016.5	$(29/2^+)$	204.8		2811.5	$(27/2^+)$
		776.4		2239.9	$(27/2^{-})$
3088.8	$(31/2^+)$	72.2		3016.5	$(29/2^+)$
3249.2	$(29/2^{-})$	1370.2		1879.3	$(25/2^{-})$
3423.2	$(31/2^+)$	406.7		3016.5	$(29/2^+)$
3608.1	$(31/2^{-})$	1368.1		2239.9	$(27/2^{-})$
3635.5	$(31/2^{-})$	1395.5		2239.9	$(27/2^{-})$
3659.9	$(31/2^+)$	236.7		3423.2	$(31/2^+)$
		571.1		3088.8	$(31/2^+)$
		643.4		3016.5	$(29/2^+)$
3912.1	$(33/2^{-})$	663.2		3249.2	$(29/2^{-})$
	(/)	823.2		3088.8	$(31/2^+)$
3995.7	$(35/2^+)$	335.7		3659.9	$(31/2^+)$
	(/)	572.5		3423.2	$(31/2^+)$
		906.8		3088.8	$(31/2^+)$
4130.9	$(35/2^{-})$	495.3		3635.5	$(31/2^{-})$
		522.8		3608.1	$(31/2^{-})$
4149.2	$(37/2^+)$	153.5		3995.7	$(35/2^+)$
4187.1	$(37/2^{-})$	191.4		3995.7	$(35/2^+)$
		275.3		3912.1	$(33/2^{-})$
4335.2	$(39/2^{-})$	148.2		4187.1	$(37/2^{-})$
	(/)	204.1		4130.9	$(35/2^{-})$
4541.0	$(39/2^+)$	353.9		4187.1	$(37/2^{-})$
4704.3	(39/2)	555.4		4149.2	$(37/2^+)$
4873.4	(41/2)	169.5		4704.3	(39/2)
1075.1	(11/2)	332.5		4541.0	$(39/2^+)$
		723.8		4149.2	$(37/2^+)$
4918 7	$(43/2^{-})$	583.6		4335.2	$(39/2^{-})$
5179.9	(41/2)	844 7		4335.2	$(39/2^{-})$
5317.3	(41/2)	982.1		4335.2	$(39/2^{-})$
5349 3	(43/2)	430 7		4918 7	$(3)/2^{-})$
5517.5	(15/2)	475.8		4873.4	(41/2)
					× / /

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Adopted Levels, Gammas (continued)

$\frac{\gamma(^{153}\text{Tm}) \text{ (continued)}}{E_f \quad J_f^{\pi} \quad E_i \text{(level)} \quad J_i^{\pi} \quad E_{\gamma} \quad E_f}$

E _i (level)	\mathbf{J}_i^{π}	Eγ	E_f	J_f^π	E_i (level)	\mathbf{J}_i^{π}	Eγ	\mathbf{E}_{f}	J_f^π
5579.9	(43/2)	262.6	5317.3	(41/2)	6900.4	$(51/2^{-})$	704.8	6195.6	(47/2 ⁻)
		661.1	4918.7	$(43/2^{-})$	7206.5	(49/2)	1250.1	5956.4	(45/2)
5956.4	(45/2)	607.1	5349.3	(43/2)	7352.9	(51/2)	1225.0	6127.9	$(47/2^+)$
6077.9	(47/2)	121.7	5956.4	(45/2)			1274.5	6077.9	(47/2)
		497.8	5579.9	(43/2)	7723.8	(53/2)	823.4	6900.4	$(51/2^{-})$
6127.9	$(47/2^+)$	171.5	5956.4	(45/2)	7976.4	(55/2)	252.6	7723.8	(53/2)
6195.6	$(47/2^{-})$	1276.9	4918.7	$(43/2^{-})$	8134.5	(55/2)	781.6	7352.9	(51/2)
6666.7	$(51/2^+)$	538.8	6127.9	$(47/2^+)$	9168.8	(57/2)	1034.3	8134.5	(55/2)

Level Scheme

Intensities: Relative photon branching from each level



¹⁵³₆₉Tm₈₄

Level Scheme (continued)

Intensities: Relative photon branching from each level



¹⁵³₆₉Tm₈₄

Level Scheme (continued)

Intensities: Relative photon branching from each level



¹⁵³₆₉Tm₈₄



¹⁵³₆₉Tm₈₄