Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Coral M. Baglin	NDS 112,1163 (2011)	15-Dec-2010

Q(β^-)=−6388.6 *25*; S(n)=12751 *4*; S(p)=4086.5 *10*; Q(α)=−5405 *24* 2012Wa38
Note: Current evaluation has used the following Q record −6391 612752 54086.5 *10*−5380 27 2003Au03,2009AuZZ.
Q(β^-), S(n), Q(α): from 2009AuZZ (cf. −6340 *90*, 12739 *26*, −5377 *27*, respectively, from 2003Au03).
Q(ε-p)=−4442 *4* (2009AuZZ) (cf. 2470 syst (2003Au03)).
For discussion of shell-model structure of high-spin levels see, e.g., 1992Si14, 1994Ro08, 1995Gh08.

^{93}Tc Levels

The high spin level scheme is that proposed in the ^{58}Ni(^{40}Ca,5pγ) reaction study; it differs in several significant respects from that suggested in ^{66}Zn(^{31}P,2p2nγ) (see the latter data set for specific differences).

Cross Reference (XREF) Flags

A	^{92}Mo(α,p2nγ), ^{90}Zr(^{6}Li,3nγ),	F	^{93}Ru ε decay (10.8 s)	K	^{66}Zn(^{31}P,2p2nγ),
B	^{92}Mo(α,t)	G	^{93}Ru ε decay (59.7 s)	L	^{93}Nb(π^+,π^-)
C	^{92}Mo(d,n)	H	^{93}Tc IT decay (43.5 min)	M	^{92}Mo(p,p′), (pol p,p) IAR
D	^{92}Mo(p,γ)	I	^{96}Ru(p,α)	N	^{58}Ni(^{40}Ca,5pγ),
E	^{92}Mo(^{3}He,d), (^{3}He,dp)	J	^{92}Mo(^{16}O,^{15}N), (^{12}C,^{11}B)	O	^{92}Mo(p,p) IAR: fine structure

E(level)[†]	J$^\pi$[‡]	T$_{1/2}$[#]	XREF	Comments
0.0[e]	9/2$^+$	2.75 h *5*	ABCDEFGHIJKL N	%ε+%β^+=100 μ=6.32 *6* J$^\pi$: L=4 in (d,n) and (^{3}He,d); comparison of μ with Schmidt values. T$_{1/2}$: from 1948Ku26. Others: 2.7 h *4* (1939De01), 2.7 h *1* (1948Mo18). μ: from g=1.405 *14* (1995Hi06); NMR on oriented nuclei. Others: 6.26 *10* from radiative detection of NMR (1989Ra17, from g=1.392 *22* (1981Ha16)); 6.2 *+11−4* from 1977Be19, low temperature nuclear orientation in iron (1989Ra17).
391.84 *8*	1/2$^-$	43.5 min *10*	BCDEFGHIJ	%IT=77.4 *6*; %ε+%β^+=22.6 *6* J$^\pi$: L=1 in (d,n) and (^{3}He,d); M4 392γ to J$^\pi$=9/2$^+$ g.s. T$_{1/2}$: from 1950Me21. Others: 45 min *5* (1939De01), 40 min *5* (1948Mo18).
680.59 *8*	(7/2$^+$)	<35[a] ns	AB DE G I	J$^\pi$: (M1+E2) 681γ to J$^\pi$=9/2$^+$; shell-model predictions; J≤7/2 from strength of excitation in (p,γ).
1190 *9*	1/2$^-$,3/2$^-$		BcdE i	Additional information 1. J$^\pi$: L=1 in (^{3}He,d).
1194.13 *10*	(≥7/2)	<35[a] ns	cd G i	J$^\pi$: log *ft*=7.4 (log $f^{1u}t$>8.5) from (9/2)$^+$; 1194γ to 9/2$^+$ g.s.
1407.80 *12*	(5/2$^-$)	<35[a] ns	B D FG I	J$^\pi$: log *ft*=7.3 (log $f^{1u}t$=8.9) from (9/2)$^+$; 1016γ to 1/2$^-$ 392.
1434.42[e] *13*	(13/2)$^+$	<10 ns	A G K N	J$^\pi$: E2 1435γ to J$^\pi$=9/2$^+$ g.s.; configuration assignment.
1503.04 *12*	1/2$^-$,3/2$^-$		BCDEF I	J$^\pi$: L(^{3}He,d)=1.
1515.95[e] *11*	(11/2)$^+$		A N	J$^\pi$: M1+E2 γ to 9/2$^+$; possible γ to (7/2$^+$); configuration assignment.
1555 *2*			D	
1788.09 *13*	1/2$^-$,3/2$^-$		BCDEF i	J$^\pi$: L=1 in (d,n) and (^{3}He,d).
1801.42 *10*	(7/2,9/2,11/2)		G i	J$^\pi$: log $f^{1u}t$<8.5 from (9/2)$^+$.
1969.09 *19*	(5/2$^-$,7/2,9/2$^-$)		G I	J$^\pi$: log *ft*=7.1 (log $f^{1u}t$=8.6) from (9/2)$^+$; 561γ to (5/2$^-$)

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Adopted Levels, Gammas (continued)

^{93}Tc Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[#]	XREF	Comments
				1408.
2133.70 *24*	5/2⁻,7/2⁻		B DE G I	Jπ: L=3 in (^{3}He,d).
2142 *2*			D	E(level): from (p,γ). Jπ: γ from J=3/2 *6576*, so J≤(7/2). Average resonance yield in (p,γ) is consistent with calculated yield for Jπ=7/2⁻, 5/2⁻ and 3/2⁺, but this may not Be a reliable indicator of Jπ.
2145.45[d] *13*	(13/2)⁻		A G N	Jπ: E1 629γ to (11/2)⁺ 1516; E1 711γ to (13/2)⁺ 1434; configuration assignment.
2184.84[e] *15*	(17/2)⁺	27 ps *5*	A K N	Jπ: E2 750γ to (13/2)⁺ 1434; configuration assignment.
2185.16[d] *15*	(17/2)⁻	10.2 μs *3*	A K N	%IT=100 μ=+10.46 *5* Jπ: M2+E3 751γ to Jπ=(13/2)⁺ 1434; 40γ to Jπ=(13/2)⁻ 2145; configuration assignment. μ: from DPAD (1989Ra17, from data of 1977Ha49); value is corrected for diamagnetic shielding and Knight shift.
2257.73 *10*	(7/2,9/2,11/2)		G	Jπ: log $f^{1u}t$<8.5 from (9/2)⁺.
2290? *20*			I	
2338.89 *14*			G	Jπ: 2432γ to 9/2⁺ g.s.; 1659γ to (7/2⁺) 681, so Jπ=(5/2⁺,7/2,9/2,11/2⁺).
2431.08 *15*	(1/2,3/2)⁻		D F	Jπ: log ft=4.7 from Jπ=(1/2)⁻.
2490.2 *4*			G I	Jπ: log ft=7.75 (log $f^{1u}t$>8.5) from (9/2)⁺; 1810γ to (7/2⁺) 681.
2535.3[e] *4*	(21/2)⁺	1.61 ns *11*	A K N	Jπ: E2 γ to (17/2)⁺; configuration assignment. $T_{1/2}$: weighted average of 1.82 ns *10* from direct timing in (^{40}Ca,5pγ), 1.61 ns *10* from α-ce(t) in (α,p2nγ) and 1.44 ns *9* from recoil distance Doppler shift in (^{35}Cl,α2pγ). The unweighted average of these data is 1.62 ns *11*.
2563 *3*	3/2⁺,5/2⁺		BCDE IJ	Additional information 2. Jπ: L=2 in (^{3}He,d).
2631.11 *22*	(7/2,9/2,11/2)		G	Jπ: log $f^{1u}t$=8.45 *10* from (9/2)⁺.
2710 *20*			I	
2840? *20*			I	
3100 *20*			B	
3150 *11*	(3/2⁺,5/2⁺)		E I	Additional information 3. Jπ: L(^{3}He,d)=(2).
3213.5 *25*	3/2⁺,5/2⁺		CD	Jπ: L=2 in (d,n).
3280.9[d] *4*	(21/2⁻)	<1.4[@] ps	A K N	$T_{1/2}$: from recoil distance Doppler shift. Jπ: Q 1096γ to Jπ=(17/2)⁻; configuration assignment.
3353 *7*	3/2⁺,5/2⁺		BC E IJ	Additional information 4. Jπ: L=2 in (d,n).
3580 *20*			B	
3888.4[d] *5*	(25/2⁻)	57.5[@] ps *21*	A K N	$T_{1/2}$: from recoil distance Doppler shift. Other: 60 ps *6* from differential decay curve method. Jπ: Q γ to (21/2⁻); configuration assignment.
3897 *12*	1/2⁺		bC E j	XREF: b(3910)j(3870). Additional information 5. Jπ: L(d,n)=0. L(^{3}He,d)=0+2 may indicate the existence of a doublet.
3914.75 *16*	(7/2,9/2,11/2)⁺		b G j	XREF: b(3910)j(3870). Jπ: log ft=5.3 from Jπ=(9/2)⁺.
3927.8[c] *8*	(19/2⁺)		N	
3950 *20*			C j	XREF: j(3870).

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Adopted Levels, Gammas (continued)

^{93}Tc Levels (continued)

E(level)[†]	J^{π}[‡]	$T_{1/2}$[#]	XREF	Comments
4104 *11*	$1/2^+$		bC E	XREF: b(4150). Additional information 6. J^{π}: L=0 in (d,n).
4158.5 *3*	$(7/2,9/2,11/2)^+$		b G	XREF: b(4150). J^{π}: log *ft*=5.75 from $(9/2)^+$.
4187.4 *3*	$(7/2,9/2,11/2)^+$		b G	XREF: b(4150). J^{π}: log *ft*=5.8 from $J^{\pi}=(9/2)^+$.
4257.3[c] *4*	$(21/2^+)$	3.3[@] ps *4*	A K N	$T_{1/2}$: from differential decay curve method. J^{π}: ΔJ=0 γ to $(21/2)^+$; configuration assignment.
4344.4 *5*	(7/2,9/2,11/2)		G	J^{π}: log $f^{1u}t$<8.5 from $J^{\pi}=(9/2)^+$.
4389.6 *3*	$(7/2,9/2,11/2)^+$		B E G	J^{π}: log *ft*=5.5 from $J^{\pi}=(9/2)^+$.
4451 *16*			B E	Additional information 7.
4608.9 *4*	$(7/2,9/2,11/2)^+$		G	J^{π}: log *ft*=5.5 from $J^{\pi}=(9/2)^+$.
4619.0 *4*	$(7/2,9/2,11/2)^+$		G	J^{π}: log *ft*=5.5 from $J^{\pi}=(9/2)^+$.
4668.63 *14*	$(9/2,11/2)^+$		BC E G	Additional information 8. J^{π}: log *ft*=4.7 from $J^{\pi}=(9/2)^+$; 3234γ to $(13/2)^+$ 1434.
4760.6 *5*	(7/2,9/2,11/2)		b G j	XREF: j(4730). J^{π}: log $f^{1u}t$<8.5 from $(9/2)^+$.
4764 *11*	$3/2^+,5/2^+$		bC E j	XREF: j(4730). J^{π}: L=2 in (^{3}He,d) and (d,n).
4775.0 *5*	$(7/2,9/2,11/2)^+$		b G j	XREF: b(4770)j(4730). J^{π}: log *ft*=5.76 from $(9/2)^+$.
4900 *12*	$3/2^+,5/2^+$		BC E	Additional information 9. J^{π}: L=2 in (^{3}He,d) and (d,n).
4937.8 *5*	$(7/2,9/2,11/2)^+$		G	J^{π}: log *ft*=5.7 from $J^{\pi}=(9/2)^+$.
4955.0 *8*	$(7/2,9/2,11/2)^+$		G	J^{π}: log *ft*=5.7 from $J^{\pi}=(9/2)^+$.
4973.9 *9*	$(25/2^+)$	<0.90[@] ps	N	$T_{1/2}$: from recoil distance Doppler shift. Configuration=(π $g^5_{9/2}$) suggested in (^{40}Ca,5pγ).
5032 *21*	$3/2^+,5/2^+$		C E	Additional information 10. J^{π}: L=2 in (^{3}He,d) and (d,n).
5076.4[c] *6*	$(23/2^+)$	<55[@] ps	K N	XREF: K(5267). $T_{1/2}$: from recoil distance Doppler shift. E(level): in (^{31}P,2p2nγ), the order of the 488γ and 818γ is reversed, resulting in E=5267 for the intermediate level energy.
5176 *10*	$3/2^+,5/2^+$		BC E	Additional information 11. J^{π}: L=2 in (d,n) and (^{3}He,d).
5298.2 *9*	$(7/2,9/2,11/2)^+$		G	J^{π}: log *ft*=5.5 from $J^{\pi}=(9/2)^+$.
5316 *18*	$3/2^+,5/2^+$		C E	Additional information 12. J^{π}: L=2 in (^{3}He,d) and (d,n).
5490 *20*	$1/2^+$		C	J^{π}: L=0 in (d,n).
5492 *18*	$(3/2^+,5/2^+)$		C E	J^{π}: L=(2) in (^{3}He,d).
5564.3[c] *7*	$(25/2^+)$	6.9[@] ps *10*	K N	XREF: K(4779). $T_{1/2}$: from differential decay curve method in ^{64}Zn(^{35}Cl,α2pγ). E(level): in (^{31}P,2p2nγ), the order of the 523γ and 1306γ is reversed, resulting in E=4779 for the intermediate level energy.
5620	$1/2^+$		C	J^{π}: L=0 in (d,n).
5648 *18*	$3/2^+,5/2^+$		E	J^{π}: L=2 in (^{3}He,d).
5680	$1/2^+$		C	J^{π}: L=0 in (d,n).
5780	$3/2^+,5/2^+$		C	J^{π}: L=2 in (d,n).
5830 *20*			E	

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Adopted Levels, Gammas (continued)

^{93}Tc Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[#]	XREF	Comments
5980 *18*	1/2$^+$		BC E	Additional information 13. Jπ: L=0 in (^{3}He,d).
6017.4 *8*	(27/2$^+$)	<62[@] ps	K N	XREF: K(3956). $T_{1/2}$: from recoil distance Doppler shift. E(level): in (^{31}P,2p2nγ), the order of the 70γ and 2130γ is reversed, resulting in E=3956 for the intermediate level energy.
6053.3[b] *9*	(25/2$^-$)	<0.55[@] ps	N	$T_{1/2}$: from recoil distance Doppler shift.
6087.8[c] *8*	(29/2$^+$)	104[@] ps *6*	K N	$T_{1/2}$: weighted average of 106 ps *7* from recoil distance Doppler shift and 100 ps *10* from differential decay curve method in (^{40}Ca,5pγ).
6106	1/2,3/2[&]		D	
6232 *18*			B E	E(level): from (^{3}He,d); 6170 *30* in (α,t).
6366	1/2,3/2,5/2$^{(-)}$		D	Jπ: γ(θ) in (p,γ); 5974γ to 1/2$^-$ 392.
6373.1[b] *7*	(27/2$^-$)	215[@] fs *14*	K N	$T_{1/2}$: from differential decay curve method. Other: <0.69 ps from recoil distance Doppler shift.
6454.0[b] *9*	(29/2$^-$)	<0.55[@] ps	N	$T_{1/2}$: from recoil distance Doppler shift. Different configuration suggested in 1994Ro08.
6463	3/2[&]		b D	
6469	5/2[&]		b D	
6477	5/2,7/2[&]		b D	XREF: b(6440).
6531	3/2[&]		D	
6576	3/2[&]		D	
6596	(3/2)$^-$		D f	XREF: f(6595). Jπ: allowed ^{93}Ru ε decay (10.8 s) is observed from (1/2)$^-$ to a 6595 *5* proton-emitting level; J=3/2 favored by γ(θ) in (p,γ).
6600	1/2,3/2,5/2$^{(-)}$		D f	XREF: f(6595). Jπ: γ(θ) in (p,γ); 6208γ to 1/2$^-$ 392. Allowed ^{93}Ru ε decay (10.8 s) is observed from (1/2)$^-$ to a 6595 *5* proton-emitting level.
6670.6[c] *9*	(31/2$^+$)	0.236[@] ps *28*	K N	XREF: K(6668). $T_{1/2}$: from differential decay curve method. Other: <0.55 ps from recoil distance Doppler shift. Jπ: (M1) γ to (33/2$^+$); configuration assignment.
6857.1[b] *7*	(29/2$^-$)	0.91[@] ps *5*	K N	$T_{1/2}$: from differential decay curve method. Other: <1.2 ps from recoil distance Doppler shift.
7160 *50*			E	
7282.2[c] *9*	(33/2$^+$)	<0.42[@] ps	K N	XREF: K(7279). $T_{1/2}$: from recoil distance Doppler shift. Jπ: (M1) γ to (31/2$^+$); configuration assignment.
7373.5[b] *9*	(31/2$^-$)	0.89[@] ps *8*	K N	$T_{1/2}$: from differential decay curve method. Other: <1.2 ps from recoil distance Doppler shift.
7650 *50*			E	
7811.9[c] *11*	(35/2$^+$)	0.62[@] ps *11*	K N	XREF: K(7809). $T_{1/2}$: from recoil distance Doppler shift. Jπ: (M1) γ to (33/2$^+$); configuration assignment.
7880.2[b] *9*	(33/2$^-$)	<0.28[@] ps	K N	$T_{1/2}$: from recoil distance Doppler shift.
8100 *50*			E	
8396.7 *20*	5/2$^+$	15 eV *2*	C E M	Jπ: L=2 in (d,n) and (^{3}He,d); analyzing power in (pol p,p) IAR; isobaric analog of 5/2$^+$ ^{93}Mo(g.s.). See

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Adopted Levels, Gammas (continued)

^{93}Tc Levels (continued)

E(level)†	Jπ‡	$T_{1/2}$#	XREF	Comments
				^{92}Mo(p,p) fine structure for data on ≈19 fragments of this resonance.
8487.6[b] *13*	(35/2−)		K N	XREF: K(8494).
8497.5[b] *9*	(35/2−)	0.41[@] ps *6*	N	$T_{1/2}$: from differential decay curve method. Other: <0.69 ps from recoil distance Doppler shift.
8852.3[b] *10*	(37/2−)	0.71[@] ps *6*	K N	$T_{1/2}$: from differential decay curve method. Other: <0.83 ps from recoil distance Doppler shift.
9139.7[b] *17*	(37/2−)		N	
9332 *3*	1/2+	36 eV *4*	C E M	Jπ: L=0 in (d,n) and (^{3}He,d). Isobaric analog of ^{93}Mo(943 level). See ^{92}Mo(p,p) fine structure for data on ≈180 fragments of this resonance.
9372.4[b] *14*	(37/2−)		N	
9420.6[b] *11*	(39/2−)	2.6[@] ps *9*	K N	XREF: K(9416). $T_{1/2}$: from recoil distance Doppler shift.
9.54×10^{3} *19*			L	E(level): $T_<$ resonance structure; not a discrete level.
9780 *16*	7/2+		C E	Jπ: L=4 in (^{3}He,d); isobaric analog of Jπ=7/2+ ^{93}Mo(1363 level).
9898	3/2+	22 eV *2*	CDE M	Jπ: L=2 in (d,n) and (^{3}He,d); analyzing power in (pol p,p) IAR. Isobaric analog of 3/2+ ^{93}Mo(1492 level). E(level): from (p,γ). E=9906 *16* in (^{3}He,d).
9948 *16*	7/2+		E	Jπ: L=4 in (^{3}He,d); isobaric analog of 7/2+ ^{93}Mo(1520 level).
10110 *16*	5/2+	17 eV *3*	E M	Jπ: L=2 in (^{3}He,d); analyzing power in (pol p,p) IAR. Isobaric analog of 5/2+ ^{93}Mo(1695 level).
10272.2 *15*	(39/2+)	<1.3[@] ps	N	$T_{1/2}$: from recoil distance Doppler shift. Configuration=($\pi\ g^{5}_{9/2}$)($\nu\ d_{5/2}g^{-1}_{9/2}$).
10566	3/2+	14 eV *4*	M	Jπ: analyzing power in (pol p,p) IAR; analog of 3/2+ ^{93}Mo(2181 level).
10728 *16*	(11/2−)		E	Jπ: if isobaric analog of (11/2)− ^{93}Mo(2304 level).
10833	1/2+	37 eV	M	Jπ: L=0 resonance in (p,p) IAR; analog of 1/2+ ^{93}Mo(2437 level).
11097.8 *13*	(41/2−)		N	
11190	(1/2+)	49 eV	M	Jπ: L=0 resonance in (p,p) IAR; analog of (1/2+) ^{93}Mo(2743 level).
11289	(3/2+)	20 eV	M	Jπ: analyzing power in (pol p,p) IAR. Possible analog of ^{93}Mo(2881 level).
11526.4 *13*	(43/2−)	<2.8[@] ps	N	$T_{1/2}$: from recoil distance Doppler shift.
11600 *50*	(5/2+)	30 eV	E M	Jπ: analyzing power in (pol p,p) IAR. Possible analog of ^{93}Mo(3159 level).
11.79×10^{3} *19*			L	E(level): $T_<$ resonance structure; not a discrete level.
11852	(5/2+)	40 eV	M	Jπ: analyzing power in (pol p,p) IAR. Possible analog of ^{93}Mo(3450 level).
12016	(3/2+)	20 eV	M	Jπ: analyzing power in (pol p,p) IAR. Possible analog of ^{93}Mo(3596 level).
12100	(3/2+)	35 eV	M	Jπ: analyzing power in (pol p,p) IAR.
12209	(5/2−)	25 eV	M	Jπ: analyzing power in (pol p,p) IAR.
12218.2 *18*	(43/2+)		N	
12436	(3/2−)	70 eV	M	Jπ: analyzing power in (pol p,p) IAR. Possible analog of ^{93}Mo(3980 level).
12584	(3/2+)	30 eV	M	Jπ: analyzing power in (pol p,p) IAR. Possible analog of ^{93}Mo(4170 level).

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Adopted Levels, Gammas (continued)

^{93}Tc Levels (continued)

E(level)[†]	J^{π}[‡]	$T_{1/2}$[#]	XREF	Comments
13258.3 *15*	(41/2,43/2$^-$)	<1.4[@] ps	N	J^{π}: 3838γ to 9421 (39/2$^-$). $T_{1/2}$: from recoil distance Doppler shift.
15.08×10^3 *7*			L	E(level): $T_<$ resonance structure; not a discrete level.
16.86×10^3 *9*			L	E(level): $T_<$ resonance structure; not a discrete level.
19.53×10^3 *2*			L	E(level): double isobaric analog resonance; not a discrete level.
20.48×10^3 *11*			L	A $T_>$ resonance.
33.73×10^3 *26*		5.1 MeV *11*	L	$T_{1/2}$: from (π^+,π^-). Collective giant resonance from coupling of GDR and isobaric analog resonance.
47.3×10^3			L	Resonance in (π^+,π^-) interpreted as double dipole resonance; $\sigma(\theta)$ has Q shape; $\Gamma\approx$8-10 MeV (1994Mo04).

[†] For additional levels with 8353<E<9533, see ^{92}Mo(p,p) IAR: fine structure.

[‡] Values given without comment are from (^{40}Ca,5pγ), and are based on transition multipolarity (from γ anisotropy ratios and the assumptions that all transitions have $J_i \geq J_f$, most have $J_i > J_f$ and that crossover transitions are E2) and calculated shell-model structure.

[#] From (α,p2nγ), except as noted, for E<8000; from ^{92}Mo(p,p), (pol p,p) IAR for E>8000, except as noted.

[@] From recoil distance Doppler shift (RDDS) and/or differential decay curve method (DDCM) in ^{64}Zn(^{35}Cl,α2pγ) (2003Ha22).

[&] From $\gamma(\theta)$ in (p,γ).

[a] From time resolution for coincidences in ^{93}Ru ε decay (59.7 s).

[b] Band(A): π=$-$, seniority=3 states. Major configuration=(π $p_{1/2}g^4_{9/2}$)(ν $d_{5/2}g^{-1}_{9/2}$) and (π $p^2_{1/2}g^4_{9/2}f^{-1}_{5/2}$)($\nu$ $d_{5/2}g^{-1}_{9/2}$) (1995Gh08).

[c] Band(B): π=+, seniority=3 states. Dominant configuration=(π $p^2_{1/2}g^3_{9/2}$)(ν $d_{5/2}g^{-1}_{9/2}$), (π $p_{1/2}g^5_{9/2}f^{-1}_{5/2}$) or ($\pi$ $g^5_{9/2}$) (1995Gh08). Note that J values here are 2 units lower than suggested by 1994Gh07 in ^{66}Zn(^{31}P,2p2nγ).

[d] Band(C): π=$-$, seniority=1 states. Configuration=(π $p_{1/2}g^4_{9/2}$) dominant (1994Ro08,1995Gh08).

[e] Band(D): π=+, seniority=1 states. Configuration=(π $p^2_{1/2}g^3_{9/2}$) dominant (1994Ro08,1995Gh08).

Adopted Levels, Gammas (continued)

$\gamma(^{93}Tc)$

E_i(level)	J^{π}_i	E_{γ}[†]	I_{γ}[†]	E_f	J^{π}_f	Mult.[‡]	δ[‡]	α[c]	$I_{(\gamma+ce)}$	Comments
391.84	$1/2^-$	391.83 *8*	100	0.0	$9/2^+$	M4		0.328		B(M4)(W.u.)=25.1 *7* E_{γ},Mult.: from IT decay. Other $E\gamma$: 392.65 *10* from ε decay.
680.59	$(7/2^+)$	680.68 *9*	100	0.0	$9/2^+$	(M1+E2)	0.7 *2*	0.00208		B(M1)(W.u.)>1.1×10^{-6}; B(E2)(W.u.)>0.00089 E_{γ}: weighted average of 680.5 *3* from (α,p2nγ) and 680.7 *1* from ε decay (59.7 s).
1194.13	$(\geq7/2)$	1194.1[#] *1*	100[#]	0.0	$9/2^+$					
1407.80	$(5/2^-)$	1015.9[#] *1*	100[#]	391.84	$1/2^-$	[E2]				B(E2)(W.u.)>0.00060
1434.42	$(13/2)^+$	1434.73 *22*	100	0.0	$9/2^+$	E2				B(E2)(W.u.)>0.00037 E_{γ}: weighted average of 1434.45 *13* from (α,p2nγ) and 1434.9 *1* from ε decay (59.7 s).
1503.04	$1/2^-,3/2^-$	1111.2[a] *1*	100[a]	391.84	$1/2^-$					
1515.95	$(11/2)^+$	835.9[d] *3*	4	680.59	$(7/2^+)$					E_{γ},I_{γ}: from (α,p2nγ). Tentative isotopic assignment; reported in (α,p2nγ) only.
		1515.80 *13*	100	0.0	$9/2^+$	M1+E2	−16.6 *+21−29*			E_{γ},I_{γ}: from (α,p2nγ).
1788.09	$1/2^-,3/2^-$	1396.2[a] *1*	100[a]	391.84	$1/2^-$					
1801.42	(7/2,9/2,11/2)	1801.4[#] *1*	100[#]	0.0	$9/2^+$					
1969.09	$(5/2^-,7/2,9/2^-)$	561.2[#] *2*	100[#] *10*	1407.80	$(5/2^-)$					
		1288.7[#] *3*	65[#] *11*	680.59	$(7/2^+)$					
2133.70	$5/2^-,7/2^-$	725.9[#] *2*	100[#]	1407.80	$(5/2^-)$					
2145.45	$(13/2)^-$	629.44 *11*	48.1 *15*	1515.95	$(11/2)^+$	E1				E_{γ},I_{γ}: from (α,p2nγ). Other $I\gamma$: I(629γ):I(711γ)=10 *4*:11 *4* in (^{40}Ca,5pγ).
		711.11 *10*	100.0 *15*	1434.42	$(13/2)^+$	E1				I_{γ}: from (α,p2nγ). E_{γ}: weighted average of 711.09 *11* from (α,p2nγ) and 711.3 *3* from ε decay (59.7 s).
2184.84	$(17/2)^+$	750.3 *2*	100	1434.42	$(13/2)^+$	E2				B(E2)(W.u.)=3.5 *7* E_{γ}: from (α,p2nγ).
2185.16	$(17/2)^-$	0.31 *2*		2184.84	$(17/2)^+$	[E1]			1.1[b] *11*	B(E1)(W.u.)=0.0003 *+4−3* α: a calculated value of 8900 is quoted in 1978Br25; this would imply B(E1)(W.u.)=$4.\times10^{-8}$ *4*. E_{γ}: from energy shift between prompt and delayed 750γ peaks in (α,p2nγ).

$\gamma(^{93}Tc)$ (continued)

E_i(level)	J^{π}_i	E_γ[†]	I_γ[†]	E_f	J^{π}_f	Mult.[‡]	δ[‡]	α[c]	Comments
									Other Eγ: 0.44 *2* (1976Br08) in (α,2pnγ).
2185.16	(17/2)$^-$	39.75 *10*	100.0 *14*	2145.45	(13/2)$^-$	[E2]		33.9 *6*	B(E2)(W.u.)=0.63 *3* E_γ,I_γ: from (α,p2nγ).
		750.7 *2*	35.7 *14*	1434.42	(13/2)$^+$	M2+E3	−1.33 +*16*−*36*		B(M2)(W.u.)=2.3×10^{-6} *4*; B(E3)(W.u.)=0.0112 *12* E_γ,I_γ: from (α,p2nγ). Mult.: possible parity-violating E2 component <6%; from (^{32}S,2n2pγ). 0° −180° asymmetry A_γ=4.1×10^{-4} *20* (2005Na28), 8.4×10^{-4} *27* (1996Ha13) from ^{45}Sc(^{52}Cr,2p2nγ).
2257.73	(7/2,9/2,11/2)	2257.7[#] *1*	100[#]	0.0	9/2$^+$				
2338.89		1658.7[#] *3*	38[#] *9*	680.59	(7/2$^+$)				
		2338.7[#] *2*	100[#] *21*	0.0	9/2$^+$				
2431.08	(1/2,3/2)$^-$	642.9[a] *5*	5.0[a] *13*	1788.09	1/2$^-$,3/2$^-$				
		928.3[a] *2*	18.0[a] *17*	1503.04	1/2$^-$,3/2$^-$				
		1023.0[a] *3*	7.5[a] *13*	1407.80	(5/2$^-$)				
		2039.1[a] *2*	100[a] *4*	391.84	1/2$^-$				
2490.2		1809.6[a] *4*	100[a]	680.59	(7/2$^+$)				
2535.3	(21/2)$^+$	350.3 *3*	100	2184.84	(17/2)$^+$	E2		0.01525	B(E2)(W.u.)=2.64 *18* E_γ: from (α,p2nγ). Mult.: Q from γ(θ) in (α,p2nγ); not M2 from RUL.
2631.11	(7/2,9/2,11/2)	1950.5[#] *2*	100[#]	680.59	(7/2$^+$)				
3280.9	(21/2$^-$)	745.2	1.7 *6*	2535.3	(21/2)$^+$				
		1095.9 *3*	100.0 *11*	2185.16	(17/2)$^-$	E2			B(E2)(W.u.)>10 E_γ: from (α,p2nγ). Mult.: Q from γ(θ) in (α,p2nγ); not M2 from RUL.
3888.4	(25/2$^-$)	607.5 *3*	100	3280.9	(21/2$^-$)	E2			B(E2)(W.u.)=4.75 *18* E_γ: from (α,p2nγ). Mult.: Q from γ(θ) in (α,p2nγ); not M2 from RUL.
3914.75	(7/2,9/2,11/2)$^+$	1576.0[#] *4*	16.8[#] *25*	2338.89					
		2720.4[#] *3*	41.1[#] *21*	1194.13	(≥7/2)				
		3914.7[#] *2*	100[#] *6*	0.0	9/2$^+$				
3927.8	(19/2$^+$)	1743.1	100	2184.84	(17/2)$^+$				
4158.5	(7/2,9/2,11/2)$^+$	3477.3[#] *6*	24[#] *3*	680.59	(7/2$^+$)				

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$\gamma(^{93}Tc)$ (continued)

E_i(level)	J^{π}_i	E_γ[†]	I_γ[†]	E_f	J^{π}_f	Mult.[‡]	Comments
4158.5	$(7/2,9/2,11/2)^+$	4158.5[#] 3	100[#] 7	0.0	$9/2^+$		
4187.4	$(7/2,9/2,11/2)^+$	4187.3[#] 3	100[#]	0.0	$9/2^+$		
4257.3	$(21/2^+)$	329.6 10	6.0 5	3927.8	$(19/2^+)$	D[&]	
		1721.9 3	100.0 25	2535.3	$(21/2)^+$		E_γ: from (α,p2nγ); 1723.0 in (^{40}Ca,5pγ), 1722.4 in (^{31}P,2p2nγ). Mult.: $\Delta J=0$ transition from (^{40}Ca,5pγ). $\Delta J=2$ assumed in (^{31}P,2p2nγ).
4344.4	(7/2,9/2,11/2)	4344.3[#] 5	100[#]	0.0	$9/2^+$		
4389.6	$(7/2,9/2,11/2)^+$	4389.5[#] 3	100[#]	0.0	$9/2^+$		
4608.9	$(7/2,9/2,11/2)^+$	3928.0[#] 5	49[#] 10	680.59	$(7/2^+)$		
		4608.9[#] 4	100[#] 17	0.0	$9/2^+$		
4619.0	$(7/2,9/2,11/2)^+$	4618.9[#] 4	100[#]	0.0	$9/2^+$		
4668.63	$(9/2,11/2)^+$	2329.7[#] 2	16[#] 3	2338.89			
		3234.3[#] 2	100[#] 5	1434.42	$(13/2)^+$		
		3988.0[#] 3	39[#] 5	680.59	$(7/2^+)$		
		4668.1[#] 3	31[#] 3	0.0	$9/2^+$		
4760.6	(7/2,9/2,11/2)	4080.1[#] 5	100[#] 29	680.59	$(7/2^+)$		
		4759.6[#] 10	17[#] 9	0.0	$9/2^+$		
4775.0	$(7/2,9/2,11/2)^+$	4094.3[#] 5	100[#] 17	680.59	$(7/2^+)$		
		4775.0[#] 10	10[#] 5	0.0	$9/2^+$		
4937.8	$(7/2,9/2,11/2)^+$	4257.2[#] 5	100[#] 24	680.59	$(7/2^+)$		
		4937.5[#] 10	44[#] 15	0.0	$9/2^+$		
4955.0	$(7/2,9/2,11/2)^+$	4954.9[#] 8	100[#]	0.0	$9/2^+$		
4973.9	$(25/2^+)$	2438.5[#] 10	100[#]	2535.3	$(21/2)^+$	E2	B(E2)(W.u.)>0.29 Mult.: Q from γ anisotropy in (^{40}Ca,5pγ); not M2 from RUL.
5076.4	$(23/2^+)$	818.2 10	100 4	4257.3	$(21/2^+)$	D[&]	
		1795.9 10	24 9	3280.9	$(21/2^-)$		
		2541.3 10	10 6	2535.3	$(21/2)^+$		
5298.2	$(7/2,9/2,11/2)^+$	4104.1[#] 10	100[#] 33	1194.13	$(\geq 7/2)$		
		5297.9[#] 15	63[#] 20	0.0	$9/2^+$		
5564.3	$(25/2^+)$	487.9 10	54.9 18	5076.4	$(23/2^+)$	(M1)	B(M1)(W.u.)=0.0097 15 Mult.: D from (^{40}Ca,5pγ); $\Delta\pi$=(no) from level scheme.
		1306.3 10	100 4	4257.3	$(21/2^+)$	E2	B(E2)(W.u.)=0.56 9 Mult.: Q from γ anisotropy in (^{40}Ca,5pγ); not M2 from RUL.
6017.4	$(27/2^+)$	452.8 10	28.4 14	5564.3	$(25/2^+)$		
		2129.5 10	100 4	3888.4	$(25/2^-)$	(E1)	B(E1)(W.u.)>4.3×10^{-7} Mult.: D from (^{40}Ca,5pγ); $\Delta\pi$=(yes) from level scheme.

Adopted Levels, Gammas (continued)

$\gamma(^{93}Tc)$ (continued)

E_i(level)	J^{π}_i	E_{γ}[†]	I_{γ}[†]	E_f	J^{π}_f	Mult.[‡]	α[c]	Comments
6053.3	$(25/2^-)$	2164.9 *10*	100	3888.4	$(25/2^-)$			Mult.: ΔJ=0 transition from (^{40}Ca,5pγ).
6087.8	$(29/2^+)$	70.0 *3*	21.9 *10*	6017.4	$(27/2^+)$	(M1)	0.766 *15*	B(M1)(W.u.)=0.097 *8* E_{γ}: from (α,p2nγ) (where γ is placed differently); 70.4 from (^{40}Ca,5pγ). Mult.: D from (^{40}Ca,5pγ); Δπ=(no) from level scheme.
		523.1 *10*	100.0 *18*	5564.3	$(25/2^+)$	E2		B(E2)(W.u.)=4.6 *3* Mult.: Q from γ anisotropy in (^{40}Ca,5pγ); not M2 from RUL.
6106	1/2,3/2	2892[@]	13[@]	3213.5	$3/2^+,5/2^+$			
		4551[@]	6[@]	1555				
		4603[@]	1.2[@]	1503.04	$1/2^-,3/2^-$			
		5714[@]	100[@]	391.84	$1/2^-$			
6366	$1/2,3/2,5/2^{(-)}$	5974[@]	100[@]	391.84	$1/2^-$			
6373.1	$(27/2^-)$	319.8 *10*	7.6 *6*	6053.3	$(25/2^-)$	(M1)	0.01266 *21*	B(M1)(W.u.)=0.210 *22* Mult.: D from (^{40}Ca,5pγ); Δπ=(no) from level scheme.
		1399.2 *10*	5.9 *8*	4973.9	$(25/2^+)$	(E1)		B(E1)(W.u.)=2.9×10^{-5} *5* Mult.: D from (^{40}Ca,5pγ); Δπ=(yes) from level scheme.
		2484.8 *10*	100.0 *23*	3888.4	$(25/2^-)$	(M1)		B(M1)(W.u.)=0.0059 *5* Mult.: D from (^{40}Ca,5pγ); Δπ=(no) from level scheme.
6454.0	$(29/2^-)$	2565.6 *10*	100	3888.4	$(25/2^-)$	E2		B(E2)(W.u.)>0.37 Mult.: Q from γ anisotropy in (^{40}Ca,5pγ); not M2 from RUL.
6463	3/2	4675[@]	7.5[@]	1788.09	$1/2^-,3/2^-$			
		4908[@]	12.5[@]	1555				
		4960[@]	3.8[@]	1503.04	$1/2^-,3/2^-$			
		6071[@]	100[@]	391.84	$1/2^-$			
6469	5/2	4914[@]	100[@]	1555				
6477	5/2,7/2	4922[@]	14[@]	1555				
		4974[@]	14[@]	1503.04	$1/2^-,3/2^-$			
		5796[@]	100[@]	680.59	$(7/2^+)$			
6531	3/2	4976[@]	11[@]	1555				
		5337[@]	3[@]	1194.13	(≥7/2)			
		6139[@]	100[@]	391.84	$1/2^-$			
6576	3/2	3362[@]	2.5[@]	3213.5	$3/2^+,5/2^+$			
		4434[@]	11[@]	2142				
		5021[@]	10[@]	1555				
		5073[@]	2.5[@]	1503.04	$1/2^-,3/2^-$			

Adopted Levels, Gammas (continued)

$\gamma(^{93}Tc)$ (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.‡	Comments
6576	3/2	6184@	100@	391.84	$1/2^-$		
6596	$(3/2)^-$	4808@	33@	1788.09	$1/2^-,3/2^-$		
		5093@	55@	1503.04	$1/2^-,3/2^-$		
		5402@	63@	1194.13	$(\geq 7/2)$		
		6204@	100@	391.84	$1/2^-$		
6600	$1/2,3/2,5/2^{(-)}$	5097@	61@	1503.04	$1/2^-,3/2^-$		
		6208@	100@	391.84	$1/2^-$		
6670.6	$(31/2^+)$	582.7 *10*	100	6087.8	$(29/2^+)$	(M1)	B(M1)(W.u.)=0.47 *6* Mult.: D from $(^{40}Ca,5p\gamma)$; $\Delta\pi$=(no) from level scheme.
6857.1	$(29/2^-)$	403.1 *10*	9.4 *7*	6454.0	$(29/2^-)$		Mult.: assigned as $\Delta J=0$ transition in $(^{40}Ca,5p\gamma)$.
		483.8 *10*	100.0 *22*	6373.1	$(27/2^-)$	(M1)	B(M1)(W.u.)=0.191 *12* Mult.: D from $(^{40}Ca,5p\gamma)$; $\Delta\pi$=(no) from level scheme.
		2968.9 *10*	2.5 *7*	3888.4	$(25/2^-)$	(E2)	B(E2)(W.u.)=0.0024 *7* Mult.: Q from $(^{40}Ca,5p\gamma)$; $\Delta\pi$=(no) from level scheme.
7282.2	$(33/2^+)$	611.5 *10*	100.0 *20*	6670.6	$(31/2^+)$	(M1)	B(M1)(W.u.)>0.22 Mult.: D from $(^{40}Ca,5p\gamma)$; $\Delta\pi$=(no) from level scheme.
		1194.2 *10*	2.6 *12*	6087.8	$(29/2^+)$	[E2]	B(E2)(W.u.)>0.56
7373.5	$(31/2^-)$	516.5 *10*	100.0 *19*	6857.1	$(29/2^-)$	(M1)	Mult.: D from $(^{40}Ca,5p\gamma)$; $\Delta\pi$=(no) from level scheme.
		1000.4 *10*	36.9 *14*	6373.1	$(27/2^-)$	E2	B(E2)(W.u.)=6.8 *7* Mult.: Q from γ anisotropy in $(^{40}Ca,5p\gamma)$; not M2 from RUL.
7811.9	$(35/2^+)$	529.7 *10*	100	7282.2	$(33/2^+)$	(M1)	B(M1)(W.u.)=0.24 *5* Mult.: D from $(^{40}Ca,5p\gamma)$; $\Delta\pi$=(no) from level scheme.
7880.2	$(33/2^-)$	506.8 *10*	100.0 *18*	7373.5	$(31/2^-)$	(M1)	B(M1)(W.u.)>0.50 Mult.: D from $(^{40}Ca,5p\gamma)$; $\Delta\pi$=(no) from level scheme.
		1023.3 *10*	15.0 *9*	6857.1	$(29/2^-)$		
		1209.5 *10*	4.0 *13*	6670.6	$(31/2^+)$		
8487.6	$(35/2^-)$	607.3 *10*	100	7880.2	$(33/2^-)$		Mult=Q for 607.3γ+607.5γ doublet.
8497.5	$(35/2^-)$	617.2 *10*	100.0 *18*	7880.2	$(33/2^-)$	(M1)	B(M1)(W.u.)=0.21 *4* Mult.: D from $(^{40}Ca,5p\gamma)$; $\Delta\pi$=(no) from level scheme.
		1124.1 *10*	5.0 *10*	7373.5	$(31/2^-)$	(E2)	B(E2)(W.u.)=1.4 *4* Mult.: (Q) from γ anisotropy in $(^{40}Ca,5p\gamma)$; not M2 from RUL.
		1215.2 *10*	3.8 *15*	7282.2	$(33/2^+)$		
8852.3	$(37/2^-)$	354.8 *10*	100.0 *20*	8497.5	$(35/2^-)$	(M1)	B(M1)(W.u.)=0.44 *4* Mult.: D from $(^{40}Ca,5p\gamma)$; $\Delta\pi$=(no) from level scheme.
		972.1 *10*	32.2 *17*	7880.2	$(33/2^-)$	E2	B(E2)(W.u.)=7.4 *8* Mult.: Q from γ anisotropy in $(^{40}Ca,5p\gamma)$; not M2 from RUL if $T_{1/2}$<0.83 ps.
		1040.3 *10*	26.8 *14*	7811.9	$(35/2^+)$	(E1)	B(E1)(W.u.)=6.9×10^{-5} *7* Mult.: D from $(^{40}Ca,5p\gamma)$; $\Delta\pi$=(yes) from level scheme.

$\gamma(^{93}Tc)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[‡]	Comments
9139.7	(37/2⁻)	652.1 *10*	100	8487.6	(35/2⁻)		
9372.4	(37/2⁻)	874.9 *10*	100	8497.5	(35/2⁻)	D[&]	
9420.6	(39/2⁻)	568.2 *10*	100.0 *22*	8852.3	(37/2⁻)	(M1)	B(M1)(W.u.)=0.037 *13* Mult.: D from (^{40}Ca,5pγ); $\Delta\pi$=(no) from level scheme.
		923.2 *10*	25.9 *14*	8497.5	(35/2⁻)	E2	B(E2)(W.u.)=2.7 *10* Mult.: Q from γ anisotropy in (^{40}Ca,5pγ); not M2 from RUL.
9898	3/2⁺	8110[@]	28[@] *15*	1788.09	1/2⁻,3/2⁻		
		8395[@]	57[@] *15*	1503.04	1/2⁻,3/2⁻		
		9506[@]	100[@] *15*	391.84	1/2⁻		
10272.2	(39/2⁺)	2460.2 *10*	100	7811.9	(35/2⁺)	E2	B(E2)(W.u.)>0.19 Mult.: Q from γ anisotropy in (^{40}Ca,5pγ); not M2 from RUL.
11097.8	(41/2⁻)	2245.5 *10*	100	8852.3	(37/2⁻)		
11526.4	(43/2⁻)	428.6 *10*	18 *6*	11097.8	(41/2⁻)	(M1)	Mult.: d from γ anisotropy in (^{40}Ca,5pγ); $\Delta\pi$=(no) from level scheme.
		2105.8 *10*	100 *10*	9420.6	(39/2⁻)	E2	B(E2)(W.u.)>0.16 Mult.: Q from γ anisotropy in (^{40}Ca,5pγ); not M2 from RUL.
12218.2	(43/2⁺)	1946.0 *10*	100	10272.2	(39/2⁺)	(E2)	Mult.: Q from (^{40}Ca,5pγ); $\Delta\pi$=(no) from level scheme.
13258.3	(41/2,43/2⁻)	3837.6 *10*	100	9420.6	(39/2⁻)	D,E2	Mult.: not M2 from RUL.

† From ^{58}Ni(^{40}Ca,5pγ), except as noted. ΔE for Eγ is 0.2-1.0 keV, depending on Eγ and Iγ; evaluator has assigned ΔE=1 keV to all Eγ adopted from this reaction.

‡ From ^{92}Mo(α,p2nγ), if not indicated otherwise.

From ^{93}Ru ε decay (59.7 s).

@ Observed in ^{92}Mo(p,γ) only; Eγ from level energy difference.

& From γ anisotropy ratio in ^{58}Ni(^{40}Ca,5pγ).

a From ^{93}Ru ε decay (10.8 s).

b From ^{92}Mo(α,p2nγ).

c 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.

d Placement of transition in the level scheme is uncertain.

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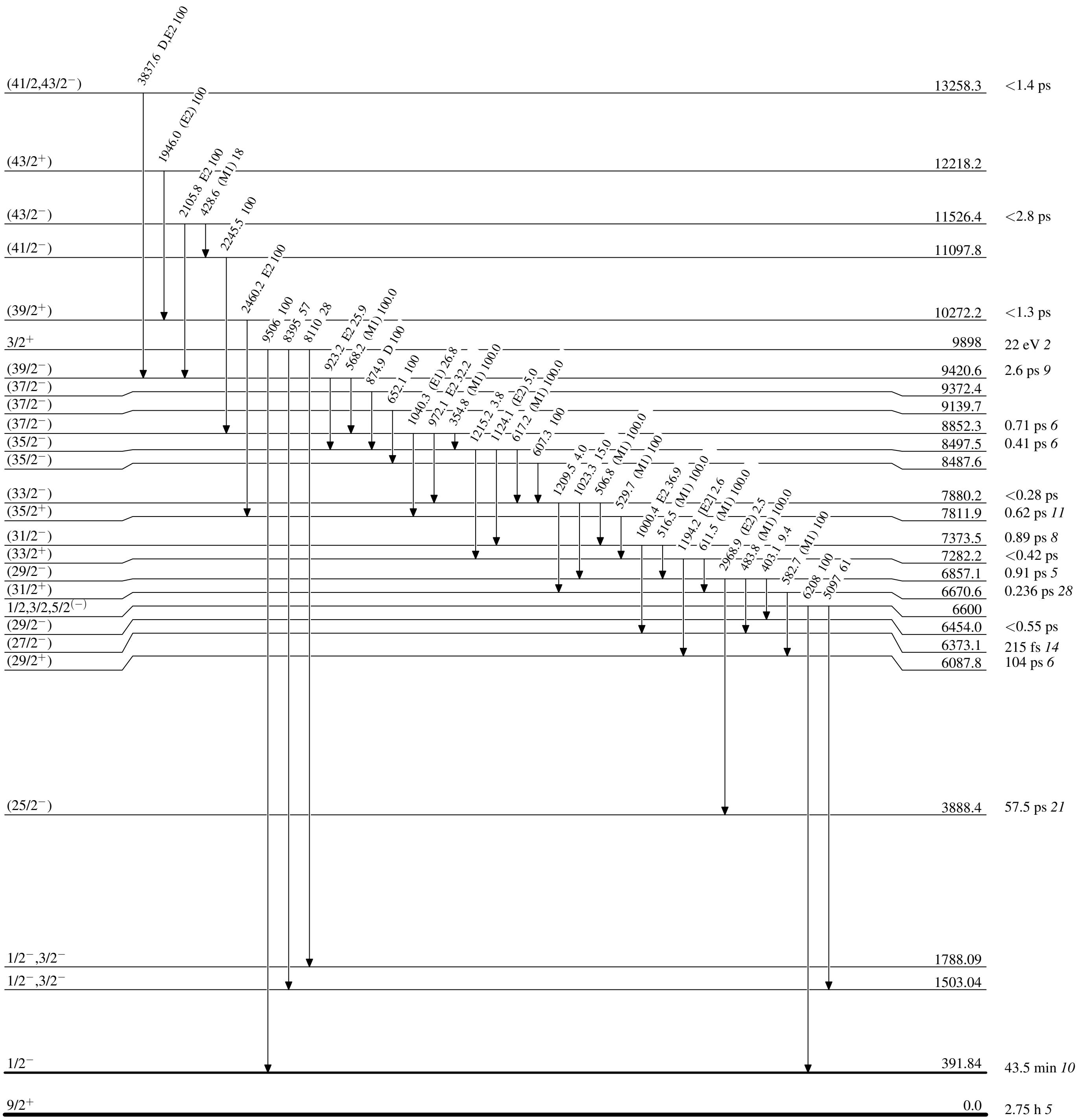
Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level



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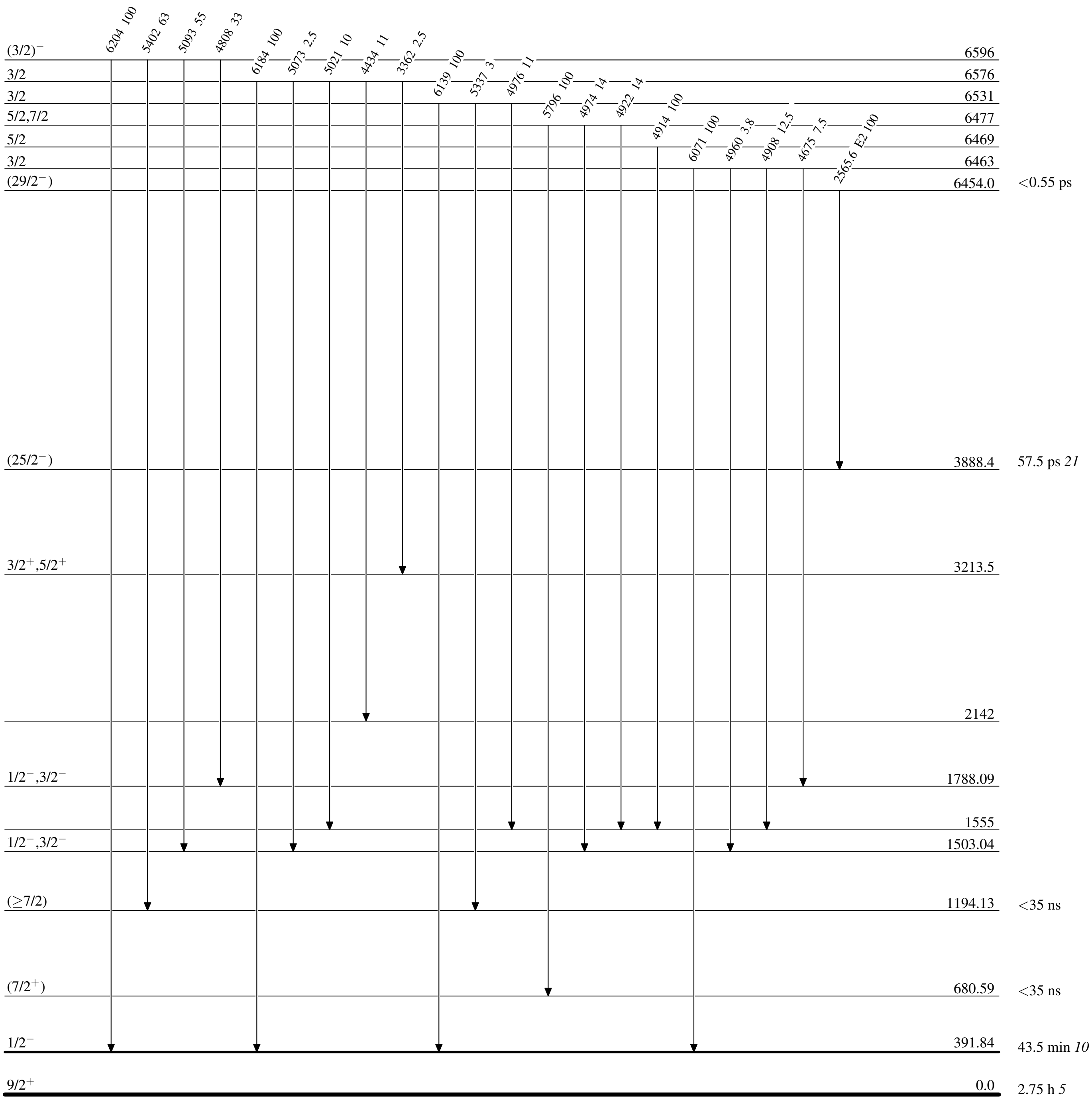
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

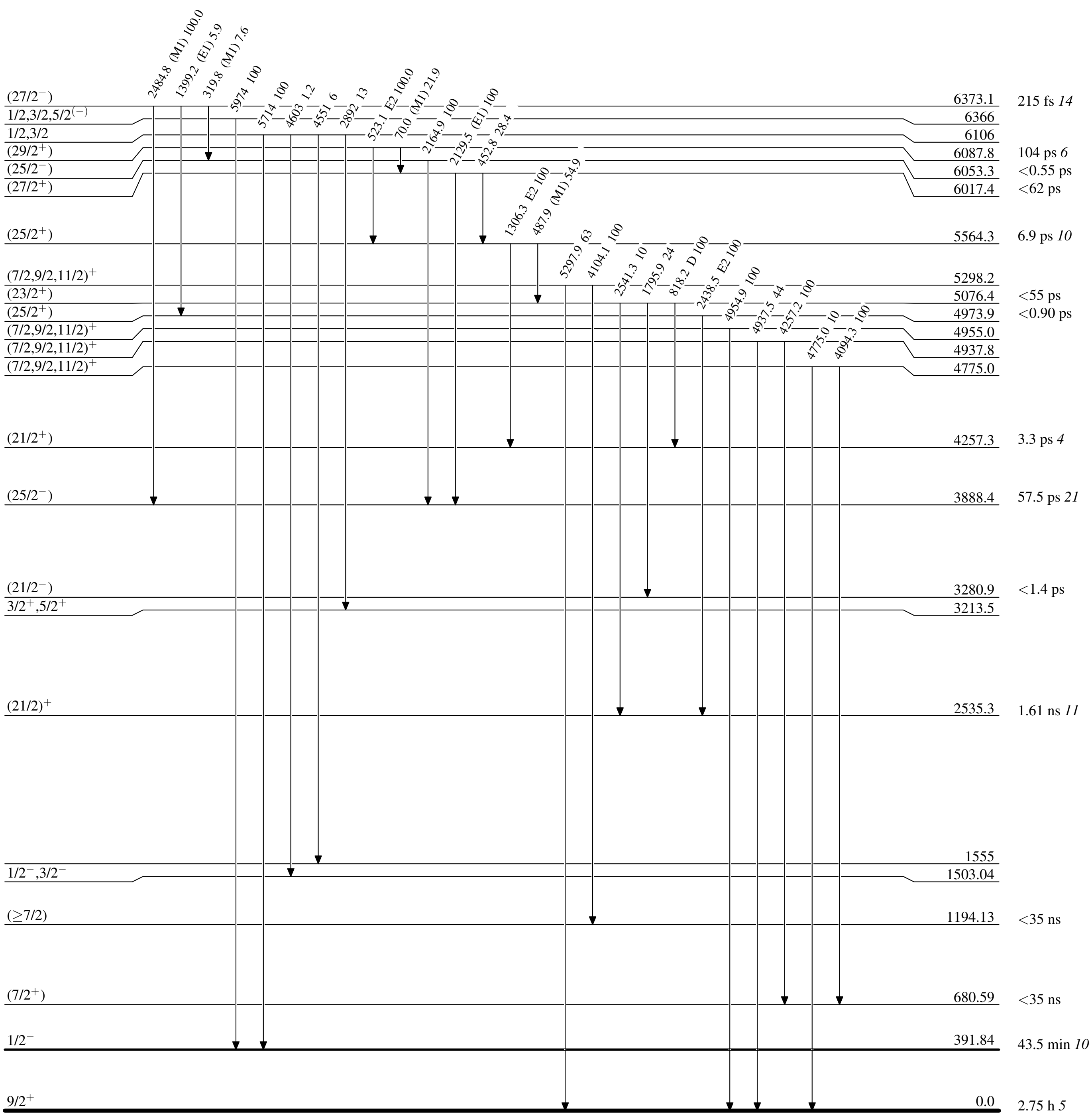


$^{93}_{43}Tc_{50}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

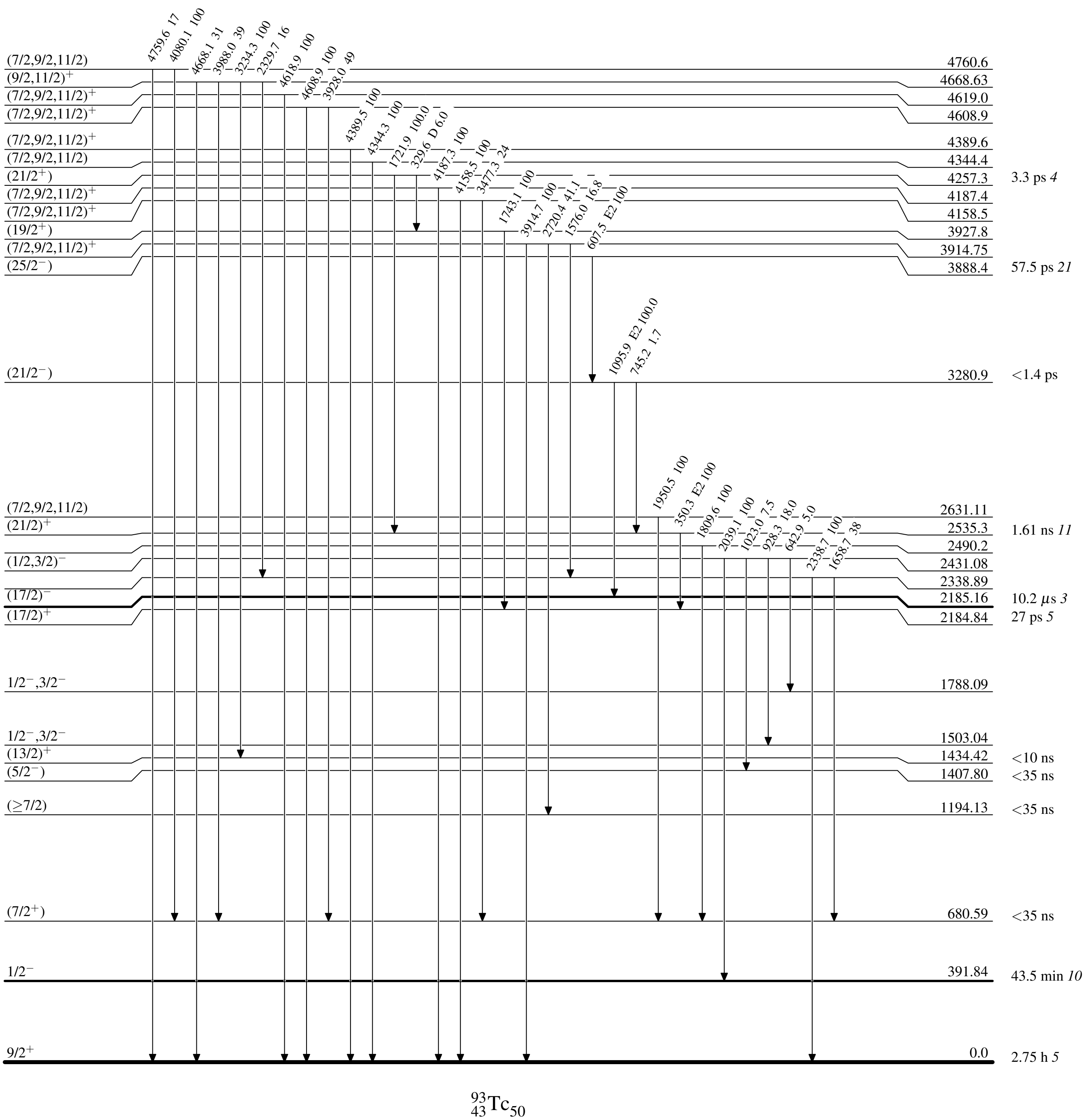


$^{93}_{43}Tc_{50}$

Adopted Levels, Gammas

Level Scheme (continued)

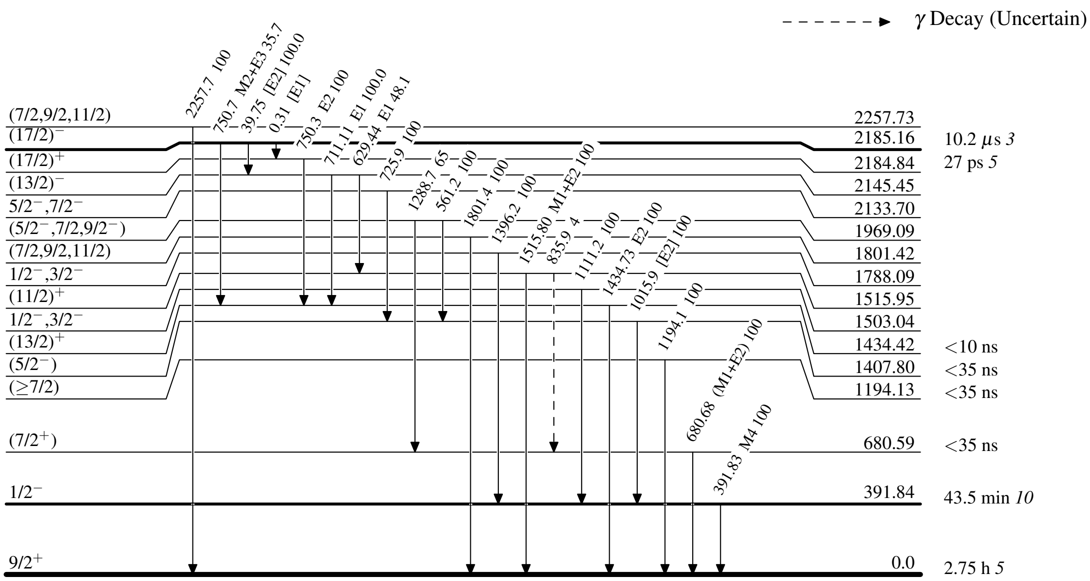
Intensities: Relative photon branching from each level



Adopted Levels, Gammas

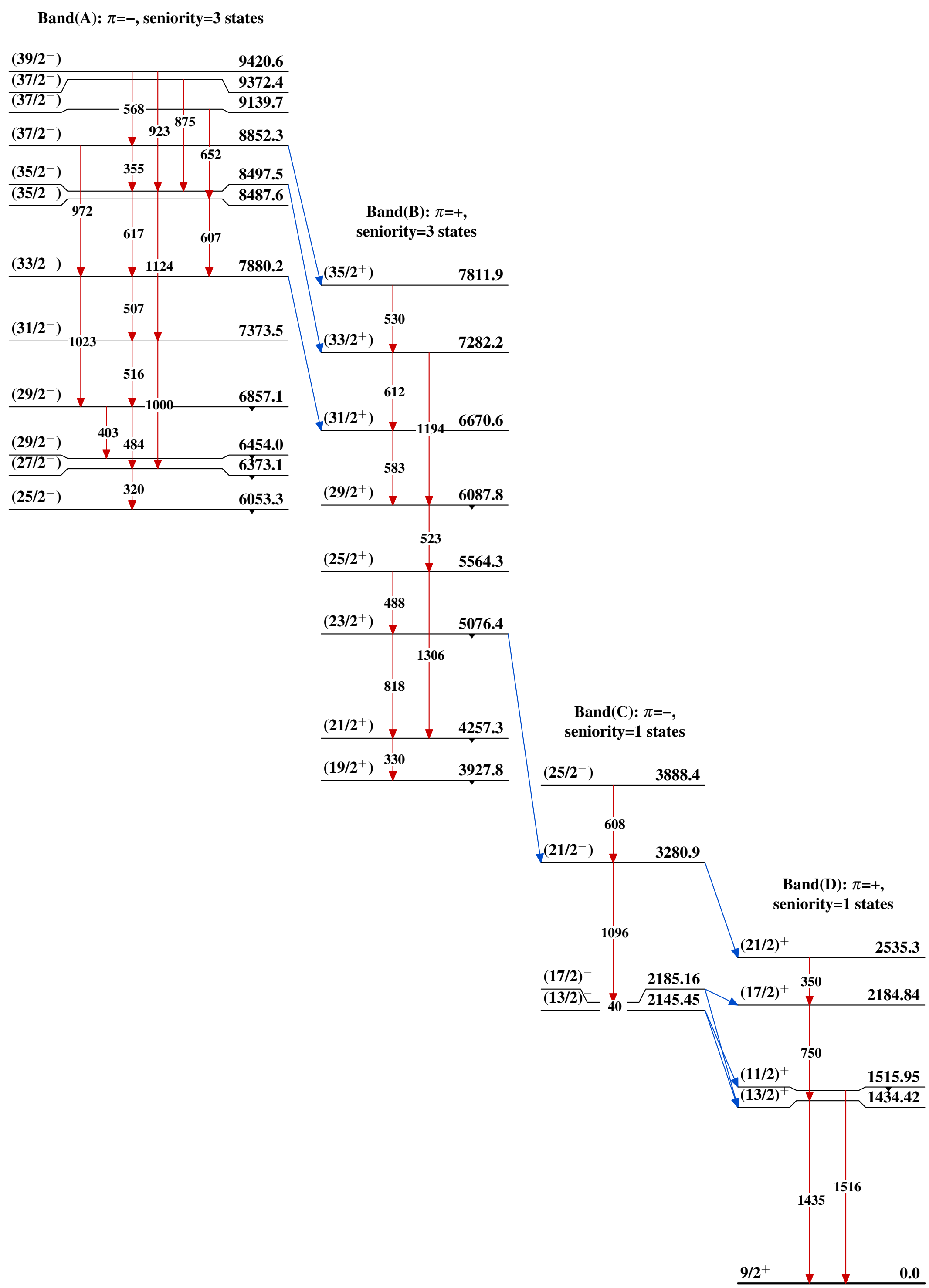
Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{93}_{43}Tc_{50}$

Adopted Levels, Gammas



$^{93}_{43}$Tc$_{50}$