^{198}Pt(^{16}O,5nγ) 1985Po08

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	J. Chen # and F. G. Kondev	NDS 126, 373 (2015)	30-Sep-2013

1985Po08: E=81-94 MeV ^{16}O beams were produced from the ANU 14 UD Pelletron accelerator. Targets were enriched Pt foils. γ-rays were detected by three Ge(Li) detectors and one intrinsic Ge low-energy photon spectrometer (LEPS), conversion electrons were detected by a cooled Si(Li) detector and neutrons were detected by a NE213 liquid scintillator. Measured Eγ, Iγ, I(ce), $\gamma\gamma$-coin, $\gamma\gamma$(t), nγ-coin, nγ(t), $\gamma(\theta)$. Deduced levels, J$^{\pi}$, $T_{1/2}$, configurations, conversion coefficients, yrast states. Two other experiments were also performed for measurements of $\gamma(\theta)$ and conversion coefficients: ^{198}Pt(^{17}O,^{6}nγ) with E=87-95 MeV and ^{205}Tl(^{10}B,6nγ) with E=63-75 MeV.

^{209}Rn Levels

E(level)†	J$^{\pi}$‡	$T_{1/2}$#	Comments
0	5/2$^-$		configuration=$\nu(f_{5/2})^{-1}$. J$^{\pi}$: from Adopted Levels.
797.80 *10*	9/2$^-$		configuration=dominant $\nu(f_{5/2})^{-1}\otimes\pi(h_{9/2})^{+4}_{2^+}$.
1173.98 *13*	13/2$^+$	13.4 μs *13*	$T_{1/2}$: from 376.2γ(t) and 797.8γ(t). configuration=$\nu(i_{13/2})^{-1}$.
1465.53 *13*	13/2$^-$		
1561.55 *14*	15/2$^-$		
1610.67 *15*	17/2$^-$		
1687.41 *15*	19/2$^-$	0.69 ns *21*	$T_{1/2}$: from 76.75γ(t) and 96.02γ(t). configuration=$\nu(f_{5/2})^{-1}\otimes\pi(h_{9/2})^{+4}_{8^+}$.
2238.16 *17*	21/2$^-$		
2418.71 *18*	21/2$^+$	8.73 ns *21*	$T_{1/2}$: from 731.3γ(t). configuration=$\nu(i_{13/2})^{-1}\otimes\pi(h_{9/2})^{+4}_{4^+}$.
2501.29 *18*	23/2$^-$		
2744.15 *21*	(23/2$^+$)		
2848.48 *18*	25/2$^-$		
2864.6 *3*			
2957.58 *18*	27/2$^-$		
3049.9 *4*			
3157.48 *21*	29/2$^-$	13.9 ns *21*	$T_{1/2}$: from 199.9γ(t). configuration=$\nu(p_{1/2})^{-1}\otimes\pi((h_{9/2})^{+3}(f_{7/2})^{+1})^{4}_{14^+}$.
3400.6 *3*			
3539.9 *3*	(27/2$^+$)		
3636.78 *23*	35/2$^+$	3.0 μs *3*	$T_{1/2}$: from 479.3γ(t) and 199.9γ(t). configuration=$\nu(p_{1/2})^{-1}\otimes\pi((h_{9/2})^{+3}(i_{13/2})^{+1})^{4}_{17^-}$.
3671.5 *4*	(29/2$^+$)		
3987.0 *4*	(31/2$^+$)		
4182.4 *4*	(33/2$^+$)		
4583.6 *4*	(35/2$^+$)		
4833.7 *3*	41/2$^-$	10.0 ns *4*	$T_{1/2}$: from 1196.9γ(t). configuration=$\nu(p_{1/2})^{-1}\otimes\pi((h_{9/2})^{+2}(i_{13/2})^{+2})^{4}_{20^+}$.
4988.0 *4*	(37/2$^+$)		
5216.9? *4*	41/2$^+$		E(level): The order of 383.2γ and 602.8γ is not well determined, and reversing the order of the two transitions would place a level of J$^{\pi}$=(43/2$^-$) at 5437 keV (1985Po08).
5819.8 *4*	43/2$^+$		
6538.0 *5*	47/2$^+$		
6772.1 *6*	49/2$^+$		
6826.1 *6*	49/2$^+$		
7307.7 *7*	51/2		

† From a least-squares fit to Eγ.

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^{198}Pt(^{16}O,5nγ) 1985Po08 (continued)

^{209}Rn Levels (continued)

‡ From 1985Po08, based on deduced γ-ray transition multipolarities.

$T_{1/2}$<1.4 ns for all excited levels where no value is given explicitly (1985Po08).

γ(^{209}Rn)

E_γ‡	I_γ‡	E_i(level)	J^π_i	E_f	J^π_f	Mult.#	δ@	α†	Comments
49.12 *5*	50	1610.67	17/2⁻	1561.55	15/2⁻	M1(+E2)	≤0.14		α(L)=16.8 *19*; α(M)=4.0 *5*; α(N+..)=1.31 *16* α(N)=1.05 *13*; α(O)=0.23 *3*; α(P)=0.033 *3* Mult.: α(exp)=22 *2* (1985Po08).
76.75 *5*	120	1687.41	19/2⁻	1610.67	17/2⁻	M1		5.51	α(L)=4.19 *6*; α(M)=0.996 *14*; α(N+..)=0.325 *5* α(N)=0.260 *4*; α(O)=0.0568 *8*; α(P)=0.00830 *12* Mult.: α(exp)=5.4 *9* (1985Po08).
96.02 *5*	200	1561.55	15/2⁻	1465.53	13/2⁻	M1+E2	0.22 *+10−17*	3.2 *4*	α(L)=2.42 *24*; α(M)=0.59 *7*; α(N+..)=0.190 *22* α(N)=0.152 *18*; α(O)=0.033 *4*; α(P)=0.0046 *4* Mult.,δ: α(exp)=3.2 *3* (1985Po08).
109.10 *7*	≈20	2957.58	27/2⁻	2848.48	25/2⁻	M1(+E2)	≤0.16		α(K)=6 *4*; α(L)=2.2 *12*; α(M)=0.5 *4*; α(N+..)=0.18 *11* α(N)=0.14 *9*; α(O)=0.030 *17*; α(P)=0.0039 *15* Mult.: α(exp)=9 *2* (1985Po08).
131.6 *2*	≈50	3671.5	(29/2⁺)	3539.9	(27/2⁺)	M1			α(K)=4.67 *20*; α(L)=0.91 *4*; α(M)=0.219 *11*; α(N+..)=0.071 *4* α(N)=0.057 *3*; α(O)=0.0124 *6*; α(P)=0.00178 *5* Mult.: α(exp)=8 *1* is larger than the calculated value for M1; A_2=−0.15 *5*, A_4=−0.05 *5* (1985Po08).
139.2 *2*	≈50	3539.9	(27/2⁺)	3400.6					A_2=+0.02 *9*, A_4=+0.12 *9* (1985Po08).
185.4 *1*	≈30	3049.9		2864.6					A_2=+0.20 *5*, A_4=+0.03 *5* (1985Po08).
195.4 *1*	100	4182.4	(33/2⁺)	3987.0	(31/2⁺)	M1(+E2)	0.6 *5*		Mult.: α(exp)=1.6 *4*, A_2=−0.53 *7*, A_4=+0.02 *7* (1985Po08).
199.9 *1*	130	3157.48	29/2⁻	2957.58	27/2⁻	M1+E2	1.6 *4*	0.89 *17*	α(K)=0.54 *17*; α(L)=0.267 *4*; α(M)=0.0690 *14*; α(N+..)=0.0221 *4* α(N)=0.0180 *4*; α(O)=0.00373 *6*; α(P)=0.000461 *15* Mult.: α(exp)=0.9 *1*, A_2=−0.13 *3*, A_4=+0.02 *3* (1985Po08).
234.1 *3*	40	6772.1	49/2⁺	6538.0	47/2⁺	M1+E2		0.7 *5*	α(K)=0.5 *5*; α(L)=0.155 *18*; α(M)=0.0387 *23*; α(N+..)=0.0125 *9* α(N)=0.0101 *6*; α(O)=0.00214 *20*; α(P)=0.00028 *6* Mult.: A_2=−0.33 *5*, A_4=+0.05 *5* (1985Po08).

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^{198}Pt(^{16}O,5nγ) 1985Po08 (continued)

γ(^{209}Rn) (continued)

E_γ‡	I_γ‡	E_i(level)	J_i^π	E_f	J_f^π	Mult.#	δ@	α†	Comments
288.1 *3*	60	6826.1	49/2+	6538.0	47/2+	M1+E2		0.4 *3*	α(K)=0.31 *24*; α(L)=0.078 *19*; α(M)=0.019 *4*; α(N+..)=0.0063 *13* α(N)=0.0050 *10*; α(O)=0.00108 *24*; α(P)=0.00015 *5* Mult.: A_2=−0.31 *4*, A_4=+0.05 *4* (1985Po08).
315.5 *1*	190	3987.0	(31/2+)	3671.5	(29/2+)	M1			α(K)=0.416 *9*; α(L)=0.0748 *12*; α(M)=0.0178 *3*; α(N+..)=0.00579 *9* α(N)=0.00463 *7*; α(O)=0.001012 *16*; α(P)=0.0001476 *24* Mult.: α(K)exp=0.46 *3*, A_2=−0.23 *2*, A_4=−0.02 *2* (1985Po08).
325.4 *1*	≈110	2744.15	(23/2+)	2418.71	21/2+	M1+E2	0.6 *3*	0.38 *7*	α(K)=0.30 *6*; α(L)=0.061 *6*; α(M)=0.0147 *13*; α(N+..)=0.0048 *4* α(N)=0.0038 *4*; α(O)=0.00083 *8*; α(P)=0.000118 *14* Mult.: α(K)exp=0.30 *6*, A_2=−0.38 *5*, A_4=+0.02 *2* (1985Po08).
347.2 *1*	50	2848.48	25/2−	2501.29	23/2−	M1(+E2)	<1.6	0.33 *7*	α(K)=0.26 *7*; α(L)=0.052 *7*; α(M)=0.0124 *14*; α(N+..)=0.0040 *5* α(N)=0.0032 *4*; α(O)=0.00070 *9*; α(P)=0.000100 *15* Mult.: α(exp)=0.5 *3*, A_2=−0.14 *6*, A_4=−0.09 *6* (1985Po08).
376.2 *1*	200	1173.98	13/2+	797.80	9/2−	M2		1.029	α(K)=0.775 *11*; α(L)=0.191 *3*; α(M)=0.0475 *7*; α(N+..)=0.01559 *22* α(N)=0.01248 *18*; α(O)=0.00272 *4*; α(P)=0.000389 *6* Mult.: α(exp)=1.10 *6*, α(K)exp=0.89 *7*, α(L)exp=0.27 *3*, A_2=+0.06 *2*, A_4=−0.01 *2* (1985Po08).
382.0& *3*	70	3539.9	(27/2+)	3157.48	29/2−	[E1]			E_γ: unassigned in Table 2 and not shown in the level scheme, but included in the table of branching ratios (Table 4) in 1985Po08. Mult.: A_2=−0.02 *8*, A_4=0.00 *9* (1985Po08) in consistent with D, the level scheme requires Mult. E1.
383.2 *2*	50	5216.9?	41/2+	4833.7	41/2−	(E1)		0.0193	α(K)=0.01572 *22*; α(L)=0.00272 *4*; α(M)=0.000641 *9*; α(N+..)=0.000207 *3* α(N)=0.0001659 *24*; α(O)=3.57×10^{-5} *5*; α(P)=4.98×10^{-6} *7* Mult.: A_2=+0.33 *5*, A_4=+0.00 *6* (1985Po08), consistent with J to J D.
387.6 *1*	280	1561.55	15/2−	1173.98	13/2+	(E1)		0.0188	α(K)=0.01534 *22*; α(L)=0.00265 *4*; α(M)=0.000625 *9*; α(N+..)=0.000201 *3* α(N)=0.0001617 *23*; α(O)=3.48×10^{-5} *5*; α(P)=4.86×10^{-6} *7* Mult.: α(K)exp<0.22, A_2=−0.05 *2*, A_4=−0.01 *2*. α(K)exp is consistent with E1 or E2(+M1). The placement in the level scheme requires Δπ=yes.

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^{198}Pt(^{16}O,5nγ) 1985Po08 (continued)

γ(^{209}Rn) (continued)

E_γ‡	I_γ‡	E_i(level)	J^π_i	E_f	J^π_f	Mult.#	δ@	α†	Comments
									Additional information 1.
401.3 *1*	160	4583.6	(35/2$^+$)	4182.4	(33/2$^+$)	M1(+E2)			α(K)=0.201 *19*; α(L)=0.0369 *22*; α(M)=0.0088 *5*; α(N+..)=0.00286 *16* α(N)=0.00229 *13*; α(O)=0.00050 *3*; α(P)=7.2×10^{-5} *5* Mult.: α(K)exp=0.32 *8*, A_2=−0.51 *2*, A_4=+0.11 *2* (1985Po08).
404.4 *1*	90	4988.0	(37/2$^+$)	4583.6	(35/2$^+$)	M1+E2		0.16 *11*	α(K)=0.13 *9*; α(L)=0.028 *11*; α(M)=0.0068 *23*; α(N+..)=0.0022 *8* α(N)=0.0018 *6*; α(O)=0.00038 *14*; α(P)=5.3×10^{-5} *23* Mult.: A_2=−0.58 *9*, A_4=+0.24 *10* (1985Po08).
446.2 *3*	70	2864.6		2418.71	21/2$^+$				A_2=−0.08 *6*, A_4=0.00 *5* (1985Po08).
456.3 *1*	70	2957.58	27/2$^-$	2501.29	23/2$^-$	E2		0.0439	α(K)=0.0284 *4*; α(L)=0.01158 *17*; α(M)=0.00296 *5*; α(N+..)=0.000953 *14* α(N)=0.000771 *11*; α(O)=0.0001612 *23*; α(P)=2.04×10^{-5} *3* Mult.: α(K)exp<0.41 is consistent with D or E2. The placement in the level scheme requires mult=E2. A_2=+0.08 *4*, A_4=−0.03 *5* (1985Po08).
479.3 *1*	200	3636.78	35/2$^+$	3157.48	29/2$^-$	E3		0.1415	α(K)=0.0647 *9*; α(L)=0.0567 *8*; α(M)=0.01514 *22*; α(N+..)=0.00489 *7* α(N)=0.00397 *6*; α(O)=0.000823 *12*; α(P)=0.0001014 *15* Mult.: α(K)exp=0.071 *10*, α(L)exp=0.056 *7*, A_2=+0.10 *1*, A_4=+0.01 *1* (1985Po08).
481.6 *3*	20	7307.7	51/2	6826.1	49/2$^+$	D			Mult.: A_2=−0.20 *9*, A_4=+0.10 *11* (1985Po08).
490.6 *4*	70	3539.9	(27/2$^+$)	3049.9					A_2=−0.12 *4*, A_4=+0.09 *5* (1985Po08).
550.8 *1*	230	2238.16	21/2$^-$	1687.41	19/2$^-$	M1(+E2)	≤0.7		α(K)=0.091 *22*; α(L)=0.016 *3*; α(M)=0.0038 *7*; α(N+..)=0.00125 *22* α(N)=0.00100 *18*; α(O)=0.00022 *4*; α(P)=3.2×10^{-5} *7* Mult.: α(K)exp=0.09 *2*, A_2=−0.45 *4*, A_4=+0.06 *4* (1985Po08).
596.2 *3*	80	4583.6	(35/2$^+$)	3987.0	(31/2$^+$)	[E2]		0.0235	α(K)=0.01670 *24*; α(L)=0.00509 *8*; α(M)=0.001277 *18*; α(N+..)=0.000412 *6* α(N)=0.000333 *5*; α(O)=7.03×10^{-5} *10*; α(P)=9.24×10^{-6} *13*
602.8 *3*	80	5819.8	43/2$^+$	5216.9?	41/2$^+$	M1+E2	0.8 +*10*−*6*		α(K)=0.052 *22*; α(L)=0.010 *3*; α(M)=0.0024 *7*;

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$^{198}Pt(^{16}O,5n\gamma)$ 1985Po08 (continued)

$\gamma(^{209}Rn)$ (continued)

E_γ‡	I_γ‡	E_i(level)	J_i^π	E_f	J_f^π	Mult.#	α†	Comments
								α(N+..)=0.00077 *24* α(N)=0.00062 *19*; α(O)=0.00013 *5*; α(P)=1.9×10^{-5} *7* Mult.: α(K)exp=0.05 *2*, A_2=−0.40 *5*, A_4=+0.05 *5* (1985Po08).
610.3 *1*	140	2848.48	25/2⁻	2238.16	21/2⁻	E2	0.0223	α(K)=0.01596 *23*; α(L)=0.00476 *7*; α(M)=0.001192 *17*; α(N+..)=0.000385 *6* α(N)=0.000310 *5*; α(O)=6.57×10^{-5} *10*; α(P)=8.66×10^{-6} *13* Mult.: α(K)exp=0.019 *6*, A_2=+0.11 *3*, A_4=−0.02 *3* (1985Po08).
627.2 *2*	50	2238.16	21/2⁻	1610.67	17/2⁻	[E2]	0.0210	α(K)=0.01514 *22*; α(L)=0.00441 *7*; α(M)=0.001101 *16*; α(N+..)=0.000355 *5* α(N)=0.000287 *4*; α(O)=6.07×10^{-5} *9*; α(P)=8.04×10^{-6} *12* Mult.: A_2=+0.03 *7*, A_4=−0.07 *8* (1985Po08).
656.3 *3*	40	3400.6		2744.15	(23/2⁺)			A_2=−0.23 *6*, A_4=+0.07 *6* (1985Po08).
667.7 *1*	650	1465.53	13/2⁻	797.80	9/2⁻	E2	0.0184	α(K)=0.01344 *19*; α(L)=0.00370 *6*; α(M)=0.000921 *13*; α(N+..)=0.000298 *5* α(N)=0.000240 *4*; α(O)=5.09×10^{-5} *8*; α(P)=6.79×10^{-6} *10* Mult.: α(K)exp=0.014 *1*, A_2=+0.16 *1*, A_4=−0.03 *1* (1985Po08).
718.2 *3*	50	6538.0	47/2⁺	5819.8	43/2⁺	E2	0.01574	α(K)=0.01170 *17*; α(L)=0.00304 *5*; α(M)=0.000753 *11*; α(N+..)=0.000243 *4* α(N)=0.000196 *3*; α(O)=4.17×10^{-5} *6*; α(P)=5.62×10^{-6} *8* Mult.: α(K)exp=0.016 *5*, A_2=+0.29 *7*, A_4=−0.01 *6* (1985Po08).
731.3 *1*	260	2418.71	21/2⁺	1687.41	19/2⁻	E1	0.00522	α(K)=0.00431 *6*; α(L)=0.000698 *10*; α(M)=0.0001636 *23*; α(N+..)=5.29×10^{-5} *8* α(N)=4.24×10^{-5} *6*; α(O)=9.20×10^{-6} *13*; α(P)=1.317×10^{-6} *19* Mult.: α(K)exp=0.003 *1*, A_2=−0.05 *2*, A_4=+0.01 *2* (1985Po08).
795.7 *2*	80	3539.9	(27/2⁺)	2744.15	(23/2⁺)	E2	0.01276	α(K)=0.00966 *14*; α(L)=0.00234 *4*; α(M)=0.000574 *8*; α(N+..)=0.000186 *3* α(N)=0.0001494 *21*; α(O)=3.19×10^{-5} *5*; α(P)=4.34×10^{-6} *6* Mult.: α(K)exp=0.007 *6*, A_2=+0.18 *7*, A_4=−0.05 *7* (1985Po08).
797.8 *1*	1000	797.80	9/2⁻	0	5/2⁻	E2	0.01269	α(K)=0.00961 *14*; α(L)=0.00232 *4*; α(M)=0.000570 *8*; α(N+..)=0.000184 *3* α(N)=0.0001483 *21*; α(O)=3.17×10^{-5} *5*; α(P)=4.32×10^{-6} *6* Mult.: α(K)exp=0.010 *1*, A_2=+0.13 *1*, A_4=−0.02 *1* (1985Po08).
805.1 *8*	50	4988.0	(37/2⁺)	4182.4	(33/2⁺)			
813.9 *1*	180	2501.29	23/2⁻	1687.41	19/2⁻	E2	0.01219	α(K)=0.00926 *13*; α(L)=0.00221 *3*; α(M)=0.000541 *8*; α(N+..)=0.0001751 *25* α(N)=0.0001409 *20*; α(O)=3.01×10^{-5} *5*; α(P)=4.11×10^{-6} *6* Mult.: α(K)exp=0.012 *2*, A_2=+0.15 *2*, A_4=−0.03 *2* (1985Po08).
986.1 *2*	90	5819.8	43/2⁺	4833.7	41/2⁻	E1	0.00302	α(K)=0.00250 *4*; α(L)=0.000396 *6*;

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^{198}Pt(^{16}O,5nγ) 1985Po08 (continued)

γ(^{209}Rn) (continued)

E_γ ‡	I_γ ‡	E_i(level)	J_i^π	E_f	J_f^π	Mult.#	α†	Comments
								α(M)=9.26×10^{-5} *13*; α(N+..)=3.00×10^{-5} *5* α(N)=2.40×10^{-5} *4*; α(O)=5.23×10^{-6} *8*; α(P)=7.54×10^{-7} *11* Mult.: α(K)exp=0.002 *1*, A_2=−0.20 *5*, A_4=−0.06 *5* (1985Po08).
1196.9 *2*	100	4833.7	41/2$^-$	3636.78	35/2$^+$	E3	0.01295	α(K)=0.00963 *14*; α(L)=0.00250 *4*; α(M)=0.000619 *9*; α(N+..)=0.000202 *3* α(N)=0.0001616 *23*; α(O)=3.46×10^{-5} *5*; α(P)=4.76×10^{-6} *7*; α(IPF)=1.054×10^{-6} *16* Mult.: M1 or E3 from α(K)exp=0.011 *2*, α(L)exp=0.005 *1*, A_2=+0.30 *3*, A_4=−0.02 *3* (1985Po08); $T_{1/2}$ rules out M1.

† Additional information 2.
‡ From 1985Po08. Relative intensities normalized to Iγ((797.8γ)=1000, for ^{16}O bombardment at 94 MeV.
\# From ce and γ(θ) data in 1985Po08. α(exp) were determined from intensity balances using Iγ from delayed spectra.
@ From ce data in 1985Po08.
& Placement of transition in the level scheme is uncertain.

^{198}Pt(^{16}O,5nγ) 1985Po08

Level Scheme

Intensities: Relative I_γ

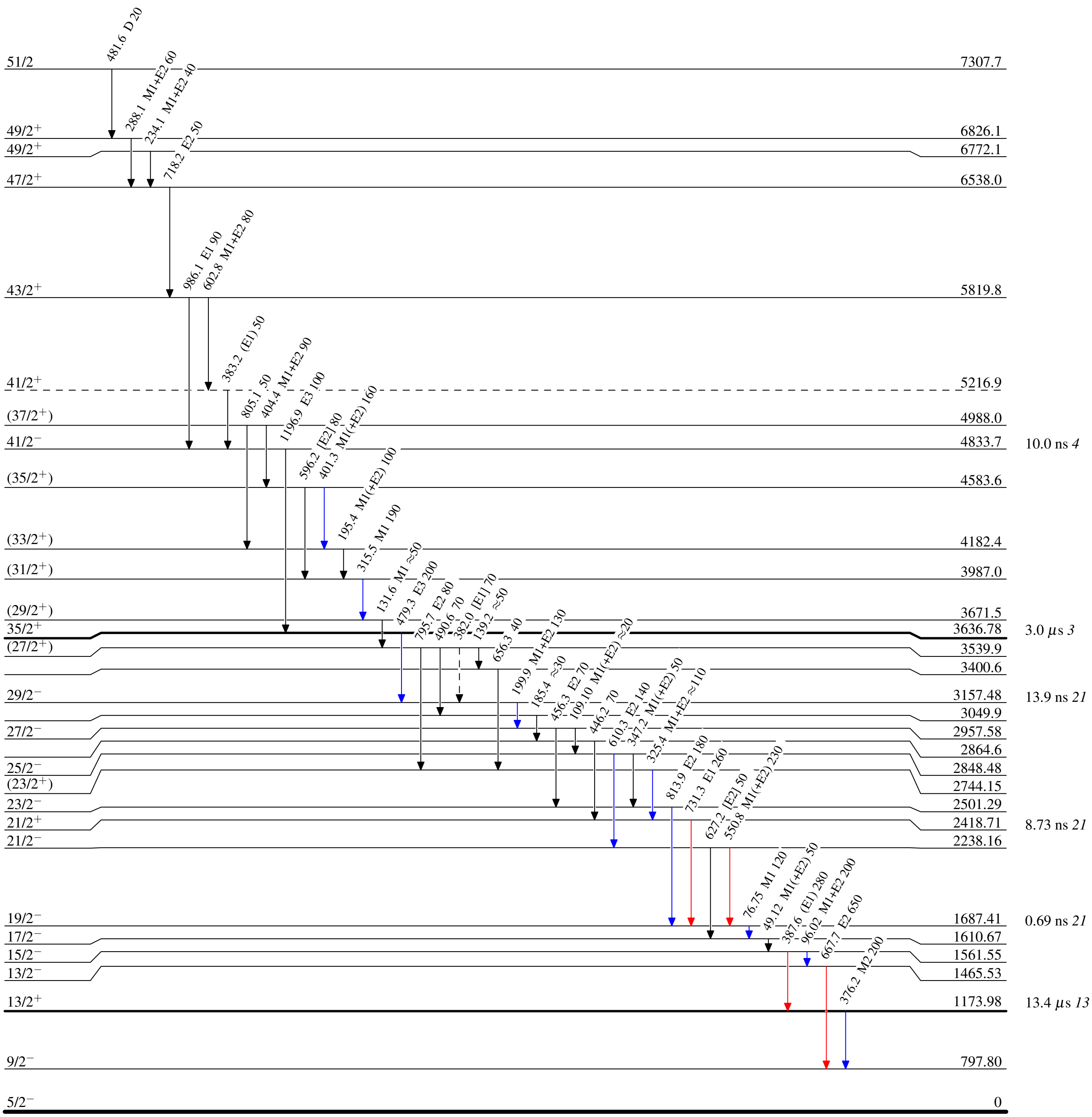
Legend

$I_\gamma < 2\% \times I_\gamma^{max}$

$I_\gamma < 10\% \times I_\gamma^{max}$

$I_\gamma > 10\% \times I_\gamma^{max}$

γ Decay (Uncertain)



$^{209}_{86}Rn_{123}$