(HI,xnγ)

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	M. S. Basunia	NDS 181, 475 (2022)	1-Jan-2022

^{204}Hg(^{14}C,5nγ) E=80-94 MeV (1989Lo02).
^{208}Pb(^{9}Be,4nγ) E=45-60 MeV (1988St10);
^{204}Hg(^{13}C,4nγ) E=72-75 MeV (1988St10).
^{208}Pb(^{9}Be,4nγ) E=31-57 MeV (1988Fu10);
^{206}Pb(^{12}C,αnγ) E=63-75 MeV (1988Fu10).
^{208}Pb(^{14}C,α5nγ) E=75-95 MeV (1983Lo16).

1989Lo02 measured: Eγ, Iγ, $\gamma(\theta)$, $\gamma\gamma$, $\gamma\gamma$(t), ce, pulsed beam-γ(t).
1988St10 measured: Eγ, Iγ, $\gamma(\theta)$, $\gamma\gamma$, $\gamma\gamma$(t), $\gamma(\theta$,H,t), ce, pulsed beam-γ(t).
1988Fu10 measured: Eγ, Iγ, $\gamma(\theta)$, $\gamma\gamma$, $\gamma\gamma$(t), γ(linear polarization), pulsed beam-γ(t).
1983Lo16 measured: Eγ, Iγ, $\gamma(\theta)$, $\gamma\gamma$, $\gamma\gamma$(t), pulsed beam-γ(t).

Others:
2004Da23: ^{209}Bi(^{7}Li,3nγ) – measured incomplete fusion cross section.
2009Vi09: ^{208}Bi(^{9}Li,4nγ) – measured evaporation residue (ER) cross section.
2010Da04: ^{208}Pb,^{209}Bi(^{9}Be,X), E=44.0, 50.0. 60.0 MeV, – measured incomplete fusion cross section.
2011Ka30: Pt(^{36}S,X), E=5.96 MeV/nucleon and W(^{48}Ca,X), E=5.41 MeV/nucleon – measured differential cross section dσ/dΩ.
The level scheme constructed by 1988St10, except where noted otherwise, is presented here. There are a number of differences between the level schemes of 1988St10 and 1989Lo02, especially at high energy levels and their deexcitation. The γs associated with the three highest energy levels of this dataset, proposed by 1989Lo02, are adopted without the proposed γ multipolarity assignments for consistency. These are listed in comments.

Results from $\gamma(\theta$,H,t) measurements:

E(level)	J$^\pi$	deduced g factor 1988St10	deduced magnetic moment μ
1664.0	21/2$^+$	0.45 *1*	4.73 *11*
1664.0+x	25/2$^+$	0.61 *2*	7.6 *3*
2186.7+x	31/2$^-$	0.639 *5*	9.90 *8*
3029.3+x	37/2$^+$	0.739 *7*	13.67 *13*
3495.4+x	43/2$^-$	0.725 *7*	15.59 *15*
4505.5+x	49/2$^+$	0.811 *12*	19.87 *29*
5928.8+x	(55/2$^+$)	0.604 *5*	16.61 *14*

^{213}Rn Levels

See 1989Lo02 for calculations of level energies by using the deformed Woods-Saxon potential, and for inferred deformations.
See 1988St10 and 1990St14 for shell-model level energies calculated by using empirical interaction energies derived from neighboring nuclei. See 1988St10 and 1990St14 also for calculations of g-factors and comparison with their experiment.

E(level)†	J$^\pi$‡	T$_{1/2}$@	Comments
0.0	(9/2$^+$)	19.4 ms *2*	J$^\pi$,T$_{1/2}$: From Adopted Levels.
705.00 *16*	11/2$^+$		
896.09 *15*	15/2$^-$	26.3 ns *7*	Configuration: Dominant ν (j$^{+1}_{15/2}$). T$_{1/2}$: From τ=38 ns *1* (1988St10). Others: 25 ns *3* (1988Fu10), 50 ns *1* (1983Lo16), 28 ns (1989Lo02 – same first author of 1983Lo16).
1259.62 *17*	13/2$^+$		
1529.03 *17*	17/2$^+$		

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(HI,xnγ) (continued)

^{213}Rn Levels (continued)

E(level)†	Jπ‡	$T_{1/2}$@	Comments
1574.1 *3*			
1612.4?			
1664.02 *20*	21/2+	29.1 ns *14*	Configuration: ν ($g^{+1}_{9/2}$)⊗6+. $T_{1/2}$: From τ=42 ns 2 (1988St10). Others: 16 ns *5* (1983Lo16) and 16 ns (1989Lo02).
1664.02+x *20*	25/2+	1.01 μs *21*	Additional information 1. Configuration: Dominant ν ($g^{+1}_{9/2}$) π ([$h^{+1}_{9/2}$,$f^{+1}_{7/2}$]$_{8+}$). %Isomeric production ratio=6 *3* (2013Ba29), E=1 GeV/nucleon, from ^{238}U fragmentation. $T_{1/2}$: From τ=1.45 μs *30* (1988St10). Others: ~1 μs (1983Lo16), 0.680 μs (1989Lo02 – same first author of 1983Lo16).
1703.5? *4*			
1745.93 *23*			
1788.73 *23*			
1856.63+x *14*	25/2+		Jπ: A_2/A_0 value consistent with ΔJ=0 transition. Configuration: Dominant ν ($g^{+1}_{9/2}$) π ([$h^{+2}_{9/2}$]$_{8+}$).
1879.4 *3*			
1936.9 *3*			
2007.43 *23*			
2072.82 *21*			
2121.62+x *20*	(27/2)		
2184.3 *3*			
2186.73+x *13*	31/2−	1.36 μs *7*	Configuration: ν ($g^{+1}_{9/2}$) π ([$h^{+1}_{9/2}$,$i^{+1}_{13/2}$]$_{11-}$). $T_{1/2}$: From τ=1.96 μs *10* (1988St10). Others: ~2 μs (1983Lo16), 1.4 μs (1989Lo02 – same first author of 1983Lo16). %Isomeric production ratio=7.2 *31* (2013Bo18) and 17 *2* (2013Ba29 – using only one transition), E=1 GeV/nucleon, from ^{238}U fragmentation.
2201.52+x *16*	(27/2−)		
2227.5 *3*			
2257.5 *3*			
2327.1 *4*			
2610.7 *4*			
2640.83+x *24*			
2662.0+x *3*			
2677.00+x *14*	29/2+		
2684.5+x *3*			
2739.83+x *19*	31/2−		
2786.73+x *19*	29/2+		
2915.82+x *16*	33/2+		
2984.03+x *15*	33/2+		
3029.35+x *19*	37/2+	26.3 ns *7*	Configuration: Dominant ν ($g^{+1}_{9/2}$) π ([$h^{+3}_{9/2}$,$f^{+1}_{7/2}$]$_{14+}$). $T_{1/2}$: From τ=38 ns *1* (1988St10). Others: 24 ns (1989Lo02), 55 ns *8* (1983Lo16 – for (37/2) with 795.5γ depopulating the state – 795.8γ (797.3γ here) placed from (33/2+) at 2984.0+x in 1989Lo02 – same first author of 1983Lo16).
3181.81+x *19*	(35/2−)		
3301.36+x *24*			
3441.17+x *22*	39/2−		
3495.5+x *3*	43/2−	27.7 ns *7*	Configuration: ν ($g^{+1}_{9/2}$) π ([$h^{+3}_{9/2}$,$i^{+1}_{13/2}$]$_{17-}$). $T_{1/2}$: From τ=40 ns *1* (1988St10). Others: 26 ns (1989Lo02), 35 ns *2* (1983Lo16). %Isomeric production ratio=9 *5* (2013Ba29 – using only one transition), E=1 GeV/nucleon, from ^{238}U fragmentation.
3604.8+x *3*			
3623.9+x *4*			
3923.0+x *4*	(43/2−)		
3927.4+x *4*			
4048.0+x *4*	(45/2−)		
4050.3+x *4*			
4343.2+x *4*			

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(HI,xnγ) (continued)

^{213}Rn Levels (continued)

E(level)†	Jπ‡	$T_{1/2}$@	Comments
4505.6+x *4*	49/2+#	11.8 ns *7*	Configuration: $\nu\ (j^{+1}_{15/2})\ \pi\ ([h^{+3}_{9/2},i^{+1}_{13/2}]_{17-})$. $T_{1/2}$: From τ=17 ns *1* (1988St10). Other: 14 ns (1989Lo02).
4532.8+x *4*			
4581.4+x *11*			
4723.1+x *4*			
4875.6+x *4*	(49/2+)		
5225.6+x *4*	(51/2+)#		
5763.7+x *4*	(53/2,55/2)		
5928.9+x *4*	(53/2,55/2)		
5928.9+y *4*	(55/2+)	164 ns *10*	Additional information 2. y=x+z, where 5 ≤ z ≤ 50-keV estimated in 1988St10 − see comments for expected (50) keV γ from 5928.9+y level. Configuration: $\nu\ ([p^{-1}_{1/2},g^{+1}_{9/2}i^{+1}_{11/2}]_{21/2-})\ \pi\ ([h^{+3}_{9/2},i^{+1}_{13/2}]_{17-})$. $T_{1/2}$: From τ=237 ns *15* (1988St10). Other: 157 ns (1989Lo02). %Isomeric production ratio=0.8 *2* (2013Ba29 − using only one transition), E=1 GeV/nucleon, from ^{238}U fragmentation.
6743.90+y *20*		59 ns	Level proposed by 1989Lo02 (6636 + Δ′). Jπ: Jπ=(61/2+) in 1989Lo02. $T_{1/2}$: From 815γ(t) in 1989Lo02.
7926.4+y *3*			Level proposed by 1989Lo02 (6818 + Δ′). Jπ: (65/2,67/2) in 1989Lo02.
8831.8+y *4*		14 ns	Level proposed by 1989Lo02 (8724 + Δ′). Jπ: (71/2,73/2) in 1989Lo02. $T_{1/2}$: From 905.4γ(t) (1989Lo02).

† From least square fit to the γ-ray energies assuming equal weight if no uncertainty for Eγ. In the latter case, no uncertainty for the level is listed.
‡ Proposed by 1988St10 from γ multipolarities assigned based on conversion electron and γ(θ) measurements.
# Spin in 1989Lo02 is two units less than those given here because of the 54.3-keV transition, not seen by 1989Lo02.
@ From 1988St10, except noted otherwise. Mean lifetime reported in 1988St10, determined from γγ coin, γX coin, pulsed beam, and time differential perturbed angular distribution (TDPAD) g-factor measurements. Others values are listed in the comments section.

(HI,xnγ) (continued)

$\gamma(^{213}Rn)$

See 1988St10 for B(E3) values calculated using the empirical-shell model, and comparison with experiments. See 1989Dr02 and 1985Be05 for systematics of E3 strengths of $15/2^-$ to $9/2^+$ transitions in the region.

E_γ [†@]	I_γ [&]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[b]	δ	α [c]	Comments
(39.5[‡])		1703.5?		1664.02	$21/2^+$				
45.3[#] *2*	≈1	3029.35+x	$37/2^+$	2984.03+x	$33/2^+$	E2		359 *5*	α(N)=18.47 *26*; α(O)=3.71 *5*; α(P)=0.405 *6* α(L)=265 *4*; α(M)=71.1 *10* Mult.: α(exp) ~380 (1988St10).
(48.6[‡])		4581.4+x		4532.8+x					
(≤50[‡])		5928.9+y	$(55/2^+)$						Transition not observed, expected a γ transition 5 ≤ Eγ ≤ 50-keV in 1988St10 based on the observation that the 165.2γ deexciting the 5928.8+x-keV level had a prompt component, suggesting that the 164-ns level is above the 5928.9+x level.
54.3[#] *2*	≈1[a]	3495.5+x	$43/2^-$	3441.17+x	$39/2^-$	E2		148.8 *21*	α(L)=109.9 *15*; α(M)=29.5 *4* α(N)=7.66 *11*; α(O)=1.541 *22*; α(P)=0.1685 *24* Mult.: α(exp)=160 *70* (1988St10).
(65.1[‡])		2186.73+x	$31/2^-$	2121.62+x	(27/2)				
68.2[#] *2*	7.6[a] *7*	2984.03+x	$33/2^+$	2915.82+x	$33/2^+$	M1+E2	0.23 *+6−8*	9.9 *12*	α(L)=7.5 *9*; α(M)=1.83 *24* α(N)=0.48 *6*; α(O)=0.102 *12*; α(P)=0.0140 *13* Mult.,δ: From α(exp)=9.8 *11* (1988St10).
(81.9[‡])		1745.93		1664.02	$21/2^+$				
(99.0[‡])		2739.83+x	$31/2^-$	2640.83+x					
113.5[#] *2*	3 *1*	3029.35+x	$37/2^+$	2915.82+x	$33/2^+$	E2		4.85 *7*	A_2/A_0=+0.15 *10* (1988St10) α(K)=0.365 *5*; α(L)=3.31 *5*; α(M)=0.891 *12* α(N)=0.2318 *32*; α(O)=0.0468 *7*; α(P)=0.00521 *7* Mult.: α(exp)=5.9 *16* (1988St10).
(125.0[‡] *2*)	<1	4048.0+x	$(45/2^-)$	3923.0+x	$(43/2^-)$				
128.4[#] *2*	3.4[a] *4*	3623.9+x		3495.5+x	$43/2^-$				
135.0 *2*	274 *5*	1664.02	$21/2^+$	1529.03	$17/2^+$	E2		2.351 *33*	A_2/A_0=0.07 *1* (1988St10) A_2=+0.085 *12*; A_4=−0.008 *23* (1988Fu10) A_2/A_0=+0.03 *5*; A_4/A0=−0.04 *8* (1983Lo16 – for doublet) α(N)=0.1047 *15*; α(O)=0.02118 *30*; α(P)=0.002377 *33* α(K)=0.326 *5*; α(L)=1.495 *21*; α(M)=0.402 *6* E_γ: Others: 135.3 *2* (1989Lo02), 135.1 (1988Fu10), 131.3 (1983Lo16). Mult.: α(exp)=2.46 *4* (1988St10).
139.8[#] *2*	2.3[a] *4*	3441.17+x	$39/2^-$	3301.36+x					

From ENSDF

$^{213}_{86}Rn_{127}$-4

γ(^{213}Rn) (continued)

E_γ[†@]	I_γ[&]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[b]	α[c]	Comments
165.2 *2*	4 *1*	5928.9+x	(53/2,55/2)	5763.7+x	(53/2,55/2)	M1	3.15 *4*	α(K)=2.55 *4*; α(L)=0.461 *6*; α(M)=0.1094 *15* α(N)=0.0285 *4*; α(O)=0.00624 *9*; α(P)=0.000911 *13* E_γ: Other: 165.7 *2* (1989Lo02). Mult.,δ: From α(exp)=3 *1* (1988St10). δ=0.3 *8* using the BriccMixing code.
184.7[#] *2*	2.0 *5*	2257.5		2072.82				
191.1[#] *2*	4.4 *8*	896.09	15/2$^-$	705.00	11/2$^+$	M2	9.96 *14*	A_2/A_0=−0.06 *28* (1988St10) α(K)=6.95 *10*; α(L)=2.242 *31*; α(M)=0.575 *8* α(N)=0.1518 *21*; α(O)=0.0329 *5*; α(P)=0.00464 *6* Mult.: α(exp)=9.9 *13* (1988St10).
192.6[#] *2*	29 *1*	1856.63+x	25/2$^+$	1664.02+x	25/2$^+$	M1	2.045 *29*	A_2/A_0=0.40 *6* (1988St10) α(K)=1.653 *23*; α(L)=0.298 *4*; α(M)=0.0708 *10* α(N)=0.01846 *26*; α(O)=0.00404 *6*; α(P)=0.000590 *8* Mult.: α(exp)=2.5 *3* (1988St10).
197.3[#] *2*	6.0[a] *7*	2984.03+x	33/2$^+$	2786.73+x	29/2$^+$			
216.9[#] *2*	8.2[a] *12*	1745.93		1529.03	17/2$^+$			
217.5[#] *2*	13[a] *2*	4723.1+x		4505.6+x	49/2$^+$			
218.7[#] *2*	≈1	2007.43		1788.73				
233.4[#] *2*	9 *1*	1936.9		1703.5?				
238.8[#] *2*	1.5 *12*	2915.82+x	33/2$^+$	2677.00+x	29/2$^+$			
244.2[#] *2*	20 *5*	2984.03+x	33/2$^+$	2739.83+x	31/2$^-$	(E1)	0.0535 *7*	A_2/A_0=−0.15 *4* (1988St10) α(K)=0.0432 *6*; α(L)=0.00788 *11*; α(M)=0.001869 *26* α(N)=0.000483 *7*; α(O)=0.0001029 *14*; α(P)=1.403×10^{-5} *20* Mult.: α(exp)<0.3, α(exp)=0.0 *3* in 1988St10.
259.4[#] *2*	≈2[a]	3441.17+x	39/2$^-$	3181.81+x	(35/2$^-$)			
259.7[#] *2*	≈1[a]	1788.73		1529.03	17/2$^+$			
261.5[#] *2*	≈1[a]	2007.43		1745.93				
266.0[#] *2*	≈3[a]	3181.81+x	(35/2$^-$)	2915.82+x	33/2$^+$			
269.4[#] *2*	15 *1*	1529.03	17/2$^+$	1259.62	13/2$^+$	E2	0.1922 *27*	A_2/A_0=0.01 *6* (1988St10) α(K)=0.0870 *12*; α(L)=0.0780 *11*; α(M)=0.02060 *29* α(N)=0.00536 *8*; α(O)=0.001100 *15*; α(P)=0.0001304 *18* Mult.: α(exp)=0.18 *16*, deduced from intensity balance (1988St10).
272.0[#] *2*	5 *1*	3301.36+x		3029.35+x	37/2$^+$			A_2/A_0=−0.26 *15* (1988St10)
272.9[#] *2*	1.7 *5*	1936.9		1664.02	21/2$^+$			
307.0[#] *2*	5 *3*	2984.03+x	33/2$^+$	2677.00+x	29/2$^+$			
314.5[#] *2*	6 *1*	1574.1		1259.62	13/2$^+$			
330.1[#] *2*	9 *1*	2186.73+x	31/2$^-$	1856.63+x	25/2$^+$	(E3)	0.552 *8*	α(K)=0.1470 *21*; α(L)=0.298 *4*; α(M)=0.0815 *11*

From ENSDF

(HI,xnγ) (continued)

γ(^{213}Rn) (continued)

E_γ [†@]	I_γ [&]	E_i(level)	J^π_i	E_f	J^π_f	Mult. [b]	δ	α [c]	Comments
									α(N)=0.02137 30; α(O)=0.00439 6; α(P)=0.000519 7 Mult.: α(exp)<0.5, α(exp)=0.2 3 in 1988St10.
343.4[#] 2	8 2	2007.43		1664.02	21/2$^+$				A_2/A_0=0.34 13 (1988St10)
344.9[#] 2	54 2	2201.52+x	(27/2$^-$)	1856.63+x	25/2$^+$	(E1)		0.02429 34	A_2/A_0=−0.28 3 (1988St10) α(K)=0.01976 28; α(L)=0.00346 5; α(M)=0.000817 11 α(N)=0.0002112 30; α(O)=4.54×10^{-5} 6; α(P)=6.30×10^{-6} 9 Mult.: α(exp)<0.17 (1988St10).
350.0 2	9 2	5225.6+x	(51/2$^+$)	4875.6+x	(49/2$^+$)	M1+E2	0.70 +26−23	0.29 5	A_2/A_0=−0.39 14 (1988St10) α(K)=0.23 4; α(L)=0.048 4; α(M)=0.0115 9 α(N)=0.00299 24; α(O)=0.00065 6; α(P)=9.1×10^{-5} 9 Mult.,δ: From α(K)exp=0.23 4, and α(L)exp<0.09 (1988St10). There is disagreement between the multipolarity assignments of 1988St10 and 1989Lo02. α(K)exp=0.23 4 was deduced, and M1 was suggested by 1988St10; from a weak K line, 1989Lo02 deduced E1 multipolarity. However, since the 720.1γ (parallel to the cascading 350.0 and 370.1 gammas) and the 370.1γ are (M1), the 350.0γ probably is not E1.
352.8[e] 2	1.8 7	1612.4?		1259.62	13/2$^+$				
370.1 2	8 2	4875.6+x	(49/2$^+$)	4505.6+x	49/2$^+$	M1		0.337 5	A_2/A_0=0.33 5 (1988St10) α(K)=0.273 4; α(L)=0.0486 7; α(M)=0.01153 16 α(N)=0.00300 4; α(O)=0.000657 9; α(P)=9.60×10^{-5} 13 E_γ: Other measurement: 369.4 (1989Lo02). Mult.,δ: From α(K)exp=0.22 4, α(L)exp=0.12 1 (1988St10). δ=0.00 12 using the BriccMixing code. Intensities measured by 1989Lo02 suggest that the 350.0γ is stronger, and therefore, should be below the 370.1γ. However, if the above placement between the above γ switched, then placement of 1053.3γ from 5928.8+x keV level to this level (1988St10) do not fit the level energy difference. So, 1988St10 level structure is followed by the evaluator. 1053.3γ is not reported in 1989Lo02.
383.2[#] 2	<1	2610.7		2227.5					
390.2[#] 2	5 1	2327.1		1936.9					
411.8 2	260 5	3441.17+x	39/2$^-$	3029.35+x	37/2$^+$	E1		0.01652 23	A_2/A_0=−0.18 1 (1988St10) A_2/A_0=−0.29 3; A_4/A0=−0.05 5 (1983Lo16) α(K)=0.01348 19; α(L)=0.002312 32; α(M)=0.000545 8 α(N)=0.0001411 20; α(O)=3.04×10^{-5} 4; α(P)=4.26×10^{-6} 6 E_γ: Others: 412.2 2 (1989Lo02), 411.8 (1988Fu10).

$^{213}_{86}Rn_{127}$-6

(HI,xnγ) (continued)

γ(^{213}Rn) (continued)

E_γ [†@]	I_γ [&]	E_i(level)	J^π_i	E_f	J^π_f	Mult. [b]	α [c]	Comments
								Mult.: α(K)exp=0.035 *4*, and α(L)exp=0.005 *1* (1988St10).
420.2[#] *2*	<1	4343.2+x		3923.0+x	(43/2⁻)			
427.5[#] *2*	16 *3*	3923.0+x	(43/2⁻)	3495.5+x	43/2⁻	M1	0.2282 *32*	A_2/A_0=0.26 *7* (1988St10) α(K)=0.1850 *26*; α(L)=0.0328 *5*; α(M)=0.00778 *11* α(N)=0.002028 *28*; α(O)=0.000444 *6*; α(P)=6.49×10^{-5} *9* Mult.: α(K)exp=0.19 *3*, and α(L)exp=0.08 *2* (1988St10).
431.9[#] *2*	13 *1*	3927.4+x		3495.5+x	43/2⁻			
445.5[#] *2*	≈1[a]	4050.3+x		3604.8+x				
454.1[#] *2*	13 *2*	2640.83+x		2186.73+x	31/2⁻			A_2/A_0=0.0 *1* (1988St10)
457.6[d] *2*	30 *5*	2121.62+x	(27/2)	1664.02+x	25/2⁺			
457.6[d] *2*	<3	4505.6+x	49/2⁺	4048.0+x	(45/2⁻)			I_γ: Determined by 1988St10 from coincidence spectra. E_γ: Other: 456.9 *2* (1989Lo02). This transition was placed on the level scheme only once by 1989Lo02.
460.5[#] *2*	4 *1*	2662.0+x		2201.52+x	(27/2⁻)			
483.0[#] *2*	5 *1*	2684.5+x		2201.52+x	(27/2⁻)			
490.2[#] *2*	13 *1*	2677.00+x	29/2⁺	2186.73+x	31/2⁻	D+Q		A_2/A_0=−0.15 *8* (1988St10) Mult.: from A_2/A_0.
520.3[#] *2*	8[a] *2*	2184.3		1664.02	21/2⁺			
522.7 *2*	480 *10*	2186.73+x	31/2⁻	1664.02+x	25/2⁺	E3	0.1073	A_2/A_0=0.130 *6* (1988St10) A_2/A_0=+0.00 *2*; A4/A0=+0.00 *4* (1983Lo16) A_2=+0.148 *11*; A_4=+0.017 *18* (1988Fu10) α(K)=0.0536 *8*; α(L)=0.0398 *6*; α(M)=0.01055 *15* α(N)=0.00276 *4*; α(O)=0.000575 *8*; α(P)=7.16×10^{-5} *10* E_γ: Others: 521.7 *2* (1989Lo02) and 522.7 (1988Fu10), 521.7 (1983Lo16). Mult.: α(K)exp=0.060 *2*, α(L)exp=0.036 *2*, and α(M)exp=0.013 *1* (1988St10). Polarization amplitude=−0.01 *4* (1988Fu10).
533.4[#e] *2*		4581.4+x		4048.0+x	(45/2⁻)			E_γ: From decay scheme of 1988St10; this transition was not listed by the authors.
537.5 *2*	18 *2*	2201.52+x	(27/2⁻)	1664.02+x	25/2⁺	(E1)	0.00951 *13*	α(K)=0.00780 *11*; α(L)=0.001301 *18*; α(M)=0.000306 *4* α(N)=7.92×10^{-5} *11*; α(O)=1.713×10^{-5} *24*; α(P)=2.424×10^{-6} *34* E_γ: Other: 536.7 *2* (1989Lo02).
538.1 *2*	10[a] *1*	5763.7+x	(53/2,55/2)	5225.6+x	(51/2⁺)			E_γ: Other: 536.7 *2* (1989Lo02).
543.7[#] *2*	2[a] *1*	2072.82		1529.03	17/2⁺			
552.5 *2*	47 *4*	4048.0+x	(45/2⁻)	3495.5+x	43/2⁻	M1	0.1150 *16*	α(K)=0.0934 *13*; α(L)=0.01646 *23*; α(M)=0.00390 *5* α(N)=0.001015 *14*; α(O)=0.0002223 *31*; α(P)=3.25×10^{-5} *5* E_γ: Other: 551.8 *2* (1989Lo02). Mult.: α(K)exp=0.12 *2* (1988St10). The α(K)exp value is presented for 553γ with a multipolarity M1 in Table 3 (1988St10).

(HI,xnγ) (continued)

γ(^{213}Rn) (continued)

E_γ[†@]	I_γ[&]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[b]	α[c]	Comments
								Evaluator presents the same α(K)exp value and M1 multipolarity for both the 552.5γ and 553.1γ from (45/2$^-$) state at 4048.0+x and 31/2$^-$ state at 2737.4+x levels, respectively.
553.1[#] *2*	26 *4*	2739.83+x	31/2$^-$	2186.73+x	31/2$^-$	M1	0.1147 *16*	α(K)=0.0931 *13*; α(L)=0.01641 *23*; α(M)=0.00389 *5* α(N)=0.001012 *14*; α(O)=0.0002216 *31*; α(P)=3.24×10^{-5} *5* Mult.: α(K)exp=0.12 *2* (1988St10). The α(K)exp value is presented for 553γ with a multipolarity M1 in Table 3 (1988St10). Evaluator presents the same α(K)exp value and M1 multipolarity for both the 552.5γ and 553.1γ from (45/2$^-$) state at 4048.0+x and 31/2$^-$ state at 2737.4+x levels, respectively.
563.5[#] *2*	28 *1*	2227.5		1664.02	21/2$^+$			A_2/A_0=−0.11 *7* (1988St10)
575.5[#] *2*	12 *3*	3604.8+x		3029.35+x	37/2$^+$			A_2/A_0=−0.05 *10* (1988St10)
609.8[#] *2*	7 *3*	4532.8+x		3923.0+x	(43/2$^-$)			A_2/A_0=−0.19 *6* (1988St10)
632.9 *2*	95×10^1 *10*	1529.03	17/2$^+$	896.09	15/2$^-$	E1	0.00688 *10*	A_2/A_0=−0.112 *24* (1988St10) A_2/A_0=−0.15 *5*; A_4/A0=+0.12 *10* (1983Lo16) A_2=−0.095 *6*; A_4=+0.010 *11* (1988Fu10) α(K)=0.00566 *8*; α(L)=0.000930 *13*; α(M)=0.0002182 *31* α(N)=5.65×10^{-5} *8*; α(O)=1.225×10^{-5} *17*; α(P)=1.745×10^{-6} *24* E_γ: Others: 631.7 *2* (1989Lo02), 632.7 (1988Fu10), 631.7 (1983Lo16). Mult.: α(K)exp=0.008 *1*, α(L)exp=0.0014 *2*, and α(M)exp<0.0009 (1988St10). Polarization amplitude=−0.01 *2* (1988Fu10).
705.0[#] *2*	770 *5*	705.00	11/2$^+$	0.0	(9/2$^+$)	M1	0.0604 *8*	A_2/A_0=−0.03 *2* (1988St10) α(K)=0.0491 *7*; α(L)=0.00860 *12*; α(M)=0.002035 *28* α(N)=0.000530 *7*; α(O)=0.0001160 *16*; α(P)=1.697×10^{-5} *24* Mult.: α(K)exp=0.040 *3* and α(L)exp=0.013 *2* (1988St10).
720.1 *2*	10 *3*	5225.6+x	(51/2$^+$)	4505.6+x	49/2$^+$	(M1)	0.0572 *8*	α(K)=0.0465 *7*; α(L)=0.00813 *11*; α(M)=0.001924 *27* α(N)=0.000501 *7*; α(O)=0.0001097 *15*; α(P)=1.605×10^{-5} *22* E_γ: Other: 718.9 *2* (1989Lo02). Mult.: α(K)exp=0.041 *4* (1988St10).
729.1 *2*	115 *6*	2915.82+x	33/2$^+$	2186.73+x	31/2$^-$	E1	0.00525	α(K)=0.00433 *6*; α(L)=0.000703 *10*; α(M)=0.0001645 *23* α(N)=4.26×10^{-5} *6*; α(O)=9.26×10^{-6} *13*; α(P)=1.324×10^{-6} *19* E_γ: Others: 727.8 *2* (1989Lo02) and 728.7 (1988Fu10). Mult.: there are disagreements between the experimental Ice's and the angular distributions measured by 1988St10 and by 1989Lo02: α(K)exp<0.0065, α(L)exp=0.004 *1* (1988St10), α(K)exp=0.019 (1989Lo02); angular distribution: A_2/A_0=−0.22 *2* (1988St10), −0.02 *4* (1989Lo02).
767.9 *2*	10 *1*	1664.02	21/2$^+$	896.09	15/2$^-$	(E3)	0.0365 *5*	A_2/A_0=0.4 *1* (1988St10) α(K)=0.02367 *33*; α(L)=0.00961 *13*; α(M)=0.002468 *35*

From ENSDF

$\gamma(^{213}Rn)$ (continued)

E_{γ} [†@]	I_{γ} [&]	E_i(level)	J^{π}_i	E_f	J^{π}_f	Mult. [b]	α [c]	Comments
								α(N)=0.000645 *9*; α(O)=0.0001362 *19*; α(P)=1.781×10^{-5} *25* E_{γ}: Other: 767.6 (1988Fu10). Mult.: E3 is expected from the level scheme; angular distribution is consistent with this multipolarity; no conversion electron line was observed.
797.3 *2*	256 *5*	2984.03+x	33/2$^+$	2186.73+x	31/2$^-$	E1	0.00444 *6*	A_2/A_0=−0.168 *8* (1988St10) A_2/A_0=−0.01 2; A_4/A0=−0.02 *2* (1983Lo16) α(K)=0.00367 *5*; α(L)=0.000591 *8*; α(M)=0.0001383 *19* α(N)=3.58×10^{-5} *5*; α(O)=7.79×10^{-6} *11*; α(P)=1.117×10^{-6} *16* E_{γ}: Comparable 795.5γ from (37/2) level as (E3) in 1983Lo16. E_{γ}: Others: 795.8 *2* (1989Lo02), 797.2 (1988Fu10), 795.5 (1983Lo16). Mult.: α(K)exp=0.0048 *4* and α(L)exp=0.0013 *3* (1988St10).
815.0 *2*	≈100[@]	6743.90+y		5928.9+y	(55/2$^+$)			α(K)=0.0209 *3*; α(L)=0.00788 *11*; α(M)=0.00202 *3*; α(N+..)=0.000653 *10* α(N)=0.000527 *8*; α(O)=0.0001114 *16*; α(P)=1.468×10^{-5} *21* Mult.: E3 from A_2/A_0=0.29 *5*, A_4/A_0=0.28 *4*; α(K)exp=0.027 (1989Lo02).
842.6[#e] *2*	5[a] *1*	3029.35+x	37/2$^+$	2186.73+x	31/2$^-$			Placement of 842.6γ between the 37/2$^+$ state at 3029.3+x and the 31/2$^-$ state at 2186.7+x keV requires the 842.6γ to be an E3 transition, with B(E3)(W.u.)=0.7 *4*.
896.1 *2*	1000	896.09	15/2$^-$	0.0	(9/2$^+$)	E3	0.02500 *35*	A_2=+0.155 *7*; A_4=+0.009 *11* (1988Fu10) A_2/A_0=0.098 *9* (1988St10) α(K)=0.01723 *24*; α(L)=0.00582 *8*; α(M)=0.001476 *21* α(N)=0.000386 *5*; α(O)=8.19×10^{-5} *11*; α(P)=1.091×10^{-5} *15* E_{γ}: Others: 894.5 *2* (1989Lo02), 896.0 (1988Fu10), 894.5 (1983Lo16). Mult.: α(K)exp=0.016 *1*, α(L)exp=0.0059 *4*, and α(M)exp=0.0016 *2* (1988St10). Polarization amplitude=−0.04 *2* (1988Fu10).
905.4 *2*	60[@] *18*	8831.8+y		7926.4+y				E_{γ}: From 1989Lo02. Mult.: (E3) from A_2/A_0=0.34 *7*, A_4/A_0=0.41 *10*; α(K)exp≤0.024 (1989Lo02).
907.4[e] *2*	5 *1*	1612.4?		705.00	11/2$^+$			E_{γ}: Other: 905.4 (1989Lo02). This transition was placed by 1989Lo02 to deexcite a level at 8724 + Δ′ keV, 8831.8+y in this dataset.
930.1[#] *2*	12 *1*	2786.73+x	29/2$^+$	1856.63+x	25/2$^+$			A_2/A_0=0.0 *1* (1988St10)
995.1[#] *2*	35 *4*	3181.81+x	(35/2$^-$)	2186.73+x	31/2$^-$	(E2)	0.00821 *11*	A_2/A_0=0.13 *5* (1988St10) α(N)=8.58×10^{-5} *12*; α(O)=1.846×10^{-5} *26*; α(P)=2.57×10^{-6} *4* α(K)=0.00641 *9*; α(L)=0.001361 *19*; α(M)=0.000330 *5*
1010.1 *2*	51 *4*	4505.6+x	49/2$^+$	3495.5+x	43/2$^-$	E3	0.01891 *26*	A_2/A_0=0.47 *2* (1988St10) α(K)=0.01352 *19*; α(L)=0.00405 *6*; α(M)=0.001016 *14* α(N)=0.000265 *4*; α(O)=5.66×10^{-5} *8*; α(P)=7.64×10^{-6} *11*

$^{213}_{86}Rn_{127}$-9

(HI,xnγ) (continued)

γ(^{213}Rn) (continued)

E_γ [†@]	I_γ [&]	E_i(level)	J^π_i	E_f	J^π_f	Mult. [b]	Comments
							E_γ: Other: 1008.1 *2* (1989Lo02). Mult.: α(K)exp=0.0155 *12*, α(L)exp=0.0049 *5*, and α(M)exp=0.0014 *3* (1988St10).
1013.0[#] *2*	11 *4*	2677.00+x	$29/2^+$	1664.02+x	$25/2^+$	Q	A_2/A_0=0.10 *9* (1988St10) Mult.: from A_2/A_0 by the evaluator.
1053.3[#] *2*	3[a] *1*	5928.9+x	(53/2,55/2)	4875.6+x	$(49/2^+)$		
1174.4[#] *2*	17 *3*	1879.4		705.00	$11/2^+$		
1176.8[#] *2*	16 *3*	2072.82		896.09	$15/2^-$		A_2/A_0=0.14 *10* (1988St10)
1182.5 *2*	≈80[@]	7926.4+y		6743.90+y			α(K)=0.00986 *14*; α(L)=0.00258 *4*; α(M)=0.000641 *9*; α(N+..)=0.000209 *3* α(N)=0.0001672 *24*; α(O)=3.58×10^{-5} *5*; α(P)=4.92×10^{-6} *7*; α(IPF)=7.24×10^{-7} *11* E_γ: From 1989Lo02. Mult.: (E3) from A_2/A_0=0.36 *2*, A_4/A_0=0.02 *3*; α(K)exp≤0.025 (1989Lo02).
1258.1 *2*	16 *3*	5763.7+x	(53/2,55/2)	4505.6+x	$49/2^+$		E_γ: Other: 1255.9 *2* (1989Lo02).
1259.6[#] *2*	24 *3*	1259.62	$13/2^+$	0.0	$(9/2^+)$		
1423.3[#] *2*	3[a] *1*	5928.9+x	(53/2,55/2)	4505.6+x	$49/2^+$		

† From 1988St10, unless noted otherwise. ΔEγ=0.2 keV listed by evaluator based on the e-mail communications (dated: Feb 3, 2022) with the first author, A.E.Stuchbery, of 1988St10. The reported Eγ in 1988St10 and 1988Fu10, and those of 1989Lo02 are discrepant. However, the data reported in 1988St10 and 1988Fu10 are consistent.

‡ From level energy difference. Transition was not observed; existence proposed from coincidence data.

Transition was not seen by others.

@ From 1989Lo02.

& Relative singles intensity measured in ^{208}Pb(57-MeV ^{9}Be,4n) by 1988St10 and normalized to Iγ(896)=1000.

a From coincidence data (1988St10).

b From conversion electron measurements by 1989Lo02 and 1988St10, angular distribution measurements of 1989Lo02, 1988St10, 1988Fu10, and 1983Lo16.

c Additional information 3.

d Multiply placed.

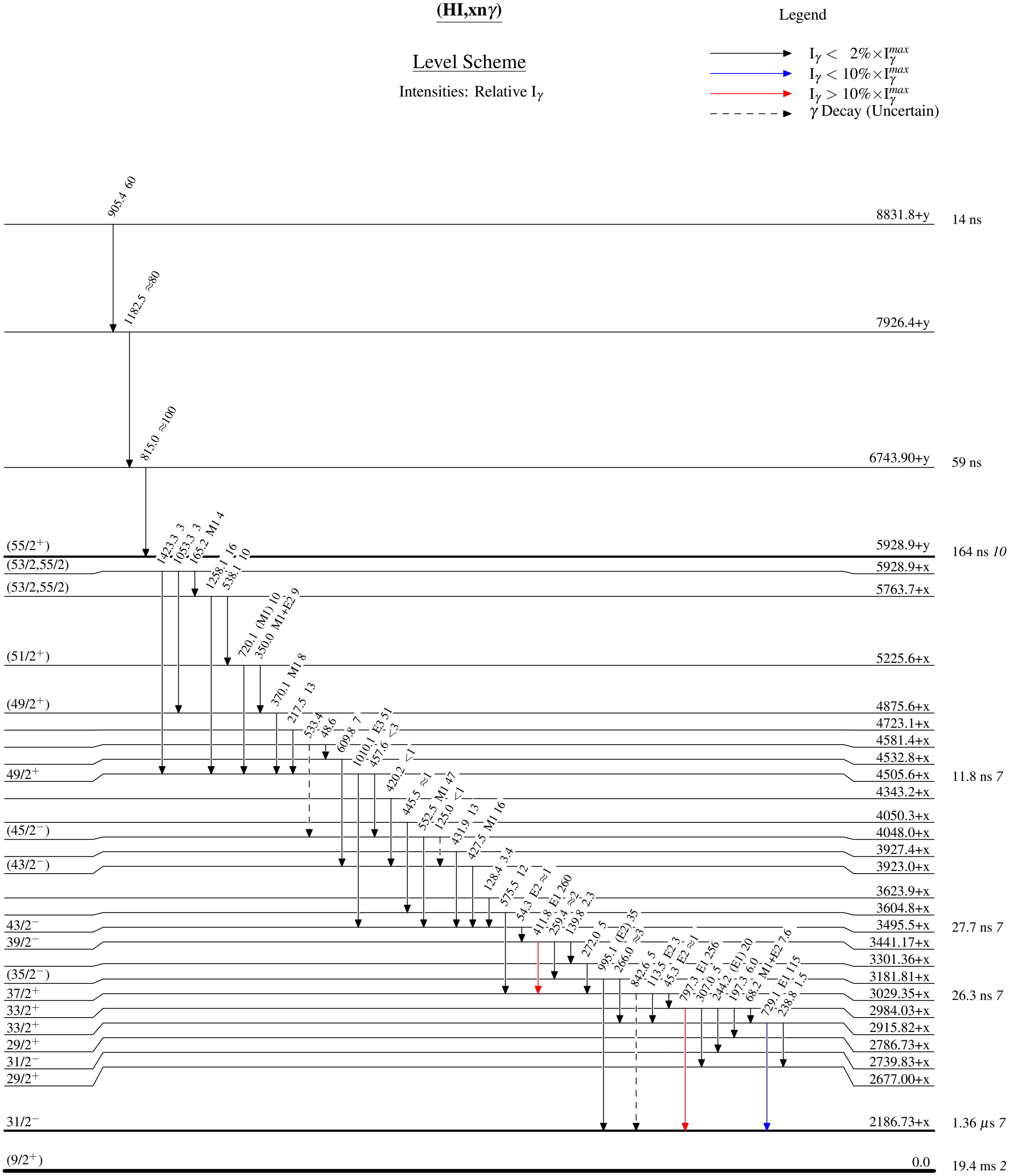
e Placement of transition in the level scheme is uncertain.

$^{213}_{86}Rn_{127}$-10

(HI,xnγ)

Level Scheme

Intensities: Relative I_γ



$^{213}_{86}Rn_{127}$

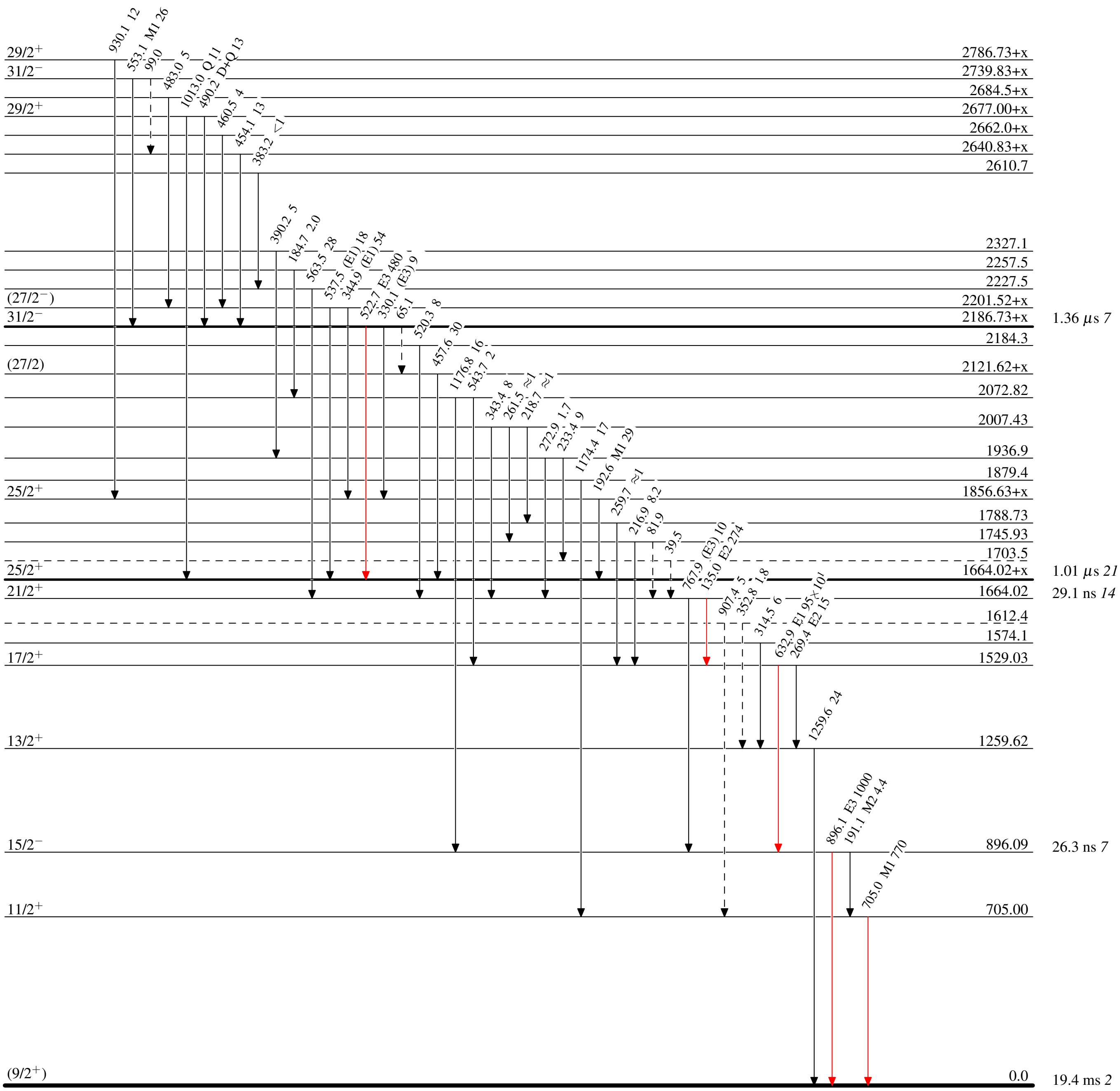
(HI,xnγ)

Level Scheme (continued)

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)



$^{213}_{86}Rn_{127}$