^{101}Pd ε decay (8.47 h) 1972Ny01,1970Ph04

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Jean Blachot	ENSDF	1-Jul-2006

Parent: ^{101}Pd: E=0.0; $J^\pi=5/2^+$; $T_{1/2}$=8.47 h *6*; Q(ε)=1980 *4*; %ε+%$β^+$ decay=100.0

Others: 1965Ev04, 1965Dz05, 1974HeYW.

Q(ε)=1982 *4* (1971Ib01) from E($β^+$)=776 *4* to E(level)=182, and E($β^+$)= 488 *12* to E(level)=478 (weighted av).

^{101}Rh Levels

E(level)	J^π†	$T_{1/2}$†	Comments
0.0	$1/2^-$	3.3 y *3*	
157.41 *3*	$9/2^+$	4.34 d *1*	
181.87 *3*	$(7/2)^+$	1.91 ns *6*	$T_{1/2}$: from (ce(K) 296γ)(ce(L) 24γ)(t): 1970Va33 (s), other: 1.77 ns *5* (1974BeZJ) γγ(t).
305.5 *3*	$3/2^-$,$5/2^-$		
355.33 *9*	$5/2^-$		
478.15 *4*	$(5/2)^+$	68 ps *16*	$T_{1/2}$: from (ce(K) 269.7γ)(ce(K) 296γ)(t): 1970Va33 (s). Other: 66 ps *10* (1974BeZJ) γγ(t).
747.86 *5*	$(7/2)^+$	≤0.2 ns	$T_{1/2}$: from 1974BeZJ (K x ray)(590γ)(t).
851.43 *11*	$7/2^-$,$9/2^-$		E(level): not seen in (p,t) but confirmed in (p,nγ).
905.77 *5*	$(5/2,7/2)^+$		
978.54 *11*	$(7/2^+,9/2^+)$		
1035.79 *7*	$(5/2)^+$		
1058.0 *3*	$3/2^-$,$5/2^-$		
1320.2 *4*	(3/2)		
1359.47 *5*	$7/2^+$		
1470.91 *5*	$5/2^+$,$7/2^+$		J^π: A_2=0.124 *16*, A_4=0.036 *12* (1973BeXV) (993γ)(296γ)(θ).
1604.4 *3*	$(7/2^-,9/2^-)$		
1696.42 *8*	$(5/2)^+$		
1789.64 *12*	$(5/2,7/2)^+$		
1820.67 *10*	$(5/2,7/2)^+$		
1845.40 *19*			
1911.52 *21*			

† From Adopted Levels.

ε,$β^+$ radiations

E(decay)	E(level)	Iβ+ †	Iε†	Log *ft*	I(ε+β+)†	Comments
(68 *4*)	1911.52		≈0.05	≈5.5	≈0.05	εK= 0.764 *10*; εL= 0.188 *8*; εM+= 0.0483 *23*
(159 *4*)	1820.67		0.23	5.7	0.23	εK= 0.8340 *11*; εL= 0.1333 *9*; εM+= 0.03275 *24*
(190 *4*)	1789.64		0.29	5.8	0.29	εK= 0.8405; εL= 0.1282 *6*; εM+= 0.03132 *16*
(284 *4*)	1696.42		0.58	5.8	0.58	εK= 0.8506; εL= 0.12026 *23*; εM+= 0.02910 *7*
(509 *4*)	1470.91		4.0 *4*	5.5	4.0 *4*	εK= 0.8590; εL= 0.11370; εM+= 0.02728
(621 *4*)	1359.47		2.7 *3*	5.9	2.7 *3*	εK= 0.8608; εL= 0.11229; εM+= 0.02689
(660 *4*)	1320.2		≈0.04	≈7.8	≈0.04	εK= 0.8613; εL= 0.11191; εM+= 0.02678
(922 *4*)	1058.0		≈0.02	≈8.4	≈0.02	εK= 0.8635; εL= 0.11023; εM+= 0.02632
(944 *4*)	1035.79		≈0.04	≈8.1	≈0.04	εK= 0.8636; εL= 0.11013; εM+= 0.02629
(1074 *4*)	905.77		1.7 *2*	6.6	1.7 *2*	εK= 0.8642; εL= 0.10964; εM+= 0.02615
(1232 *4*)	747.86		21.6 *20*	5.6	21.6 *20*	av Eβ= 101.6 *18*; εK= 0.8643; εL= 0.10912; εM+= 0.02601 $Iβ^+$: 0.013 derived from $ε/β^+$=1715 (theory).
1510 *12*	478.15	0.19 *2*	11.4 *10*	6.0	11.6 *10*	av Eβ= 218.5 *18*; εK= 0.8516; εL= 0.10690; εM+= 0.02546 E($β^+$)=488 *12* (1971Ib01), 495 *25* (1965Ev04) s, F-K plot.

Continued on next page (footnotes at end of table)

^{101}Pd ε decay (8.47 h) 1972Ny01,1970Ph04 (continued)

ε,β+ radiations (continued)

E(decay)	E(level)	Iβ+ †	Iε†	Log *ft*	I(ε+β+)†	Comments
						Iβ+: from %ε+%β+=11.6 via level scheme intensity balance and ε/β+=61.4 (theory). Other: 0.44 *13* from I(ce(K) 296γ)/Iβ(488β)= 0.74 *21* (1971Ib01). Iβ(776β)/Iβ(488β)= 14 *3* (1971Ib01), 4.9 (1965Ev04).
(1625 *4*)	355.33		0.157 *20*	7.94 *6*	0.157 *20*	av Eβ= 271.4 *18*; εK= 0.8341; εL= 0.10448; εM+=0.024880
(1675 *4*)	305.5		0.18 *5*	7.92 *13*	0.18 *5*	
1798 *4*	181.87	4.88 *12*	52.2 *13*	5.49	57.1 *13*	av Eβ= 346.7 *18*; εK= 0.7917 *13*; εL= 0.09894 *16*; εM+= 0.02355 *4*
						E(decay): E(β+)= 776 *4* (1971Ib01), 785 *15* (1965Ev04) s, F-K plot. Others: 1949Eg04, 1956Ka25. Iβ+: from %ε+%β+=57.1 *14* via level scheme intensity balance and ε/β+=10.7 (theory). Other: 6.2 *6* from I(ce(K) 296γ)/Iβ(776β)= 0.052 *3* (1971Ib01).

† Absolute intensity per 100 decays.

^{101}Pd ε decay (8.47 h) 1972Ny01,1970Ph04 (continued)

γ(^{101}Rh)

Iγ normalization: for Σ(Iγ+ce)=100 to 0.0+157.3 levels (excluding 157 transition), if %(ε+β$^+$)-branchings are negligible.
γγ-coin: 1970Ph04, 1972Ny01; (ce)γ-coin: 1965Ev04.
α(K)exp=ce(K)/Iγ (1972Ny01) normalized to α(K)(296γ)=0.0170 (M1+7.8% E2,theory). Other: ce(K)/Iγ (1970Ph04) simultaneous measurement.

E_γ [†]	I_γ [†#]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	δ	α[@]	Comments
24.46 *1*	20.3 *8*	181.87	(7/2)$^+$	157.41	9/2$^+$	M1+E2	0.019 *+3−2*	20.1	α(K)=17.38 *25*; α(L)=2.27 *5*; α(M)=0.423 *9*; α(N+..)=0.0730 *15* α(N)=0.0697 *14*; α(O)=0.00332 *5* B(M1)(W.u.)=0.0360 *16*; B(E2)(W.u.)=20 *7* I_γ: from 1970Ph04. Other: 22 *4* (1972Ny01) calc from I(ce(L))/α(L). δ: from L-subshell ratios (1972Ny01). L1/L2=13.2 *24*, L1/L3=24 *6*, L2/L3=1.8 *6* and L1/M=4.8 *6*. Measured I(ce(L)+ce(M)+ce(N))=61 *5* (1972Ny01) normalized to I(ce(K) 296γ)=17.0.
111.40 *8*	0.06 *2*	1470.91	5/2$^+$,7/2$^+$	1359.47	7/2$^+$	M1(+E2)	<0.55	0.34 *8*	α(K)= 0.2222; α(L)= 0.0270; α(M)=0.00501; α(N+..)=0.00098 α(K)exp=0.22 *+12−8*
129.7 *10*	0.08 *4*	1035.79	(5/2)$^+$	905.77	(5/2,7/2)$^+$				E_γ: Eγ,Iγ from 1970Ph04.
132.8 *5*	0.11 *4*	1604.4	(7/2$^-$,9/2$^-$)	1470.91	5/2$^+$,7/2$^+$	E1		0.065	α(K)= 0.0566; α(L)=0.00666; α(M)=0.00122; α(N+..)=0.00023 α(K)exp=0.039 *+26−16*
157.41 *3*		157.41	9/2$^+$	0.0	1/2$^-$	M4		29.2	α(K)=21.1 *3*; α(L)=6.61 *10*; α(M)=1.332 *19*; α(N+..)=0.218 *3* α(N)=0.211 *3*; α(O)=0.00642 *9* B(M4)(W.u.)=31.2 *9* E_γ,Mult.: from ^{101}Rh IT decay.
158.0 *5*	0.12 *5*	905.77	(5/2,7/2)$^+$	747.86	(7/2)$^+$				
[x]171.0 *5*	0.09 *5*								
[x]173.1 *5*	0.12 *5*					E1		0.0304	α(K)= 0.0265; α(L)=0.00309; α(M)=0.00057; α(N+..)=0.00011 α(K)exp<0.050
185.0 *10*	0.05 *2*	1789.64	(5/2,7/2)$^+$	1604.4	(7/2$^-$,9/2$^-$)				
269.67 *7*	33.5 *6*	747.86	(7/2)$^+$	478.15	(5/2)$^+$	M1		0.024	α(K)=0.0207 *3*; α(L)=0.00245 *4*; α(M)=0.000456 *7*; α(N+..)=7.95×10^{-5} *12* α(N)=7.57×10^{-5} *11*; α(O)=3.84×10^{-6} *6* α(K)exp=0.0197 *7* B(M1)(W.u.)>0.0016 I_γ: others: 30.9 *10* (1970Ph04), 39 *3* (1974HeYW). α(K)exp: others: 0.022 *1* (1970Ph04) ce(K)/I, K/L= 8.18 *45*(1972Ny01).

^{101}Pd ε decay (8.47 h) 1972Ny01,1970Ph04 (continued)

γ(^{101}Rh) (continued)

E_γ [†]	I_γ [†#]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	δ	α[@]	Comments
296.29 *3*	100	478.15	$(5/2)^+$	181.87	$(7/2)^+$	M1+E2	0.28 *4*	0.0187	α(K)=0.0169 *3*; α(L)=0.00204 *4*; α(M)=0.000380 *7*; α(N+..)=6.59×10^{-5} *12* α(N)=6.28×10^{-5} *12*; α(O)=3.11×10^{-6} *5* α(K)exp=0.0175 *8* (1970Ph04) B(M1)(W.u.)=0.011 *3*; B(E2)(W.u.)=9 *4* δ: 0.28 *4*; upper limit is from L1/(L2+L3)=15 *4*; lower limit from K/L= 8.20 *12* (1972Ny01).
305.3 *6*	0.20 *5*	305.5	$3/2^-,5/2^-$	0.0	$1/2^-$				I_γ: from intensity balance about 305 level and Iγ<0.26 from and assumption of M1 mult. For E2 one would get Iγ<0.18.
320.74 *4*	2.94 *15*	478.15	$(5/2)^+$	157.41	$9/2^+$	E2		0.0226	α(K)=0.0194 *3*; α(L)=0.00262 *4*; α(M)=0.000489 *7*; α(N+..)=8.25×10^{-5} *12* α(N)=7.92×10^{-5} *11*; α(O)=3.29×10^{-6} *5* α(K)exp=0.0222 *20* B(E2)(W.u.)=2.5 *6*
355.30 *10*	1.16 *7*	355.33	$5/2^-$	0.0	$1/2^-$	E2(+M1)	>1.5	0.0155 *7*	α(K)=0.01394 *20*; α(L)=0.00184 *3*; α(M)=0.000344 *5*; α(N+..)=5.82×10^{-5} *9* α(N)=5.59×10^{-5} *8*; α(O)=2.39×10^{-6} *4* α(K)exp=0.0148 *19* Mult.: M1 excluded from adopted ΔJ=2.
374.6 *2*	0.03 *2*	1845.40		1470.91	$5/2^+,7/2^+$				
381.2 *2*	0.20 *4*	1359.47	$7/2^+$	978.54	$(7/2^+,9/2^+)$	M1,E2		0.0114 *15*	α(K)exp=0.0080 *+21−15*
427.65 *8*	0.51 *3*	905.77	$(5/2,7/2)^+$	478.15	$(5/2)^+$	M1,E2			α(K)exp=0.0079 *10*
435.08 *8*	0.33 *4*	1470.91	$5/2^+,7/2^+$	1035.79	$(5/2)^+$	E2			α(K)=0.00742; α(L)=0.00094; α(M)=0.00018 α(K)exp=0.0084 *+15−10*
453.70 *5*	3.15 *12*	1359.47	$7/2^+$	905.77	$(5/2,7/2)^+$	M1+E2	<0.8		α(K)exp=0.0056 *4*
492.0 *2*	0.05 *2*	1470.91	$5/2^+,7/2^+$	978.54	$(7/2^+,9/2^+)$				α(K)exp=0.0064 *+39−19*
496.08 *15*	0.17 *5*	851.43	$7/2^-,9/2^-$	355.33	$5/2^-$	M1,E2			α(K)=0.00478 *25*; α(L)=0.00058 *5*; α(M)=0.000108 *10*; α(N+..)=1.86×10^{-5} *15* α(N)=1.78×10^{-5} *15*; α(O)=8.59×10^{-7} *24*
544.9		851.43	$7/2^-,9/2^-$	305.5	$3/2^-,5/2^-$				
565	1.1 *4*	1470.91	$5/2^+,7/2^+$	905.77	$(5/2,7/2)^+$				I_γ: inferred from γγ-coin spectra.
565.98 *5*	17.9 *4*	747.86	$(7/2)^+$	181.87	$(7/2)^+$	M1,E2			α(K)exp=0.00339 *19* α(K)exp: other: 0.0035 *4* (1970Ph04) doublet ce(K)/Iγ.
590.44 *6*	62.8 *10*	747.86	$(7/2)^+$	157.41	$9/2^+$	M1,E2			α(K)exp=0.00306 *9* I_γ: others: 61.6 *10* (1970Ph04), 70 *4* (1974HeYW). α(K)exp: others: 0.0031 *2* (1970Ph04) ce(K)/Iγ, K/L= 8.5*20* (1972Ny01).
611.44 *10*	0.49 *5*	1359.47	$7/2^+$	747.86	$(7/2)^+$	M1,E2			α(K)exp=0.0027 *7*
619.45 *12*	0.21 *3*	1470.91	$5/2^+,7/2^+$	851.43	$7/2^-,9/2^-$				
702.4 *3*	0.09 *3*	1058.0	$3/2^-,5/2^-$	355.33	$5/2^-$				α(K)exp=0.0034 *+21−14*
722.9 *2*	1.4 *4*	1470.91	$5/2^+,7/2^+$	747.86	$(7/2)^+$	M1,E2			α(K)exp=0.0026 *+11−60*

$^{101}_{45}Rh_{56}$-4

^{101}Pd ε decay (8.47 h) 1972Ny01,1970Ph04 (continued)

γ(^{101}Rh) (continued)

E_γ [†]	I_γ [†#]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [‡]	Comments
							I_γ: from Iγ(722.9γ+723.75γ)=11.6 and Iγ(722.9γ/723.75γ)=0.14 *3* (1970Ph04).
723.75 *10*	10.2 *6*	905.77	(5/2,7/2)$^+$	181.87	(7/2)$^+$	M1+E2	α(K)exp=0.0021 *2* I_γ: see 722.9, doublet: 12.2 *12* (1970Ph04) apportioned via γγ-coin spectra. Other: 14.4 *16* (1974HeYW).
748.37 *5*	2.61 *10*	905.77	(5/2,7/2)$^+$	157.41	9/2$^+$	M1,E2	α(K)exp=0.00177 *14*
787.0 *4*	0.025 *12*	1845.40		1058.0	3/2$^-$,5/2$^-$		
790.4 *2*	0.12 *2*	1696.42	(5/2)$^+$	905.77	(5/2,7/2)$^+$	M1,E2	α(K)exp=0.0024 *+9−8*
796.62 *15*	0.14 *2*	978.54	(7/2$^+$,9/2$^+$)	181.87	(7/2)$^+$	M1,E2	α(K)exp=0.0023 *9*
821.2 *6*	0.10 *4*	978.54	(7/2$^+$,9/2$^+$)	157.41	9/2$^+$		
853.89 *7*	0.46 *4*	1035.79	(5/2)$^+$	181.87	(7/2)$^+$	M1,E2	α(K)exp= 0.0012 *3*.
857.0 *5*	0.04 *2*	1604.4	(7/2$^-$,9/2$^-$)	747.86	(7/2)$^+$		
[x]870.7 *2*	0.11 *3*						
881.29 *8*	0.56 *5*	1359.47	7/2$^+$	478.15	(5/2)$^+$	M1,E2	α(K)exp=0.0013 *3*
905.8 *3*	0.04 *2*	905.77	(5/2,7/2)$^+$	0.0	1/2$^-$		
[x]911.8 *4*	0.11 *3*						
914.86 *12*	0.39 *4*	1820.67	(5/2,7/2)$^+$	905.77	(5/2,7/2)$^+$	M1,E2	α(K)exp=0.0013 *3*
949.0 *4*	0.04 *2*	1696.42	(5/2)$^+$	747.86	(7/2)$^+$		
965.2 *5*	0.10 *5*	1320.2	(3/2)	355.33	5/2$^-$		
992.84 *6*	4.9 *3*	1470.91	5/2$^+$,7/2$^+$	478.15	(5/2)$^+$	M1,E2	α(K)exp=0.00092 *8*
1014.6 *2*	0.12 *4*	1320.2	(3/2)	305.5	3/2$^-$,5/2$^-$		
1041.73 *15*	0.29 *4*	1789.64	(5/2,7/2)$^+$	747.86	(7/2)$^+$	M1,E2	α(K)exp=0.0011 *4*
1072.9 *2*	0.15 *4*	1820.67	(5/2,7/2)$^+$	747.86	(7/2)$^+$		
1163.6 *7*	0.05 *3*	1911.52		747.86	(7/2)$^+$		I_γ: Iγ from 1970Ph04.
1165.7 *7*	0.05 *3*	1470.91	5/2$^+$,7/2$^+$	305.5	3/2$^-$,5/2$^-$		I_γ: Iγ from 1970Ph04.
1177.63 *8*	1.84 *10*	1359.47	7/2$^+$	181.87	(7/2)$^+$	M1+E2	α(K)exp=0.00068 *9*
1202.04 *6*	7.9 *3*	1359.47	7/2$^+$	157.41	9/2$^+$	M1(+E2)	α(K)exp=0.00062 *4*
1218.28 *7*	2.71 *10*	1696.42	(5/2)$^+$	478.15	(5/2)$^+$	M1(+E2)	α(K)exp=0.00062 *6*
1289.05 *5*	11.9 *3*	1470.91	5/2$^+$,7/2$^+$	181.87	(7/2)$^+$	M1	α(K)=0.00053 α(K)exp=0.00056 *3*
1311.5 *3*	0.82 *15*	1789.64	(5/2,7/2)$^+$	478.15	(5/2)$^+$		I_γ: see 1313.5, doublet: 1.5 *3* (1970Ph04) apportioned via γγ-coin spectra. Other: 1.4 *16* (1974HeYW). Mult.: α(K)exp= 0.00053 *11* for the 1311+1313 γ′s.
1313.5 *3*	0.38 *10*	1470.91	5/2$^+$,7/2$^+$	157.41	9/2$^+$		I_γ: from Iγ(1311γ+1313γ)=1.20 and Iγ(1311γ/1313γ)=0.46 *13* (1970Ph04).
1342.5 *2*	0.13 *2*	1820.67	(5/2,7/2)$^+$	478.15	(5/2)$^+$		
1391.2 *6*	0.03 *1*	1696.42	(5/2)$^+$	305.5	3/2$^-$,5/2$^-$		
1433.4 *3*	0.15 *3*	1911.52		478.15	(5/2)$^+$		
1447.0 *5*	0.02 *1*	1604.4	(7/2$^-$,9/2$^-$)	157.41	9/2$^+$		
[x]1512.4 *3*	0.13 *3*						
1514.6 *3*	0.10 *3*	1696.42	(5/2)$^+$	181.87	(7/2)$^+$		
1607.7 *3*	0.14 *2*	1789.64	(5/2,7/2)$^+$	181.87	(7/2)$^+$		
1632.5 *3*	0.10 *2*	1789.64	(5/2,7/2)$^+$	157.41	9/2$^+$	M1,E2	α(K)exp=0.00027 *17*
1638.6 *3*	0.52 *5*	1820.67	(5/2,7/2)$^+$	181.87	(7/2)$^+$	M1,E2	α(K)exp=0.00039 *10*

$^{101}_{45}Rh_{56}$-5

^{101}Pd ε decay (8.47 h) 1972Ny01,1970Ph04 (continued)

γ(^{101}Rh) (continued)

E_γ [†]	I_γ [†#]	E_i(level)	J_i^π	E_f	J_f^π
[x]1646.5 *10*	0.009 *5*				
1663.6 *4*	0.011 *6*	1820.67	(5/2,7/2)$^+$	157.41	9/2$^+$
1729.6 *3*	0.045 *15*	1911.52		181.87	(7/2)$^+$

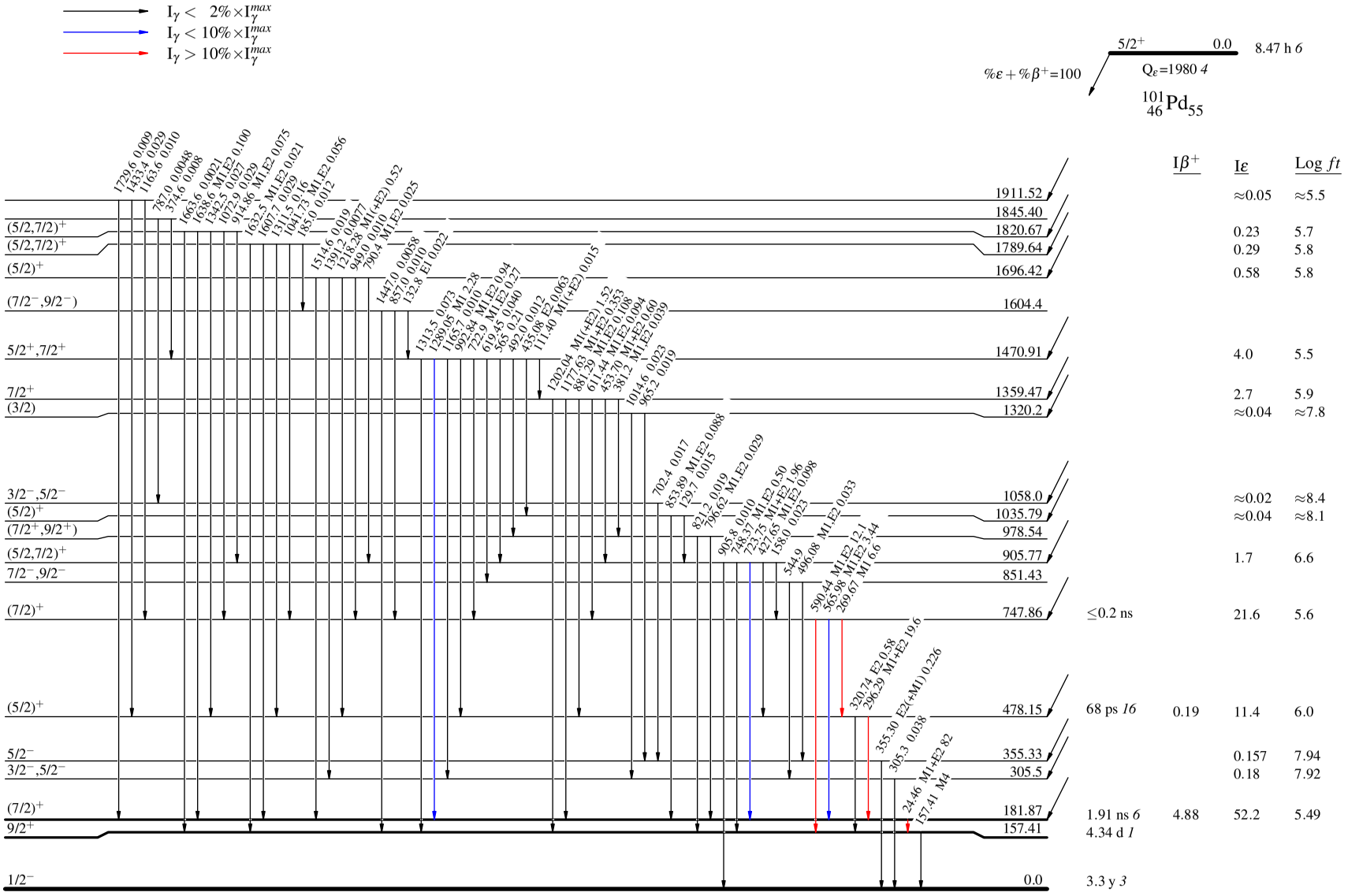
[†] Are from 1972Ny01, unless otherwise noted.
[‡] From ce.
[#] For absolute intensity per 100 decays, multiply by 0.192 *8*.
[@] Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.
[x] γ ray not placed in level scheme.

$^{101}_{45}Rh_{56}$-6

^{101}Pd ε decay (8.47 h) 1972Ny01,1970Ph04

Decay Scheme

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays



$^{101}_{45}Rh_{56}$