(HI,xnγ) 2009Dr12,2008Dr01,1988St17

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	K. Auranen and E. A. Mccutchan	NDS 168, 117 (2020)	1-Aug-2020

2009Dr12,2008Dr01: nuclei of interest were produced in a ^{204}Hg(^{13}C,5n)^{212}Rn fusion-evaporation reaction using ^{204}Hg enriched oxide target. The pulsed (1 ns wide pulses separated by 856 ns) beam was provided by the 14UD Pelletron accelerator at the Australian National University with an energy of 89 MeV (above the peak cross section of *5n* channel to enhance the high-spin population). Eγ, Iγ, γγ-coin, γ(θ) were measured using the CAESAR array of six compton suppressed Ge detectors and one LEPS detector. For the second phase of the experiment three large-volume Ge and one more LEPS detector were added to the setup. See also 1990Dr07 and 1990Dr12 from the same laboratory.

1988St17: nuclei of interest produced in ^{208}Pb(^{9}Be,5n) reaction with E=45-60 MeV and ^{204}Hg(^{13}C,5n) reaction with E=72-75 MeV. Measured Eγ, Iγ, γγ(t), γ(θ), Ece, Ice.

1979Ho06, 1977Ho17: nuclei of interest were produced in a ^{204}Hg(^{13}C,5n)^{212}Rn fusion-evaporation reaction at the Chalk River MP tandem Van de Graaff facility with beam energies of 72 to 86 MeV. Measured Eγ, Iγ, γγ, γγ(t), Iγ(θ), γ(pol) and g-factors. Iγ(θ) measured with two Ge(Li) detectors, one fixed at 90°, one movable. γ(pol) from three Ge(Li) crystal Compton polarimeters. g-factor from time-dependent perturbed angular correlation technique, magnetic fields up to 3 T.

Others: 1989Lo02, 1978Ha50, 1976Ha62, 1975Wi01, and 1971MaXH.

All data are from 2009Dr12 unless otherwise specified.

α: Additional information 1.

^{212}Rn Levels

E(level)†	Jπ‡	$T_{1/2}$	Comments
0.0	0+		configuration=$\pi h^4_{9/2}$.
1273.70 *10*	2+		configuration=$\pi h^4_{9/2}$.
1501.40 *14*	4+	8.80 ns *35*	$T_{1/2}$: from 1988St17. g=1.01 *6* (1988St17, TDPAD). configuration=$\pi h^4_{9/2}$.
1639.70 *17*	6+	118 ns *14*	$T_{1/2}$: from 1988St17. Other: 165 ns *15* (1971MaXH). g=0.909 *8* (1988St17, TDPAD). configuration=$\pi h^4_{9/2}$.
1693.9 *3*	8+	0.91 μs *3*	$T_{1/2}$: weighted average of 0.82 μs *6* (1988St17), 0.92 μs *2* (1976Ha62), and 1.0 μs *1* (1971MaXH). g=+0.894 *2* from 1977Ho17 (sign from 1975Wi01). Others: 0.895 *7* (1988St17), +0.911 *12* (1975Wi01), 0.89 *3* (1971MaXH). configuration=$\pi h^4_{9/2}$.
2115.9 *4*	8+		configuration=$\pi(h^3_{9/2}f_{7/2})$.
2306.2? *10*	(6+)		E(level): from 1988St17, not seen in 2009Dr12. configuration=$\pi h^4_{9/2}$.
2654.7 *4*	10+		configuration=$\pi h^4_{9/2}$.
2696.0 *5*	(8)		configuration=$\pi h^4_{9/2}$.
2760.4 *4*	11−	5.5 ns *2*	$T_{1/2}$: from 1988St17. Other: <2 ns (1989Lo02). configuration=$\pi(h^3_{9/2}i_{13/2})$.
2881.1 *4*	12+	2.08 ns *14*	$T_{1/2}$: from 1988St17. Other: 2.0 ns (1977Ho17). configuration=$\pi h^4_{9/2}$.
2967.0 *5*	(12+)		
3066.1 *4*	10+		configuration=$\pi(h^3_{9/2}f_{7/2})$.
3278.0 *4*	11+		configuration=$\pi(h^3_{9/2}f_{7/2})$.
3297.5 *4*	12+		configuration=$\pi(h^3_{9/2}f_{7/2})$.
3357.3 *4*	14+	7.4 ns *9*	$T_{1/2}$: from 1988St17. Other: 8 ns (1977Ho17). g=1.07 *3* (1988St17). configuration=$\pi(h^3_{9/2}f_{7/2})$.
3510.0 *5*	(13+)		configuration=$\pi(h^3_{9/2}f_{7/2})$.
3734.9 *4*	13−		configuration=$\pi(h^3_{9/2}i_{13/2})$.
3990.7 *4*	15−		configuration=$\pi(h^3_{9/2}i_{13/2})$.

Continued on next page (footnotes at end of table)

(HI,xnγ) 2009Dr12,2008Dr01,1988St17 (continued)

^{212}Rn Levels (continued)

E(level)†	J$^{\pi}$‡	$T_{1/2}$	Comments
3997.8 *5*	(14$^-$)		configuration=$\pi(h^3_{9/2}i_{13/2})$.
4066.4 *4*	17$^-$	28.9 ns *14*	$T_{1/2}$: from 1988St17. Other: 28 ns (1977Ho17). g=1.05 *1* (1977Ho17,1988St17). configuration=$\pi(h^3_{9/2}i_{13/2})$.
4134.3 *4*	16$^-$		configuration=$\pi(h^3_{9/2}i_{13/2})$.
4151.0 *4*	15$^-$		configuration=$\pi(h^3_{9/2}i_{13/2})$.
4582.1 *4*	17$^-$		configuration=$\pi(h^2_{9/2}f_{7/2}i_{13/2})$.
4929.2 *4*	(16$^-$)		configuration=$\pi(h^2_{9/2}f_{7/2}i_{13/2})$.
5113.9 *4*	18$^-$		configuration=$\pi(h^2_{9/2}f_{7/2}i_{13/2})$.
5356.9 *4*	(18$^+$)		configuration=$\pi(h^2_{9/2}i^2_{13/2})$.
5426.7 *4*	(20$^+$)	5.2 ns *5*	configuration=$\pi(h^3_{9/2}i_{13/2})$. $T_{1/2}$: from 1988St17.
5771.5 *4*	19$^-$		configuration=$\pi(h^3_{9/2}f_{7/2})\otimes\nu(p^{-1}_{1/2}g_{9/2})$.
5794.2 *4*	(19$^+$)		configuration=$\pi(h^2_{9/2}i^2_{13/2})$.
6166.5 *4*	20$^+$		configuration=$\pi(h^3_{9/2}i_{13/2})\otimes\nu(p^{-1}_{1/2}g_{9/2})$.
6174.0 *4*	22$^+$	101.8 ns *32*	configuration=$\pi(h^3_{9/2}i_{13/2})_{17-}\otimes\nu(p^{-1}_{1/2}g_{9/2})$. $T_{1/2}$: weighted average of 101.2 ns *35* (2009Dr12, e-mail communications with the authors and B. Singh) and 104 ns *7* (1988St17). Others: 113 ns *6* (1977Ho17, uncertainty from 1976McZD). g=0.72 *1* (1977Ho17,1988St17).
6709.1 *4*	23$^+$		configuration=$\pi(h^3_{9/2}i_{13/2})_{17-}\otimes\nu(p^{-1}_{1/2}i_{11/2})$.
6821.2 *5*	23$^+$		configuration=$\pi(h^3_{9/2}i_{13/2})\otimes\nu(f^{-1}_{5/2}g_{9/2})$.
7141.8 *4*	25$^-$	18.0 ns *6*	configuration=$\pi(h^2_{9/2}i^2_{13/2})_{20+}\otimes\nu(p^{-1}_{1/2}g_{9/2})$. $T_{1/2}$: from 1977Ho17, uncertainty from 1977HoZQ. g=0.71 *2* (1977Ho17).
7177.5 *5*	24$^{(+)}$		configuration=$\pi(h^3_{9/2}i_{13/2})_{17-}\otimes\nu(f^{-1}_{5/2}g_{9/2})$.
7524.4 *4*	25$^-$		configuration=$\pi(h^3_{9/2}i_{13/2})_{17-}\otimes\nu(p^{-1}_{1/2}j_{15/2})$.
7818.9 *4*	26$^-$		configuration=$\pi(h^2_{9/2}i^2_{13/2})\otimes\nu(f_{5/2}g_{9/2})$.
7862.6 *4*	26$^-$		configuration=$\pi(h^3_{9/2}i_{13/2})_{17-}\otimes\nu(f_{5/2}j_{15/2})$.
7878.1 *4*	27$^-$	14 ns *4*	configuration=$\pi(h^3_{9/2}i_{13/2})_{17-}\otimes\nu(p^{-2}_{1/2}g_{9/2}i_{11/2})$. $T_{1/2}$: from 1977Ho17, uncertainty from 1977HoZQ. g=0.63 *3* (1977Ho17).
8361.7 *5*	(27$^-$)		configuration=$\pi(h^3_{9/2}i_{13/2})_{17-}\otimes\nu(f^{-1}_{5/2}j_{15/2})$.
8497.1 *4*	28$^+$		configuration=$\pi(h^2_{9/2}i^2_{13/2})_{20+}\otimes\nu(p_{1/2}j_{15/2})$.
8557.1 *4*	28$^{(+)}$		J$^{\pi}$: parity from E2 multipolarity of 21.9-keV transition. See detailed comments about multipolarity of 21.9-keV transition from 8579 level. 2009Dr12 assign 28$^{(-)}$ from comparison with shell-model calculations. for a (28$^-$) level predicted at 8670 keV, configuration= $\pi(h^2_{9/2}f_{7/2}i_{13/2})_{18-}\otimes\nu(p^{-2}_{1/2}g_{9/2}i_{11/2})$.
8579.0 *4*	30$^+$	154 ns *14*	configuration=$\pi(h^2_{9/2}i^2_{13/2})_{20+}\otimes\nu(p^{-2}_{1/2}g_{9/2}i_{11/2})$. $T_{1/2}$: from 1977Ho17, uncertainty from 1977HoZQ. Other: 151 ns (1989Lo02). g=0.657 *3* (1977Ho17).
8932.7 *5*	30$^+$		configuration=$\pi(h^3_{9/2}i_{13/2})_{17-}\otimes\nu(p^{-2}_{1/2}i_{11/2}j_{15/2})$.
9028.2 *5*	29,31		configuration=$\pi(h^3_{9/2}i_{13/2})_{17-}\otimes\nu(p^{-2}_{1/2}g_{9/2}j_{15/2})$ for J^{π}=29$^+$.
9446.5 *5*	31$^+$		configuration=$\pi(h^2_{9/2}i^2_{13/2})\otimes\nu(p^{-1}_{1/2}f^{-1}_{5/2}g_{9/2}i_{11/2})$.
9509.3 *5*	31$^+$		configuration=$\pi(h^3_{9/2}i_{13/2})\otimes\nu(p^{-1}_{1/2}f^{-1}_{5/2}g_{9/2}j_{15/2})$.
9608.2 *5*	31		possible configuration=$\pi(h^2_{9/2}i^2_{13/2})\otimes\nu(p^{-2}_{1/2}g_{9/2}j_{15/2})$.
9695.6 *4*	33$^-$	4.9 ns *7*	configuration=$\pi(h^2_{9/2}i^2_{13/2})_{20+}\otimes\nu(p^{-2}_{1/2}i_{11/2}j_{15/2})$. $T_{1/2}$: from 1990Dr07.
10102.2 *5*	(32)		possible configuration=$\pi(h^2_{9/2}i^2_{13/2})\otimes\nu(i^{-1}_{13/2}j_{15/2})$.
10124.5 *6*	32$^{(+)}$		possible configuration=$\pi(h^2_{9/2}i^2_{13/2})\otimes\nu(p^{-1}_{1/2}f^{-1}_{5/2}g_{9/2}i_{11/2})$.
10619.3 *5*	34$^-$	≈20 ns	configuration=$\pi(h^2_{9/2}i^2_{13/2})\otimes\nu(p^{-1}_{1/2}f^{-1}_{5/2}g_{9/2}j_{15/2})$. $T_{1/2}$: From 1990Dr07.
10843.2 *5*	(32)		
10961.2 *5*	(33)		

Continued on next page (footnotes at end of table)

(HI,xnγ) 2009Dr12,2008Dr01,1988St17 (continued)

^{212}Rn Levels (continued)

E(level)[†]	J^{π}[‡]	$T_{1/2}$	Comments
11085.8 *5*	(34)		possible configuration=$\pi(h^{2}_{9/2}i^{2}_{13/2})_{20+}\otimes\nu(p^{-1}_{1/2}p^{-1}_{3/2}g_{9/2}j_{15/2})$.
11175.1? *5*	(34)		possible configuration=$\pi(h^{3}_{9/2}i_{13/2})_{17-}\otimes\nu(f^{-2}_{5/2}i_{11/2}j_{15/2})$ or $\pi(h^{2}_{9/2}i^{2}_{13/2})_{20+}$ $\nu(f^{-2}_{5/2}g_{9/2}i_{11/2})$.
11261.8 *5*	35^{-}		configuration=$\pi(h^{2}_{9/2}i^{2}_{13/2})\otimes\nu(p^{-1}_{1/2}f^{-1}_{5/2}i_{11/2}j_{15/2})$ or $\nu(p^{-1}_{1/2}f^{-1}_{5/2}g_{9/2}j_{15/2})$.
11354.3 *5*	35^{-}	<3.5 ns	$T_{1/2}$: from table II of 2009Dr12. configuration=$\pi(h^{2}_{9/2}i^{2}_{13/2})\otimes\nu(p^{-1}_{1/2}f^{-1}_{5/2}i_{11/2}j_{15/2})$ or $\nu(p^{-1}_{1/2}f^{-1}_{5/2}g_{9/2}j_{15/2})$.
11462.3 *5*	(35)		possible configuration=$\pi(h^{2}_{9/2}i^{2}_{13/2})\otimes\nu(p^{-1}_{1/2}i^{-1}_{13/2}g_{9/2}i_{11/2})$.
11670.6 *6*	(36)		possible configuration=$\pi(h^{3}_{9/2}i_{13/2})\otimes\nu(p^{-2}_{1/2}f^{-1}_{5/2}g_{9/2}i_{11/2}j_{15/2})$.
11827.1 *6*	36		possible configuration=$\pi(h^{2}_{9/2}i^{2}_{13/2})\otimes\nu(p^{-2}_{1/2}f^{-1}_{5/2}g^{2}_{9/2}j_{15/2})$.
11880.1 *5*	(35)		possible configuration=$\pi(h^{2}_{9/2}i^{2}_{13/2})\otimes\nu(p^{-1}_{1/2}f^{-1}_{5/2}j^{2}_{15/2})$.
12052.6 *5*	(37)		possible configuration=$\pi(h^{2}_{9/2}i^{2}_{13/2})\otimes\nu(p^{-1}_{1/2}i^{-1}_{13/2}g_{9/2}j_{15/2})$.
12165.5 *6*	(36)		
12211.1 *5*	(37^{-})	17.3 ns *14*	$T_{1/2}$: from $\gamma\gamma$(t) with a pulsed beam (2008Dr01,2009Dr12). configuration=$\pi(h^{2}_{9/2}f_{7/2}i_{13/2})\otimes\nu(p^{-2}_{1/2}f^{-1}_{5/2}g_{9/2}i_{11/2}j_{15/2})$.
12547.4 *6*	(38^{+})	8.3 ns *14*	$T_{1/2}$: from $\gamma\gamma$(t) with a pulsed beam (2008Dr01,2009Dr12). configuration=$\pi(h^{2}_{9/2}i^{2}_{13/2})\otimes\nu(p^{-2}_{1/2}f^{-1}_{5/2}g_{9/2}i_{11/2}j_{15/2})$.
13375.1 *11*	(38,39)		
13444.4 *6*	(39,40)		

† From least-squares fit to Eγ data.

‡ As proposed by 2009Dr12, except where noted.

$\gamma(^{212}$Rn)

For transition strengths from selected levels, consult tables II and III in 2009Dr12.

E_γ[†]	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.	δ	α	$I_{(\gamma+ce)}$	Comments
(7.5[#] *6*)	0.62×10^{-4}[#] *33*	6174.0	22$^+$	6166.5	20$^+$	[E2]		6.8×10^5 *35*	42.3[#] *9*	I_γ: E2 character was assumed for the calculation of Iγ, based on ΔJ^π.
(15.5[#] *6*)	0.044[#] *4*	7878.1	27$^-$	7862.6	26$^-$	[M1]		153	6.8[#] *5*	I_γ: M1 character was assumed for the calculation of Iγ, based on ΔJ^π.
(19.5[#])	0.0052 *10*	3297.5	12$^+$	3278.0	11$^+$	[M1]		309	1.6[#] *3*	I_γ: M1 character was assumed for the calculation of Iγ, based on ΔJ^π.
(21.9[#] *6*)	0.00031[#] *8*	8579.0	30$^+$	8557.1	28$^{(+)}$	(E2)		1.28×10^4 *19*	4.0[#] *7*	Mult.: E3 and M2 are excluded by RUL. E2 remains the only possibility. This point was discussed in email communication with first author and there is general agreement with the conclusions drawn here, and for implied positive parity of the 8557-keV level.
54.2 *3*	0.67 *8*	1693.9	8$^+$	1639.70	6$^+$	E2		150 *5*		α(L)=111 *4*; α(M)=29.8 *10*; α(N)=7.73 *24*; α(O)=1.55 *5*; α(P)=0.170 *6* Mult.: from α(exp)=180 *30* (1988St17). A_2=0.28 *8* (1988St17).
(59.2[#] *6*)	0.45[#] *5*	7878.1	27$^-$	7818.9	26$^-$	[M1]		11.8 *4*	5.7[#] *6*	I_γ: M1 character was assumed for the calculation of Iγ, based on ΔJ^π.
(59.8[#] *6*)	0.16[#] *3*	3357.3	14$^+$	3297.5	12$^+$	(E2)		93 *5*	15.5[#] *23*	Mult.: from α(exp)=50 *40* (1988St17).
67.9 *3*	0.87 *11*	4134.3	16$^-$	4066.4	17$^-$	(M1+E2)	0.45 *+22−28*	15.1 *61*		α(L)=11.3 *45*; α(M)=2.9 *13*; α(N)=0.75 *32*; α(O)=0.156 *63*; α(P)=0.0196 *65* Mult.: from α(exp)=15 *6* (1988St17). δ: calculated by the evaluators from the measured α(exp) with BrIccMixing.
(69.8[#] *6*)	0.053[#] *8*	5426.7	(20$^+$)	5356.9	(18$^+$)	[E2]		44.3 *20*	2.4[#] *4*	I_γ: E2 character was assumed for the calculation of Iγ, based on ΔJ^π.
75.7 *2*	2.05 *11*	4066.4	17$^-$	3990.7	15$^-$					
(81.9[#] *6*)	0.21[#] *3*	8579.0	30$^+$	8497.1	28$^+$	[E2]		20.7 *8*	4.6[#] *6*	I_γ: E2 character was assumed for the calculation of Iγ, based on ΔJ^π.
(92.5[#] *8*)	0.12[#] *3*	11354.3	35$^-$	11261.8	35$^-$	[M1]		3.20 *10*	0.5[#] *1*	I_γ: M1 character was assumed for the calculation of Iγ, based on ΔJ^π.

γ(^{212}Rn) (continued)

E_γ [†]	I_γ [‡]	E_i(level)	J^π_i	E_f	J^π_f	Mult.	δ	α	Comments
105.8 *1*	8.2 *3*	2760.4	11⁻	2654.7	10⁺	E1+M2	0.11 *3*	1.41 *62*	α(K)=0.93 *38*; α(L)=0.36 *18*; α(M)=0.092 *47*; α(N)=0.024 *13*; α(O)=0.0052 *27* α(P)=7.2×10^{-4} *37* Mult.: from α(exp)=1.4 *5* (1988St17), fits only for mixed E1+M2. δ: calculated by the evaluators from the measured α(exp) with BrIccMixing. A_2=−0.23 *1* (1988St17).
118.0 *3*	0.23 *4*	10961.2	(33)	10843.2	(32)				
120.7 *3*	0.34 *8*	2881.1	12⁺	2760.4	11⁻				
138.3 *1*	37.7 *24*	1639.70	6⁺	1501.40	4⁺	E2		2.13	α(K)=0.316 *5*; α(L)=1.340 *20*; α(M)=0.361 *6*; α(N)=0.0939 *14*; α(O)=0.0190 *3* α(P)=0.00213 *3* Mult.: from α(exp)=2.18 *5* (1988St17). A_2=0.113 *5* (1988St17).
143.7 *3*	0.51 *6*	4134.3	16⁻	3990.7	15⁻				
158.4 *3*	0.17 *3*	12211.1	(37⁻)	12052.6	(37)	D			A_2=0.29 *23*. Mult.: assigned as ΔJ=0 transition.
179.3 *3*	0.45 *5*	11354.3	35⁻	11175.1?	(34)	D			E_γ: ordering of 179-214 cascade is uncertain. A_2=−0.40 *20*.
195.5 *3*	0.22 *4*	8557.1	28$^{(+)}$	8361.7	(27⁻)				
206.6 *3*	0.34 *3*	2967.0	(12⁺)	2760.4	11⁻				
211.8 *3*	0.51 *3*	3278.0	11⁺	3066.1	10⁺				
214.0 *3*	1.23 *8*	11175.1?	(34)	10961.2	(33)	D			E_γ: ordering of 179-214 cascade is uncertain. A_2=−0.12 *11*.
226.4 *1*	55.3 *6*	2881.1	12⁺	2654.7	10⁺	Q [@]			A_2=0.398 *63*, A_4=−0.155 *99* (1979Ho06).
227.7 *1*	75.1 *6*	1501.40	4⁺	1273.70	2⁺	Q [@]			A_2=0.107 *5* (1988St17).
231.5 *3*	1.0 *2*	3297.5	12⁺	3066.1	10⁺				
255.6 *3*	0.34 *9*	3990.7	15⁻	3734.9	13⁻				
285.4 *3*	0.50 *6*	12165.5	(36)	11880.1	(35)	D			A_2=−0.65 *23*.
294.5 *3*	0.50 *6*	7818.9	26⁻	7524.4	25⁻	D			A_2=−0.31 *23*.
316.3 *3*		11670.6	(36)	11354.3	35⁻				E_γ: from level-scheme figure 2 in 2009Dr12, not given in authors′ table I.
336.3 *3*	0.68 *6*	12547.4	(38⁺)	12211.1	(37⁻)	D			A_2=−0.44 *15*.
344.8 *2*	2.67 *20*	5771.5	19⁻	5426.7	(20⁺)				
353.7 *2*	2.63 *25*	8932.7	30⁺	8579.0	30⁺	D			A_2=0.59 *14*. Mult.: assigned as ΔJ=0 transition.
353.8 *3*	1.0 *3*	7878.1	27⁻	7524.4	25⁻				
356.3 *3*	0.81 *7*	7177.5	24$^{(+)}$	6821.2	23⁺	D			A_2=−0.53 *13*.
372.3 *2*	1.52 *17*	6166.5	20⁺	5794.2	(19⁺)				
382.6 *2*	2.15 *16*	7524.4	25⁻	7141.8	25⁻	D			A_2=0.21 *9*. Mult.: assigned as ΔJ=0 transition.
395.0 *1*	36.0 *9*	6166.5	20⁺	5771.5	19⁻	E1		0.0181	α(K)=0.01473 *21*; α(L)=0.00254 *4*; α(M)=0.000599 *9*; α(N)=0.0001549 *22*; α(O)=3.33×10^{-5} *5* α(P)=4.66×10^{-6} *7*

From ENSDF

γ(^{212}Rn) (continued)

E_γ[†]	I_γ[‡]	E_i(level)	J^π_i	E_f	J^π_f	Mult.	α	Comments
								A_2=−0.212 *18*, A_4=−0.007 *25* (1979Ho06), Other: A_2=−0.17 *1*, A_2=−0.07 *3* (1988St17). γ(pol)=0.33 *10* (1979Ho06).
402.5 *3*	0.81 *14*	6174.0	22$^+$	5771.5	19$^-$			
406.6 *3*	1.55 *6*	10102.2	(32)	9695.6	33$^-$	D		A_2=−0.15 *13*.
416.2 *3*	≈0.09	4151.0	15$^-$	3734.9	13$^-$			
416.3 *1*	8.3 *4*	3297.5	12$^+$	2881.1	12$^+$	M1	0.245	α(K)=0.199 *3*; α(L)=0.0353 *5*; α(M)=0.00837 *12*; α(N)=0.00218 *3*; α(O)=0.000477 *7* α(P)=6.97×10^{-5} *10* Mult.: from α(K)exp=0.24 *3*, α(L)exp=0.031 *9* (1988St17). A_2=0.20 *5* (1988St17).
422.0 *2*	3.32 *22*	2115.9	8$^+$	1693.9	8$^+$	M1	0.236	α(K)=0.192 *3*; α(L)=0.0340 *5*; α(M)=0.00806 *12*; α(N)=0.00210 *3*; α(O)=0.000460 *7* α(P)=6.72×10^{-5} *10* Mult.: from α(K)exp=0.21 *2*, α(L)exp=0.035 *5* (1988St17). A_2=0.20 *5* (1988St17).
432.5 *2*	2.43 *17*	7141.8	25$^-$	6709.1	23$^+$	(Q)		A_2=0.11 *9*.
447.8 *2*	4.5 *3*	4582.1	17$^-$	4134.3	16$^-$			
449.2 *3*	1.03 *15*	9028.2	29,31	8579.0	30$^+$	D		A_2=−0.23 *20*.
472.8 *3*	0.76 *22*	11827.1	36	11354.3	35$^-$	D		A_2=−0.38 *20*.
476.2 *1*	57.0 *11*	3357.3	14$^+$	2881.1	12$^+$	E2	0.0395	α(K)=0.0261 *4*; α(L)=0.01008 *15*; α(M)=0.00257 *4*; α(N)=0.000670 *10*; α(O)=0.0001402 *20* α(P)=1.79×10^{-5} *3* Mult.: from α(K)exp<0.032 *2*, α(L)exp=0.009 *1* (1988St17). A_2=0.361 *24*, A_4=−0.105 *32* (1979Ho06). Other: A_2=0.18 *1* (1988St17). γ(pol)=0.58 *10* (1979Ho06).
483.7 *2*	2.49 *13*	8361.7	(27$^-$)	7878.1	27$^-$	D		A_2=0.22 *11*. Mult.: assigned as ΔJ=0 transition.
515.7 *1*	22.5 *6*	4582.1	17$^-$	4066.4	17$^-$	M1	0.1381	α(K)=0.1121 *16*; α(L)=0.0198 *3*; α(M)=0.00469 *7*; α(N)=0.001222 *18*; α(O)=0.000267 *4* α(P)=3.91×10^{-5} *6* Mult.: from α(K)exp<0.172 *2*, α(L)exp=0.059 *8*, α(M)exp=0.036 *5* (1988St17). A_2=0.430 *51*, A_4=0.003 *72* (1979Ho06). γ(pol)=0.98 *21* (1979Ho06).
531.7 *1*	22.7 *6*	5113.9	18$^-$	4582.1	17$^-$	M1	0.1273	α(K)=0.1034 *15*; α(L)=0.0182 *3*; α(M)=0.00432 *6*; α(N)=0.001125 *16*; α(O)=0.000246 *4* α(P)=3.60×10^{-5} *5* Mult.: from α(K)exp=0.153 *10*, α(L)exp=0.042 *5* (1988St17). A_2=−0.335 *57*, A_4=−0.018 *81* (1979Ho06). γ(pol)=−0.43 *16* (1979Ho06).
535.0 *1*	5.7 *3*	6709.1	23$^+$	6174.0	22$^+$	D		A_2=−0.50 *6*.
537.1 *1*	7.2 *4*	3297.5	12$^+$	2760.4	11$^-$	D		A_2=−0.21 *13* (1988St17).
615.2 *3*	0.81 *10*	10124.5	32$^{(+)}$	9509.3	31$^+$	D		A_2=−0.47 *18*.
619.0 *1*	4.32 *25*	8497.1	28$^+$	7878.1	27$^-$	D		A_2=−0.11 *7*.
623.3 *2*	1.91 *25*	3278.0	11$^+$	2654.7	10$^+$			
628.9 *3*	≈0.2	3510.0	(13$^+$)	2881.1	12$^+$			

$^{212}_{86}Rn_{126}$-6

(HI,xnγ) **2009Dr12,2008Dr01,1988St17 (continued)**

γ(^{212}Rn) (continued)

E_γ †	I_γ ‡	E_i(level)	J_i^π	E_f	J_f^π	Mult.	α	Comments
633.4 *1*	60.7 *17*	3990.7	15^-	3357.3	14^+	E1	0.00687	α(K)=0.00566 *8*; α(L)=0.000929 *13*; α(M)=0.000218 *3*; α(N)=5.64×10^{-5} *8*; α(O)=1.223×10^{-5} *18* α(P)=1.742×10^{-6} *25* A_2=−0.184 *29*, A_4=0.004 *43* (1979Ho06), Other: A_2=−0.15 *2* (1988St17). γ(pol)=0.54 *12* (1979Ho06).
640.5 *3*	1.41 *22*	3997.8	(14^-)	3357.3	14^+			
642.7 *3*	1.50 *13*	11261.8	35^-	10619.3	34^-	D		A_2=−0.71 *14*.
644.5 *3*	0.31 *6*	2760.4	11^-	2115.9	8^+			
647.2 *2*	2.04 *16*	6821.2	23^+	6174.0	22^+			A_2=0.80 *10*.
657.6 *1*	42.9 *10*	5771.5	19^-	5113.9	18^-	M1	0.0726	α(K)=0.0590 *9*; α(L)=0.01035 *15*; α(M)=0.00245 *4*; α(N)=0.000638 *9*; α(O)=0.0001396 *20* α(P)=2.04×10^{-5} *3* Mult.: from α(K)exp=0.050 *3*, α(L)exp=0.018 *2*, α(M)exp=0.006 *2* (1988St17). A_2=−0.213 *49*, A_4=0.008 *73* (1979Ho06). γ(pol)=−0.39 *12* (1979Ho06).
677.1 *1*	7.2 *5*	7818.9	26^-	7141.8	25^-	D		A_2=−0.56 *7*.
679.0 *1*	5.9 *5*	8557.1	$28^{(+)}$	7878.1	27^-	D		A_2=−0.17 *6*.
698.1 *3*	1.57 *19*	12052.6	(37)	11354.3	35^-	Q		A_2=0.25 *16*.
700.9 *1*	32.2 *10*	8579.0	30^+	7878.1	27^-	E3	0.0463	α(K)=0.0286 *4*; α(L)=0.01316 *19*; α(M)=0.00341 *5*; α(N)=0.000891 *13*; α(O)=0.000187 *3* α(P)=2.42×10^{-5} *4* A_2=0.632 *51*, A_4=0.044 *65* (1979Ho06). Other: A_2=0.10 *4* (2009Dr12). γ(pol)=0.55 *24* (1979Ho06).
709.1 *1*	8.9 *4*	4066.4	17^-	3357.3	14^+	E3	0.0449	α(K)=0.0279 *4*; α(L)=0.01263 *18*; α(M)=0.00327 *5*; α(N)=0.000855 *12*; α(O)=0.000180 *3* α(P)=2.33×10^{-5} *4* Mult.: from α(K)exp=0.028 *5*, α(L)exp=0.021 *3* (1988St17). A_2=0.664 *52*, A_4=0.003 *68* (1979Ho06). γ(pol)=0.76 *29* (1979Ho06).
720.8 *1*	8.9 *4*	7862.6	26^-	7141.8	25^-	D		A_2=−0.38 *6*.
735.1 *2*	3.47 *20*	11354.3	35^-	10619.3	34^-	D		A_2=−0.62 *13*.
736.3 *1*	32.2 *12*	7878.1	27^-	7141.8	25^-	E2	0.01495	α(K)=0.01117 *16*; α(L)=0.00285 *4*; α(M)=0.000704 *10*; α(N)=0.000183 *3*; α(O)=3.91×10^{-5} *6* α(P)=5.27×10^{-6} *8* A_2=0.323 *42*, A_4=−0.098 *57* (1979Ho06), Other: A_2=0.09 *4* (2009Dr12). γ(pol)=0.40 *27* (1979Ho06).
739.7 *1*	3.54 *25*	6166.5	20^+	5426.7	(20^+)			
747.3 *1*	5.5 *3*	6174.0	22^+	5426.7	(20^+)			
774.8 *3*	1.21 *22*	5356.9	(18^+)	4582.1	17^-			
778.3 *3*	0.51 *14*	4929.2	(16^-)	4151.0	15^-			
793.7 *3*	1.49 *25*	4151.0	15^-	3357.3	14^+			
804.8&		2306.2?	(6^+)	1501.40	4^+			E_γ: from 1988St17, not seen in 2009Dr12.
843.0 *3*	0.37 *5*	11462.3	(35)	10619.3	34^-			

$^{212}_{86}Rn_{126}$-7

$\gamma(^{212}Rn)$ (continued)

E_γ †	I_γ ‡	E_i(level)	J_i^π	E_f	J_f^π	Mult.	δ	α	Comments
844.5 *2*	2.2 *4*	5426.7	(20^+)	4582.1	17^-				
856.7 *2*	4.4 *3*	12211.1	(37^-)	11354.3	35^-	Q			A_2=0.33 *18*.
859 *1*	0.44 *16*	10961.2	(33)	10102.2	(32)				
862.8 *3*	1.04 *8*	4929.2	(16^-)	4066.4	17^-				
865.0 *2*	2.39 *8*	5794.2	(19^+)	4929.2	(16^-)				
867.5 *2*	2.11 *23*	9446.5	31^+	8579.0	30^+	D			A_2=−1.3 *2*.
923.7 *1*	8.21 *25*	10619.3	34^-	9695.6	33^-	D			A_2=−0.73 *6*.
930.3 *2*	3.93 *16*	9509.3	31^+	8579.0	30^+	D			A_2=−0.83 *6*.
938.3 *3*	1.35 *20*	4929.2	(16^-)	3990.7	15^-				
949.5 *3*	0.99 *25*	12211.1	(37^-)	11261.8	35^-				
950.3 *2*	2.36 *25*	3066.1	10^+	2115.9	8^+				
960.8 *1*	83.9 *18*	2654.7	10^+	1693.9	8^+	E2		0.00878	α(K)=0.00683 *10*; α(L)=0.001476 *21*; α(M)=0.000359 *5*; α(N)=9.33×10^{-5} *13*; α(O)=2.00×10^{-5} *3* α(P)=2.78×10^{-6} *4* Mult.: from α(K)exp=0.007 *1*, α(L)exp=0.0016 *2*, α(M)exp=0.0009 *1* (1988St17). A_2=0.349 *15*, A_4=−0.105 *22* (1979Ho06). Other: A_2=0.20 *1* (1988St17). γ(pol)=0.62 *11*.
967.8 *1*	49.6 *10*	7141.8	25^-	6174.0	22^+	E3		0.0209	α(K)=0.01473 *21*; α(L)=0.00460 *7*; α(M)=0.001158 *17*; α(N)=0.000302 *5*; α(O)=6.44×10^{-5} *9* α(P)=8.66×10^{-6} *13* A_2=0.574 *23*, A_4=0.025 *32* (1979Ho06), Other: A_2=0.19 *3* (2009Dr12). γ(pol)=0.79 *19* (1979Ho06).
974.4 *3*	1.01 *20*	3734.9	13^-	2760.4	11^-				
979.6 *3*	1.83 *22*	5113.9	18^-	4134.3	16^-				
1002.1 *3*	0.87 *17*	2696.0	(8)	1693.9	8^+				
1029.2 *2*	2.91 *16*	9608.2	31	8579.0	30^+	D			A_2=−0.49 *11*.
1047.4 *1*	12.9 *10*	5113.9	18^-	4066.4	17^-	M1+E2	1.4 *2*	0.0122 *11*	α(K)=0.0098 *9*; α(L)=0.00183 *14*; α(M)=0.00044 *4*; α(N)=0.000113 *9*; α(O)=2.47×10^{-5} *18* α(P)=3.5×10^{-6} *3* A_2=−0.965 *32*, A_4=0.275 *43* (1979Ho06). γ(pol)=0.25 *14* (1979Ho06). δ: from γ(θ) and γ(pol) (1979Ho06).
1066.4 *3*	0.70 *8*	2760.4	11^-	1693.9	8^+				
1116.6 *1*	17.9 *6*	9695.6	33^-	8579.0	30^+	E3		0.01508	α(K)=0.01105 *16*; α(L)=0.00303 *5*; α(M)=0.000755 *11*; α(N)=0.000197 *3*; α(O)=4.21×10^{-5} *6* α(P)=5.75×10^{-6} *8* Mult.: from α(K)exp=0.0102 *5*, K/L=3.9 *5*, and γ(θ) (1990Dr07). A_2=0.47 *6*.
1164 *1*	0.35 *9*	13375.1	(38,39)	12211.1	(37^-)				
1212.3 *3*	0.48 *9*	5794.2	(19^+)	4582.1	17^-				
1233.3 *3*	0.85 *20*	13444.4	(39,40)	12211.1	(37^-)				
1260.8 *3*	1.07 *16*	11880.1	(35)	10619.3	34^-				A_2=−0.04 *37*.

$\gamma(^{212}Rn)$ (continued)

E_γ †	I_γ ‡	E_i(level)	J_i^π	E_f	J_f^π	Mult.	α	Comments
1273.7 *1*	100.0 *23*	1273.70	2^+	0.0	0^+	E2	0.00515	α(K)=0.00411 *6*; α(L)=0.000786 *11*; α(M)=0.000188 *3*; α(N)=4.90×10^{-5} *7*; α(O)=1.060×10^{-5} *15* α(P)=1.501×10^{-6} *21* Mult.: from α(K)exp=0.0043 *5*, α(L)exp=0.0008 *1*, α(M)exp=0.00024 *6* (1988St17). A_2=0.18 *1* (1988St17).
1290.5 *3*	1.74 *25*	5356.9	(18^+)	4066.4	17^-			
1334.0 *3*	1.33 *14*	10843.2	(32)	9509.3	31^+	D		A_2=−0.14 *14*.
1355.4 *3*	1.32 *13*	8497.1	28^+	7141.8	25^-	O	0.00992	α(K)=0.00753 *11*; α(L)=0.00179 *3*; α(M)=0.000441 *7*; α(N)=0.0001150 *17*; α(O)=2.47×10^{-5} *4* α(P)=3.44×10^{-6} *5* A_2=0.34 *19*.
1360.3 *1*	12.4 *8*	5426.7	(20^+)	4066.4	17^-	(O)		A_2=0.45 *6* (1988St17).
1390.2 *3*	0.40 *10*	11085.8	(34)	9695.6	33^-			
1658.4 *3*	0.79 *14*	11354.3	35^-	9695.6	33^-			
1705.1 *3*	0.37 *6*	5771.5	19^-	4066.4	17^-			

† Energy uncertainty stated by the authors in the email reply to B. Singh on March 30, 2008: 0.1 keV for the most intense transitions to 0.3 keV for weak transitions and 1 keV when energy is stated to nearest keV. B. Singh assigned 0.1 keV for Iγ>5, 0.2 keV for Iγ=2-5 and 0.3 keV for Iγ<2 and evaluators retain these assignments.

‡ Intensities listed in 2009Dr12 have been divided here by a factor of 10, so that values are relative to 100 for 1273.7γ.

γ not seen in 2009Dr12, but implied by γγ data. Eγ is deduced by the evaluator from the level-energy difference, and the I(γ+ce) is from 2009Dr12. The Iγ is deduced by the evaluator from the transition intensity and total conversion coefficient.

@ α(L)exp(226.4γ+227.7γ)=0.19 4, α(M)exp(226.4γ+227.7γ)=0.067 8 (1988St17).

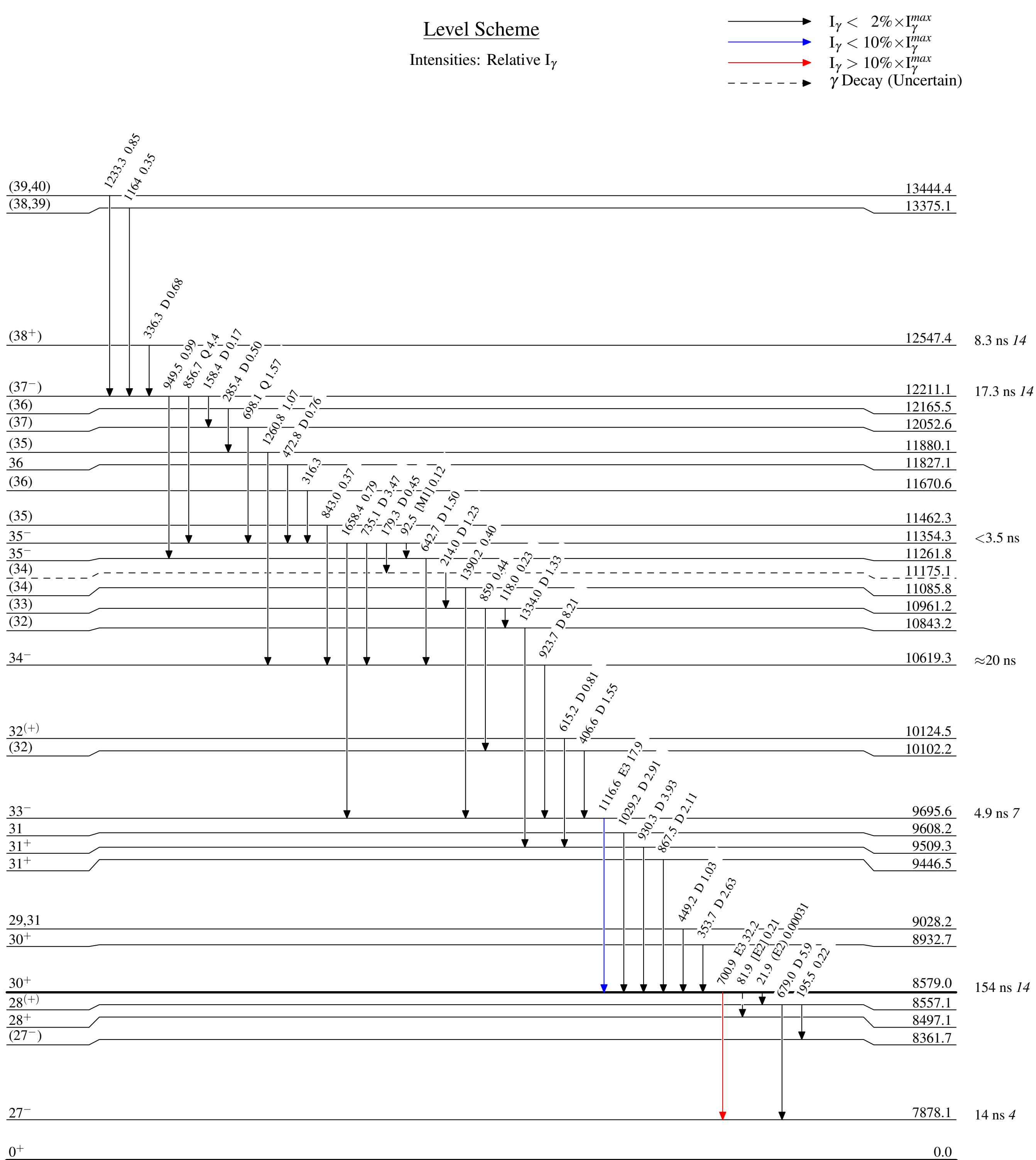
& Placement of transition in the level scheme is uncertain.

$^{212}_{86}Rn_{126}$-9

(HI,xnγ) 2009Dr12,2008Dr01,1988St17

Level Scheme

Intensities: Relative I_γ

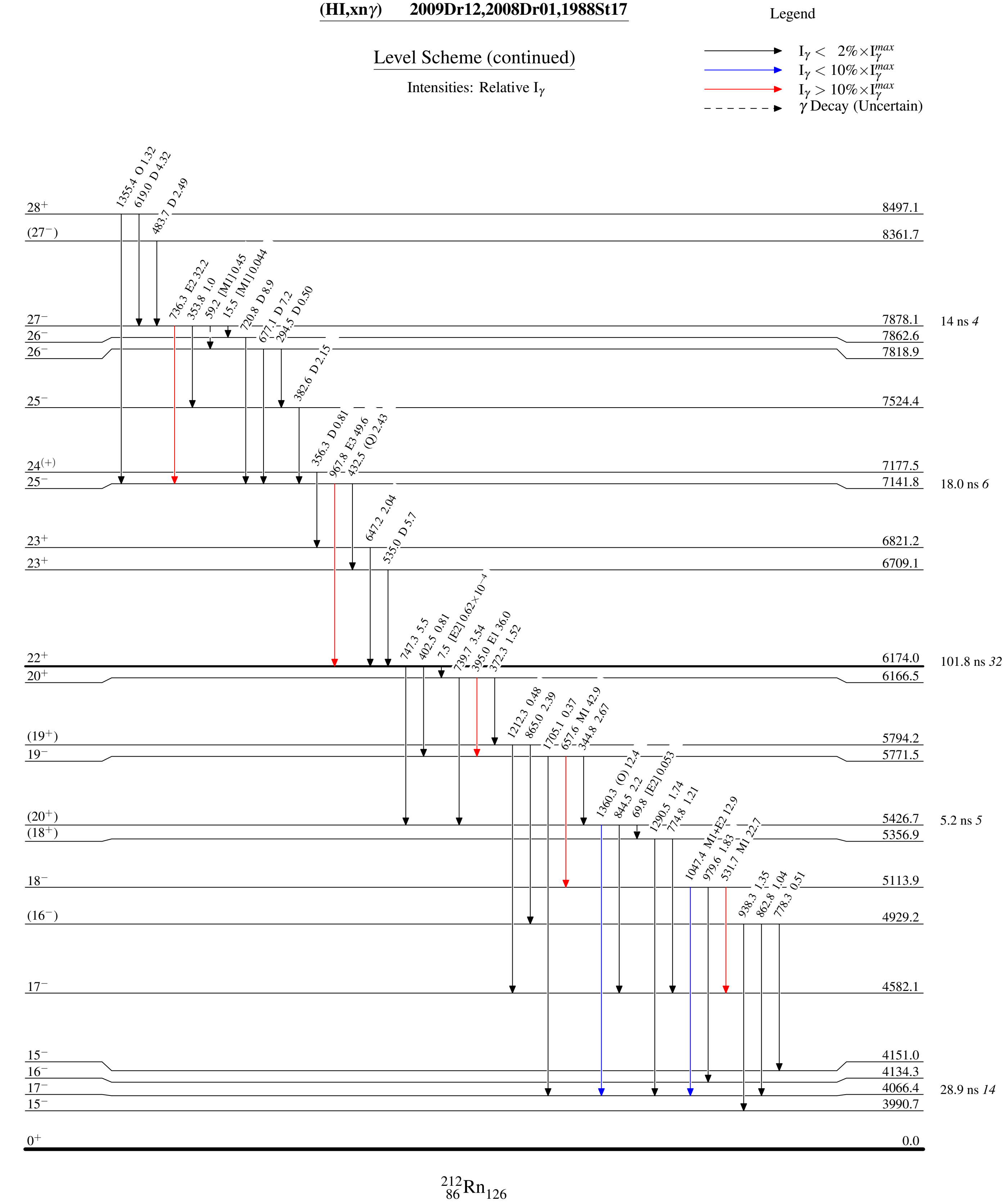


$^{212}_{86}Rn_{126}$

(HI,xnγ) 2009Dr12,2008Dr01,1988St17

Level Scheme (continued)

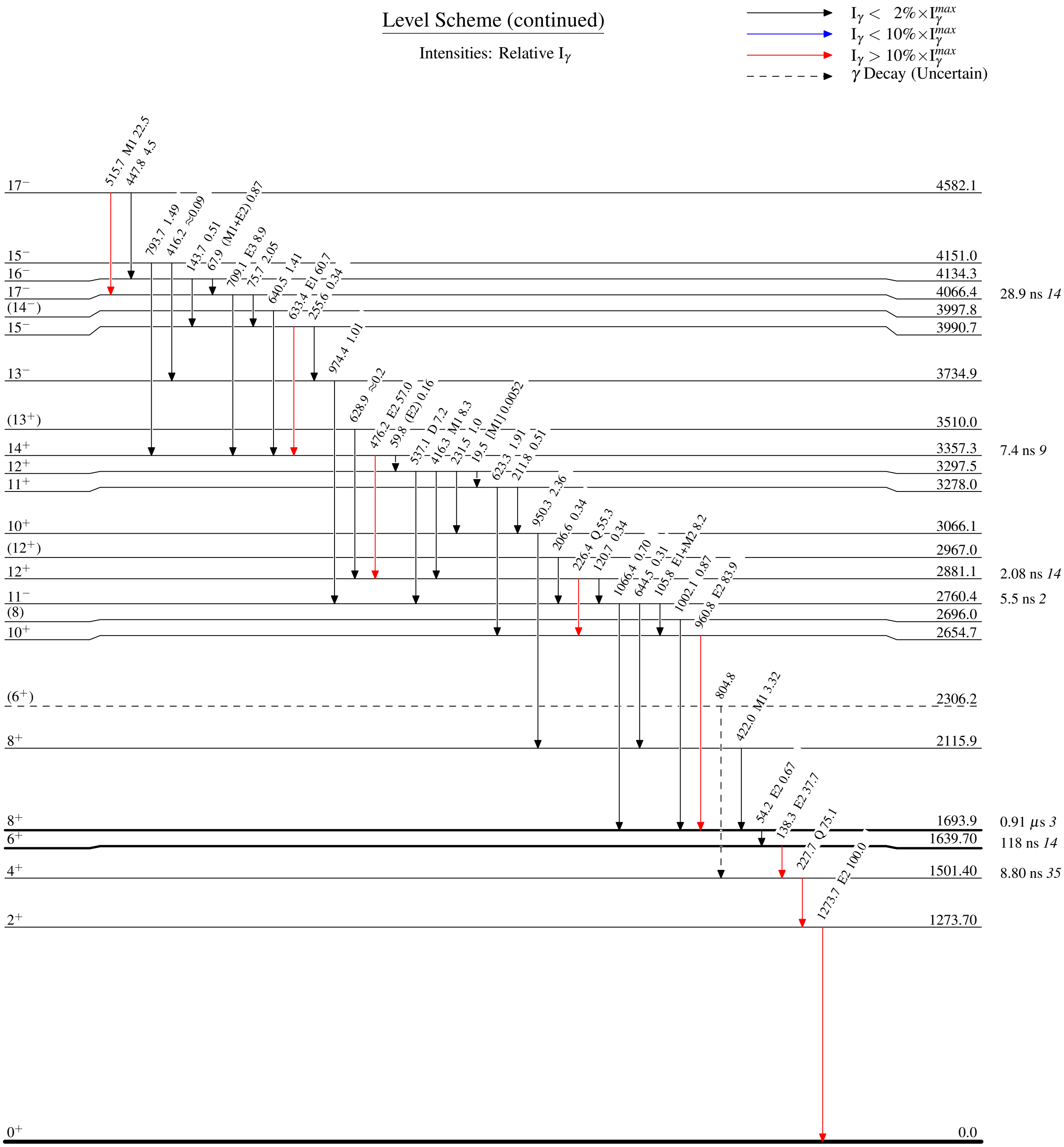
Intensities: Relative I_γ



(HI,xnγ) 2009Dr12,2008Dr01,1988St17

Level Scheme (continued)

Intensities: Relative I_γ



$^{212}_{86}Rn_{126}$