Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	F. G. Kondev	NDS 201,346 (2025)	21-Jan-2025

Q(β^-)=−7886 *29*; S(n)=9494 *10*; S(p)=3437 *15*; Q(α)=6383.7 *16* 2021Wa16
S(2n)=17305 *11*, S(2p)=5370 *13*, Q(ε)=3306 *16*, Q(εp)=1100 *13* (2021Wa16).

^{206}Rn Levels

Cross Reference (XREF) Flags

- A ^{210}Ra α decay
- B ^{206}Fr ε decay
- C (HI,xnγ)

E(level)†	J$^\pi$	$T_{1/2}$	XREF	Comments
0.0	0^+	5.67 min *17*	ABC	%α=62 *3*; %ε+%β^+=38 *3* $T_{1/2}$: From 1969Ha03. The same value is also quoted in 1971Ho01. Others: 6.5 min *5* (1954Bu67), 7 min *1* (1954Wi26), 6.2 min *5* (1957St10) and 6.5 min *1* (1967Va17). %α: From 1971Ho01. Others: 63% (1969Ha03, same authors as 1971Ho01) and 65% (1957St10). A value of %α=68% is quoted in 1991Ry01, but its origin is unknown.
575.30 *10*	2^+		ABC	J$^\pi$: 575.3γ E2 to 0^+.
1134.30 *15*	4^+		BC	J$^\pi$: 559.0γ E2 γ to 2^+.
1501.80 *15*	$(2^-,3)$		B	J$^\pi$: 926.5γ to 2^+ level. The absence of γ from the 6^+ level at 1762.9 keV would argue against $J^\pi=4^+$. The absence of γ to the 0^+ ground state would argue against $J^\pi=1^+$, 1^- and 2^+.
1762.90 *18*	6^+	1.8 ns *13*	BC	J$^\pi$: 628.6γ E2 γ to 4^+. $T_{1/2}$: From 282.3γ-628.6γ(ΔT) using centroid shift method in 1981Ri02 (^{206}Fr ε decay).
1818.30 *18*	$(6)^+$		BC	J$^\pi$: 648.0γ E2 to 4^+ consistent with $J^\pi=2^+$,4^+ or 6^+. However, population of this level in ^{197}Au(^{14}N,5nγ) (2008An01) would suggest $J^\pi=6^+$.
1924.30 *20*	8^+	6.3 ns *24*	BC	μ=6.6 *4* J$^\pi$: 161.4γ E2 to 6^+ level; systematics of structures in neighboring nuclei; μ. $T_{1/2}$: From 282.3γ-161.4γ(ΔT) in 1981Ri02 (^{206}Fr ε decay). Others: 19 ns *3* from 575.4γ(t) in 1981Ho29, by taking into account the half-life of the 2475.55-keV isomer, and 13.5 ns *10* in 1981Ma28 using 575.4-559.1-628.8γ(t). μ: From g=0.83 *5* in 1981Ma28,2020StZV using perturbed angular distribution technique. This value was corrected by +1.86% *2* for diamagnetic and Knight shift. Configuration=$\pi(h^{+2}_{9/2})$.
2024.90 *18*			B	
2174.30 *20*			B	
2206.90 *23*	$(7,8)^+$		B	J$^\pi$: 282.6γ M1 γ to 8^+. The direct feeding of this level in ^{206}Fr ε decay ($J^\pi=7^+$) argues against $J^\pi=9^+$.
2269.89 *23*	9^-		BC	J$^\pi$: 345.6γ E1 to 8^+.
2475.55 *25*	10^-	65 ns *5*	C	μ=11.20 *10* J$^\pi$: 205.7γ M1 to 9^-; μ; systematics of structures in neighboring nuclei. $T_{1/2}$: From 551.2γ(t) in 1981Ho29. The non-observation of a prompt component in the time spectrum suggests that 551.2γ directly depopulates the isomer. Other: 75 ns *10* in 1981Ma28 using 575.4-559.1-628.8γ(t). μ: From g=1.120 *10* in 1981Ma28,2020StZV using perturbed angular distribution technique. This value was corrected by +1.86% *2* for diamagnetic and Knight shift. Configuration=$\pi(f^{+1}_{7/2},i^{+1}_{13/2})$.

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Adopted Levels, Gammas (continued)

^{206}Rn Levels (continued)

E(level)[†]	J$^\pi$	T$_{1/2}$	XREF	Comments
2534.6 *3*	10$^+$		C	J$^\pi$: 610.3γ E2 to 8$^+$.
2585.3 *4*	(11)		C	J$^\pi$: 109.8γ D to 10$^-$.
2834.2? *5*	(12)		C	J$^\pi$: 248.9γ D to J=(11).
3131.5 *5*	12$^+$		C	J$^\pi$: 596.9γ E2 to 10$^+$.
3362.0 *5*	(13)		C	J$^\pi$: 527.8γ D γ to J=(12), 776.6γ E2 to J=(11).
3887.5? *6*	(14)		C	J$^\pi$: 525.5γ D to J=(13); relative population of this level in (HI,xnγ).
4129.8 *9*	(15)	11 ns *2*	C	J$^\pi$: 242γ to J=(14) and 768γ to J=(13). T$_{1/2}$: From 768γ(t) in 1981Ho29. Possible configuration=$\pi(h^{+3}_{9/2},i^{+1}_{13/2})$. The assignment is tentative.

[†] From a least-squares fit to Eγ.

$\gamma(^{206}Rn)$

E$_i$(level)	J$_i^\pi$	E$_\gamma$[†]	I$_\gamma$[†]	E$_f$	J$_f^\pi$	Mult.[#]	α[&]	Comments
575.30	2$^+$	575.3 *1*	100	0.0	0$^+$	E2	0.0254 *4*	α(K)=0.01790 *25*; α(L)=0.00565 *8*; α(M)=0.001421 *20* α(N)=0.000370 *5*; α(O)=7.81×10^{-5} *11*; α(P)=1.022×10^{-5} *14* Mult.: α(K)exp=0.013 *5* (1981Ri02); α(K)exp=0.018 *4* and α(L)exp=0.0068 *16* (2008An01).
1134.30	4$^+$	559.0 *1*	100	575.30	2$^+$	E2	0.0271 *4*	α(K)=0.01894 *27*; α(L)=0.00615 *9*; α(M)=0.001550 *22* α(N)=0.000403 *6*; α(O)=8.51×10^{-5} *12*; α(P)=1.109×10^{-5} *16* Mult.: α(K)exp=0.015 *5* (1981Ri02); α(K)exp=0.027 *7* and α(L)exp=0.0076 *18* (2008An01).
1501.80	(2$^-$,3)	926.5 *1*	100	575.30	2$^+$			
1762.90	6$^+$	628.6 *1*	100	1134.30	4$^+$	E2	0.02091 *29*	B(E2)(W.u.)=0.04 *4* α(K)=0.01508 *21*; α(L)=0.00438 *6*; α(M)=0.001094 *15* α(N)=0.000285 *4*; α(O)=6.03×10^{-5} *8*; α(P)=7.99×10^{-6} *11* Mult.: α(K)exp=0.016 *5* (1981Ri02); α(K)exp=0.011 *3* and α(L)exp=0.0016 *4* (2008An01).
1818.30	(6)$^+$	684.0 *1*	100	1134.30	4$^+$	E2[@]	0.01744 *24*	α(K)=0.01283 *18*; α(L)=0.00347 *5*; α(M)=0.000861 *12* α(N)=0.0002242 *31*; α(O)=4.76×10^{-5} *7*; α(P)=6.38×10^{-6} *9* Mult.: α(K)exp=0.017 *4* (2008An01).
1924.30	8$^+$	161.4 *1*	100	1762.90	6$^+$	E2	1.159 *16*	B(E2)(W.u.)=5.3 *20* α(K)=0.2488 *35*; α(L)=0.672 *10*; α(M)=0.1804 *26* α(N)=0.0470 *7*; α(O)=0.00953 *14*; α(P)=0.001080 *15* Mult.: α(L)exp=0.65 *7* (1981Ri02).
2024.90		890.6 *1*	100	1134.30	4$^+$			
2174.30		356.0 *1*	100	1818.30	(6)$^+$			
2206.90	(7,8)$^+$	282.6 *1*	100	1924.30	8$^+$	M1	0.704 *10*	α(K)=0.570 *8*; α(L)=0.1021 *14*; α(M)=0.02423 *34* α(N)=0.00631 *9*; α(O)=0.001382 *19*;

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Adopted Levels, Gammas (continued)

$\gamma(^{206}Rn)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[#]	α[&]	Comments
								α(P)=0.0002017 *28* Mult.: α(K)exp=0.51 *7* (1981Ri02).
2269.89	9^-	345.6 *1*	100	1924.30	8^+	E1	0.02418 *34*	α(K)=0.01967 *28*; α(L)=0.00344 *5*; α(M)=0.000813 *11* α(N)=0.0002102 *29*; α(O)=4.52×10^{-5} *6*; α(P)=6.27×10^{-6} *9* Mult.: α(K)exp=0.010 *3* and α(L)exp=0.0097 *23* (2008An01).
2475.55	10^-	205.7[‡] *2*	100[‡]	2269.89	9^-	M1[@]	1.701 *24*	B(M1)(W.u.)=1.03×10^{-5} *8* α(K)=1.375 *20*; α(L)=0.2478 *35*; α(M)=0.0588 *8* α(N)=0.01533 *22*; α(O)=0.00336 *5*; α(P)=0.000490 *7* I_γ: From I(γ+ce) in 1981Ho29 and corrected by α(M1)=1.185 from 1978Ro21. Mult.: Other: from total α deduced from intensity balance in $\gamma\gamma$ coin studies in 1981Ho29.
		551.2[‡] *2*	82[‡]	1924.30	8^+	M2	0.317 *4*	B(M2)(W.u.)=0.058 *5* α(K)=0.2447 *34*; α(L)=0.0543 *8*; α(M)=0.01330 *19* α(N)=0.00349 *5*; α(O)=0.000760 *11*; α(P)=0.0001096 *15* I_γ: From I(γ+ce) in 1981Ho29 and corrected by α(M2)=0.333 from 1978Ro21. Mult.: α(K)exp=0.20 *5* (2008An01).
2534.6	10^+	610.3[‡] *2*	100[‡]	1924.30	8^+	E2[@]	0.02230 *31*	α(K)=0.01596 *22*; α(L)=0.00476 *7*; α(M)=0.001192 *17* α(N)=0.000310 *4*; α(O)=6.57×10^{-5} *9*; α(P)=8.66×10^{-6} *12*
2585.3	(11)	109.8[‡] *3*	100[‡]	2475.55	10^-	D		Mult.: A_2=−0.20 *13* and −0.11 *37* in 1981Ho29.
2834.2?	(12)	248.9[‡] *3*	100[‡]	2585.3	(11)	D[@]		
3131.5	12^+	596.9[‡] *3*	100[‡]	2534.6	10^+	E2	0.02342 *33*	α(K)=0.01666 *23*; α(L)=0.00508 *7*; α(M)=0.001273 *18* α(N)=0.000331 *5*; α(O)=7.00×10^{-5} *10*; α(P)=9.21×10^{-6} *13* Mult.: α(K)exp=0.018 *5* (2008An01).
3362.0	(13)	527.8[‡] *2*	100[‡]	2834.2?	(12)	D[@]		I_γ: From I(γ+ce) in 1981Ho29 and corrected by α(M1)=0.139 from Rosel (1978Ro21).
		776.6[‡] *3*	91[‡]	2585.3	(11)	E2[@]	0.01340 *19*	α(K)=0.01011 *14*; α(L)=0.002484 *35*; α(M)=0.000611 *9* α(N)=0.0001591 *22*; α(O)=3.40×10^{-5} *5*; α(P)=4.61×10^{-6} *6* I_γ: From I(γ+ce) in 1981Ho29 and corrected by α(E2)=0.0136 from 1978Ro21.
3887.5?	(14)	525.5[‡] *3*	100[‡]	3362.0	(13)	D[@]		
4129.8	(15)	242 *1*		3887.5?	(14)			E_γ: From 1981Ho29.
		768 *1*		3362.0	(13)			E_γ: From 1981Ho29.

[†] From ^{206}Fr ε decay (1981Ri02), unless otherwise stated.
[‡] From (HI,xnγ).
[#] From α(K)exp and α(L)exp in 1981Ri02 and 2008An01, unless otherwise stated. See 1981Ho29 for additional support from $\gamma(\theta)$ data.

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Adopted Levels, Gammas (continued)

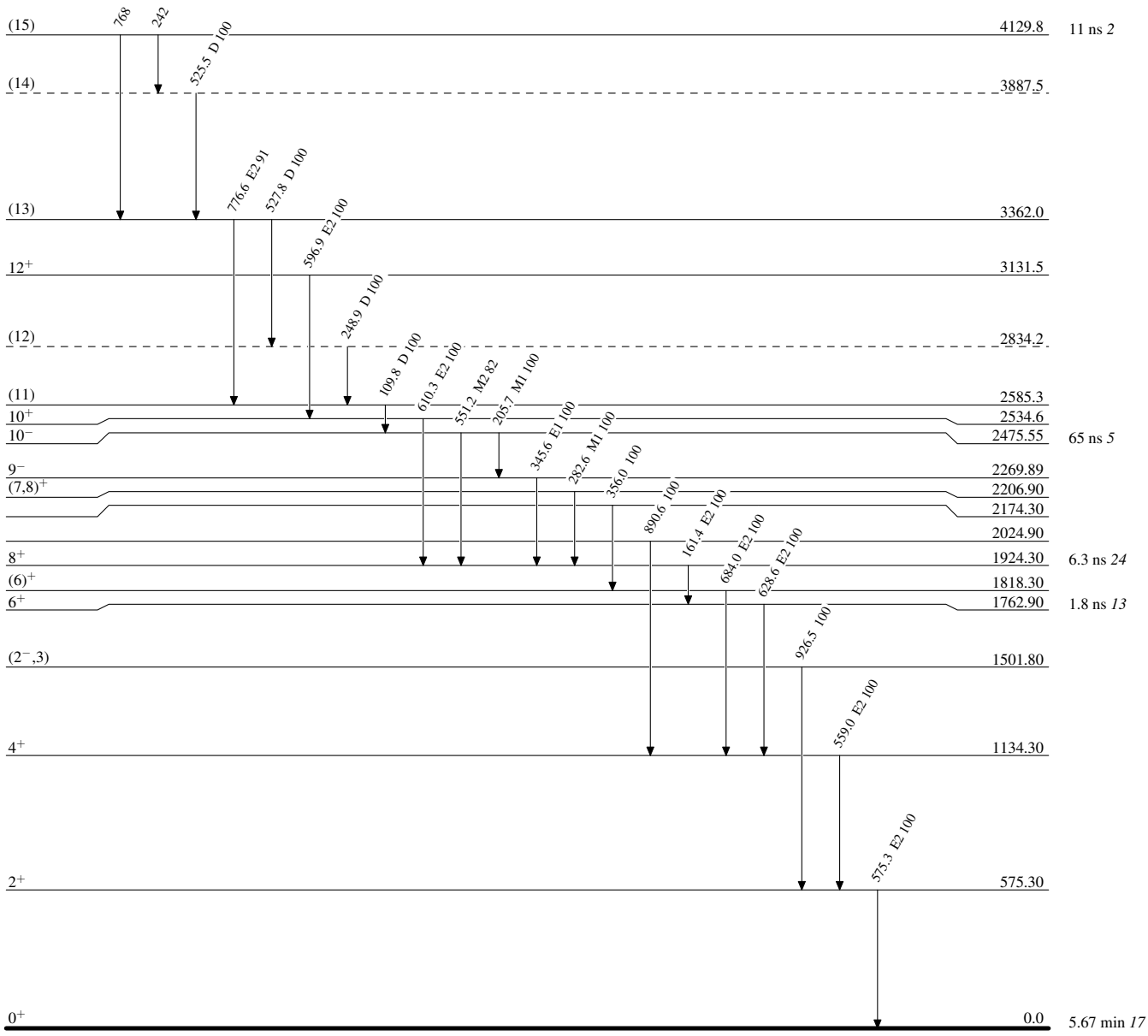
$\gamma(^{206}Rn)$ (continued)

[@] From $\gamma(\theta)$ in 1981Ho29.
[&] Additional information 1.

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level



$^{206}_{86}Rn_{120}$