^{94}Mo(p,nγ) 1981Ad08

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	D. Abriola(a), A. A. Sonzogni	NDS 107, 2423 (2006)	1-Jan-2006

1981Ad08: E=5.0 MeV to 8.0 MeV. Enriched target. two Ge(Li) detectors with FWHM=1.8 keV, and 1.9 keV at 1332 MeV. Measured Eγ, Iγ, γ-ray excitation functions, nγ coinc, γγ coin, γ(θ). Deduced $T_{1/2}$ from Doppler-shift attenuation. Hauser-Feshbach calculations of σ(θ).

1979Mi08: E=5.39 MeV, 5.82 MeV, and 6.14 MeV. Enriched target. Ge(Li), FWHM=0.5 keV at 50 keV. Si(Li), FWHM=3.3 keV at 320 keV. Measured Eγ, Iγ, Ice, Iγ on and off IAR. Deduced α(K)exp, α(L+...)exp from absolute Iγ, Ice rates using intensity calibrated sources. The same measurement, together with a more detailed discussion of spin arguments, is presented in 1978MiZO.

1974Mc14: E=5.82 MeV. Enriched target. Ge(Li) detector, FWHM=1.5 keV at 237 keV. Measured γ(t) with respect to pulsed beam..

1973Mc04:E=5.52 MeV, 5.82 MeV, and 6.15 MeV. Enriched target. Measured E(n) with the time of flight , σ(θ), Eγ.

Others: 1975Ke12, 1969De22.

^{94}Tc Levels

Level scheme constructed on the basis of γγ, nγ coin, and γ-ray threshold measurements.

E(level)[#]	J^{π}[†]	$T_{1/2}$[‡]	Comments
0	7^+		
76 *3*	$(2)^+$		E(level): from ^{94}Mo(^{3}He,t).
98 *3*	(3^+)		
101.90 *20*	(6^+)		
210.6 *3*	$(5)^+$		
244 *3*	$(4)^+$		
336 *3*	$(2)^-$	1.5[@] ns *3*	
443 *3*	1^+		
478 *3*	$(3)^-$		
801 *3*	(2^-)	0.27 ps *+83−13*	
826 *3*	(2^+)	0.103 ps *28*	
921 *3*	(3^+)	0.063 ps *18*	
929 *3*	(4^+)	0.07 ps *3*	
956 *3*	(3^-)	0.17 ps *6*	
968 *3*	1^+	0.074 ps *19*	
1048 *3*	(3^+)	0.054 ps *14*	
1181 *3*	$(2^-,3^-)$		
1267 *3*	$(3)^+$	0.07 ps *+4−2*	
1317 *3*	(4^-)	0.07 ps *3*	
1355 *3*	(3^-)	0.08 ps *+6−3*	
1368 *3*	(2^+)	0.075 ps *18*	
1397 *3*	(3^-)	0.080 ps *21*	
1410 *3*	(3^+)	0.078 ps *21*	
1432 *3*	(1^+)	0.10 ps *4*	
1543 *3*	(3^+)	0.066 ps *16*	
1663 *3*			
1682 *3*	$(2,3,4^-)$	0.044 ps *11*	
1781 *3*	(3^+)		
1860 *3*		0.04 ps *+4−2*	
1868 *3*	(3^+)	0.044 ps *11*	
1887 *3*			
1977 *3*			
2005 *3*			
2025 *3*			
2097 *3*			

Continued on next page (footnotes at end of table)

^{94}Mo(p,nγ) 1981Ad08 (continued)

^{94}Tc Levels (continued)

E(level)[#]	Jπ[†]	E(level)[#]	Jπ[†]	E(level)[#]	Jπ[†]	E(level)[#]
2135 *3*	(1+)	2211 *3*	(1+)	2244 *3*	(1−,2,3+)	2271 *3*
2170 *3*		2217 *3*		2267 *3*	(1+)	2310 *3*

† From Adopted Levels.
‡ From Doppler-shift attenuation (1981Ad08) if not indicated otherwise. The uncertainties include the statistical uncertainties and 20% uncertainty due to the stopping power.
# From least-squares fit to Eγ, fixing the first excited state energy at 76 keV *3*, as measured in ^{94}Mo(^{3}He,t).
@ From γ(t) with respect to beam pulse (1974Mc14).

γ(^{94}Tc)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[@]	α[b]	Comments
101.90	(6+)	101.9 *2*	100	0	7+	(M1+E2)	+0.09 *13*	0.27 *4*	α=0.27 *4*; α(K)=0.24 *3*; α(L)=0.029 *7*; α(M)=0.0053 *12*; α(N+..)=0.00102 *20*
210.6	(5)+	108.7 *2*	100	101.90	(6+)	(M1+E2)	−0.02 *8*	0.223 *7*	α=0.223 *7*; α(K)=0.195 *6*; α(L)=0.0232 *12*; α(M)=0.00421 *22*; α(N+..)=0.00082 *4*
244	(4)+	145.2 *2*	100	98	(3+)	M1(+E2)	−0.03 *2*	0.1005 *4*	α(K)exp=0.100 *10* α=0.1005 *4*; α(K)=0.0879 *3*; α(L)=0.01040 *6*; α(M)=0.00189; α(N+..)=0.00037 δ: 0.27 *+10−16* from α(K)exp.
336	(2)−	237.6 *2*	98.4 *20*	98	(3+)	E1(+M2)	+0.03 *4*	0.0112 *6*	α(K)exp=0.0111 *12* α=0.0112 *6*; α(K)=0.0098 *5*; α(L)=0.00112 *6*; α(M)=0.00020 δ: 0.11 *+4−7* from α(K)exp.
		260.1 *2*	1.6 *2*	76	(2)+	(E1)		0.0086	α=0.0086
443	1+	366.9 *2*	100	76	(2)+	M1(+E2)	+0.17 *10*	0.0091 *2*	α(K)exp=0.0077 *8* α=0.0091 *2* δ: <0.45 from α(K)exp.
478	(3)−	141.8 *2*	48 *3*	336	(2)−	M1(+E2)	+0.02 *4*	0.1071 *8*	α(K)exp=0.098 *11* α=0.1071 *8*; α(K)=0.0936 *7*; α(L)=0.01108 *13*; α(M)=0.00201; α(N+..)=0.00039 δ: 0.15 *15* from α(K)exp.
		234.2 *2*	16 *1*	244	(4)+	(E1+M2)	+0.04 *3*	0.0117 *5*	α(K)exp=0.016 *5* α=0.0117 *5*; α(K)=0.0103 *4*; α(L)=0.00117 *6*; α(M)=0.00021 δ: 0.23 *+9−14* from α(K)exp.
		379.4 *2*	27 *2*	98	(3+)	(E1+M2)	−0.08 *4*	0.0033 *3*	α=0.0033 *3*
		401.9 *2*	9 *1*	76	(2)+	(E1+M2)	−0.02 *4*	0.0027 *1*	α=0.0027 *1*
801	(2−)	358.1 *1*	30 *1*	443	1+	(E1+M2)	+0.12 *8*	0.0041 *9*	α=0.0041 *9*
		464.8 *1*	70 *2*	336	(2)−	(M1+E2)	−0.34 *5*	0.0052 *1*	α=0.0052 *1*
		702.4		98	(3+)				
826	(2+)	383.3 *1*	11 *1*	443	1+	(M1+E2)	+0.10 *5*	0.0081 *1*	α=0.0081 *1*
		727.7 *1*	44 *3*	98	(3+)	(M1+E2)	+0.15 *4*	0.0018	α=0.0018
		750.2 *1*	45 *5*	76	(2)+	(M1+E2)		0.0017	α=0.0017
921	(3+)	676.9 *1*	52 *2*	244	(4)+	(M1+E2)	+0.08 *3*	0.0021	α=0.0021
		822.4 *1*	48 *2*	98	(3+)	(M1+E2)	−0.06 *4*	0.0014	α=0.0014
929	(4+)	685.4 *1*	43 *3*	244	(4)+	(M1+E2)	+0.01 *11*	0.0021	α=0.0021
		830.9 *1*	57 *4*	98	(3+)	(M1+E2)	+0.05 *3*	0.0013	α=0.0013

Continued on next page (footnotes at end of table)

^{94}Mo(p,nγ) 1981Ad08 (continued)

γ(^{94}Tc) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[@]	α[b]	Comments
956	(3$^-$)	478.3	2 *1*	478	(3)$^-$				
		620.4[&]	98	336	(2)$^-$	(M1+E2)	+0.19 *2*	0.0026	α=0.0026
968	1$^+$	524.7 *1*	9.4 *5*	443	1$^+$	(M1+E2)	+0.03 *22*	0.0039 *1*	α=0.0039 *1*
		891.7 *1*	90.6 *23*	76	(2)$^+$	(M1+E2)	−0.16[a] *16*	0.0011	α=0.0011
1048	(3$^+$)	605.3 *1*	66 *2*	443	1$^+$	(M1+E2)		0.0029 *2*	α=0.0029 *2*
		949.4 *5*	3 *1*	98	(3$^+$)				
		972.1 *1*	31 *1*	76	(2)$^+$	(M1+E2)	−0.17 *4*	0.00094	α=0.00094; α(K)=0.00082
1181	(2$^-$,3$^-$)	703.4 *1*	58 *10*	478	(3)$^-$				
		845.4 *1*	37 *5*	336	(2)$^-$				
		1105.0 *2*	5 *3*	76	(2)$^+$				
1267	(3)$^+$	337.9 *3*	4 *3*	929	(4$^+$)				
		440.7 *1*	28 *2*	826	(2$^+$)	(M1+E2)	+0.09 *1*	0.0058	α=0.0058
		1023.2 *1*	55 *3*	244	(4)$^+$	(M1+E2)	+0.14 *2*		α(K)=0.00073
		1168.4 *2*	6 *2*	98	(3$^+$)	(M1+E2)			
		1191.1 *3*	7 *1*	76	(2)$^+$	(M1+E2)	−0.02 *7*		α(K)=0.00053
1317	(4$^-$)	361.0 *4*	10 *2*	956	(3$^-$)				
		839.2 *1*	56 *3*	478	(3)$^-$	(M1+E2)	−0.05 *4*	0.0013	α=0.0013
		1218.6 *2*	34 *13*	98	(3$^+$)	(E1)			α(K)=0.00022
1355	(3$^-$)	1018.6 *2*	74 *4*	336	(2)$^-$	(M1+E2)	+0.22 *2*		α(K)=0.00074
		1256.1 *1*	9 *2*	98	(3$^+$)	(E1+M2)	−0.03 *22*		α(K)=0.00021 *5*
		1278.8 *1*	17 *2*	76	(2)$^+$	(E1+M2)	+0.02 *5*		α(K)=0.00020
1368	(2$^+$)	400.1 *2*	10 *1*	968	1$^+$	(M1+E2)	−0.01 *6*	0.0073	α=0.0073
		447.2 *2*	5 *1*	921	(3$^+$)				
		541.5 *2*	12 *2*	826	(2$^+$)	(M1+E2)		0.0038 *3*	α=0.0038 *3*
		925.0 *2*	5 *1*	443	1$^+$	(M1+E2)		0.0010 *1*	α=0.0010 *1*
		1292.0 *2*	68 *4*	76	(2)$^+$	(M1+E2)	−0.04 *3*		α(K)=0.00045
1397	(3$^-$)	596.4 *2*	4 *1*	801	(2$^-$)	(M1+E2)		0.0030 *2*	α=0.0030 *2*
		1061.2 *1*	82 *4*	336	(2)$^-$	(M1+E2)	+0.19 *2*		α(K)=0.00068
		1321.0 *2*	14 *1*	76	(2)$^+$	(E1+M2)	+0.03 *3*		α(K)=0.00019
1410	(3$^+$)	480.6 *5*	3 *2*	929	(4$^+$)				
		583.6 *2*	19 *1*	826	(2$^+$)	(M1+E2)	+0.06 *4*	0.0030	α=0.0030
		1311.5 *1*	58 *3*	98	(3$^+$)	(M1+E2)	+0.3 *9*		α(K)=0.00043
		1333.6 *2*	20 *1*	76	(2)$^+$	(M1+E2)	+0.16 *3*		α(K)=0.00042
1432	(1$^+$)	464.6 *4*	4 *3*	968	1$^+$				
		606.1 *3*	75 *10*	826	(2$^+$)	(M1+E2)		0.0028 *2*	α=0.0028 *2*
		989.1 *4*	21 *2*	443	1$^+$	(M1+E2)	−0.17 *18*	0.00091	α=0.00091; α(K)=0.00079
		1356.4[c] *3*		76	(2)$^+$				
1543	(3$^+$)	1299.1 *2*	51 *2*	244	(4)$^+$	(M1+E2)	+0.45 *6*		α(K)=0.00044
		1444.5 *1*	26 *2*	98	(3$^+$)	(M1+E2)	−0.12 *10*		α(K)=0.00036
		1467.1 *2*	23 *6*	76	(2)$^+$	(M1+E2)			
1663		695.3 *2*	24 *8*	968	1$^+$				
		1220.0 *2*	76 *13*	443	1$^+$				
1682	(2,3,4$^-$)	1204.0 *1*	82 *5*	478	(3)$^-$				
		1346.4 *5*	15 *3*	336	(2)$^-$				
		1583.3 *2*	3 *1*	98	(3$^+$)				
1781	(3$^+$)	1445.3 *2*	64 *22*	336	(2)$^-$				
		1705.5 *3*	36 *3*	76	(2)$^+$				
1860		427.5 *1*	71 *4*	1432	(1$^+$)				
		1416.8 *4*	29 *5*	443	1$^+$				
		1783.8[c]		76	(2)$^+$				
1868	(3$^+$)	911.8 *2*	16 *8*	956	(3$^-$)				
		1532.1 *1*	36 *2*	336	(2)$^-$				
		1769.4 *4*	21 *2*	98	(3$^+$)				
		1791.6 *6*	27 *2*	76	(2)$^+$				
1887		839.5[c]		1048	(3$^+$)				

Continued on next page (footnotes at end of table)

^{94}Mo(p,nγ) 1981Ad08 (continued)

γ(^{94}Tc) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π
1887		1444.1 *2*	79 *15*	443	1^+
		1811.1 *4*	21 *2*	76	$(2)^+$
1977		1498.8 *3*	23 *4*	478	$(3)^-$
		1640.4 *2*	77 *6*	336	$(2)^-$
2005		1527.0 *4*	23 *4*	478	$(3)^-$
		1669.1 *2*	77 *5*	336	$(2)^-$
2025		1223.7 *4*	76 *4*	801	(2^-)
		1689.2 *2*	24 *3*	336	$(2)^-$
2097		1176.5 *2*	25 *3*	921	(3^+)
		1999.1 *3*	39 *3*	98	(3^+)
		2021.6 *4*	36 *3*	76	$(2)^+$
2135	(1^+)	702.5 *2*	68 *12*	1432	(1^+)
		1086.6 *3*	8 *2*	1048	(3^+)
		1167.3[c]		968	1^+
		1691.7 *3*	10 *1*	443	1^+
		2036.4 *3*	9 *1*	98	(3^+)
		2058.9 *5*	5 *1*	76	$(2)^+$
2170		773.1 *4*	20 *9*	1397	(3^-)
		988.6[c]		1181	$(2^-,3^-)$
		1833.5 *4*	80 *8*	336	$(2)^-$
2211	(1^+)	1243.5 *2*	100	968	1^+
2217		1773.6 *3*	100	443	1^+
2244	$(1^-,2,3^+)$	1287.9 *2*	55 *5*	956	(3^-)
		1801.6 *6*	45 *7*	443	1^+
		2168.8 *3*		76	$(2)^+$
2267	(1^+)	1299.7[c]		968	1^+
		2168.8 *3*		98	(3^+)
		2190.6 *6*	100	76	$(2)^+$
2271		1303.3 *3*	56 *5*	968	1^+
		1827.8 *3*	44 *5*	443	1^+
2310		1342.0 *5*	61 *6*	968	1^+
		1866.7[c]		443	1^+
		2233.6 *5*	39 *9*	76	$(2)^+$

[†] From 1981Ad08. The energies of other measurements (only few γ′s are measured by other authors) agree with 1981Ad08 within the uncertainty limits.

[‡] Branching ratios for each level (1981Ad08).

[#] From α(K)exp, α(L+...)exp, and γ(θ) measured at three bombarding energies, and restrictions imposed by J^π.

[@] From p,γ(θ) measured at three bombarding energies (1981Ad08). δ from α(K)exp (1979Mi08) is given as comment.

[&] Missing in table but γ is shown in drawing (1981Ad08).

[a] $-0.32<\delta<0$.

[b] 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.

[c] Placement of transition in the level scheme is uncertain.

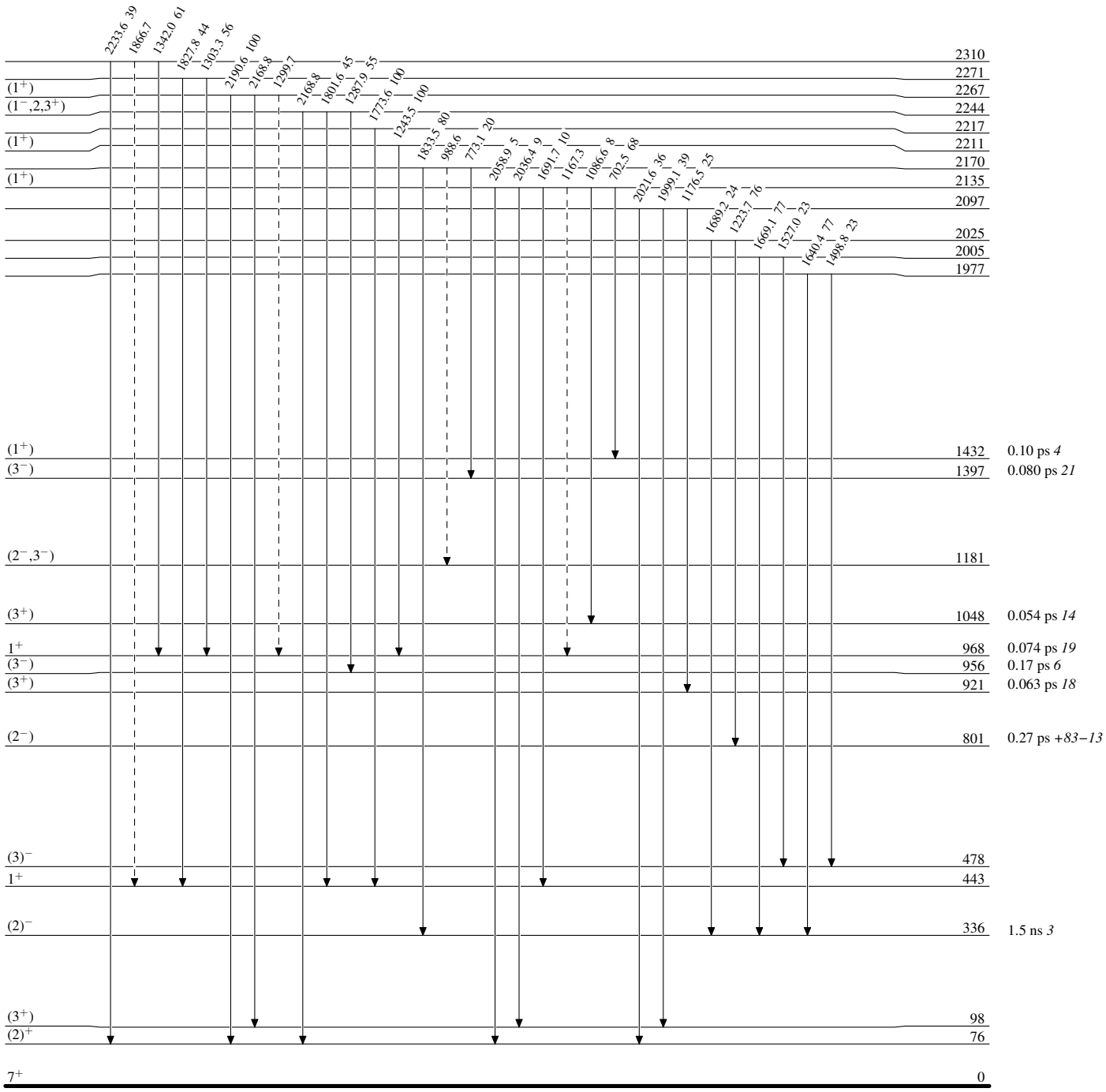
^{94}Mo(p,nγ) 1981Ad08

Legend

Level Scheme

Intensities: % photon branching from each level

γ Decay (Uncertain)



$^{94}_{43}Tc_{51}$

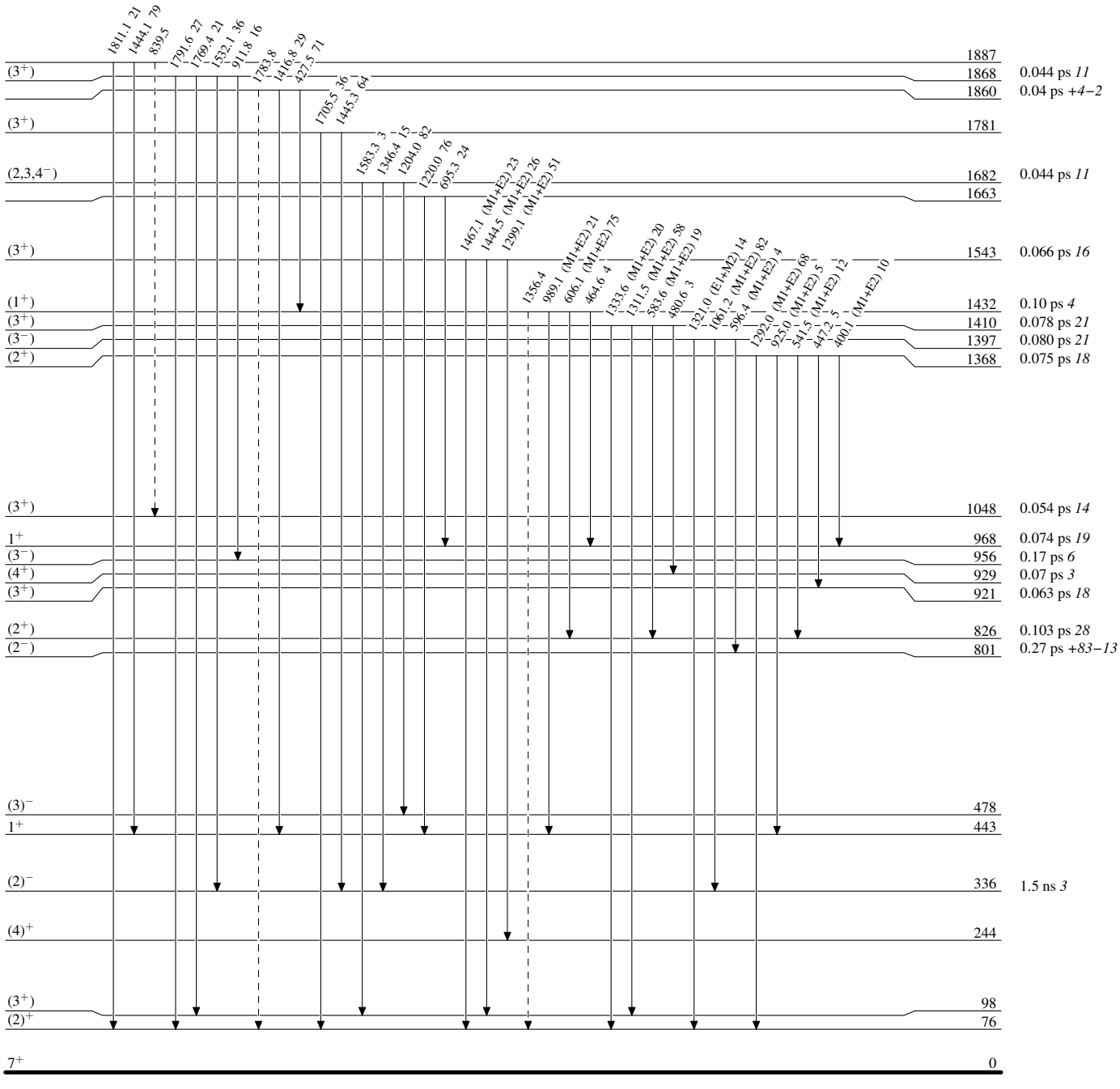
^{94}Mo(p,nγ) 1981Ad08

Legend

Level Scheme (continued)

Intensities: % photon branching from each level

- - - - - - ► γ Decay (Uncertain)

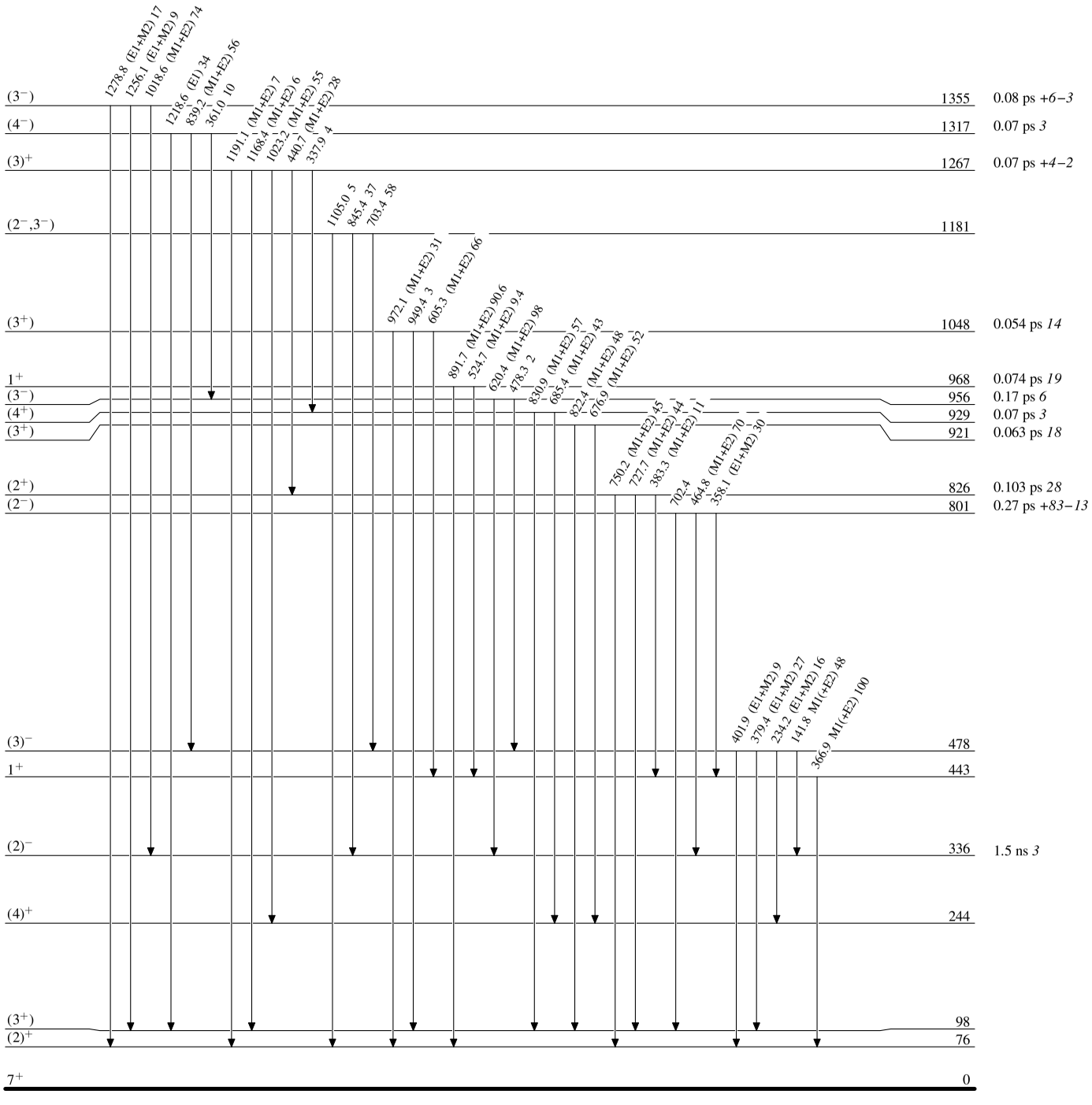


$^{94}_{43}Tc_{51}$

^{94}Mo(p,nγ) 1981Ad08

Level Scheme (continued)

Intensities: % photon branching from each level

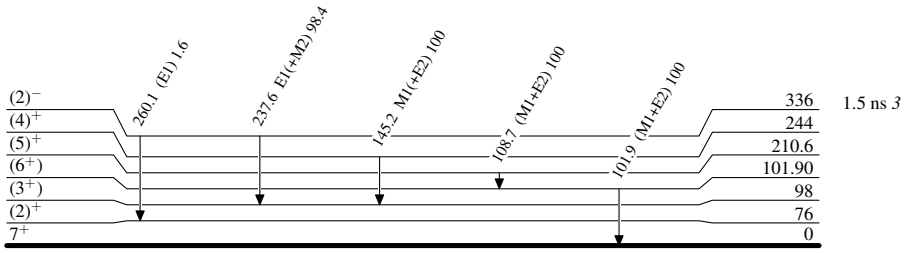


$^{94}_{43}Tc_{51}$

^{94}Mo(p,nγ) 1981Ad08

Level Scheme (continued)

Intensities: % photon branching from each level



$^{94}_{43}Tc_{51}$