

¹²⁸Te(³⁷Cl,4nγ) 1995Sm02,1995Wa21

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	C. W. Reich	NDS 112,2497 (2011)	1-Jun-2011

Additional information 1.

1995Sm02: ¹²⁸Te(³⁷Cl,4n), E(³⁷Cl)=170 MeV. Two enriched (enrichment not given) stacked targets, 750 μg/cm² thick, on a 500 μg/cm² Au layer, were used. γ radiation was studied using the TESSA3 array of 16 escape-suppressed Ge detectors and a 50-element inner BGO ball. Level lifetimes measured using the Doppler-shift attenuation method (DSAM) with an ≈1.2 mg/cm² ¹²⁸Te target on backing materials of ¹⁹⁷Au and ¹⁵⁹Tb, having thicknesses between 10 and 12 mg/cm². γ radiation detected in the Nordball array of 19 escape-suppressed Ge detectors and an inner ball of 39 BaF₂ detectors. Measured Eγ, γ singles, γγ, T_{1/2}. Transition quadrupole moments, but not T_{1/2} values, are reported.

1995Wa21: ¹²⁸Te(³⁷Cl,4n), E(³⁷Cl)=167 MeV. γγ coincidences measured using the Nordball array of 20 Compton-suppressed HPGe detectors and a 60-element inner ball of BaF₂ detectors. DCO ratios measured but not reported. Lifetime measurements were performed using the recoil-distance method with a 700 μg/cm²-thick ¹²⁸Te target backed with a 500 μg/cm² Au layer. Recoils stopped in a thick Au plunger. The level scheme used by these authors appears to be that proposed by 1995Sm02.

¹⁶¹Tm Levels

E(level) [†]	Jπ [‡]	T _{1/2} [#]	Comments
0.0 ^a	7/2 ⁺	30.2 min 8	T _{1/2} : from adopted values.
18.90 ^d 12	5/2 ⁺		
22.7 ^c	3/2 ⁺		
78.1 ^e	7/2 ⁻		
149.1 ^f	9/2 ⁻		
159.1 ^d	7/2 ⁺		
161.8 ^b	9/2 ⁺		
211.0 ^c	7/2 ⁺		
254.7 ^e	11/2 ⁻		
326.7 ^d	9/2 ⁺		
347.9 ^a	11/2 ⁺		
376.6 ^g	5/2 ⁻		
417.4 ^f	13/2 ⁻		
515.7 ^d	11/2 ⁺		
516.5 ^g	9/2 ⁻		
531.4 ^c	11/2 ⁺		
557.3 ^b	13/2 ⁺		
577.3 ^e	15/2 ⁻	7.5 [@] ps 17	
756.4 ^g	13/2 ⁻		
788.5 ^a	15/2 ⁺		
815.4 ^f	17/2 ⁻	3.6 [@] ps 11	
1008.3 ^e	19/2 ⁻	2.6 [@] ps 10	
1036.8 ^b	17/2 ⁺		
1080.1 ^g	17/2 ⁻		
1305.0 ^a	19/2 ⁺		
1309.9 ^f	21/2 ⁻	1.7 [@] ps 4	
1496.1 ^g	21/2 ⁻	2.7 [@] ps 3	T _{1/2} : computed by the evaluator using a transition quadrupole moment, Q _t , =7.1 4, as reported by 1995Wa21. Using this value, the authors report T _{1/2} =0.18 ps 2 for this level half-life.
1525.4 ^e	23/2 ⁻	1.1 [@] ps 3	
1581.7 ^b	21/2 ⁺		

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$^{128}\text{Te}(^{37}\text{Cl},4n\gamma)$ **1995Sm02,1995Wa21** (continued)

^{161}Tm Levels (continued)

E(level) [†]	J ^π [‡]	T _{1/2} [#]	Comments
1873.8 ^f	25/2 ⁻	0.55 [@] ps 7	
1876.7 ^a	23/2 ⁺		
1996.2 ^g	25/2 ⁻	0.96 [@] ps 5	T _{1/2} : computed by the evaluator using a transition quadrupole moment, Q _t =7.4 2, as reported by 1995Wa21 . Using this value, the authors report T _{1/2} =0.51 ps 2 for this level half-life.
2108.8 ^e	27/2 ⁻	1.0 [@] ps 3	
2172.4 ^b	25/2 ⁺		
2478.2 ^a	27/2 ⁺		
2480.8 ^f	29/2 ⁻	0.49 [@] ps 14	
2570.3 ^g	29/2 ⁻		
2736.4 ^e	31/2 ⁻		
2786 ^b	29/2 ⁺		
3050.6 ^f	33/2 ⁻		
3110 ^a	31/2 ⁺		
3117	(33/2 ⁻)		
3206.4 ^g	33/2 ⁻		
3254.9 ^e	35/2 ⁻		
3380.8	35/2 ⁻		E(level): probably the same as the 3380.7 level reported by 1984Fo04 , in $^{152}\text{Sm}(^{14}\text{N},5n\gamma)$. Those authors report only a 644.2 γ deexciting this level.
3441 ^b	33/2 ⁺		
3476.2 ^f	37/2 ⁻		
3723?	(37/2 ⁻)		
3739.2 ^e	39/2 ⁻		
3779 ^a	35/2 ⁺		
3886 ^g	(37/2 ⁻)		
4012.2 ^f	41/2 ⁻	0.42 ^{&} ps 10	T _{1/2} : 1995Sm02 report T _{1/2} =0.87 ps for this level.
4084?	(39/2 ⁻)		
4130 ^b	37/2 ⁺		
4330.1 ^e	43/2 ⁻	0.42 ^{&} ps 10	T _{1/2} : 1995Sm02 report T _{1/2} =0.78 ps for this level.
4492 ^a	(39/2 ⁺)		
4578 ^g	(41/2 ⁻)		
4655.6 ^f	45/2 ⁻	0.28 ^{&} ps +15-8	T _{1/2} : 1995Sm02 report T _{1/2} =0.38 ps for this level.
4867 ^b	(41/2 ⁺)		
5017.0 ^e	47/2 ⁻	0.21 ^{&} ps +21-12	T _{1/2} : computed by the evaluator using a transition quadrupole moment, Q _t =5.9 +19-18 (1995Sm02). These authors also list Q _t =7.0 +41-24. They quote T _{1/2} =0.22 ps for this level.
5267 ^a	(43/2 ⁺)		
5270 ^g	(45/2 ⁻)		
5393.7 ^f	49/2 ⁻	0.14 ^{&} ps 3	T _{1/2} : weighted average of 0.15 ps 3 and 0.12 ps 4, computed by the evaluator using the two transition quadrupole moments, Q _t =5.98 +60-53 and Q _t =6.7 +18-10, listed by 1995Sm02 . These authors quote T _{1/2} =0.18 ps for this level.
5675 ^b	(45/2 ⁺)		
5788.7 ^e	51/2 ⁻	0.10 ^{&} ps 3	T _{1/2} : 1995Sm02 quote T _{1/2} =0.16 ps for this level.
5988 ^g	(49/2 ⁻)		
6113 ^a	(47/2 ⁺)		
6216.2 ^f	53/2 ⁻	≤0.18 ps	T _{1/2} : a second, but questionable, γ transition is shown deexciting this level. The listed T _{1/2} value was computed by the evaluator neglecting this possible branch and, hence, represents an upper limit for the actual T _{1/2} value. 1995Sm02 quote T _{1/2} =0.14 ps.

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$^{128}\text{Te}(^{37}\text{Cl},4n\gamma)$ **1995Sm02,1995Wa21** (continued) ^{161}Tm Levels (continued)

E(level) [†]	J ^π [‡]	T _{1/2} [#]	Comments
6560 ^b	(49/2 ⁺)		
6633.0 ^e	(55/2 ⁻)	0.11 ^{&} ps 4	T _{1/2} : 1995Sm02 quote T _{1/2} =0.10 ps for this level.
6726? ^g	(53/2 ⁻)		
7037? ^a	(51/2 ⁺)		
7109.9 ^f	(57/2 ⁻)	0.08 ^{&} ps 4	
7519? ^b	(53/2 ⁺)		
7533.4 ^e	(59/2 ⁻)	0.07 ^{&} ps 3	
8052.4 ^f	(61/2 ⁻)	0.07 ^{&} ps 2	
8475.9 ^e	(63/2 ⁻)	0.07 ^{&} ps 2	
9033.7 ^f	(65/2 ⁻)	0.11 ^{&} ps 4	
9457.2 ^e	(67/2 ⁻)	0.11 ^{&} ps 4	
10059.2 ^f	(69/2 ⁻)		
10482.7 ^e	(71/2 ⁻)		
11140? ^f	(73/2 ⁻)		
11585? ^e	(75/2 ⁻)		

[†] From a least-squares fit to the γ energies. In this fit, it was assumed that the uncertainties in all the γ -ray energies were 1.0 keV. Consequently, no uncertainties are given for the computed level energies.

[‡] From adopted values. For the present in-beam data, the J^π assignments rely largely on considerations of the expected rotational band structure, supplemented with information on γ multiplicities.

[#] Values are from both 1995Wa21 (recoil-distance method) and 1995Sm02 (DSAM lineshape analysis), unless noted otherwise.

[@] Value from 1995Wa21 only.

[&] Value deduced by the evaluator from the transition quadrupole moments (Q_t) reported by 1995Sm02 and the adopted γ and conversion-electron branching from these levels. These authors state that their listed lifetimes are level lifetimes. This is not correct. Where more than one γ transition is reported to deexcite a given level, their lifetime value is, in fact, a partial one only, presumably corresponding to the partial lifetime of the crossover (E2) transition.

^a Band(A): 7/2[404] band; $\alpha=-1/2$ branch.

^b Band(a): 7/2[404] band; $\alpha=+1/2$ branch.

^c Band(B): 1/2[411] band.

^d Band(C): 5/2[402] band.

^e Band(D): 7/2[523] band; $\alpha=-1/2$ branch.

^f Band(E): 7/2[523] band; $\alpha=+1/2$ branch.

^g Band(F): 1/2[541] band; $\alpha=+1/2$ branch. Only the $\alpha=+1/2$ portion is observed.

 $\gamma(^{161}\text{Tm})$

E _{γ} [†]	I _{γ} [‡]	E _i (level)	J _i ^π	E _f	J _f ^π	Mult. [@]	δ ^{&}	Comments
(18.90 12)		18.90	5/2 ⁺	0.0	7/2 ⁺	M1		E _{γ} ,Mult.: from ^{161}Yb ε decay (1981Ad02).
71.0		149.1	9/2 ⁻	78.1	7/2 ⁻			
78.1		78.1	7/2 ⁻	0.0	7/2 ⁺			
105.6	59 1	254.7	11/2 ⁻	149.1	9/2 ⁻	M1+E2	0.23 6	
139.9	15.1 [#] 3	516.5	9/2 ⁻	376.6	5/2 ⁻			
140.2	15.1 [#] 3	159.1	7/2 ⁺	18.90	5/2 ⁺			
159.9	67 3	577.3	15/2 ⁻	417.4	13/2 ⁻	M1+E2	0.162 22	
161.8		161.8	9/2 ⁺	0.0	7/2 ⁺			
162.7	100	417.4	13/2 ⁻	254.7	11/2 ⁻	M1+E2	0.26 3	

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¹²⁸Te(³⁷Cl,4nγ) **1995Sm02,1995Wa21** (continued)

γ(¹⁶¹Tm) (continued)

<u>E_γ[†]</u>	<u>I_γ[‡]</u>	<u>E_i(level)</u>	<u>J_i^π</u>	<u>E_f</u>	<u>J_f^π</u>	<u>Mult.[@]</u>	<u>δ&</u>	<u>Comments</u>
167.6	14.2 3	326.7	9/2 ⁺	159.1	7/2 ⁺			
176.6	43 3	254.7	11/2 ⁻	78.1	7/2 ⁻	E2		I _γ : From the directly measured ΔJ=2/ΔJ=1 γ branching (0.29 1, 1995Sm02) of this level, I _γ (176.6γ)=17.1 7 is computed.
186.1	13.0 5	347.9	11/2 ⁺	161.8	9/2 ⁺	M1+E2	0.64 13	
188.3	25.6 4	211.0	7/2 ⁺	22.7	3/2 ⁺			
189.0	5.9 2	515.7	11/2 ⁺	326.7	9/2 ⁺			
192.8	54 3	1008.3	19/2 ⁻	815.4	17/2 ⁻	M1+E2	0.15 3	
204.5	58 4	3254.9	35/2 ⁻	3050.6	33/2 ⁻			
204.8	6.3 2	531.4	11/2 ⁺	326.7	9/2 ⁺			
209.5	13.5 5	557.3	13/2 ⁺	347.9	11/2 ⁺	M1+E2	0.67 18	
215.4	67 4	1525.4	23/2 ⁻	1309.9	21/2 ⁻	M1+E2	0.18 4	
221.4	60 4	3476.2	37/2 ⁻	3254.9	35/2 ⁻			
225.0	15.1 3	756.4	13/2 ⁻	531.4	11/2 ⁺			
231.2	26.1 5	788.5	15/2 ⁺	557.3	13/2 ⁺	M1+E2	0.55 7	
235.0	22 1	2108.8	27/2 ⁻	1873.8	25/2 ⁻	M1+E2	0.128 23	
238	73 4	815.4	17/2 ⁻	577.3	15/2 ⁻	M1+E2	0.17 3	
239.8	7.7 [#] 2	756.4	13/2 ⁻	516.5	9/2 ⁻			
240.6	7.7 [#] 2	756.4	13/2 ⁻	515.7	11/2 ⁺			
248.2	6.5 3	1036.8	17/2 ⁺	788.5	15/2 ⁺	M1+E2	0.45 13	
255.6	17 1	2736.4	31/2 ⁻	2480.8	29/2 ⁻	M1+E2	0.125 17	
263.0	41 2	3739.2	39/2 ⁻	3476.2	37/2 ⁻			
264 ^c		3380.8	35/2 ⁻	3117	(33/2 ⁻)			
268.3 ^b	27 ^b 2	417.4	13/2 ⁻	149.1	9/2 ⁻	E2		I _γ : From the directly measured ΔJ=2/ΔJ=1 γ branching (0.347 5, 1995Sm02) of this level, I _γ (268.3γ)=34.7 5 is computed.
268.3 ^b	12.1 ^b 1	1305.0	19/2 ⁺	1036.8	17/2 ⁺	M1+E2	0.48 20	
273.1	35 2	4012.2	41/2 ⁻	3739.2	39/2 ⁻			
276.7	14.7 4	1581.7	21/2 ⁺	1305.0	19/2 ⁺	M1+E2	0.46 16	
295	4.9 2	1876.7	23/2 ⁺	1581.7	21/2 ⁺	M1+E2	0.42 9	
296	7.8 2	2172.4	25/2 ⁺	1876.7	23/2 ⁺			
301.7	67 3	1309.9	21/2 ⁻	1008.3	19/2 ⁻	M1+E2	0.26 3	
305.5	8.8 2	516.5	9/2 ⁻	211.0	7/2 ⁺			
306	14.2 4	2478.2	27/2 ⁺	2172.4	25/2 ⁺			
307.8	3.0 2	326.7	9/2 ⁺	18.90	5/2 ⁺			
308	3.8 3	2786	29/2 ⁺	2478.2	27/2 ⁺			
314.4	28 2	3050.6	33/2 ⁻	2736.4	31/2 ⁻			
317.7	28 2	4330.1	43/2 ⁻	4012.2	41/2 ⁻			
320.4	19.4 4	531.4	11/2 ⁺	211.0	7/2 ⁺			
322.6	76 4	577.3	15/2 ⁻	254.7	11/2 ⁻	E2		I _γ : From the directly measured ΔJ=2/ΔJ=1 γ branching (0.84 3, 1995Sm02) of this level, I _γ (322.6γ)=56 3 is computed.
323.7	17.2 4	1080.1	17/2 ⁻	756.4	13/2 ⁻			
324	2.9 3	3110	31/2 ⁺	2786	29/2 ⁺			I _γ : 1995Sm02 report E _γ =234 for this transition. The evaluator has assumed that this is a misprint.
325.1	12.1 9	4655.6	45/2 ⁻	4330.1	43/2 ⁻			
330		3380.8	35/2 ⁻	3050.6	33/2 ⁻			
331	2.8 3	3441	33/2 ⁺	3110	31/2 ⁺			
338	2.2 3	3779	35/2 ⁺	3441	33/2 ⁺			
342 ^c	1.2 1	3723?	(37/2 ⁻)	3380.8	35/2 ⁻			
347.9	24.1 11	347.9	11/2 ⁺	0.0	7/2 ⁺	E2		I _γ : From the directly measured ΔJ=2/ΔJ=1 γ branching (1.85 5, 1995Sm02) of this level,

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¹²⁸Te(³⁷Cl,4n γ) **1995Sm02,1995Wa21 (continued)**

$\gamma(^{161}\text{Tm})$ (continued)

E_γ †	I_γ ‡	E_i (level)	J_i^π	E_f	J_f^π	Mult. @	δ &	Comments
348.4	38 2	1873.8	25/2 ⁻	1525.4	23/2 ⁻	M1+E2	0.227 19	$I_\gamma(347.9\gamma)=24.1$ 11 is computed. This is the value listed here. 1995Sm02 do not list an I_γ value for this γ .
351 ^c	1.3 1	4130	37/2 ⁺	3779	35/2 ⁺			
356.6	7.5 [#] 2	515.7	11/2 ⁺	159.1	7/2 ⁺			
357.7	7.5 [#] 2	376.6	5/2 ⁻	18.90	5/2 ⁺			
358	5.2 2	3739.2	39/2 ⁻	3380.8	35/2 ⁻			
361 ^c	2.1 1	4084?	(39/2 ⁻)	3723?	(37/2 ⁻)			
361.5	12.1 7	5017.0	47/2 ⁻	4655.6	45/2 ⁻			
372.0	24 1	2480.8	29/2 ⁻	2108.8	27/2 ⁻	M1+E2	0.15 3	
372.3	1.8 1	531.4	11/2 ⁺	159.1	7/2 ⁺			
376.6	5.7 5	5393.7	49/2 ⁻	5017.0	47/2 ⁻			
381	13.4 3	3117	(33/2 ⁻)	2736.4	31/2 ⁻			
394.8	7.3 7	5788.7	51/2 ⁻	5393.7	49/2 ⁻			
395.5	19 3	557.3	13/2 ⁺	161.8	9/2 ⁺	E2		I_γ : From the directly measured $\Delta J=2/\Delta J=1$ γ branching (1.43 21, 1995Sm02) of this level, $I_\gamma(395.5\gamma)=19$ 3 is computed. This is the value listed here. 1995Sm02 do not list an I_γ value for this γ .
398.1	59 3	815.4	17/2 ⁻	417.4	13/2 ⁻	E2		I_γ : From the directly measured $\Delta J=2/\Delta J=1$ γ branching (0.77 4, 1995Sm02) of this level, $I_\gamma(398.1\gamma)=56$ 8 is computed.
416.0	13.3 3	1496.1	21/2 ⁻	1080.1	17/2 ⁻	E2		
425.9	22.8 9	3476.2	37/2 ⁻	3050.6	33/2 ⁻			I_γ : From the directly measured $\Delta J=2/\Delta J=1$ γ branching (0.66 5, 1995Sm02) of this level, $I_\gamma(425.9\gamma)=40$ 4 is computed.
426.7 ^c		6216.2	53/2 ⁻	5788.7	51/2 ⁻			
431.0	58 1	1008.3	19/2 ⁻	577.3	15/2 ⁻	E2		I_γ : From the directly measured $\Delta J=2/\Delta J=1$ γ branching (1.76 34, 1995Sm02) of this level, $I_\gamma(431.0\gamma)=95$ 19 is computed.
440.6	47 1	788.5	15/2 ⁺	347.9	11/2 ⁺			I_γ : From the directly measured $\Delta J=2/\Delta J=1$ γ branching (2.74 18, 1995Sm02) of this level, $I_\gamma(440.6\gamma)=72$ 5 is computed.
479.4	47 1	1036.8	17/2 ⁺	557.3	13/2 ⁺	E2		I_γ : From the directly measured $\Delta J=2/\Delta J=1$ γ branching (5.00 25, 1995Sm02) of this level, $I_\gamma(479.4\gamma)=33$ 2 is computed.
484.3	19.4 9	3739.2	39/2 ⁻	3254.9	35/2 ⁻			I_γ : From the directly measured $\Delta J=2/\Delta J=1$ γ branching (0.59 5, 1995Sm02) of this level, $I_\gamma(484.3\gamma)=24$ 2 is computed.
494.5	37 2	1309.9	21/2 ⁻	815.4	17/2 ⁻	E2		I_γ : From the directly measured $\Delta J=2/\Delta J=1$ γ branching (1.40 4, 1995Sm02) of this level, $I_\gamma(494.5\gamma)=94$ 5 is computed.
500.1	13.1 3	1996.2	25/2 ⁻	1496.1	21/2 ⁻	E2		
516.6	64 [#] 2	1305.0	19/2 ⁺	788.5	15/2 ⁺	E2		I_γ : From the directly measured $\Delta J=2/\Delta J=1$ γ branching (5.28 17, 1995Sm02) of this level, $I_\gamma(516.6\gamma)=64$ 2 is computed.
517.1	143 [#] 12	1525.4	23/2 ⁻	1008.3	19/2 ⁻	E2		I_γ : 1995Sm02 do not list an I_γ value for this placement. From the directly measured $\Delta J=2/\Delta J=1$ γ branching (2.13 13, 1995Sm02) of this level, $I_\gamma(517.1\gamma)=143$ 12 is computed. This is the value listed here.
518.4	38 8	3254.9	35/2 ⁻	2736.4	31/2 ⁻			I_γ : From the directly measured $\Delta J=2/\Delta J=1$ γ branching (0.65 13, 1995Sm02) of this level, $I_\gamma(518.4\gamma)=38$ 8 is computed. This is

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¹²⁸Te(³⁷Cl,4n γ) **1995Sm02,1995Wa21 (continued)**

$\gamma(^{161}\text{Tm})$ (continued)

E_γ †	I_γ ‡	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult. @	Comments
536.2	25 1	4012.2	41/2 ⁻	3476.2	37/2 ⁻		the value listed here. 1995Sm02 do not list an I_γ value for this γ .
544.9	45 3	1581.7	21/2 ⁺	1036.8	17/2 ⁺	E2	I_γ : From the directly measured $\Delta J=2/\Delta J=1$ γ branching (0.92 3, 1995Sm02) of this level, $I_\gamma(536.2\gamma)=32$ 2 is computed.
563.9	64 3	1873.8	25/2 ⁻	1309.9	21/2 ⁻	E2	I_γ : From the directly measured $\Delta J=2/\Delta J=1$ γ branching (1.41 8, 1995Sm02) of this level, $I_\gamma(563.9\gamma)=54$ 4 is computed.
570.0	37 2	3050.6	33/2 ⁻	2480.8	29/2 ⁻		I_γ : From the directly measured $\Delta J=2/\Delta J=1$ γ branching (1.44 3, 1995Sm02) of this level, $I_\gamma(570.0\gamma)=40$ 3 is computed.
571.7	44 3	1876.7	23/2 ⁺	1305.0	19/2 ⁺	E2	I_γ : From the directly measured $\Delta J=2/\Delta J=1$ γ branching (7.09 38, 1995Sm02) of this level, $I_\gamma(571.7\gamma)=35$ 2 is computed.
574.1	9.3 3	2570.3	29/2 ⁻	1996.2	25/2 ⁻		
583.4	64 3	2108.8	27/2 ⁻	1525.4	23/2 ⁻	E2	I_γ : From the directly measured $\Delta J=2/\Delta J=1$ γ branching (3.20 42, 1995Sm02) of this level, $I_\gamma(583.4\gamma)=70$ 10 is computed.
590.6 ^b	33 ^b 1	2172.4	25/2 ⁺	1581.7	21/2 ⁺		I_γ : From the directly measured $\Delta J=2/\Delta J=1$ γ branching (10.76 118, 1995Sm02) of this level, $I_\gamma(590.6\gamma)=84$ 9 is computed.
590.6 ^b	29 ^b 1	4330.1	43/2 ⁻	3739.2	39/2 ⁻		I_γ : From the directly measured $\Delta J=2/\Delta J=1$ γ branching (1.09 9, 1995Sm02) of this level, $I_\gamma(590.6\gamma)=31$ 3 is computed.
601.3	32 1	2478.2	27/2 ⁺	1876.7	23/2 ⁺		I_γ : From the directly measured $\Delta J=2/\Delta J=1$ γ branching (2.25 13, 1995Sm02) of this level, $I_\gamma(601.3\gamma)=32$ 2 is computed.
606 ^c		3723?	(37/2 ⁻)	3117	(33/2 ⁻)		
607.0	28 1	2480.8	29/2 ⁻	1873.8	25/2 ⁻	E2	I_γ : From the directly measured $\Delta J=2/\Delta J=1$ γ branching (2.05 12, 1995Sm02) of this level, $I_\gamma(607.0\gamma)=49$ 4 is computed.
614	23 2	2786	29/2 ⁺	2172.4	25/2 ⁺		I_γ : From the directly measured $\Delta J=2/\Delta J=1$ γ branching (5.93 89, 1995Sm02) of this level, $I_\gamma(614\gamma)=23$ 4 is computed.
627.6	64 3	2736.4	31/2 ⁻	2108.8	27/2 ⁻	E2	I_γ : From the directly measured $\Delta J=2/\Delta J=1$ γ branching (2.82 20, 1995Sm02) of this level, $I_\gamma(627.6\gamma)=48$ 4 is computed.
632	≥ 22	3110	31/2 ⁺	2478.2	27/2 ⁺		I_γ : From the directly measured $\Delta J=2/\Delta J=1$ γ branching (≥ 7.77 , 1995Sm02) of this level, $I_\gamma(632\gamma)\geq 22$ is computed. This is the value listed here. 1995Sm02 do not list an I_γ value for this γ .
636	15.5 9	3117	(33/2 ⁻)	2480.8	29/2 ⁻		
636.1	7.8 3	3206.4	33/2 ⁻	2570.3	29/2 ⁻		
643.9	27 3	4655.6	45/2 ⁻	4012.2	41/2 ⁻		I_γ : From the directly measured $\Delta J=2/\Delta J=1$ γ branching (2.19 13, 1995Sm02) of this level, $I_\gamma(643.9\gamma)=27$ 3 is computed. This is the value listed here. 1995Sm02 do not list an I_γ value for this γ .
644.2 3		3380.8	35/2 ⁻	2736.4	31/2 ⁻		E_γ : From 1984Fo04 , ¹⁵² Sm(¹⁴ N,5n γ). Reported as 642 on the level scheme of 1995Sm02 , but that value is not consistent with their reported level energies.
655	25 1	3441	33/2 ⁺	2786	29/2 ⁺		I_γ : From the directly measured $\Delta J=2/\Delta J=1$ γ branching (8.90 107, 1995Sm02) of this level, $I_\gamma(655\gamma)=25$ 4 is computed.

Continued on next page (footnotes at end of table)

¹²⁸Te(³⁷Cl,4n γ) **1995Sm02,1995Wa21 (continued)**

$\gamma(^{161}\text{Tm})$ (continued)

E_γ †	I_γ ‡	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Comments
669	17.3 7	3779	35/2 ⁺	3110	31/2 ⁺	I_γ : From the directly measured $\Delta J=2/\Delta J=1$ γ branching (7.78 118, 1995Sm02) of this level, $I_\gamma(669\gamma)=17$ 3 is computed.
680	6.7 2	3886	(37/2 ⁻)	3206.4	33/2 ⁻	I_γ : From the directly measured $\Delta J=2/\Delta J=1$ γ branching (2.1 2, 1995Sm02) of this level, $I_\gamma(686.8\gamma)=25$ 2 is computed.
686.8	26 1	5017.0	47/2 ⁻	4330.1	43/2 ⁻	
689	18.8 9	4130	37/2 ⁺	3441	33/2 ⁺	I_γ : From the directly measured $\Delta J=2/\Delta J=1$ γ branching (2.7 8, 1995Sm02) of this level, $I_\gamma(738.1\gamma)=15$ 5 is computed.
692 ^a	12.6 ^a 3	4578	(41/2 ⁻)	3886	(37/2 ⁻)	
692 ^a	12.6 ^a 3	5270	(45/2 ⁻)	4578	(41/2 ⁻)	
703 ^c	6.3 2	4084?	(39/2 ⁻)	3380.8	35/2 ⁻	
713	16.9 7	4492	(39/2 ⁺)	3779	35/2 ⁺	
718	3.6 2	5988	(49/2 ⁻)	5270	(45/2 ⁻)	
737	22.0 7	4867	(41/2 ⁺)	4130	37/2 ⁺	
738 ^c	2.8 2	6726?	(53/2 ⁻)	5988	(49/2 ⁻)	
738.1	37 2	5393.7	49/2 ⁻	4655.6	45/2 ⁻	
771.9	20.3 3	5788.7	51/2 ⁻	5017.0	47/2 ⁻	
775	8.9	5267	(43/2 ⁺)	4492	(39/2 ⁺)	
808	13.0 7	5675	(45/2 ⁺)	4867	(41/2 ⁺)	
822.5	20.1 3	6216.2	53/2 ⁻	5393.7	49/2 ⁻	
844.3	18.2 3	6633.0	(55/2 ⁻)	5788.7	51/2 ⁻	
846	16.0 8	6113	(47/2 ⁺)	5267	(43/2 ⁺)	
885	7.6 7	6560	(49/2 ⁺)	5675	(45/2 ⁺)	
893.7	19.3 3	7109.9	(57/2 ⁻)	6216.2	53/2 ⁻	
900.4	14.1 3	7533.4	(59/2 ⁻)	6633.0	(55/2 ⁻)	
924 ^c	9.0 8	7037?	(51/2 ⁺)	6113	(47/2 ⁺)	
942.5 ^a	14.3 ^a 3	8052.4	(61/2 ⁻)	7109.9	(57/2 ⁻)	
942.5 ^a	14.3 ^a 3	8475.9	(63/2 ⁻)	7533.4	(59/2 ⁻)	
959 ^c	5.1 7	7519?	(53/2 ⁺)	6560	(49/2 ⁺)	
981.3 ^a	14.6 ^a 3	9033.7	(65/2 ⁻)	8052.4	(61/2 ⁻)	
981.3 ^a	14.6 ^a 3	9457.2	(67/2 ⁻)	8475.9	(63/2 ⁻)	
1025.5 ^a	10.0 ^a 3	10059.2	(69/2 ⁻)	9033.7	(65/2 ⁻)	
1025.5 ^a	10.0 ^a 3	10482.7	(71/2 ⁻)	9457.2	(67/2 ⁻)	
1081 ^c	6.6 3	11140?	(73/2 ⁻)	10059.2	(69/2 ⁻)	
1102 ^c	3.8 3	11585?	(75/2 ⁻)	10482.7	(71/2 ⁻)	

† 1995Sm02 state that the uncertainties in their E_γ values range from 0.5 to 1.0 keV.

‡ 1995Sm02 list I_γ values for a number of γ 's. In a separate table, they list branching ratios, measured specifically for γ 's deexciting various members of the bands based on 7/2[523] and 7/2[404]. These ratios are occasionally not consistent with the corresponding I_γ values given for the individual γ 's. They are used in the adopted γ branching from the respective levels.

Peak contains two γ 's. The listed I_γ value is for the pair.

@ Primarily from $\gamma\gamma(\theta)$ (DCO ratios) (1995Wa21). Where δ values are known (see the comment there), the evaluator has listed the multipolarity as M1+E2 rather than E1+M2, from considerations of rotational-band structure as well as RUL (where half-life data are available).

& Values are from the angular-correlation measurements (DCO ratios) of 1995Wa21. These values were not listed in that work. They have kindly been provided by S.J. Freeman, one of the authors of that work. In their study, 1995Sm02 assumed that the mixing ratios were small enough (<0.3) that they could be neglected. In those instances where the δ values are needed, but not available, the evaluator has assumed $\delta < 0.3$.

^a Multiply placed with undivided intensity.

^b Multiply placed with intensity suitably divided.

^c Placement of transition in the level scheme is uncertain.

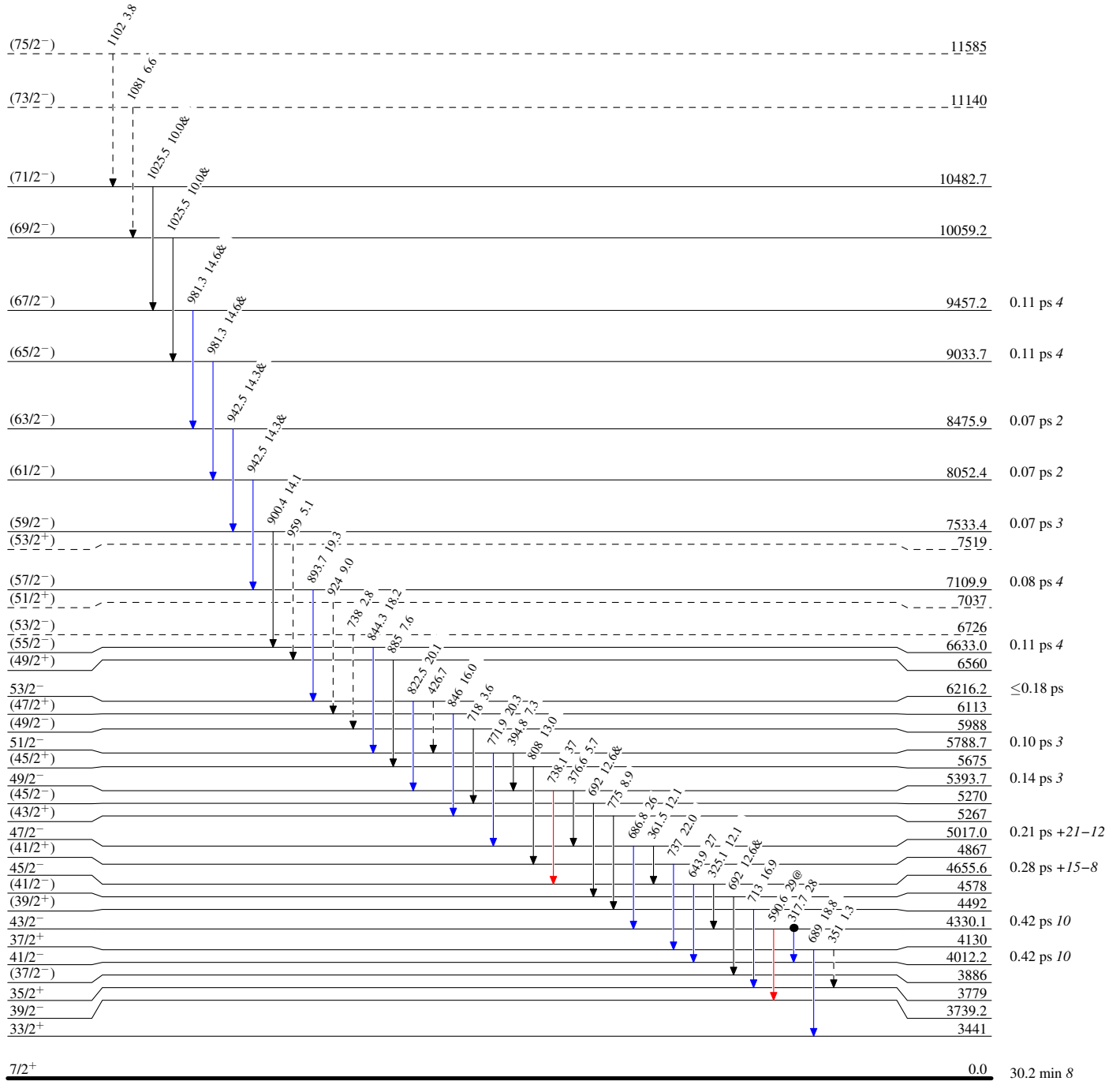
$^{128}\text{Te}(\text{}^{37}\text{Cl},4n\gamma)$ 1995Sm02,1995Wa21

Level Scheme

Intensities: Relative I_γ
 & Multiply placed: undivided intensity given
 @ Multiply placed: intensity suitably divided

Legend

- $I_\gamma < 2\% \times I_\gamma^{\text{max}}$
- $I_\gamma < 10\% \times I_\gamma^{\text{max}}$
- $I_\gamma > 10\% \times I_\gamma^{\text{max}}$
- - - - - γ Decay (Uncertain)
- Coincidence



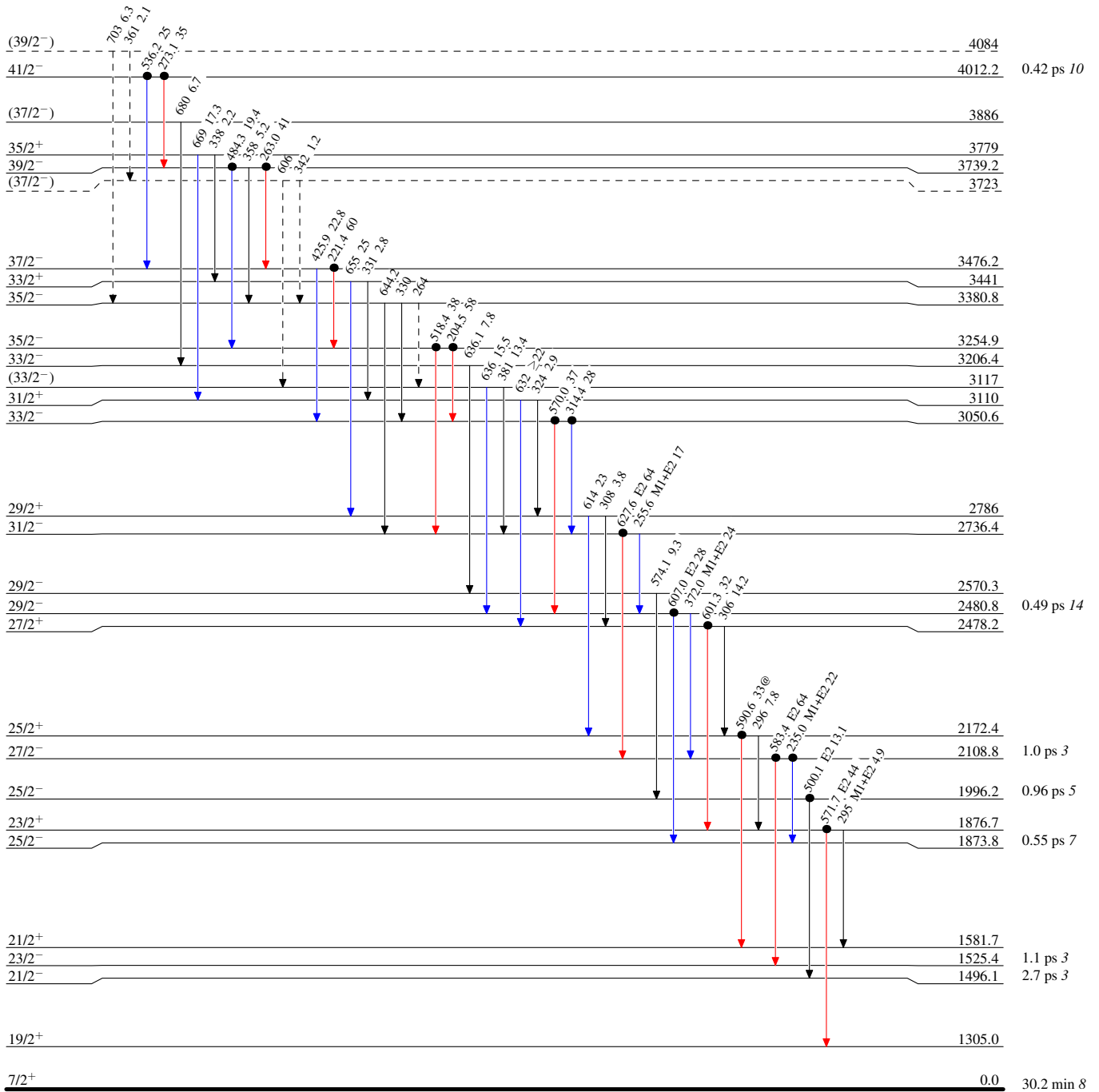
¹²⁸Te(³⁷Cl,4n γ) 1995Sm02,1995Wa21

Level Scheme (continued)

Intensities: Relative I γ
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

Legend

- I γ < 2% \times I γ^{max}
- I γ < 10% \times I γ^{max}
- I γ > 10% \times I γ^{max}
- - - γ Decay (Uncertain)
- Coincidence



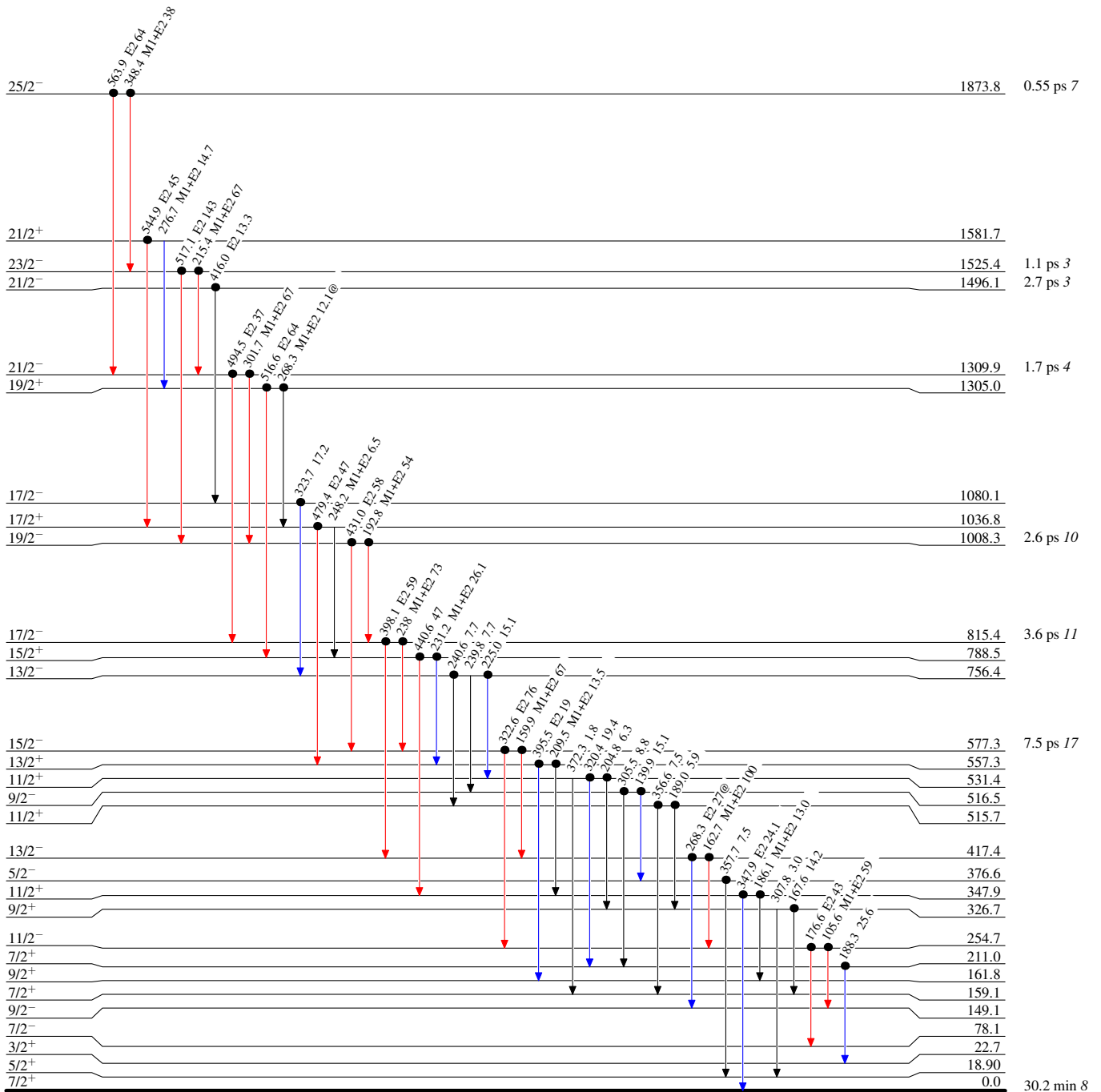
$^{128}\text{Te}(^{37}\text{Cl},4n\gamma)$ 1995Sm02,1995Wa21

Level Scheme (continued)

Intensities: Relative I_γ
 & Multiply placed: undivided intensity given
 @ Multiply placed: intensity suitably divided

Legend

- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$
- Coincidence



$^{161}_{69}\text{Tm}_{92}$

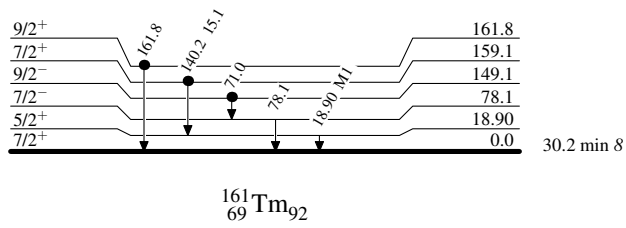
$^{128}\text{Te}^{(37}\text{Cl},4n\gamma)$ 1995Sm02,1995Wa21

Level Scheme (continued)

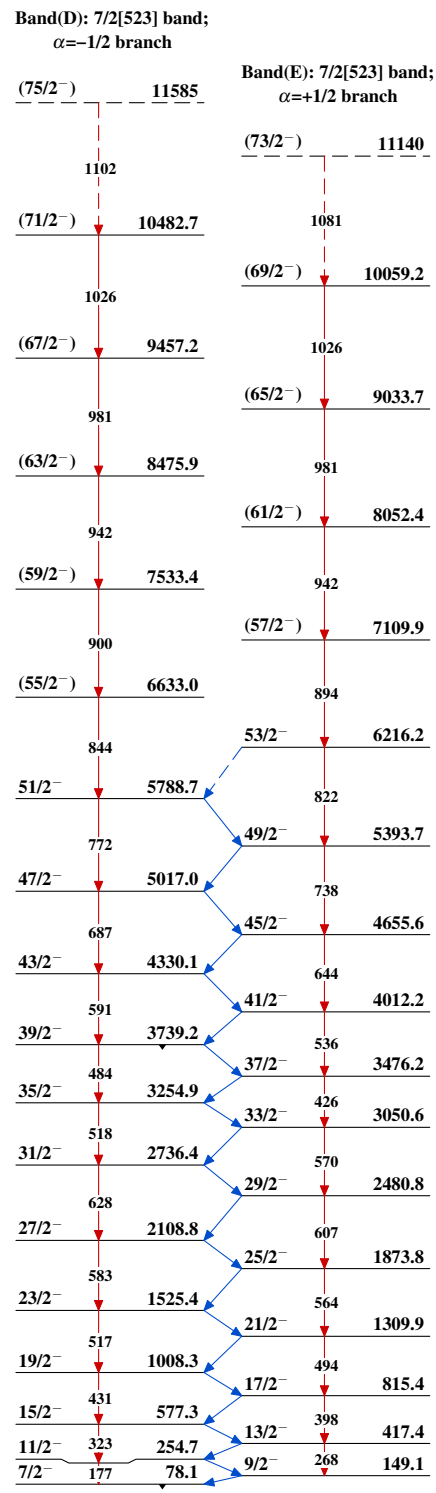
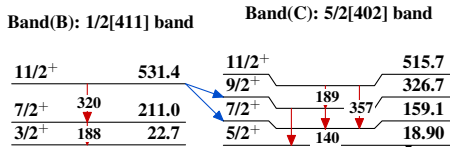
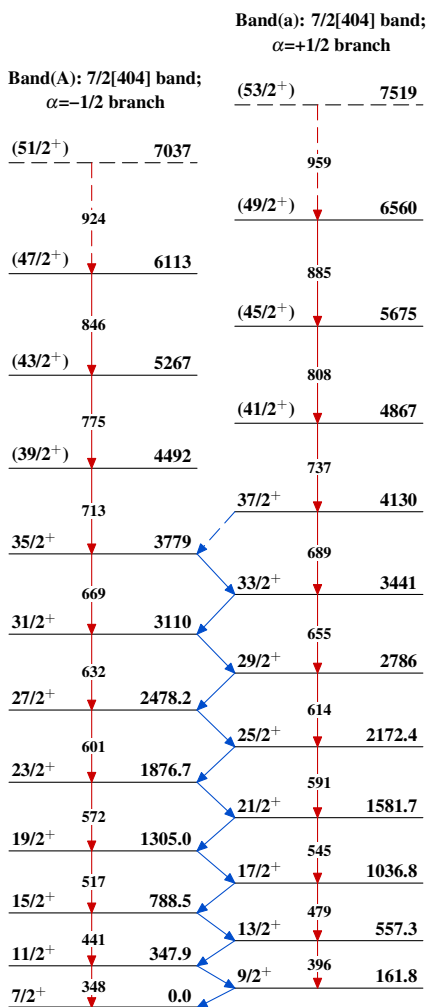
Legend

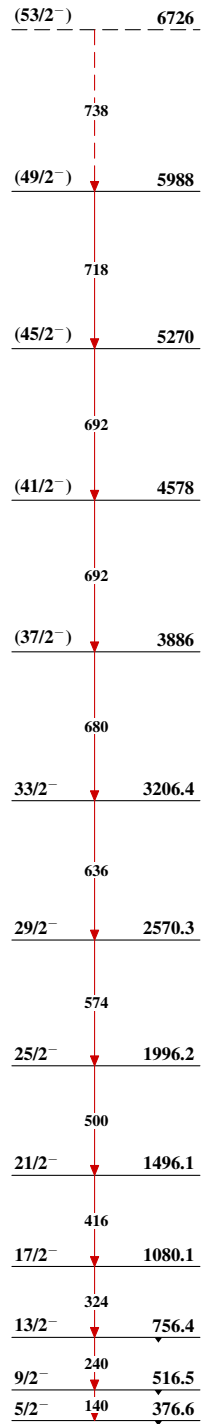
Intensities: Relative I_γ
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

-----► γ Decay (Uncertain)
● Coincidence

 $^{161}_{69}\text{Tm}_{92}$

$^{128}\text{Te}(^{37}\text{Cl},4n\gamma)$ 1995Sm02,1995Wa21



$^{128}\text{Te} (^{37}\text{Cl}, 4n\gamma)$ 1995Sm02,1995Wa21 (continued)Band(F): 1/2[541] band;
 $\alpha=+1/2$ branch $^{161}_{69}\text{Tm}_{92}$