

**Adopted Levels, Gammas**

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 170, 1 (2020)	16-Aug-2020

Q(β<sup>-</sup>)=-6495 13; S(n)=8040 12; S(p)=4153 15; Q(α)=4802.4 14 2017Wa10

<sup>153</sup>Er Levels

Cross Reference (XREF) Flags

- A <sup>153</sup>Tm ε decay (1.48 s)
- B <sup>153</sup>Tm ε decay (2.5 s)
- C <sup>157</sup>Yb α decay
- D <sup>144</sup>Sm(<sup>14</sup>N,p4nγ), <sup>144</sup>Sm(<sup>12</sup>C,3nγ)

E(level)	J <sup>π</sup> †	T <sub>1/2</sub>	XREF	Comments
0.0‡	(7/2 <sup>-</sup> )	37.1 s 2	ABCD	%α=53 3; %ε+%β <sup>+</sup> =47 3 μ=-0.939 7; Q=-0.42 2 T <sub>1/2</sub> : From 1982Bo04; others: 35.1 s 20 and 36.3 s 20 (1980Da09), 36 s (1978De34), 40 s 2 (1977Ha48), 36 s 1 (1970To16), and 36 s 2 (1963Ma18). J <sup>π</sup> : Tentative assignment based on J <sup>π</sup> of nearby isotones <sup>151</sup> Dy and <sup>149</sup> Gd and shell-model predictions. %α: From 1977Ha48 and 1979Ho10; others: 38 +19-7 (1974To07) and 1963Ma18. Evaluation of 1991Ry01 recommends 53%. μ: From 2014StZZ. Q: From 2016St14.
266.5 1	(3/2 <sup>-</sup> )		B	
299.3# 1	(9/2 <sup>-</sup> )		A D	
765.8‡ 2	(11/2 <sup>-</sup> )		A D	
971.0@ 3	(13/2 <sup>+</sup> )		A D	
1011.9 4			A	
1110.9#	(13/2 <sup>-</sup> )		A D	
1132.7 5			A	
1497.6‡	(15/2 <sup>-</sup> )		D	
1699.1#	(17/2 <sup>-</sup> )		D	
1725.1@	(17/2 <sup>+</sup> )		D	
1731.1 4			A	
2039.3#	(21/2 <sup>-</sup> )		D	
2378.3@	(21/2 <sup>+</sup> )		D	
2751.7	(23/2 <sup>-</sup> )		D	
2798.2	(27/2 <sup>-</sup> )	373 ns 9	D	T <sub>1/2</sub> : From 1982Ca09 (( <sup>14</sup> N,p4nγ),( <sup>12</sup> C,3nγ)); others: 380 ns 30 (1981Ho05), 0.40 μs 20 (1980Ja16), 0.30 μs 10 (1980Bo07), and 0.5 μs 3 (1979Ha29).
2908.9@	(25/2 <sup>+</sup> )		D	
2949.1	(25/2 <sup>-</sup> )		D	
2992.7	(29/2 <sup>+</sup> )	≈10 ns	D	T <sub>1/2</sub> : From 1982Fo06 (( <sup>14</sup> N,p4nγ),( <sup>12</sup> C,3nγ)).
3312.1	(27/2 <sup>-</sup> )		D	
3378.0	(29/2 <sup>-</sup> )		D	
3556.1	(31/2 <sup>-</sup> )		D	
3651.7	(31/2 <sup>+</sup> )		D	
3939.5	(33/2 <sup>+</sup> )	≈10 ns	D	T <sub>1/2</sub> : From 1982Fo06 (( <sup>14</sup> N,p4nγ),( <sup>12</sup> C,3nγ)).
4044.8	(33/2 <sup>+</sup> )		D	
4124.4	(33/2 <sup>-</sup> )		D	
4249.2	(33/2 <sup>-</sup> )		D	
4337.3			D	

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**Adopted Levels, Gammas (continued)**

$^{153}\text{Er}$  Levels (continued)

<u>E(level)</u>	<u>J<sup>π</sup></u>	<u>T<sub>1/2</sub></u>	<u>XREF</u>	<u>Comments</u>
4542.6	(37/2 <sup>-</sup> )		D	
4819.3	(37/2 <sup>+</sup> )		D	
4827.1			D	
4844.5	(37/2 <sup>+</sup> )		D	
4891.8	(37/2 <sup>+</sup> )		D	
5248.1	(41/2 <sup>-</sup> )	248 ns 32	D	T <sub>1/2</sub> : Weighted average of 270 ns 20 (1981Ho05) and 200 ns 30 (1980Ja16) with internal uncertainty of 17 and reduced-χ <sup>2</sup> of 3.8; others: 1.0 μs 5 (1980Bo07) and > 0.2 μs (1979Ha29). (all references are from ( <sup>14</sup> N,p4nγ),( <sup>12</sup> C,3nγ) dataset).
5980.4	(43/2)		D	
6676.3			D	
6853.6	(47/2)		D	
7253.6			D	
7383.1			D	
7441			D	
8063.9			D	
8275.1			D	
8409.6			D	

† For level seen in (HI,xnγ), from 2000Fo04 and are based on measured I<sub>γ</sub>(θ), I<sub>γ</sub>(t), and comparison with systematics of nearby isotones, and shell-model predictions.

‡ Seq.(A): ΔJ=2 sequence based on 7/2<sup>-</sup> ground state.

# Seq.(B): ΔJ=2 sequence based on 9/2<sup>-</sup> level at 299 keV.

@ Seq.(C): ΔJ=2 sequence based on 13/2<sup>+</sup> level at 970 keV.

γ(<sup>153</sup>Er)

Unplaced γ's are not included here, see individual data sets.

<u>E<sub>i</sub>(level)</u>	<u>J<sub>i</sub><sup>π</sup></u>	<u>E<sub>γ</sub><sup>†</sup></u>	<u>I<sub>γ</sub><sup>†</sup></u>	<u>E<sub>f</sub></u>	<u>J<sub>f</sub><sup>π</sup></u>	<u>Mult.<sup>‡</sup></u>	<u>α<sup>@</sup></u>	<u>Comments</u>
266.5	(3/2 <sup>-</sup> )	266.5 <sup>#</sup> 1	100	0.0	(7/2 <sup>-</sup> )			
299.3	(9/2 <sup>-</sup> )	299.3 1	100	0.0	(7/2 <sup>-</sup> )	M1(+E2)	0.102 33	α(K)=0.082 31; α(L)=0.0155 12; α(M)=0.00352 16 α(N)=0.00081 5; α(O)=0.000112 13; α(P)=4.8×10 <sup>-6</sup> 22
765.8	(11/2 <sup>-</sup> )	765.8 2	100	0.0	(7/2 <sup>-</sup> )			
971.0	(13/2 <sup>+</sup> )	205.2 2	100	765.8	(11/2 <sup>-</sup> )	E1	0.0486	α(K)=0.0409 6; α(L)=0.00605 9; α(M)=0.001337 19 α(N)=0.000308 5; α(O)=4.27×10 <sup>-5</sup> 6; α(P)=2.03×10 <sup>-6</sup> 3
1011.9		712.6 3	100	299.3	(9/2 <sup>-</sup> )			
1110.9	(13/2 <sup>-</sup> )	345.5	≤17	765.8	(11/2 <sup>-</sup> )			
		811.2 3	100	299.3	(9/2 <sup>-</sup> )			
		833.4 4	100	299.3	(9/2 <sup>-</sup> )			
1497.6	(15/2 <sup>-</sup> )	731.9		765.8	(11/2 <sup>-</sup> )			
1699.1	(17/2 <sup>-</sup> )	201.6	4	1497.6	(15/2 <sup>-</sup> )			
		588.1	100	1110.9	(13/2 <sup>-</sup> )			
1725.1	(17/2 <sup>+</sup> )	754.5	100	971.0	(13/2 <sup>+</sup> )			
1731.1		965.3 3	100	765.8	(11/2 <sup>-</sup> )			
2039.3	(21/2 <sup>-</sup> )	340.3	100	1699.1	(17/2 <sup>-</sup> )	E2	0.0474	α(K)=0.0357 5; α(L)=0.00910 13; α(M)=0.00212 3

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Adopted Levels, Gammas (continued) $\gamma(^{153}\text{Er})$  (continued)

$E_i(\text{level})$	$J_i^\pi$	$E_\gamma^\dagger$	$I_\gamma^\dagger$	$E_f$	$J_f^\pi$	Mult. $^\ddagger$	$\alpha^\ominus$	Comments
								$\alpha(\text{N})=0.000485$ 7; $\alpha(\text{O})=6.32\times 10^{-5}$ 9; $\alpha(\text{P})=1.88\times 10^{-6}$ 3
2378.3	(21/2 <sup>+</sup> )	653.2	100	1725.1	(17/2 <sup>+</sup> )			
2751.7	(23/2 <sup>-</sup> )	712.2 3	100	2039.3	(21/2 <sup>-</sup> )			
2798.2	(27/2 <sup>-</sup> )	(46.4)		2751.7	(23/2 <sup>-</sup> )			
2908.9	(25/2 <sup>+</sup> )	530.5	100	2378.3	(21/2 <sup>+</sup> )			
2949.1	(25/2 <sup>-</sup> )	909.8	100	2039.3	(21/2 <sup>-</sup> )			
2992.7	(29/2 <sup>+</sup> )	83.9		2908.9	(25/2 <sup>+</sup> )			
		194.5		2798.2	(27/2 <sup>-</sup> )	E1	0.0559	$\alpha(\text{K})=0.0470$ 7; $\alpha(\text{L})=0.00698$ 10; $\alpha(\text{M})=0.001542$ 22
3312.1	(27/2 <sup>-</sup> )	363.0	100	2949.1	(25/2 <sup>-</sup> )	M1(+E2)	0.060 21	$\alpha(\text{N})=0.000355$ 5; $\alpha(\text{O})=4.92\times 10^{-5}$ 7; $\alpha(\text{P})=2.32\times 10^{-6}$ 4 $\alpha(\text{K})=0.049$ 19; $\alpha(\text{L})=0.0086$ 13; $\alpha(\text{M})=0.0019$ 3
3378.0	(29/2 <sup>-</sup> )	65.9		3312.1	(27/2 <sup>-</sup> )			$\alpha(\text{N})=0.00045$ 7; $\alpha(\text{O})=6.2\times 10^{-5}$ 12; $\alpha(\text{P})=2.9\times 10^{-6}$ 13
		429.0	$\leq 73$	2949.1	(25/2 <sup>-</sup> )			
		579.7	100	2798.2	(27/2 <sup>-</sup> )			
3556.1	(31/2 <sup>-</sup> )	757.9	100	2798.2	(27/2 <sup>-</sup> )			
3651.7	(31/2 <sup>+</sup> )	659.0	100	2992.7	(29/2 <sup>+</sup> )			
3939.5	(33/2 <sup>+</sup> )	287.8	100	3651.7	(31/2 <sup>+</sup> )			
		946.7	43	2992.7	(29/2 <sup>+</sup> )			
4044.8	(33/2 <sup>+</sup> )	105.3		3939.5	(33/2 <sup>+</sup> )			
		488.8	$\leq 140$	3556.1	(31/2 <sup>-</sup> )			
		1052	100	2992.7	(29/2 <sup>+</sup> )			
4124.4	(33/2 <sup>-</sup> )	568.3		3556.1	(31/2 <sup>-</sup> )			
		746.4		3378.0	(29/2 <sup>-</sup> )			
4249.2	(33/2 <sup>-</sup> )	693.0	100	3556.1	(31/2 <sup>-</sup> )			
4337.3		1344.6		2992.7	(29/2 <sup>+</sup> )			
4542.6	(37/2 <sup>-</sup> )	293.2	25	4249.2	(33/2 <sup>-</sup> )			
		418.1	100	4124.4	(33/2 <sup>-</sup> )			
4819.3	(37/2 <sup>+</sup> )	482.0		4337.3				
		570		4249.2	(33/2 <sup>-</sup> )			
4827.1		284.5	100	4542.6	(37/2 <sup>-</sup> )			
4844.5	(37/2 <sup>+</sup> )	595.5		4249.2	(33/2 <sup>-</sup> )			
		799.5		4044.8	(33/2 <sup>+</sup> )			
4891.8	(37/2 <sup>+</sup> )	349.1		4542.6	(37/2 <sup>-</sup> )	E1	0.01281	$\alpha(\text{K})=0.01083$ 16; $\alpha(\text{L})=0.001548$ 22; $\alpha(\text{M})=0.000341$ 5 $\alpha(\text{N})=7.89\times 10^{-5}$ 11; $\alpha(\text{O})=1.114\times 10^{-5}$ 16; $\alpha(\text{P})=5.66\times 10^{-7}$ 8
5248.1	(41/2 <sup>-</sup> )	847.2		4044.8	(33/2 <sup>+</sup> )			
		356.3	$< 167$	4891.8	(37/2 <sup>+</sup> )	M2	0.316	$\alpha(\text{K})=0.256$ 4; $\alpha(\text{L})=0.0466$ 7; $\alpha(\text{M})=0.01062$ 15 $\alpha(\text{N})=0.00248$ 4; $\alpha(\text{O})=0.000355$ 5; $\alpha(\text{P})=1.86\times 10^{-5}$ 3 B(M2)(W.u.) $< 0.36$
		403.7	100	4844.5	(37/2 <sup>+</sup> )	M2	0.213	$\alpha(\text{K})=0.1732$ 25; $\alpha(\text{L})=0.0307$ 5; $\alpha(\text{M})=0.00697$ 10 $\alpha(\text{N})=0.001629$ 23; $\alpha(\text{O})=0.000233$ 4; $\alpha(\text{P})=1.230\times 10^{-5}$ 18 B(M2)(W.u.)=0.151 +43-51
		428.7	$< 67$	4819.3	(37/2 <sup>+</sup> )	[M2]	0.1764	$\alpha(\text{K})=0.1440$ 21; $\alpha(\text{L})=0.0252$ 4; $\alpha(\text{M})=0.00571$ 8 $\alpha(\text{N})=0.001335$ 19; $\alpha(\text{O})=0.000191$ 3;

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**Adopted Levels, Gammas (continued)**

						$\gamma(^{153}\text{Er})$ (continued)		
$E_i(\text{level})$	$J_i^\pi$	$E_\gamma^\dagger$	$I_\gamma^\dagger$	$E_f$	$J_f^\pi$		Comments	
						$\alpha(\text{P})=1.012\times 10^{-5}$ 15		
						$\text{B}(\text{M}2)(\text{W.u.})<0.070$		
5980.4	(43/2)	732.3		5248.1	(41/2 <sup>-</sup> )			
6676.3		696.1		5980.4	(43/2)			
6853.6	(47/2)	177.6	27	6676.3				
		873.0	100	5980.4	(43/2)			
7253.6		400.0	100	6853.6	(47/2)			
7383.1		129.5	100	7253.6				
7441		765		6676.3				
8063.9		680.8		7383.1				
8275.1		211.2	100	8063.9				
8409.6		134.5	100	8275.1				

† Unless noted otherwise  $E_\gamma$  values with uncertainty and their  $I_\gamma$ 's are from  $^{153}\text{Tm}$   $\varepsilon$  decay (2.5 s) while  $E_\gamma$  values without uncertainty are from ( $^{14}\text{N},\text{p}4\text{n}\gamma$ ), ( $^{12}\text{C},3\text{n}\gamma$ ).

‡ From I(ceK) and  $I_\gamma$  normalized to  $\alpha_K(340.3)=0.0358$  the theoretical value for an E2  $\gamma$  (( $^{14}\text{N},\text{p}4\text{n}\gamma$ ), ( $^{12}\text{C},3\text{n}\gamma$ ), 1982Fo06).

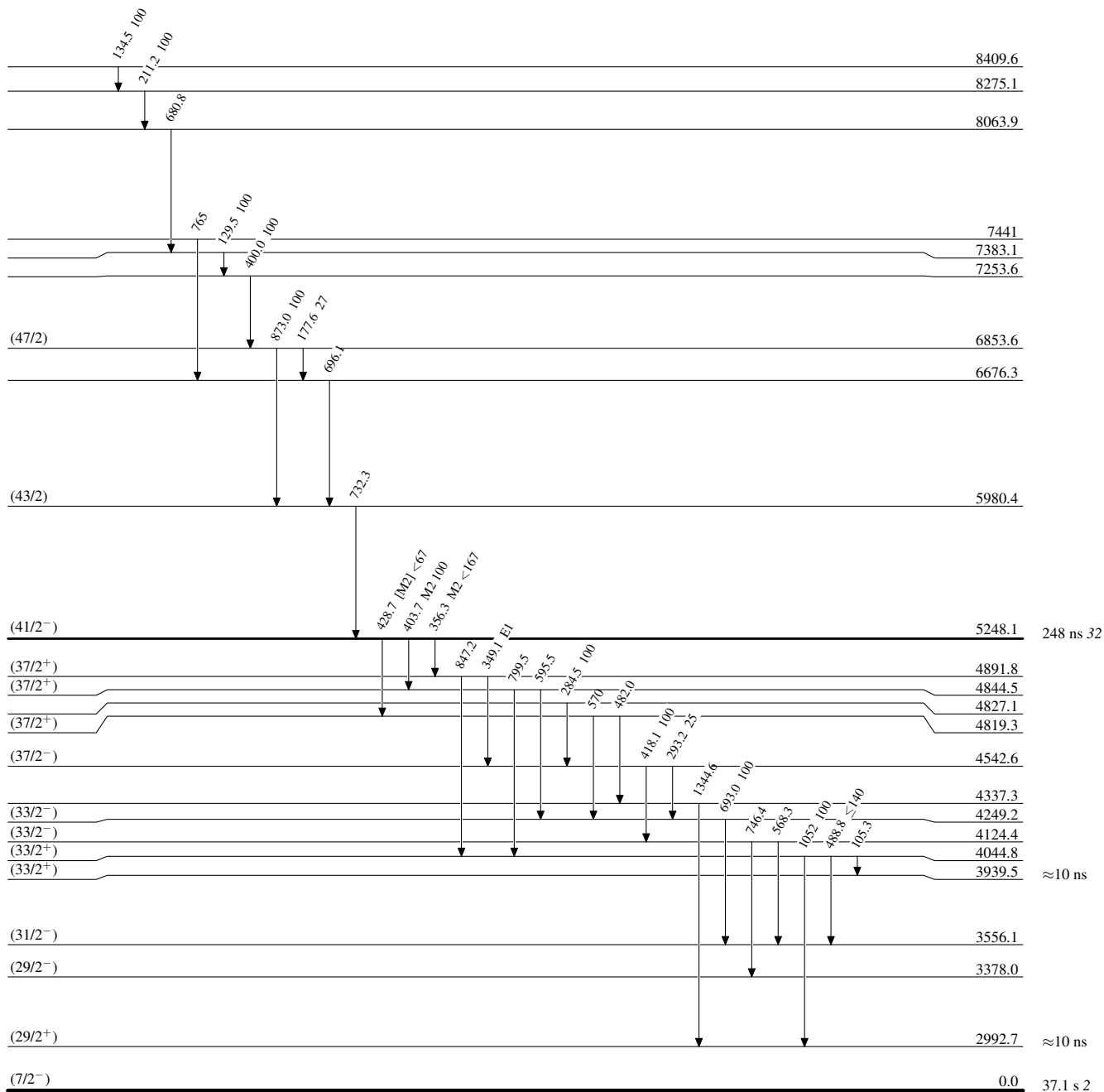
# From  $^{153}\text{Tm}$   $\varepsilon$  decay (1.48 s).

@ Additional information 1.

**Adopted Levels, Gammas**

Level Scheme

Intensities: Relative photon branching from each level



$^{153}_{68}\text{Er}_{85}$

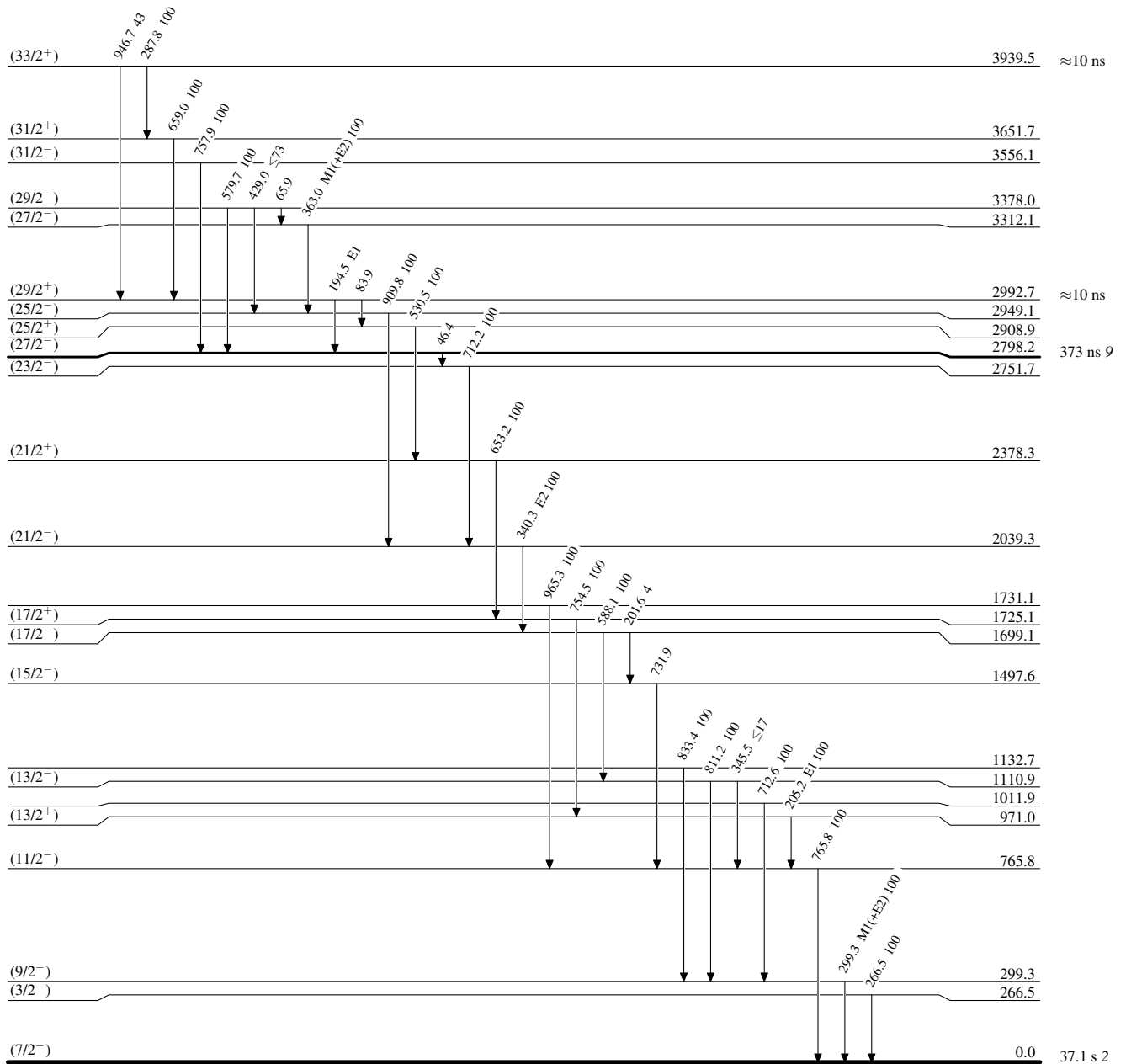
**Adopted Levels, Gammas**

Legend

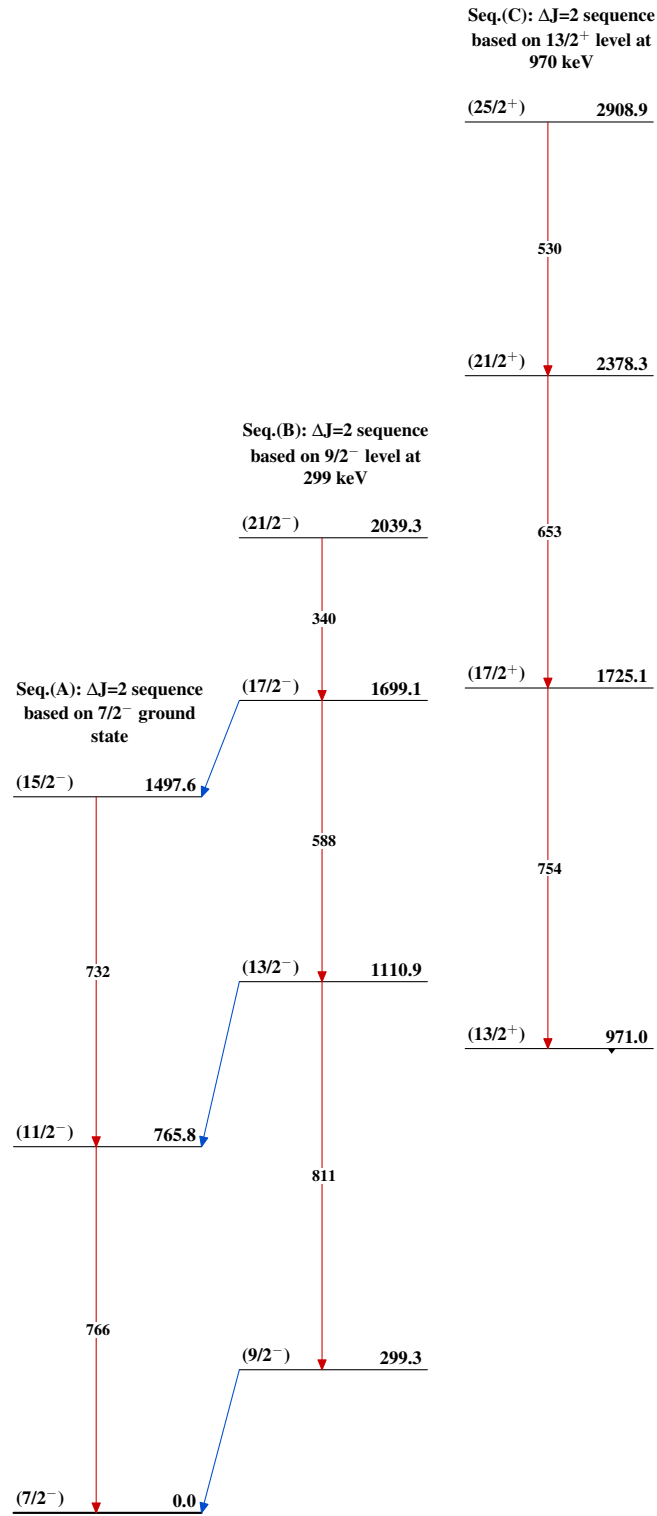
Level Scheme (continued)

Intensities: Relative photon branching from each level

-----▶  $\gamma$  Decay (Uncertain)



$^{153}_{68}\text{Er}_{85}$

Adopted Levels, Gammas $^{153}_{68}\text{Er}_{85}$