Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Coral M. Baglin	NDS 114, 1293 (2013)	1-Sep-2013

Q(β^-)=−7747 *3*; S(n)=13332.9 *26*; S(p)=3102 *4*; Q(α)=−4538 *7* 2012Wa38
Q(εp)=−613 *4* (2012Wa38).
Additional information 1.

Theory (partial list):
Nuclear structure: 1983Am06, 1996Ru02 (shell-model calculations).
Compilation and analysis of g.s. and SD band quadrupole moments: 2001Cl06.

^{91}Tc Levels

Although ^{91}Tc appears to decay with a single half-life, it is difficult to construct a decay scheme assuming a single parent since transitions to 9/2$^+$ and 1/2$^-$ would occur with log *ft*=6.1 and log *ft*=6.0, respectively. Since no strong isomeric transition was found, it is concluded that there exist a g.s. and an isomeric state, and both decay with almost the same half-life (see 1976De37).

Cross Reference (XREF) Flags

A	^{54}Fe(^{40}Ca,3pγ)	D	^{58}Ni(^{40}Ca,α3pγ)
B	^{91}Ru ε decay	E	^{92}Rh β^+p decay
C	^{58}Ni(^{36}Ar,3pγ)		

E(level)[†]	J$^\pi$[‡]	T$_{1/2}$[#]	XREF	Comments
0	(9/2)$^+$	3.14 min *2*	ABCDE	%ε+%β^+=100 J$^\pi$: log *ft*=5.2 for ε decay to 9/2$^+$, 2451 level in ^{91}Mo; shell-model systematics. Probable configuration=(π g$_{9/2}$). T$_{1/2}$: from γ(t) of γ lines which could be assigned to the decay of the high-spin ^{91}Tc (1976De37). Other measurement: 3.12 min *5* (1974Ia01) from β^+ activity.
139.3[&] *3*	(1/2)$^-$	3.3 min *1*	C	%ε+%β^+=100; %IT<1 J$^\pi$: log *ft*=5.7 to 3/2$^-$, 1156 in ^{91}Mo; (HI,xnγ) systematics. Probable configuration is (π p$_{1/2}$) (1994Ru01). T$_{1/2}$: from γ(t) of γ lines assigned to low-spin ^{91}Tc ε decay (1976De37). %ε+%β^+: %IT<1 estimated in ^{91}Tc ε decay (1975DeZX) based on absence of growth in decay curves.
394.51 *9*	(7/2)$^+$		ABCDE	J$^\pi$: M1+E2 395γ to (9/2)$^+$ g.s. In (HI,xnγ)-type reactions.
698.91 *8*	(7/2$^+$)		B	J$^\pi$: gammas to (9/2)$^+$ and (7/2)$^+$ levels favoring J$^\pi$=(5/2$^+$,7/2,9/2,11/2$^+$); stretched Q 1138γ from (11/2$^+$) 1533.
884.90[e] *17*	(5/2$^-$)		C	J$^\pi$: (E2) 746γ to (1/2)$^-$ 139.
892.90 *8*	(13/2$^+$)		ABCDE	J$^\pi$: (E2) 893γ to (9/2)$^+$ g.s.
905.3 *3*			B	J$^\pi$: 905γ to (9/2)$^+$ g.s.
1097.10 *7*	(11/2$^+$)		ABCDE	J$^\pi$: (M1(+E2)) 1097γ to (9/2)$^+$ g.s.; 702γ to (7/2)$^+$ 395.
1248.4			B	J$^\pi$: 1248γ to (9/2)$^+$ g.s.
1339.1			B	J$^\pi$: 945γ to (7/2)$^+$ 395.
1465.5			B	J$^\pi$: 1466γ to (9/2)$^+$ g.s.; 1071γ to (7/2)$^+$ 395.
1532.62 *10*	(11/2$^+$)		A CD	J$^\pi$: ΔJ=1 D+Q 1533γ to (9/2)$^+$ g.s.; ΔJ=1 411γ from (13/2$^-$) 1943 level; J$^\pi$=(9/2$^-$) suggested in (^{40}Ca,α3pγ) and in (^{40}Ca,3pγ) is not consistent with DCO ratios for 1533γ and 411γ in (^{36}Ar,3pγ).
1555.80 *13*	(9/2$^-$)		C	J$^\pi$: (E2) 671γ to (5/2$^-$) 885 In (^{36}Ar,3pγ).
1766.3			B	

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Adopted Levels, Gammas (continued)

^{91}Tc Levels (continued)

E(level)[†]	J^{π}[‡]	$T_{1/2}$[#]	XREF	Comments
1821.33 *10*	(17/2$^+$)		A CD	J^{π}: (E2) 928γ to (13/2$^+$) 893.
1943.10 *9*	(13/2$^-$)		A CD	J^{π}: (E2) ΔJ=2 387γ to (9/2$^-$) 1556 In (^{36}Ar,3pγ); (E1(+M2)) 411γ to (11/2$^+$) 1533.
1997.6			B	
2044.84 *9*	(15/2$^+$)		A CD	J^{π}: (M1+E2) 224γ to (17/2$^+$) 1821; (E2) ΔJ=2 948γ to (11/2$^+$) 1097.
2137.17[a] *13*	(21/2$^+$)	1.85 ns *3*	A CD	J^{π}: (E2) 316γ to (17/2$^+$) 1821. $T_{1/2}$: Other value: 2.0 ns *3* from (^{40}Ca,α3pγ).
2153.01[e] *10*	(17/2$^-$)	1.07 ns *6*	A CD	J^{π}: (E1+M2) 108γ to (15/2$^+$) 2045; (E1+M2) 332γ to (17/2$^+$) 1821. $T_{1/2}$: Other value: 0.8 ns *2* from (^{40}Ca,α3pγ).
2767.58[a] *14*	(23/2$^+$)	<0.7 ps	A CD	J^{π}: (M1+E2) 630γ to (21/2$^+$) 2137.
2980.57[f] *13*	(21/2$^-$)	3.3 ps *7*	A CD	J^{π}: E2 ΔJ=2 828γ to (17/2$^-$) 2153; 843γ to (21/2$^+$) 2137.
3135.90[a] *15*	(25/2$^+$)	<0.7 ps	A CD	J^{π}: (M1+E2) 368γ to (23/2$^+$) 2768; 998γ to (21/2$^+$) 2137.
3345.43[a] *15*	(25/2$^+$)	1.2 ps *9*	A CD	J^{π}: (M1(+E2)) 578γ to (23/2$^+$) 2767; 210γ to (25/2$^+$) 3135.
3804.37[f] *15*	(25/2$^-$)	4.6 ps *5*	A CD	J^{π}: E2 ΔJ=2 824γ to (21/2$^-$) 2981; 1037γ to (23/2$^+$) 2768.
4080.36 *16*	(25/2$^-$)	3.5 ps *10*	A CD	J^{π}: (M1) 276γ to (25/2$^-$) 3804; 1100γ to (21/2$^-$) 2980; 944γ to (25/2$^+$) 3136.
4119.30[b] *16*	(27/2$^+$)	<1.4 ps	A CD	J^{π}: (M1+E2) 774γ to (25/2$^+$) 3345; Q 1352γ to (23/2$^+$) 2767.
4354.52[b] *15*	(29/2$^+$)	1.5 ps *4*	A CD	J^{π}: (M1+E2) 235γ to (27/2$^+$) 4119; E2 1009γ to (25/2$^+$) 3345.
4594.89 *16*	(27/2$^-$)	<0.7 ps	A CD	J^{π}: (M1(+E2)) 515γ to (25/2$^-$) 4080.
4703.13[f] *17*	(29/2$^-$)		A CD	J^{π}: (E2) ΔJ=2 899γ to (25/2$^-$) 3804.
4750.22[b] *18*	(29/2$^+$)		CD	J^{π}: 1614γ to (25/2$^+$) 3136; 630γ to (27/2$^+$) 4119; 396γ to (29/2$^+$) 4355.
4935.73[f] *17*	(29/2$^-$)	<0.7 ps	A CD	J^{π}: (M1(+E2)) 341γ to (27/2$^-$) 4595; 232γ to (29/2$^-$) 4703.
5077.93[f] *18*	(31/2$^-$)	3.3 ps *3*	A CD	J^{π}: (M1+E2) 142γ to (29/2$^-$) 4936.
5090.56[b] *17*	(31/2$^+$)	<1.4 ps	A CD	J^{π}: (M1+E2) 340γ to (29/2$^+$) 4750; 972γ to (27/2$^+$) 4119.
5268.10[b] *17*	(33/2$^+$)	6.4 ps *4*	A CD	J^{π}: (M1+E2) 178γ to (31/2$^+$) 5091; E2 914γ to (29/2$^+$) 4355.
5382.90 *19*	(31/2$^+$)		CD	J^{π}: (M1(+E2)) 1028γ to (29/2$^+$) 4355.
5567.13[f] *19*	(33/2$^-$)	<0.7 ps	A CD	J^{π}: (M1(+E2)) 489γ to (31/2$^-$) 5078; 864γ to (29/2$^-$) 4703.
5776.12 *19*	(33/2$^+$)		C	J^{π}: (M1(+E2)) 686γ to (31/2$^+$) 5090; 393γ to (31/2$^+$) 5383.
5933.67[b] *18*	(35/2$^+$)	0.49 ps *+35−21*	A CD	J^{π}: (M1(+E2)) 666γ to (33/2$^+$) 5268; 158γ to (33/2$^+$) 5776.
6158.73[g] *20*	(35/2$^-$)	1.46 ps *21*	A CD	J^{π}: (M1(+E2)) 592γ to (33/2$^-$) 5567; E2 1081γ to (31/2$^-$) 5078.
6192.16 *18*	(33/2$^+$)		CD	J^{π}: (M1(+E2)) 809γ to (31/2$^+$) 5383; (M1(+E2)) 924γ to (33/2$^+$) 5268; (E2) 1837γ to (29/2$^+$) 4355.
6452.35[b] *21*	(37/2$^+$)	0.8[@] ps *6*	CD	J^{π}: (M1(+E2)) 519γ to (35/2$^+$) 5934.
6615.81[g] *22*	(37/2$^-$)	0.83[@] ps *14*	A CD	J^{π}: (M1(+E2)) 457γ to (35/2$^-$) 6159; 1049γ to (33/2$^-$) 5567.
6690.8 *7*			C	
6843.07 *19*	(35/2$^+$)		CD	J^{π}: (M1(+E2)) 651γ to (33/2$^+$) 6192; 1575γ to (33/2$^+$) 5268.
7292.85[b] *20*	(37/2$^+$)		CD	J^{π}: (M1(+E2)) 450γ to (35/2$^+$) 6843; 1100γ to (33/2$^+$) 6192.
7505.03[g] *23*	(39/2$^-$)		A CD	J^{π}: (M1+E2) 889γ to (37/2$^-$) 6616; 1346γ to (35/2$^-$) 6159.
7667.99[c] *22*	(37/2$^+$)		CD	J^{π}: 1476γ to (33/2$^+$) 6192.
7716.17[g] *23*	(41/2$^-$)	0.83[@] ps *21*	A CD	J^{π}: (M1+E2) 211γ to (39/2$^-$) 7505; stretched E2 1100γ to (37/2$^-$) 6616.
7992.7 *4*			C	
8141.22[c] *21*	(39/2$^+$)		CD	J^{π}: (M1(+E2)) 473γ to (37/2$^+$) 7668; stretched Q 2208γ to (35/2$^+$) 5934.
8276.58[c] *23*	(39/2$^+$)		CD	J^{π}: 984γ to (37/2$^+$) 7293; 2343γ to (35/2$^+$) 5934.
8392.3[c] *11*	(41/2$^+$)	0.37 ps *4*	CD	J^{π}: E2 ΔJ=2 1940γ to (37/2$^+$) 6455.
8559.0 *5*			C	
8835.89[c] *22*	(41/2$^+$)	4.0 ps *4*	CD	J^{π}: (M1(+E2)) 559γ to (39/2$^+$) 8277; 1543γ to (37/2$^+$) 7293; Q ΔJ=2 2384γ to (37/2$^+$) 6452.
9008.7 *11*	(41/2$^+$)		D	J^{π}: 2556γ to (37/2$^+$) 6453.
9299.78[c] *24*	(43/2$^+$)	0.9 ps *4*	CD	J^{π}: (M1+E2) 464γ to (41/2$^+$) 8836; 1159γ to (39/2$^+$) 8141.
9717.0[g] *21*	(45/2$^-$)		CD	J^{π}: (E2) ΔJ=2 2001γ to (41/2$^-$) 7716.

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Adopted Levels, Gammas (continued)

^{91}Tc Levels (continued)

E(level)[†]	J^{π}[‡]	$T_{1/2}$[#]	XREF	Comments
10166.7[d] *17*	(45/2$^+$)	0.44[@] ps *3*	CD	J^{π}: stretched E2 1774γ to (41/2$^+$) 8392.
10388.0 *11*	(43/2$^-$,45/2$^-$)		D	J^{π}: 2672γ to (41/2$^-$) 7716 In (^{40}Ca,α3pγ).
10505.4[d] *3*	(47/2$^+$)	1.8[@] ps *4*	CD	J^{π}: stretched E2 1206γ to (43/2$^+$) 9300.
10843.5 *11*	(43/2$^-$,45/2$^-$)		D	J^{π}: 3127γ to (41/2$^-$) 7716.
12172.5 *23*	(47/2$^-$,49/2$^-$)		D	J^{π}: 2456γ to (45/2$^-$) 9717 In (^{40}Ca,α3pγ).
12225.1[d] *24*			CD	J^{π}: 2058γ to (45/2$^+$) 10167 In (^{40}Ca,α3pγ).
x[h]	J≈(51/2)		D	Additional information 2. E(level): no connecting transitions to normal deformed structures have been found. J^{π}: from coincidence observation of SD band transitions with 1206γ from 10502, (47/2$^+$) level and assuming an average spin cost of 2 units to connect to the 47/2$^+$ level.
1348.4+x[h] *3*	J+2		D	
2807.9+x[h] *3*	J+4		D	
4377.7+x[h] *4*	J+6		D	
6059.7+x[h] *4*	J+8		D	
7852.3+x[h] *4*	J+10		D	
9756.2+x[h] *5*	J+12		D	
11771.0+x[h] *5*	J+14		D	
13890.3+x[h] *5*	J+16		D	
16114.4+x[h] *6*	J+18		D	
18440.4+x[h] *7*	J+20		D	
20861.9+x[h] *8*	J+22		D	

[†] From least-squares fit to adopted Eγ.

[‡] J^{π} values are those proposed in (^{36}Ar,3pγ) (1994Ru01), based on DCO ratios and γ cascade patterns. In many instances, these J^{π} are supported by γ anisotropy ratios or excit data from other heavy-ion induced reactions. Relevant transition multipolarity and final level information is given In comments on individual levels. SD band J^{π} values are adopted from (^{40}Ca,α3pγ).

[#] From (^{36}Ar,3pγ), unless noted otherwise.

[@] Effective $T_{1/2}$; not corrected for feeding.

[&] ^{91}Tc ε decay studies could not establish which of the observed 3.3 min and 3.14 min states is the g.s., but systematics suggest that the 3.3 min (1/2$^-$) level is the isomer; 1976De37 estimate E(isomer)<350 based on %IT<1 for the anticipated M4 IT. Although the authors of the (^{36}Ar,3pγ) study do not comment, the evaluator presumes that the (1/2$^-$) 139.3 keV state they report is, in fact, the isomeric state.

[a] Band(A): Seniority=3 states. (1994Ru01). Probable dominant configuration=((π $g_{9/2}$)(ν $g_{9/2}$)$^{-2}$).

[b] Band(B): Seniority=3 states. (1994Ru01). Probable dominant configuration=((π $g_{9/2}$)^3(ν $g_{9/2}$)$^{-2}$).

[c] Band(C): Seniority=3 states. (1994Ru01).

[d] Band(D): Seniority=3 states. (1994Ru01).

[e] Band(E): Seniority=3 states. (1994Ru01). Probable dominant configuration=((π $p_{1/2}$)(π $g_{9/2}$)^2).

[f] Band(F): Seniority=3 states. (1994Ru01).

[g] Band(G): Seniority=3 states. (1994Ru01).

[h] Band(H): SD band (2000Id01,2003La24). Q(intrinsic)=6.7 *+13−8* (2003La24), 8.1 *+19−14* (2000Id01). Population≈1% of the (^{40}Ca,α3pγ), E=185 MeV reaction channel. Configuration: comparison of experimental moments of inertia with calculations shows that it is not $\pi5^1\nu5^2$ As proposed for ^{89}Tc. These calculations seem to agree with $\pi5^2\nu5^4$ (2000Id01). 2003La24 propose $\nu5^3\pi5^2$ or $\nu5^4\pi5^2$.

Adopted Levels, Gammas (continued)

$\gamma(^{91}$Tc)

E_i(level)	J^π_i	E_γ[†]	I_γ[‡]	E_f	J^π_f	Mult.[#]	δ[@]	α[e]	Comments
394.51	(7/2)$^+$	394.5 1	100	0	(9/2)$^+$	M1+E2[b]	−0.7 +4−13		
698.91	(7/2$^+$)	304.1[&] 1	52[&] 10	394.51	(7/2)$^+$				
		699.1[&] 1	100[&] 24	0	(9/2)$^+$				
884.90	(5/2$^-$)	745.6 2	100	139.3	(1/2)$^-$	(E2)			
892.90	(13/2$^+$)	892.9 1	100	0	(9/2)$^+$	(E2)			
905.3		905.3[&] 3	100[&]	0	(9/2)$^+$				
1097.10	(11/2$^+$)	204.3 1	22.6 7	892.90	(13/2$^+$)				Other Iγ: 25 8 in (^{40}Ca,3pγ); 15.0 16 at 65° in (^{36}Ar,3pγ); 11 6 In ε decay.
		702.1 3	5.3[a] 21	394.51	(7/2)$^+$				
		1097.1 1	100.0 19	0	(9/2)$^+$	(M1(+E2))	+0.04 7		
1248.4		1248.4[&] 1	100[&]	0	(9/2)$^+$				
1339.1		944.7[&] 1	100[&]	394.51	(7/2)$^+$				
1465.5		1070.7[&] 1	100[&] 16	394.51	(7/2)$^+$				
		1465.5[&] 3	53[&] 16	0	(9/2)$^+$				
1532.62	(11/2$^+$)	435.4 2	12[a] 4	1097.10	(11/2$^+$)				
		1138.3 2	47.8 22	394.51	(7/2)$^+$	Q[b]			Other Iγ: 33 4 at 65° in (^{36}Ar,3pγ).
		1532.6 2	100 4	0	(9/2)$^+$	(M1+E2)	−1.1 9		Mult.: D+Q from DCO ratio; δ somewhat large for E1+M2.
1555.80	(9/2$^-$)	670.9 1	100[a] 33	884.90	(5/2$^-$)	(E2)			
		1555.9 4	100[a] 13	0	(9/2)$^+$				
1766.3		669.6[&] 2	100[&] 31	1097.10	(11/2$^+$)				
		1371.9[&] 2	72[&] 26	394.51	(7/2)$^+$				
1821.33	(17/2$^+$)	928.4 1	100	892.90	(13/2$^+$)	(E2)			
1943.10	(13/2$^-$)	387.3 1	30[a] 3	1555.80	(9/2$^-$)	(E2)		0.01104	
		410.5 1	97.6 24	1532.62	(11/2$^+$)	(E1(+M2))	−0.01 8		Other Iγ: 100 4 at 65° in (^{36}Ar,3pγ).
		846.1 1	100.0 24	1097.10	(11/2$^+$)	(E1(+M2))	+0.06 7		
		1050.0 2	30.6[a] 20	892.90	(13/2$^+$)				Other Iγ: <55 in (^{40}Ca,α3pγ), 33 13 In (^{40}Ca,3pγ).
1997.6		657.6[&] 2	76[&] 24	1339.1					
		1997.6[&] 9	100[&] 23	0	(9/2)$^+$				
2044.84	(15/2$^+$)	223.6 1	82.6 22	1821.33	(17/2$^+$)	(M1+E2)		0.051 20	Other Iγ: 50 3 at 65° in (^{36}Ar,3pγ); 63 10 in (^{40}Ca,3pγ).
		947.7 1	68.5 22	1097.10	(11/2$^+$)	(E2)			Other Iγ: 74 7 at 65° in (^{36}Ar,3pγ).
		1151.9 1	100.0 22	892.90	(13/2$^+$)	(M1+E2)	−0.25 6		Mult.: D+Q from DCO ratio; δ somewhat large for E1+M2.
2137.17	(21/2$^+$)	315.8 1	100	1821.33	(17/2$^+$)	(E2)		0.0215	B(E2)(W.u.)=3.92 7 Mult.: probably Q from anisotropy ratio in (^{40}Ca,α3pγ); D or E2 from RUL.
2153.01	(17/2$^-$)	108.2 1	100.0 9	2044.84	(15/2$^+$)	(E1+M2)		1.1 11	
		210.0 1	<85	1943.10	(13/2$^-$)	E2[b]		0.0875	B(E2)(W.u.)=8 +9−8

γ(^{91}Tc) (continued)

E$_i$(level)	J$^\pi_i$	E$_\gamma$[†]	I$_\gamma$[‡]	E$_f$	J$^\pi_f$	Mult.[#]	δ[@]	α[e]	Comments
									Other Iγ: 128 *5* at 65° in (^{36}Ar,3pγ); 109 *20* in (^{40}Ca,3pγ). Mult.: Δπ=No from level scheme.
2153.01	(17/2$^-$)	331.6 *1*	28.5 *6*	1821.33	(17/2$^+$)	(E1(+M2))	+0.2 *6*		B(E1)(W.u.)<8×10^{-7} *4*; B(M2)(W.u.)=1.4 *+80−14* Mult.: DCO ratio consistent with Q (ΔJ=2) or D (ΔJ=0); 1994Ru01 assume the latter. Other Iγ: 50 *3* at 65° in (^{36}Ar,3pγ); 61 *9* in (^{40}Ca,3pγ).
2767.58	(23/2$^+$)	630.3 *1*	100	2137.17	(21/2$^+$)	(M1+E2)	−0.05 *2*		B(M1)(W.u.)>0.13; B(E2)(W.u.)>0.17
2980.57	(21/2$^-$)	827.6 *1*	100[a] *3*	2153.01	(17/2$^-$)	E2			B(E2)(W.u.)=18 *4*
		843.3 *4*	0.80[a] *20*	2137.17	(21/2$^+$)				
3135.90	(25/2$^+$)	368.3 *1*	100[a] *3*	2767.58	(23/2$^+$)	(M1+E2)	−0.03 *1*		B(M1)(W.u.)>0.60; B(E2)(W.u.)>1.4
		998.5 *2*	4.7[a] *7*	2137.17	(21/2$^+$)	[E2]			B(E2)(W.u.)>1.5
3345.43	(25/2$^+$)	210.1 *2*	9.7[a] *10*	3135.90	(25/2$^+$)				
		577.7 *1*	100.0 *17*	2767.58	(23/2$^+$)	(M1(+E2))	−0.04 *4*		B(M1)(W.u.)=0.06 *5*; B(E2)(W.u.)=0.3 *+7−3*
		1208.4 *1*	36.7 *12*	2137.17	(21/2$^+$)	E2			B(E2)(W.u.)=1.9 *15* Other Iγ: 30.8 *26* at 65° in (^{36}Ar,3pγ); 63 *10* in (^{40}Ca,3pγ).
3804.37	(25/2$^-$)	823.8 *1*	100.0 *8*	2980.57	(21/2$^-$)	E2			B(E2)(W.u.)=13.0 *15*
		1036.9 *2*	2.94 *20*	2767.58	(23/2$^+$)				
4080.36	(25/2$^-$)	276.0 *1*	100[a] *8*	3804.37	(25/2$^-$)	(M1)		0.0184	B(M1)(W.u.)=0.20 *7* Mult.: DCO ratio consistent with Q (ΔJ=2) or D (ΔJ=0); 1994Ru01 assume the latter.
		944.2 *2*	25[a] *6*	3135.90	(25/2$^+$)				
		1100.0 *3*	25[a] *11*	2980.57	(21/2$^-$)	[E2]			B(E2)(W.u.)=0.7 *4*
4119.30	(27/2$^+$)	774.0 *1*	100.0 *11*	3345.43	(25/2$^+$)	(M1+E2)	−0.07 *4*		B(M1)(W.u.)>0.032
		1351.9 *3*	5.0 *6*	2767.58	(23/2$^+$)	Q[b]			
4354.52	(29/2$^+$)	235.3 *1*	43.5 *6*	4119.30	(27/2$^+$)	(M1+E2)		0.043 *16*	Other Iγ: 48.0 *20* at 65° in (^{36}Ar,3pγ); 46 *5* in (^{40}Ca,3pγ).
		1009.1 *1*	9.2 *3*	3345.43	(25/2$^+$)	E2			B(E2)(W.u.)=0.88 *24* Other Iγ: 7.7 *6* at 65° in (^{36}Ar,3pγ).
		1218.5 *1*	100.0 *11*	3135.90	(25/2$^+$)	E2			B(E2)(W.u.)=3.7 *10*
4594.89	(27/2$^-$)	514.5 *1*	50.7 *11*	4080.36	(25/2$^-$)	(M1(+E2))	−0.04 *8*		B(M1)(W.u.)>0.076 Other Iγ: 31.6 *14* at 65° in (^{36}Ar,3pγ); 65 *20* in (^{40}Ca,3pγ).
		790.6 *1*	100.0 *14*	3804.37	(25/2$^-$)	(M1(+E2))	−0.04 *7*		B(M1)(W.u.)>0.041
		1459.2 *7*	2.4[a] *10*	3135.90	(25/2$^+$)				
4703.13	(29/2$^-$)	898.7 *1*	100	3804.37	(25/2$^-$)	(E2)			
4750.22	(29/2$^+$)	395.7 *2*	58[a] *17*	4354.52	(29/2$^+$)				
		630 *1*	≈125[a]	4119.30	(27/2$^+$)				
		1613.8 *3*	100[a] *33*	3135.90	(25/2$^+$)				
4935.73	(29/2$^-$)	232.4 *2*	1.5[a] *4*	4703.13	(29/2$^-$)				
		340.9 *1*	100[a] *5*	4594.89	(27/2$^-$)	(M1(+E2))	−0.05 *7*	0.01081 *17*	B(M1)(W.u.)>0.77

$\gamma(^{91}Tc)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[@]	α[e]	Comments
5077.93	(31/2⁻)	142.2 *1*	100.0 *9*	4935.73	(29/2⁻)	(M1+E2)		0.23 *13*	
		374.8 *1*	59.2 *6*	4703.13	(29/2⁻)	(M1(+E2))	−0.01 *6*		B(M1)(W.u.)=0.041 *5*; B(E2)↓=0.03 *+38−3* Other Iγ: 86 *4* at 65° in (^{36}Ar,3pγ); 76 *13* in (^{40}Ca,3pγ).
5090.56	(31/2⁺)	340.3 *1*	10.0[a] *10*	4750.22	(29/2⁺)	(M1+E2)		0.014 *3*	
		736.0 *1*	100[a] *4*	4354.52	(29/2⁺)	(M1(+E2))	−0.02 *3*		B(M1)(W.u.)>0.034
		972.0 *3*	5.5[a] *10*	4119.30	(27/2⁺)	[E2]			B(E2)(W.u.)>0.91
5268.10	(33/2⁺)	177.6 *1*	73.8 *7*	5090.56	(31/2⁺)	(M1+E2)		0.11 *5*	Other Iγ: 87 *4* at 65° in (^{36}Ar,3pγ); 85 *11* in (^{40}Ca,3pγ).
		913.6 *1*	100.0 *11*	4354.52	(29/2⁺)	E2			B(E2)(W.u.)=3.14 *21*
5382.90	(31/2⁺)	1028.4 *2*	100	4354.52	(29/2⁺)	(M1(+E2))			
5567.13	(33/2⁻)	489.2 *1*	100[a] *4*	5077.93	(31/2⁻)	(M1(+E2))	−0.02 *6*		B(M1)(W.u.)>0.26
		864.0 *3*	3.2[a] *11*	4703.13	(29/2⁻)	[E2]			B(E2)(W.u.)>2.1
5776.12	(33/2⁺)	393.1 *2*	80[a] *20*	5382.90	(31/2⁺)				
		685.9 *2*	100[a] *20*	5090.56	(31/2⁺)	(M1(+E2))			
5933.67	(35/2⁺)	157.6 *1*	2.9[a] *6*	5776.12	(33/2⁺)				
		665.5 *1*	100[a] *4*	5268.10	(33/2⁺)	(M1(+E2))	−0.01 *6*		B(M1)(W.u.)=0.15 *+7−11*
6158.73	(35/2⁻)	591.6 *1*	84.8 *10*	5567.13	(33/2⁻)	(M1(+E2))	−0.01 *6*		B(M1)(W.u.)=0.033 *5*
		1080.8 *1*	100.0 *14*	5077.93	(31/2⁻)	E2			B(E2)(W.u.)=5.8 *9*
6192.16	(33/2⁺)	257.8 *3*	20[a] *7*	5933.67	(35/2⁺)				
		809.3 *1*	93[a] *7*	5382.90	(31/2⁺)	(M1(+E2))			
		924.2 *1*	100[a] *10*	5268.10	(33/2⁺)	(M1(+E2))			
		1101.1 *2*	57[a] *13*	5090.56	(31/2⁺)				
		1441.6 *4*	43[a] *7*	4750.22	(29/2⁺)				
		1837.4 *3*	93[a] *10*	4354.52	(29/2⁺)	(E2)			
6452.35	(37/2⁺)	518.7 *1*	100	5933.67	(35/2⁺)	(M1(+E2))	0.00 *7*		B(M1)(W.u.)=0.20 *15*
6615.81	(37/2⁻)	457.1 *1*	100[a] *3*	6158.73	(35/2⁻)	(M1+E2)	−0.08 *4*		B(M1)(W.u.)=0.26 *5*; B(E2)(W.u.)=9 *9*
		1048.7 *3*	5.0[a] *12*	5567.13	(33/2⁻)				
6690.8		1613.0 *8*	100	5077.93	(31/2⁻)				
6843.07	(35/2⁺)	650.9 *1*	100[a] *6*	6192.16	(33/2⁺)	(M1(+E2))			
		1575.1 *6*	8[a] *3*	5268.10	(33/2⁺)				
7292.85	(37/2⁺)	449.8 *1*	100.0 *23*	6843.07	(35/2⁺)	(M1(+E2))			
		1100.4 *3*	36[a] *10*	6192.16	(33/2⁺)				
		1359.2 *2*	47.7 *23*	5933.67	(35/2⁺)				Other Iγ: 81 *7* at 65° in (^{36}Ar,3pγ).
7505.03	(39/2⁻)	889.2 *1*	100[a] *4*	6615.81	(37/2⁻)	(M1+E2)	−0.07 *5*		Other Eγ: 890.2 *2* from (^{40}Ca,3pγ).
		1345.6 *5*	1.5[a] *5*	6158.73	(35/2⁻)				
7667.99	(37/2⁺)	1475.6 *3*	100 *4*	6192.16	(33/2⁺)				
		2399.8 *5*	67 *4*	5268.10	(33/2⁺)				
7716.17	(41/2⁻)	211.1 *1*	100[a] *4*	7505.03	(39/2⁻)	(M1+E2)		0.061 *25*	Other Eγ: 210.1 *2* from (^{40}Ca,3pγ).
		1100.4 *1*	28.9[a] *21*	6615.81	(37/2⁻)	E2			B(E2)(W.u.)=3.7 *10* Other Iγ: <83 in (^{40}Ca,α3pγ).
7992.7		1302.2 *10*	53[a] *26*	6690.8					
		1833.9 *4*	100[a] *16*	6158.73	(35/2⁻)				

From ENSDF

Adopted Levels, Gammas (continued)

γ(^{91}Tc) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[‡]	E_f	J^π_f	Mult.[#]	δ[@]	α[e]	Comments
8141.22	(39/2+)	473.2 *1*	100 *5*	7667.99	(37/2+)	(M1(+E2))			Other Iγ: 85 *5* at 65° in (^{36}Ar,3pγ).
		848.5 *2*	100 *5*	7292.85	(37/2+)	(M1(+E2))			
		1297.9 *3*	66 *5*	6843.07	(35/2+)	(E2)			Other Iγ: 49 *5* at 65° in (^{36}Ar,3pγ).
		1689.0 *3*	43 *5*	6452.35	(37/2+)	(M1(+E2))			Other Iγ: 36 *5* at 65° in (^{36}Ar,3pγ).
		2207.7 *3*	89 *5*	5933.67	(35/2+)	(E2)			Other Iγ: 77 *8* at 65° in (^{36}Ar,3pγ).
8276.58	(39/2+)	983.5 *3*	100[a] *10*	7292.85	(37/2+)				
		1824.4 *4*	48[a] *10*	6452.35	(37/2+)				
		2343.2 *10*	19[a] *5*	5933.67	(35/2+)				
8392.3	(41/2+)	1939.9 *10*	100	6452.35	(37/2+)	E2			B(E2)(W.u.)=2.29 *25*
8559.0		566.3 *2*	100[a] *15*	7992.7					
		1943.0 *7*	20[a] *5*	6615.81	(37/2−)				
8835.89	(41/2+)	559.3 *1*	16.7 *7*	8276.58	(39/2+)	(M1(+E2))			
		694.7 *1*	100.0 *14*	8141.22	(39/2+)	(M1(+E2))	−0.01 *7*		B(M1)(W.u.)=0.0127 *13*
		1542.6 *5*	4.3 *7*	7292.85	(37/2+)	[E2]			B(E2)(W.u.)=0.022 *5*
		2383.6 *5*	8.0 *7*	6452.35	(37/2+)	Q[b]			B(E2)(W.u.)=0.0047 *7* Other Iγ: 5.4 *14* at 65° in (^{36}Ar,3pγ).
9008.7	(41/2+)	2556.3[c]	100	6452.35	(37/2+)	Q[b]			
9299.78	(43/2+)	289.9	10.0[a] *5*	9008.7	(41/2+)	[M1,E2]		0.022 *7*	E_γ: from (^{40}Ca,α3pγ).
		463.9 *1*	100.0 *15*	8835.89	(41/2+)	(M1+E2)	+0.08 *5*		B(M1)(W.u.)=0.21 *10*; B(E2)(W.u.)=7 *+9−7*
		1158.5 *3*	4.5 *5*	8141.22	(39/2+)	[E2]			B(E2)(W.u.)=0.49 *23*
9717.0	(45/2−)	2000.8 *20*	100	7716.17	(41/2−)	(E2)			
10166.7	(45/2+)	1774.4 *13*	100	8392.3	(41/2+)	E2			B(E2)(W.u.)=3.01 *21*
10388.0	(43/2−,45/2−)	2671.8[c]	100	7716.17	(41/2−)				
10505.4	(47/2+)	1205.6 *1*	100	9299.78	(43/2+)	E2			B(E2)(W.u.)=5.1 *12*
10843.5	(43/2−,45/2−)	3127.3[c]	100	7716.17	(41/2−)				
12172.5	(47/2−,49/2−)	2455.5[c]	100	9717.0	(45/2−)				
12225.1		2058.4 *17*	100	10166.7	(45/2+)				
1348.4+x	J+2	1348.4[d] *3*	0.25[d] *3*	x	J≈(51/2)				
2807.9+x	J+4	1459.51[d] *4*	0.99[d] *5*	1348.4+x	J+2				
4377.7+x	J+6	1569.75[d] *17*	1.00[d] *5*	2807.9+x	J+4				
6059.7+x	J+8	1681.97[d] *13*	1.05[d] *5*	4377.7+x	J+6				
7852.3+x	J+10	1792.63[d] *13*	0.93[d] *5*	6059.7+x	J+8				
9756.2+x	J+12	1903.79[d] *16*	1.00[d] *5*	7852.3+x	J+10				
11771.0+x	J+14	2014.84[d] *17*	0.95[d] *5*	9756.2+x	J+12				
13890.3+x	J+16	2119.26[d] *17*	0.89[d] *5*	11771.0+x	J+14				
16114.4+x	J+18	2224.1[d] *3*	0.61[d] *4*	13890.3+x	J+16				
18440.4+x	J+20	2325.9[d] *3*	0.37[d] *3*	16114.4+x	J+18				
20861.9+x	J+22	2421.5[d] *3*	0.21[d] *3*	18440.4+x	J+20				

$^{91}_{43}Tc_{48}$-7

$\gamma(^{91}Tc)$ (continued)

† From 1994Ru01 in $^{58}Ni(^{36}Ar,3p\gamma)$, except as noted.

‡ From 1993Ar01 in $(^{40}Ca,\alpha 3p\gamma)$, except as noted.

Definite E2 assignments are made for transitions assigned as stretched Q (based on DCO ratios in $(^{36}Ar,3p\gamma)$) which cannot be M2 based on RUL; note, however, that DCO ratios cannot differentiate between Q ($\Delta J=2$) and D ($\Delta J=0$) transitions. Other assignments are based on measured DCO ratios combined with $\Delta\pi$ deduced from level scheme in $(^{36}Ar,3p\gamma)$, unless noted to the contrary.

@ From DCO ratios in $(^{36}Ar,3p\gamma)$ (from 1994Ru01).

& From ^{91}Ru ε decay.

[a] From 1994Ru01 in $(^{36}Ar,3p\gamma)$. $I\gamma$ is photon branching at 65°.

[b] D+Q from DCO ratio in $(^{40}Ca,\alpha 3p\gamma)$; not E1+M2 from RUL.

[c] From $(^{40}Ca,\alpha 3p\gamma)$. $E\gamma$ lies outside the γ-energy range of the $(^{36}Ar,3p\gamma)$ study in 1994Ru01.

[d] SD band transition from 2003La24, relative intensity within the band from 2000Id01 In $(^{40}Ca,\alpha 3p\gamma)$.

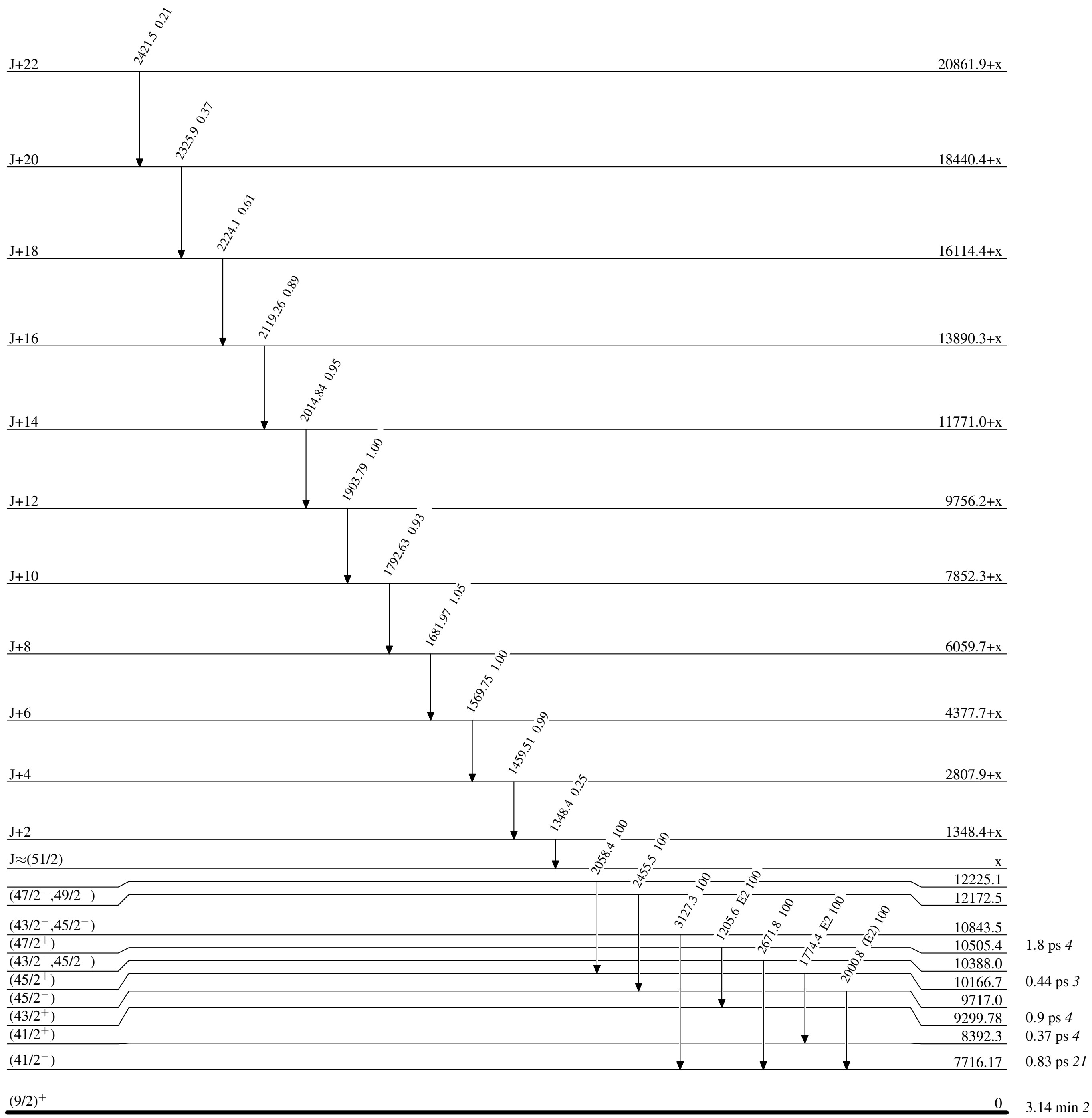
[e] Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

$^{91}_{43}Tc_{48}$-8

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level

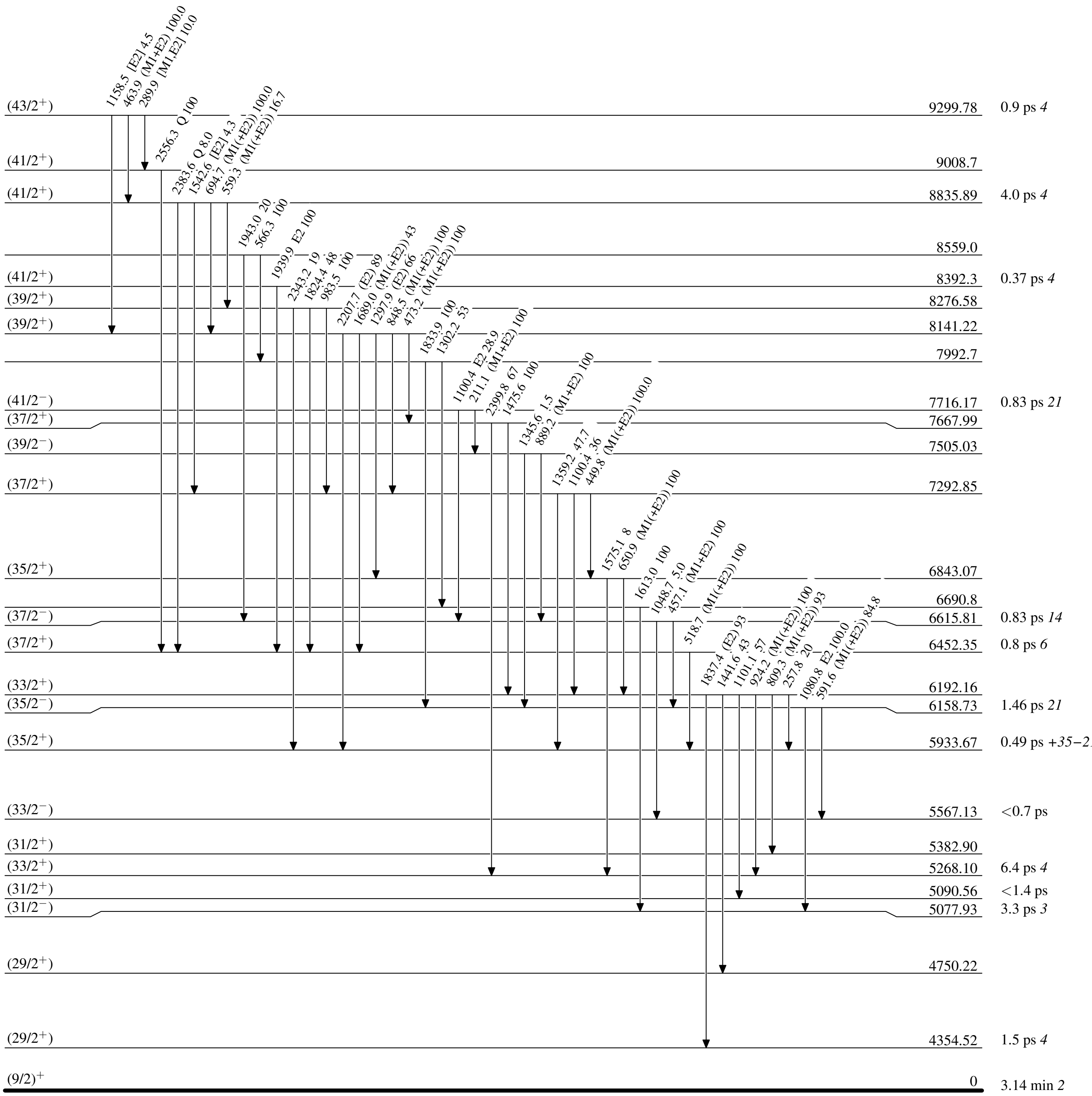


$^{91}_{43}Tc_{48}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

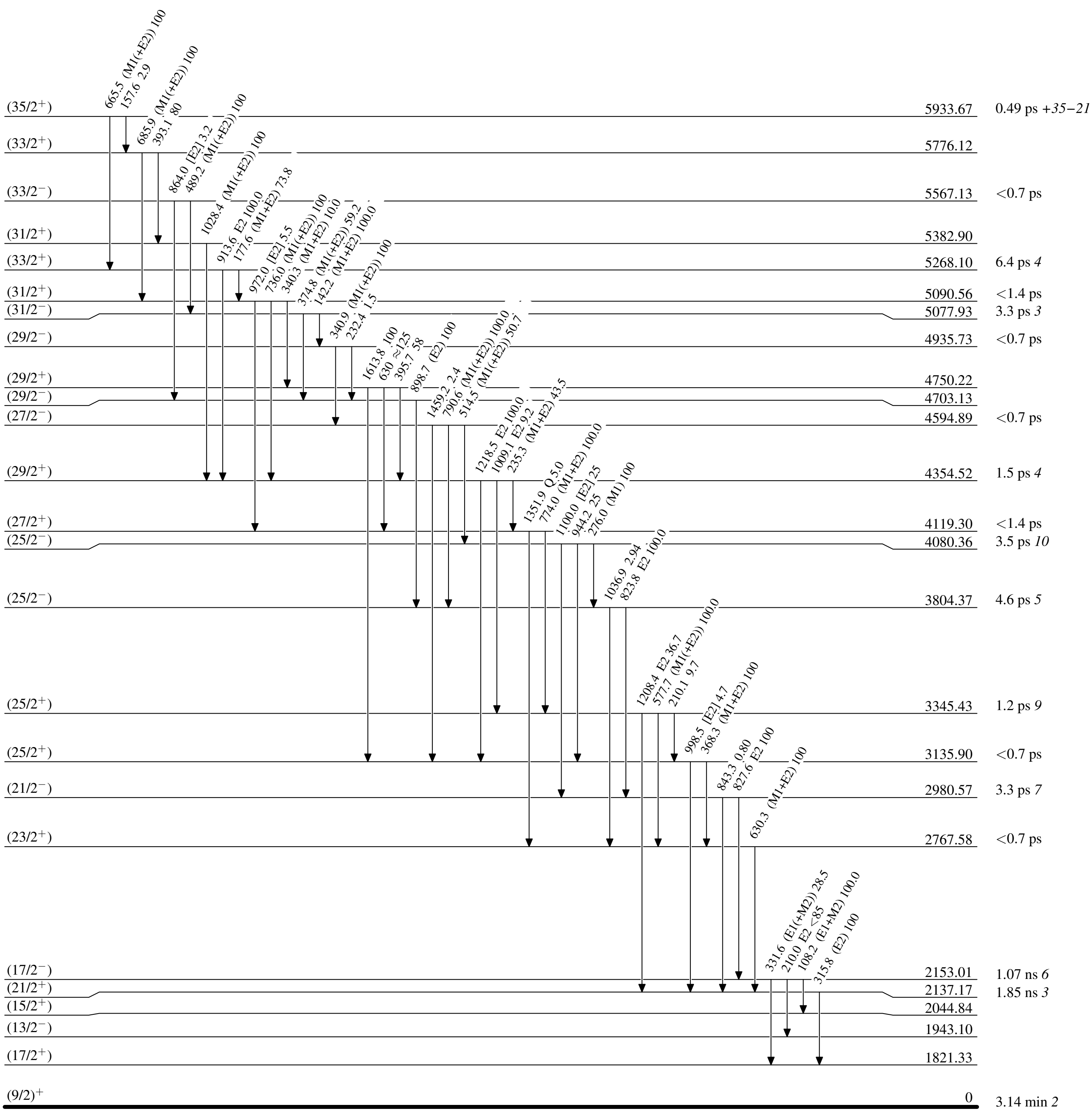


$^{91}_{43}Tc_{48}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

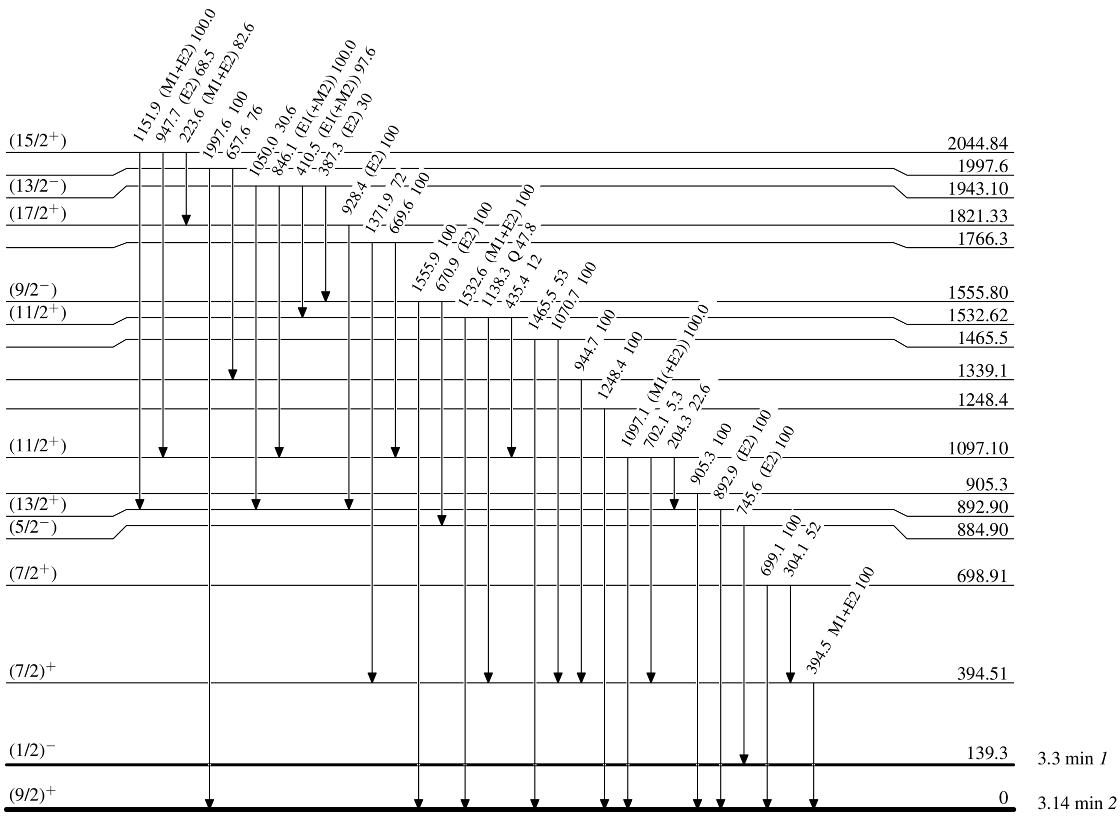


$^{91}_{43}Tc_{48}$

Adopted Levels, Gammas

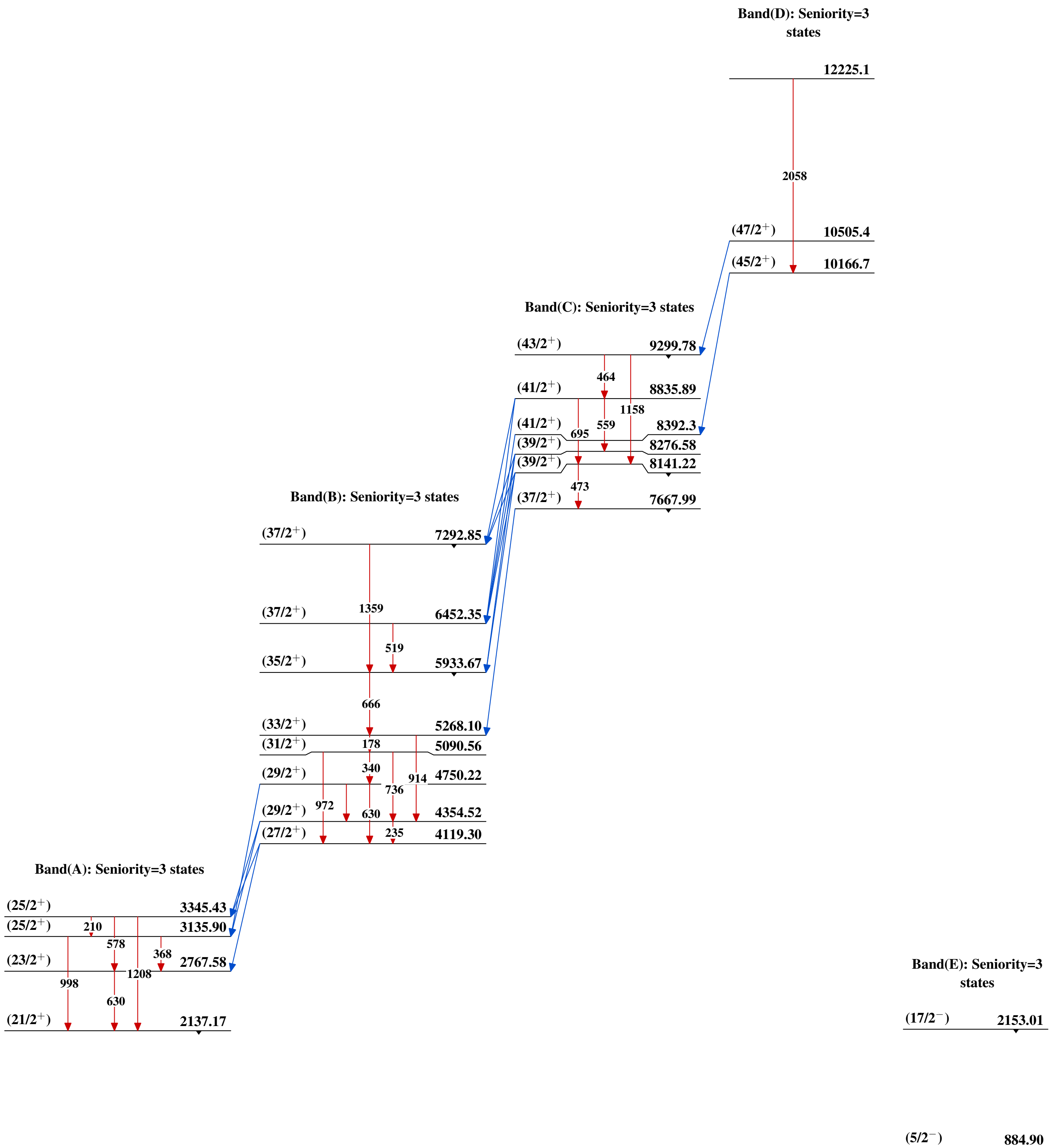
Level Scheme (continued)

Intensities: Relative photon branching from each level



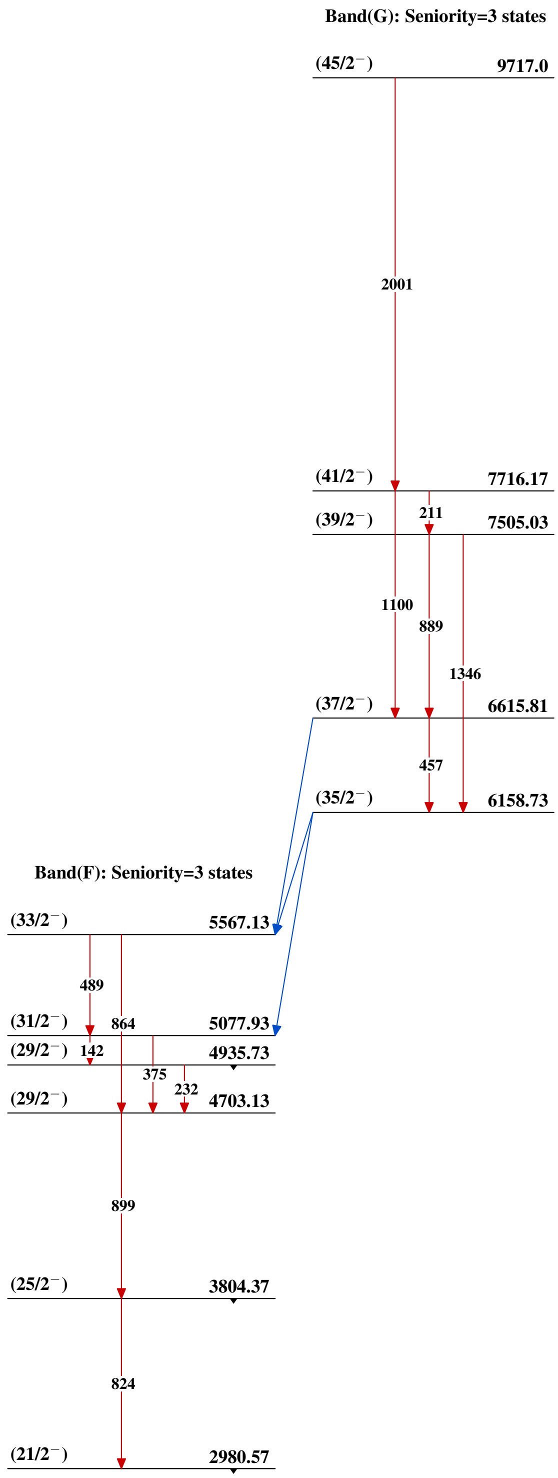
$^{91}_{43}Tc_{48}$

Adopted Levels, Gammas



$^{91}_{43}Tc_{48}$

Adopted Levels, Gammas (continued)



$^{91}_{43}Tc_{48}$

Adopted Levels, Gammas (continued)