Adopted Levels, Gammas

History

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

Q(β^-)=−5161 *25*; S(n)=7345 *23*; S(p)=3748 *22*; Q(α)=6155.5 *20* 2012Wa38

^{209}Rn Levels

Cross Reference (XREF) Flags

- A ^{209}Fr ε decay
- B ^{213}Ra α decay (2.73 min)
- C ^{213}Ra α decay (2.18 ms)
- D ^{198}Pt(^{16}O,5nγ)

E(level)†	J$^\pi$	T$_{1/2}$	XREF	Comments
0.0	5/2$^-$	28.8 min *10*	ABCD	%α=17 *2*; %ε+%β^+=83 *2* μ=0.8388 *4* (1988Ki03); Q=+0.31 *3* (1987OtZW) J$^\pi$: from collinear laser spectroscopy (1987Bo29,1987OtZW); favored α-decay to ^{205}Po g.s. (J$^\pi$=5/2$^-$). T$_{1/2}$: weighted average of 28.5 min *10* (1971Go35) and 30 min *3* (1955Mo68). %α,%ε+%β^+: from measured %α=17 *2* (1971Go35) and %I(ε+β)+%I(α)=100. μ: measured using the NMR technique (1988Ki03). Other: 0.82 from 1987Bo29 using the Collinear Fast beam Laser Spectroscopy technique. Q: measured using the Collinear Fast Beam Laser Spectroscopy technique. configuration=ν(f$_{5/2}$)$^{-1}$. Eα(decay to ^{205}Po g.s.)=6039 *3* (1971Go35), 6037 *3* (1955Mo69).
110.25 *8*	1/2$^-$		ABC	J$^\pi$: 110.3γ E2 to 5/2$^-$; favored α decay from ^{213}Ra g.s. (J$^\pi$=1/2$^-$). configuration=ν(p$_{1/2}$)$^{-1}$.
214.93 *9*	3/2$^-$		BC	J$^\pi$: 104.8γ M1(+E2) to 1/2$^-$ and 214.9γ M1(+E2) to 5/2$^-$. configuration=ν(p$_{3/2}$)$^{-1}$.
328.31 *9*	3/2$^-$		B	J$^\pi$: 218.1γ M1 to 1/2$^-$ and 328.3γ M1(+E2) to 5/2$^-$.
382.33 *15*	(3/2$^-$)‡		A	J$^\pi$: 272.1γ to 1/2$^-$, 382.3γ to 5/2$^-$.
511.32 *14*	(1/2,3/2,5/2)$^-$		B	J$^\pi$: 183.0γ and 296.4γ M1 to 3/2$^-$.
547.10 *20*	(7/2$^-$)‡		A	
652.60 *21*	(5/2$^-$)‡		A	
690.1 *3*	(1/2$^-$,3/2$^-$)‡		A	
797.83 *10*	9/2$^-$‡		A D	J$^\pi$: 797.8γ E2 to 5/2$^-$.
867.70 *18*	(7/2,9/2$^-$)		A	J$^\pi$: 867.7γ to 5/2$^-$; possible feeding in ε+β^+ decay (J$^\pi$=9/2$^-$).
1020.7 *4*			A	
1174.01 *13*	13/2$^+$	13.4 μs *13*	A D	J$^\pi$: 376.2γ stretched M2 to 9/2$^-$. T$_{1/2}$: from 376.2γ(t) and 797.8γ(t) in ^{198}Pt(^{16}O,5nγ) (1985Po08). configuration: ν(i$_{13/2}$)$^{-1}$.
1327.45 *18*	(5/2$^-$,7/2,9/2$^-$)		A	J$^\pi$: 529.5γ to 9/2$^-$ and 1327.7γ to 5/2$^-$.
1352.7 *3*			A	
1383.2 *3*			A	
1388.2 *3*			A	
1465.56 *13*	13/2$^-$		A D	J$^\pi$: 667.7γ stretched E2 to 9/2$^-$.
1561.58 *13*	15/2$^-$		D	J$^\pi$: 96.02γ M1+E2 ΔJ=1 to 13/2$^-$ and 387.5γ E1 to 13/2$^+$.
1588.41 *24*			A	
1610.70 *14*	17/2$^-$		D	J$^\pi$: 49.12γ M1(+E2) to 15/2$^-$.
1687.43 *15*	19/2$^-$	0.69 ns *21*	D	J$^\pi$: 76.75γ stretched M1 to 17/2$^-$.

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Adopted Levels, Gammas (continued)

^{209}Rn Levels (continued)

E(level)[†]	Jπ	$T_{1/2}$	XREF	Comments
				$T_{1/2}$: from 76.75γ(t) and 96.02γ(t) from ^{198}Pt(^{16}O,5nγ) (1985Po08). configuration=$\nu(f_{5/2})^{-1}\otimes\pi(h_{9/2})^{+4}_{8+}$.
1767.0 *4*			A	
1931.3 *4*			A	
2238.18 *17*	21/2⁻		D	Jπ: 550.8γ M1(+E2) to 19/2⁻, 627.2 E2 to 17/2⁻.
2418.74 *18*	21/2⁺	8.73 ns *21*	D	Jπ: 731.3γ stretched E1 to 19/2⁻. $T_{1/2}$: from 731.3γ(t) from ^{198}Pt(^{16}O,5nγ) (1985Po08). configuration=$\nu(1i_{13/2})^{-1}\otimes\pi(h_{9/2})^{+4}_{4+}$.
2501.32 *17*	23/2⁻		D	Jπ: 813.9γ E2 to 19/2⁻.
2744.17 *21*	(23/2)⁺		D	Jπ: 325.4γ M1+E2 to 21/2⁺.
2848.51 *18*	25/2⁻		D	Jπ: 610.3γ E2 to 21/2⁻.
2864.6 *3*			D	
2957.61 *18*	27/2⁻		D	Jπ: 456.3γ E2 to 23/2⁻.
3050.0 *4*			D	
3157.51 *21*	29/2⁻	13.9 ns *21*	D	Jπ: 199.9γ M1+E2 to 27/2⁻. $T_{1/2}$: from 199.9γ(t) from ^{198}Pt(^{16}O,5nγ) (1985Po08). configuration=$\nu(p_{1/2})^{-1}\otimes\pi((h_{9/2})^{+3}(f_{7/2})^{+1})^{4}_{14+}$.
3400.7 *3*			D	
3539.9 *3*	(27/2)⁺		D	Jπ: 795.7γ E2 to (23/2)⁺.
3636.81 *23*	35/2⁺	3.0 μs *3*	D	Jπ: 479.3γ E3 to 29/2⁻. $T_{1/2}$: from 479.3γ(t) and 199.9γ(t) from ^{198}Pt(^{16}O,5nγ) (1985Po08). configuration=$\nu(p_{1/2})^{-1}\otimes\pi((h_{9/2})^{+3}(i_{13/2})^{+1})^{4}_{17-}$.
3671.5 *4*	(29/2)⁺		D	Jπ: 131.6γ M1 to (27/2)⁺.
3987.0 *4*	(31/2)⁺		D	Jπ: 315.5γ M1 to (29/2)⁺.
4182.4 *4*	(33/2)⁺		D	Jπ: 195.4γ M1(+E2) to (31/2)⁺.
4583.6 *4*	(35/2)⁺		D	Jπ: 401.3γ M1(+E2) to 33/2⁺.
4833.7 *3*	41/2⁻	10.0 ns *4*	D	Jπ: 1196.9γ E3 to 35/2⁺. $T_{1/2}$: from 1196.9γ(t) in ^{198}Pt(^{16}O,5nγ) (1985Po08). configuration=$\nu(p_{1/2})^{-1}\otimes\pi((h_{9/2})^{+2}(i_{13/2})^{+2})^{4}_{20+}$.
4988.0 *4*	(37/2)⁺		D	Jπ: 404.4γ M1+E2 to (35/2)⁺.
5216.9? *4*	41/2⁺		D	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 Jπ=(43/2⁻) at 5437 keV (1985Po08). Jπ: 383.2γ to 41/2⁻ is consistent with a ΔJ=0 pure dipole (from γ(θ)); 602.8γ M1+E2 from 43/2⁺.
5819.8 *4*	43/2⁺		D	Jπ: 986.1γ stretched E1 to 41/2⁻.
6538.0 *5*	47/2⁺		D	Jπ: 718.2γ E2 to 43/2⁺.
6772.1 *6*	49/2⁺		D	Jπ: 234.1γ M1+E2 to 47/2⁺.
6826.1 *6*	49/2⁺		D	Jπ: 288.1γ M1+E2 to 47/2⁺.
7307.7 *7*	51/2		D	Jπ: 481.6γ D to 47/2⁺.

[†] From a least-squares fit to Eγ.

[‡] From 1996Xu02 in ^{209}Fr ε decay. The authors proposed configuration=$\nu(f_{5/2})^{-1}\otimes 2^+$ for the levels of 382.33, 547.10, 652.60, 690.1 and 797.8 from comparisons with the low-lying states in ^{207}Po and ^{205}Pb. The assignments are tentative.

Adopted Levels, Gammas (continued)

γ(^{209}Rn)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[&]	δ[ac]	α[b]	Comments
110.25	1/2⁻	110.3[@] *1*	100	0.0	5/2⁻	E2		5.48	α(K)=0.362 *5*; α(L)=3.77 *6*; α(M)=1.017 *15* α(N)=0.265 *4*; α(O)=0.0534 *8*; α(P)=0.00594 *9* Mult.: α(exp)=5.1 *9* from ^{213}Ra α decay (2.73 min) (2006Ku26).
214.93	3/2⁻	104.8[@] *2*	29[@] *8*	110.25	1/2⁻	M1(+E2)	≤0.8	10.8 *12*	α(K)=8.0 *23*; α(L)=2.1 *8*; α(M)=0.53 *23* α(N)=0.14 *6*; α(O)=0.029 *12*; α(P)=0.0039 *11* I_γ: from ^{213}Ra α decay (2.73 min). Iγ/Iγ(215γ)=0.12 *11* in ^{213}Ra α decay (2.15 ms) (2006Ku26). Mult.,δ: α(K)exp=8.1 *24* in ^{213}Ra α decay (2.73 min) (2006Ku26).
		214.9[@] *1*	100[@] *20*	0.0	5/2⁻	M1(+E2)	<1.2	1.2 *4*	α(K)=0.9 *4*; α(L)=0.212 *8*; α(M)=0.0521 *8* α(N)=0.01357 *20*; α(O)=0.00291 *7*; α(P)=0.00040 *4* Mult.,δ: from estimated E2 admixture <58% based on intensity balance in ^{213}Ra α decay (2.73 min) (2006Ku26).
328.31	3/2⁻	(113.3[@] *2*)	<15[@]	214.93	3/2⁻				E_γ,I_γ: Not observed, but inferred in ^{213}Ra α decay (2.73 min) (2006Ku26) from intensity balance at the 328 level. Intensity limit of I(113.3γ)/I(328.3γ)<0.15 in 2006Ku26 is based upon systematics of N=123 isotones.
		218.1[@] *2*	49[@] *21*	110.25	1/2⁻	M1		1.444	α(K)=1.167 *17*; α(L)=0.210 *3*; α(M)=0.0499 *8* α(N)=0.01301 *19*; α(O)=0.00285 *4*; α(P)=0.000416 *6* Mult.: α(K)exp=1.7 *16* from ^{213}Ra α decay (2.73 min) (2006Ku26).
		328.3[@] *1*	100[@] *36*	0.0	5/2⁻	M1(+E2)		0.467	α(K)=0.378 *6*; α(L)=0.0675 *10*; α(M)=0.01601 *23* α(N)=0.00417 *6*; α(O)=0.000913 *13*; α(P)=0.0001334 *19* Mult.: Estimated by 2006Ku26 from intensity balance, life-time limit, and ce data. M1+E2 is not excluded from ^{213}Ra α decay (2.73 min).
382.33	(3/2⁻)	272.1[#] *2*	100[#] *25*	110.25	1/2⁻				
		382.3[#] *2*	75[#] *25*	0.0	5/2⁻				
511.32	(1/2,3/2,5/2)⁻	183.0[@] *2*	29[@] *16*	328.31	3/2⁻	M1		2.36	α(K)=1.91 *3*; α(L)=0.345 *5*; α(M)=0.0818 *12* α(N)=0.0213 *3*; α(O)=0.00467 *7*; α(P)=0.000681 *10* Mult.: α(exp)=2.5 *18* from ^{213}Ra α decay (2.73 min) (2006Ku26).
		296.4[@] *2*	100[@] *51*	214.93	3/2⁻	M1		0.617	α(K)=0.500 *7*; α(L)=0.0895 *13*; α(M)=0.0212 *3* α(N)=0.00553 *8*; α(O)=0.001211 *17*; α(P)=0.0001768 *25* Mult.: α(exp)=0.9 *6* from ^{213}Ra α decay (2.73 min) (2006Ku26).
		401.6[@d] *6*	3.1[@] *24*	110.25	1/2⁻				
		511.3[@] *3*	49[@] *27*	0.0	5/2⁻				

$^{209}_{86}Rn_{123}$-3

Adopted Levels, Gammas (continued)

γ(^{209}Rn) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[&]	δ[ac]	α[b]	Comments
547.10	(7/2⁻)	547.1[#] *2*	100	0.0	5/2⁻				
652.60	(5/2⁻)	652.6[#] *3*	100	0.0	5/2⁻				
690.1	(1/2⁻,3/2⁻)	690.1[#] *3*	100	0.0	5/2⁻				
797.83	9/2⁻	797.8 *1*	100	0.0	5/2⁻	E2		0.01269	α(K)=0.00961 *14*; α(L)=0.00232 *4*; α(M)=0.000570 *8* 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* from ^{198}Pt(^{16}O,5nγ) (1985Po08).
867.70	(7/2,9/2⁻)	215.1[#] *2*	100[#] *7*	652.60	(5/2⁻)				
		867.7[#] *2*	53[#] *20*	0.0	5/2⁻				
1020.7		330.6[#] *2*	100	690.1	(1/2⁻,3/2⁻)				
1174.01	13/2⁺	376.2 *1*	100	797.83	9/2⁻	M2		1.029	B(M2)(W.u.)=0.0043 *5* α(K)=0.775 *11*; α(L)=0.191 *3*; α(M)=0.0475 *7* 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* from ^{198}Pt(^{16}O,5nγ) (1985Po08).
1327.45	(5/2⁻,7/2,9/2⁻)	529.5[#] *2*	80[#] *40*	797.83	9/2⁻				
		1327.7[#] *3*	100[#] *40*	0.0	5/2⁻				
1352.7		805.6[#] *2*	100	547.10	(7/2⁻)				
1383.2		836.1[#] *2*	100	547.10	(7/2⁻)				
1388.2		841.1[#] *2*	100	547.10	(7/2⁻)				
1465.56	13/2⁻	667.7 *1*	100	797.83	9/2⁻	E2		0.0184	α(K)=0.01344 *19*; α(L)=0.00370 *6*; α(M)=0.000921 *13* 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* from ^{198}Pt(^{16}O,5nγ) (1985Po08).
1561.58	15/2⁻	96.02 *5*	82[‡]	1465.56	13/2⁻	M1+E2	0.22 *+10−17*	3.2 *4*	α(L)=2.42 *24*; α(M)=0.59 *7* α(N)=0.152 *18*; α(O)=0.033 *4*; α(P)=0.0046 *4* Mult.: α(exp)=3.2 *3* from ^{198}Pt(^{16}O,5nγ) (1985Po08).
		387.6 *1*	100[‡]	1174.01	13/2⁺	(E1)		0.0188	α(K)=0.01534 *22*; α(L)=0.00265 *4*; α(M)=0.000625 *9* 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.

$^{209}_{86}Rn_{123}$-4

Adopted Levels, Gammas (continued)

γ(^{209}Rn) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[&]	δ[ac]	α[b]	Comments
1588.41		414.4[#] *2*	100	1174.01	13/2$^+$				
1610.70	17/2$^-$	49.12 *5*	100	1561.58	15/2$^-$	M1(+E2)	≤0.14		α(L)=16.8 *19*; α(M)=4.0 *5* α(N)=1.05 *13*; α(O)=0.23 *3*; α(P)=0.033 *3* Mult.: α(exp)=22 *2* from ^{198}Pt(^{16}O,5nγ) (1985Po08).
1687.43	19/2$^-$	76.75 *5*	100	1610.70	17/2$^-$	M1		5.51	B(M1)(W.u.)=0.011 *4* α(L)=4.19 *6*; α(M)=0.996 *14* α(N)=0.260 *4*; α(O)=0.0568 *8*; α(P)=0.00830 *12* Mult.: α(exp)=5.4 *9* from ^{198}Pt(^{16}O,5nγ) (1985Po08).
1767.0		178.6[#] *2*	100	1588.41					
1931.3		1384.2[#] *3*	100	547.10	(7/2$^-$)				
2238.18	21/2$^-$	550.8 *1*	100[‡]	1687.43	19/2$^-$	M1(+E2)	≤0.7	0.11 *3*	α(K)=0.091 *22*; α(L)=0.016 *3*; α(M)=0.0038 *7* 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* from ^{198}Pt(^{16}O,5nγ) (1985Po08).
		627.2 *2*	22[‡]	1610.70	17/2$^-$	[E2]		0.0210	α(K)=0.01514 *22*; α(L)=0.00441 *7*; α(M)=0.001101 *16* 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* from ^{198}Pt(^{16}O,5nγ) (1985Po08).
2418.74	21/2$^+$	731.3 *1*	100	1687.43	19/2$^-$	E1		0.00522	B(E1)(W.u.)=5.60×10^{-8} *14* α(K)=0.00431 *6*; α(L)=0.000698 *10*; α(M)=0.0001636 *23* 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* from ^{198}Pt(^{16}O,5nγ) (1985Po08).
2501.32	23/2$^-$	813.9 *1*	100	1687.43	19/2$^-$	E2		0.01219	α(K)=0.00926 *13*; α(L)=0.00221 *3*; α(M)=0.000541 *8* 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* from ^{198}Pt(^{16}O,5nγ) (1985Po08).
2744.17	(23/2)$^+$	325.4 *1*	100	2418.74	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)=0.0038 *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* from ^{198}Pt(^{16}O,5nγ) (1985Po08).
2848.51	25/2$^-$	347.2 *1*	35[‡]	2501.32	23/2$^-$	M1(+E2)	<1.6	0.29 *12*	α(K)=0.23 *10*; α(L)=0.048 *11*; α(M)=0.0116 *22* α(N)=0.0030 *6*; α(O)=0.00065 *14*; α(P)=9.2×10^{-5} *23* Mult.: α(exp)=0.5 *2*, A$_2$=−0.14 *6*, A$_4$=−0.09 *6* from ^{198}Pt(^{16}O,5nγ) (1985Po08).
		610.3 *1*	100[‡]	2238.18	21/2$^-$	E2		0.0223	α(K)=0.01596 *23*; α(L)=0.00476 *7*; α(M)=0.001192 *17* 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* from ^{198}Pt(^{16}O,5nγ) (1985Po08).
2864.6		446.2 *3*	100	2418.74	21/2$^+$				
2957.61	27/2$^-$	109.10 *7*	29[‡]	2848.51	25/2$^-$	M1(+E2)	≤0.16	9.1 *21*	α(K)=6 *4*; α(L)=2.2 *12*; α(M)=0.5 *4*

$^{209}_{86}Rn_{123}$-5

Adopted Levels, Gammas (continued)

γ(^{209}Rn) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[&]	δ[ac]	α[b]	Comments
									α(N)=0.14 *9*; α(O)=0.030 *17*; α(P)=0.0039 *15* Mult.: α(exp)=9 *2* from ^{198}Pt(^{16}O,5nγ) (1985Po08).
2957.61	27/2$^-$	456.3 *1*	100[‡]	2501.32	23/2$^-$	E2		0.0439	α(K)=0.0284 *4*; α(L)=0.01158 *17*; α(M)=0.00296 *5* α(N)=0.000771 *11*; α(O)=0.0001612 *23*; α(P)=2.04×10^{-5} *3* Mult.: α(K)exp is consistent with D or E2. The placement in the level scheme requires mult=E2 from ^{198}Pt(^{16}O,5nγ) (1985Po08).
3050.0		185.4 *1*	100	2864.6					A_2=+0.20 *5*, A_4=+0.03 *5* from ^{198}Pt(^{16}O,5nγ) (1985Po08).
3157.51	29/2$^-$	199.9 *1*	100	2957.61	27/2$^-$	M1+E2	1.6 *4*	0.89 *17*	B(M1)(W.u.)=2.9×10^{-5} *12*; B(E2)(W.u.)=0.66 *15* α(K)=0.54 *17*; α(L)=0.267 *4*; α(M)=0.0690 *14* 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* from ^{198}Pt(^{16}O,5nγ) (1985Po08).
3400.7		656.3 *3*	100	2744.17	(23/2)$^+$				
3539.9	(27/2)$^+$	139.2 *2*	≈62	3400.7					
		382.0[d] *3*	88	3157.51	29/2$^-$				
		490.6 *4*	88	3050.0					
		795.7 *2*	100	2744.17	(23/2)$^+$	E2		0.01276	α(K)=0.00966 *14*; α(L)=0.00234 *4*; α(M)=0.000574 *8* 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* from ^{198}Pt(^{16}O,5nγ) (1985Po08).
3636.81	35/2$^+$	479.3 *1*	100	3157.51	29/2$^-$	E3		0.1415	B(E3)(W.u.)=23.5 *24* α(K)=0.0647 *9*; α(L)=0.0567 *8*; α(M)=0.01514 *22* 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* from ^{198}Pt(^{16}O,5nγ) (1985Po08).
3671.5	(29/2)$^+$	131.6 *2*	100	3539.9	(27/2)$^+$	M1		6.01	α(K)=4.85 *8*; α(L)=0.881 *13*; α(M)=0.209 *3* α(N)=0.0546 *8*; α(O)=0.01194 *18*; α(P)=0.00174 *3* Mult.: α(exp)=8 *1*, A_2=−0.15 *5*, A_4=−0.05 *5*, from ^{198}Pt(^{16}O,5nγ) (1985Po08).
3987.0	(31/2)$^+$	315.5 *1*	100	3671.5	(29/2)$^+$	M1		0.520	α(K)=0.421 *6*; α(L)=0.0753 *11*; α(M)=0.0179 *3* α(N)=0.00466 *7*; α(O)=0.001019 *15*; α(P)=0.0001488 *21* Mult.: α(K)exp=0.46 *3*, A_2=−0.23 *2*, A_4=−0.02 *2* from ^{198}Pt(^{16}O,5nγ) (1985Po08).
4182.4	(33/2)$^+$	195.4 *1*	100	3987.0	(31/2)$^+$	M1+E2	0.6 *5*	1.6 *4*	α(K)=1.2 *4*; α(L)=0.288 *5*; α(M)=0.071 *3* α(N)=0.0184 *8*; α(O)=0.00395 *10*; α(P)=0.00054 *3* Mult.: α(exp)=1.6 *4*, A_2=−0.53 *7*, A_4=+0.02 *7* from ^{198}Pt(^{16}O,5nγ) (1985Po08).
4583.6	(35/2)$^+$	401.3 *1*	100	4182.4	(33/2)$^+$	M1(+E2)			α(K)=0.219 *3*; α(L)=0.0390 *6*; α(M)=0.00924 *13* α(N)=0.00241 *4*; α(O)=0.000527 *8*; α(P)=7.70×10^{-5} *11* Mult.: α(K)exp=0.32 *8*, A_2=−0.51 *2*, A_4=+0.11 *2* from ^{198}Pt(^{16}O,5nγ) (1985Po08).
		596.2 *3*	50	3987.0	(31/2)$^+$				

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Adopted Levels, Gammas (continued)

γ(^{209}Rn) (continued)

E_i(level)	J_i^π	E_γ †	I_γ †	E_f	J_f^π	Mult.&	δ[ac]	α[b]	Comments
4833.7	41/2$^-$	1196.9 *2*	100	3636.81	35/2$^+$	E3		0.01295	B(E3)(W.u.)=13.1 *6* α(K)=0.00963 *14*; α(L)=0.00250 *4*; α(M)=0.000619 *9* 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* from ^{198}Pt(^{16}O,5nγ) (1985Po08); $T_{1/2\ 1/2}$ rules out M1.
4988.0	(37/2)$^+$	404.4 *1*	100	4583.6	(35/2)$^+$	M1+E2		0.265	α(K)=0.215 *3*; α(L)=0.0382 *6*; α(M)=0.00905 *13* α(N)=0.00236 *4*; α(O)=0.000516 *8*; α(P)=7.54×10^{-5} *11* Mult.: A_2=−0.58 *9*, A_4=+0.24 *10* from ^{198}Pt(^{16}O,5nγ) (1985Po08).
5216.9?	41/2$^+$	805.1 *8* 383.2 *2*	56 100	4182.4 4833.7	(33/2)$^+$ 41/2$^-$	(E1)		0.0193	α(K)=0.01572 *22*; α(L)=0.00272 *4*; α(M)=0.000641 *9* 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* from ^{198}Pt(^{16}O,5nγ), consistent with a ΔJ=0 pure dipole (1985Po08); Δπ=yes from level scheme.
5819.8	43/2$^+$	602.8 *3*	89	5216.9?	41/2$^+$	M1+E2	0.8 *+10−6*	0.06 *3*	α(K)=0.052 *22*; α(L)=0.010 *3*; α(M)=0.0024 *7* α(N)=0.00062 *18*; α(O)=0.00013 *4*; α(P)=1.9×10^{-5} *7* Mult.: α(K)exp=0.05 *2*, A_2=−0.40 *5*, A_4=+0.05 *5* from ^{198}Pt(^{16}O,5nγ) (1985Po08).
		986.1 *2*	100	4833.7	41/2$^-$	E1		0.00302	α(K)=0.00250 *4*; α(L)=0.000396 *6*; α(M)=9.26×10^{-5} *13* 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* from ^{198}Pt(^{16}O,5nγ) (1985Po08).
6538.0	47/2$^+$	718.2 *3*	100	5819.8	43/2$^+$	E2		0.01574	α(K)=0.01170 *17*; α(L)=0.00304 *5*; α(M)=0.000753 *11* α(N)=0.000196 *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* from ^{198}Pt(^{16}O,5nγ) (1985Po08).
6772.1	49/2$^+$	234.1 *3*	100	6538.0	47/2$^+$	M1+E2		1.185 *18*	α(K)=0.958 *14*; α(L)=0.1724 *25*; α(M)=0.0409 *6* α(N)=0.01067 *16*; α(O)=0.00233 *4*; α(P)=0.000341 *5* Mult.: A_2=−0.33 *5*, A_4=+0.05 *5* from ^{198}Pt(^{16}O,5nγ) (1985Po08).
6826.1	49/2$^+$	288.1 *3*	100	6538.0	47/2$^+$	M1+E2		0.668	α(K)=0.540 *8*; α(L)=0.0968 *14*; α(M)=0.0230 *4* α(N)=0.00598 *9*; α(O)=0.001310 *19*; α(P)=0.000191 *3* Mult.: A_2=−0.31 *4*, A_4=+0.05 *4* from ^{198}Pt(^{16}O,5nγ) (1985Po08).
7307.7	51/2	481.6 *3*	100	6826.1	49/2$^+$	D			Mult.: A_2=−0.20 *9*, A_4=+0.10 *11* from ^{198}Pt(^{16}O,5nγ) (1985Po08).

† From ^{198}Pt(^{16}O,5nγ) (1985Po08), unless otherwise stated.
‡ From γ-ray branching ratios given in Table 4 in 1985Po08 (^{198}Pt(^{16}O,5nγ)).
# From ^{209}Fr ε decay.
@ From ^{213}Ra α decay.

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γ(^{209}Rn) (continued)

[&] From ^{198}Pt(^{16}O,5nγ) (1985Po08) and ^{213}Ra α decay (2006Ku26), based on ce and/or $\gamma(\theta)$ data.

[a] From ce data in ^{198}Pt(^{16}O,5nγ) (1985Po08) and ^{213}Ra α decay (2006Ku26) using the BrIccMixing program, unless otherwise stated.

[b] Additional information 1.

[c] Additional information 2.

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

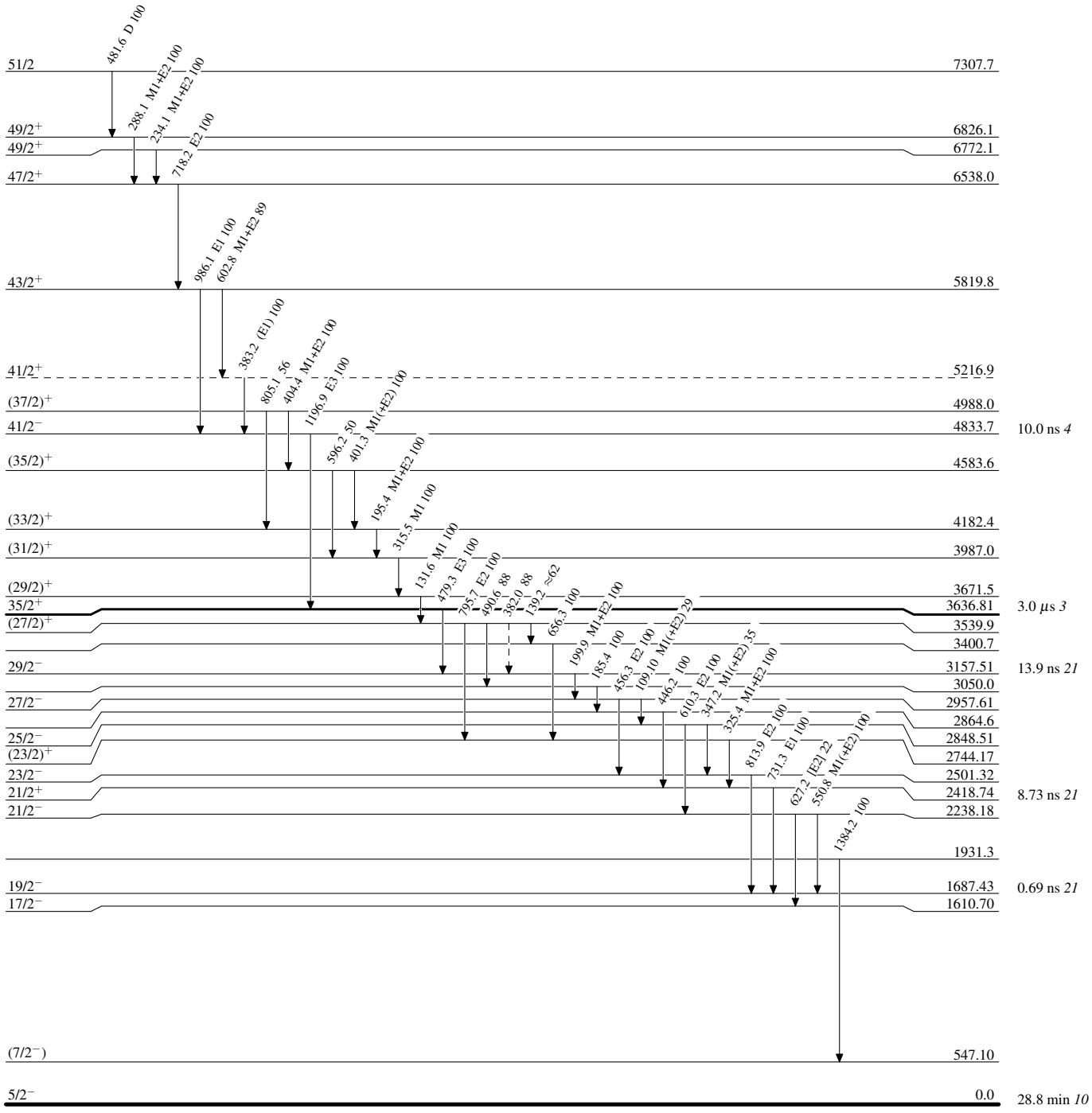
Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level

γ Decay (Uncertain)



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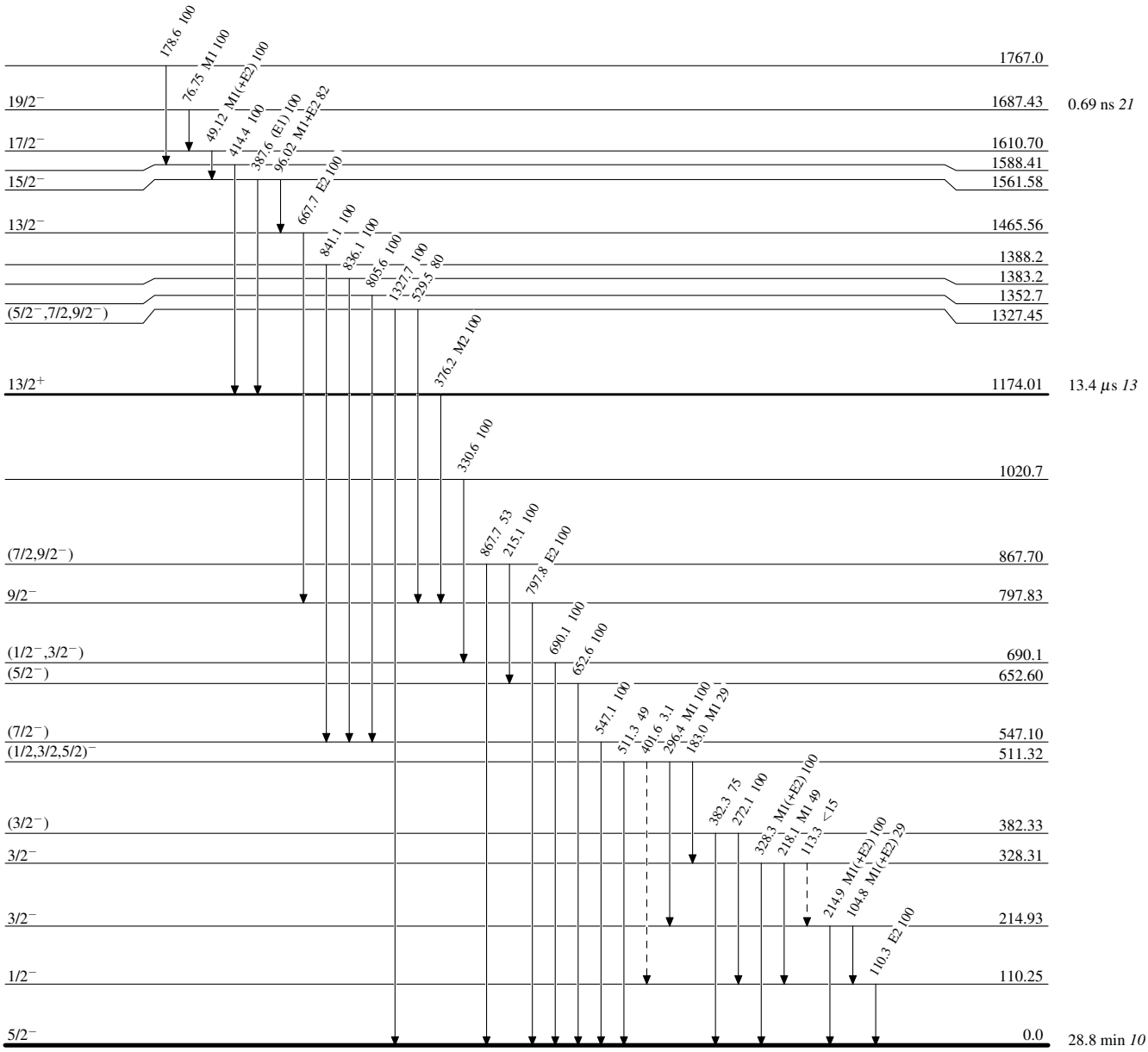
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

γ Decay (Uncertain)



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