Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	S. Kumar(a), J. Chen(b) and F. G. Kondev	NDS 137, 1 (2016)	31-May-2016

Q(β^-)=1113.3 *14*; S(n)=6153.59 *15*; S(p)=9864 *14*; Q(α)=−4099.0 *28* 2012Wa38

^{109}Pd Levels

Cross Reference (XREF) Flags

A	^{109}Rh β^- decay	E	^{108}Pd(n,γ) E=2.96 eV
B	^{109}Pd IT decay (4.703 min)	F	^{108}Pd(d,p)
C	^{108}Pd(n,γ) E=thermal	G	^{110}Pd(d,t)
D	^{108}Pd(n,γ) E=res: av	H	^{176}Yb(^{30}Si,Fγ)

E(level)[†]	J^π	$T_{1/2}$[‡]	XREF	Comments
0[a]	5/2+[#]	13.59 h *12*	ABCDEFGH	%β^-=100 J^π: L(d,p)=L(d,t)=2 and direct β-feeding to J^π=7/2+ in ^{109}Ag. $T_{1/2}$: using the Limitation of Relative Statistical Weight method and 13.45 h 1 (2015Kr07), 13.7012 h 24 (1990Ab06), 13.404 h 8 (1988Ba60), 13.85 h 17 (1983Ch42), 13.427 h 14 (1977Gi11), 13.67 h 7 (1970Bo22), 13.47 h *1* (1962Br15), 13.45 h *1* (1959St28). Others: 13.99 h *16* (1958Gu09), and 14.1 h *3* (1948Mo33). configuration: a mixture between ν5/2+[413] and ν5/2+[402] Nilsson configurations.
113.4000 *14*	1/2+	380 ns *50*	A CDEFG	J^π: L(d,p)=L(d,t)=0. 113.4γ E2 to 5/2+. $T_{1/2}$: from (178.0γ)(113.4γ)(t) measurements by 1978Ka10 in ^{109}Rh β^- decay. configuration: K$^\pi$=1/2+, ν1/2[411] Nilsson configuration. Assignment is tentative.
188.9903[@] *10*	11/2−[#]	4.703 min *9*	BCDEFGH	%IT=100 J^π: L(d,p)=L(d,t)=5, 188.990γ E3 to 5/2+. $T_{1/2}$: using the Limitation of Relative Statistical Weight method and 4.694 m 2 (2015Kr07), 4.696 m 3 (1990Ab06), 4.750 min *4* (1992An19), 4.663 min *11* (1992KaZM), 4.6 min *4* (1970Bo22), 4.7 min *1* (1967Na18), 4.69 min *1* (1959St28), and 4.75 min *5* (1957St87). configuration: Most likely the K^π=3/2−, ν3/2−[541] ($h_{11/2}$) Nilsson configuration.
245.0807 *16*	(7/2)−	1.528 ns *56*	A CDE	J^π: average resonance capture; 245.080γ E1 to 5/2+.
248.01 *11*	9/2+		C FG	XREF: F(245)G(243). J^π: L(d,p)=L(d,t)=4; 59.4γ to 11/2−, 247.96γ to 5/2+.
266.3424 *15*	1/2+		A CDEFG	J^π: L(d,p)=L(d,t)=0; 152.942γ M1 to 1/2+, 266.346γ E2 to 5/2+.
276.289[b] *3*	7/2+[#]	11.3 ps *34*	A CDE H	J^π: 276.296γ M1+E2 to 5/2+; av res capture.
287.250[&] *3*	9/2−[#]		CDE H	J^π: 98.258γ M1 to 11/2−, 317.255γ from 5/2−.
291.4339 *16*	3/2+	136.5 ps *23*	A CDEFG	J^π: L(d,p)=L(d,t)=2, 178.034γ M1 to 1/2+.
325.2836 *16*	3/2+	39.6 ps *35*	A CDEfg	J^π: L(d,t)=2, L(d,p)=0+2, 211.884γ M1(+E2) to 1/2+.
326.8689 *22*	5/2+	0.832 ns *27*	A CDEfg	J^π: direct feeding in ^{109}Rh β^- decay (J^π=7/2+) ; L(d,t)=2, L(d,p)=0+2; average res rules out 7/2+ and 9/2+; 35.34γ M1 to 3/2+, 81.78γ E1(+M2) to (7/2)−. $T_{1/2}$: Other: 0.57 ns *15* from 1998Lh02 using the centroid-shift method of delayed-coincidence.
339.5299 *17*	5/2−		CDE G	J^π: 339.528γ E1(+M2) to 5/2+, 94.450γ M1+E2 to J^π=(7/2)−; av res capture.
370 *4*	(1/2−,3/2−)		F	J^π: L(d,p)=(1).

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Adopted Levels, Gammas (continued)

^{109}Pd Levels (continued)

E(level)[†]	J^π	$T_{1/2}$[‡]	XREF	Comments
382 *4*	1/2+,3/2+,5/2+		F	J^π: L(d,p)=0,2.
404 *4*	1/2+		F	J^π: L(d,p)=0.
426.140 *3*	7/2+	73.6 ps *42*	A CDEFG	J^π: L(d,p)=L(d,t)=4, 426.135γ M1 to 5/2+.
433.5630 *17*	3/2+		CDE	J^π: 320.164γ M1 to 1/2+, 433.552γ M1 to 5/2+.
491.589 *3*	3/2+	62.9 ps *42*	A CDEFG	J^π: L(d,p)=L(d,t)=2, 5/2+ is ruled out from av res capture.
540.6753 *19*	5/2+	29.3 ps *43*	A CDEFG	J^π: L(d,p)=L(d,t)=2, av res capture rules out 3/2+.
597.1[a] *5*	(9/2)+[#]		A GH	J^π: L(d,t)=4.
604.5118 *24*	5/2−		CDE	J^π: 264.980γ M1+E2 to 5/2−, av res capture.
623.4813 *23*	1/2+		CDEFG	J^π: L(d,p)=0.
625.0[@] *9*	(15/2−)[#]		H	J^π: 436γ to 11/2−.
645.96 *4*	7/2+,9/2+		CDEFG	J^π: L(d,p)=L(d,t)=4, inconsistent with J^π=5/2−,7/2 from av res capture.
673.4878 *24*	3/2−		CDEFG	J^π: L(d,p)=L(d,t)=1, 333.964γ M1(+E2) to 5/2−.
712 *4*	(7/2+,9/2+)		G	J^π: L(d,t)=(4).
718.1[&] *7*	(13/2−)[#]		H	J^π: 431γ to 9/2−, 529γ to 11/2−.
722.043 *3*	3/2+,5/2+		CDEF	XREF: F(719). J^π: L(d,p)=2.
729 *4*	3/2+,5/2+		G	J^π: L(d,t)=2.
742 *4*	1/2+		F	J^π: L(d,p)=0.
791.425 *5*	5/2+,3/2+		CDEFG	J^π: L(d,p)=L(d,t)=2.
810.592 *4*	3/2+		CDEFG	J^π: L(d,p)=L(d,t)=2, av res capture.
846.1 *5*	5/2+		CDEFG	J^π: from L(d,p)=L(d,t)=2, av res capture.
883 *4*	9/2−,11/2−		G	J^π: L(d,t)=5.
907.2[b] *7*	(11/2+)[#]		H	
911.253 *12*	5/2+		CDEFG	J^π: L(d,p)=L(d,t)=2, av res capture.
941.098 *3*	3/2−		CDEF	J^π: L(d,p)=1, 336.584γ M1 to 5/2−.
944.967 *6*	1/2+		CDE G	J^π: L(d,t)=0.
954.164 *9*	1/2+		CDEFG	XREF: G(960). J^π: L(d,p)=0.
981.755 *10*	5/2+		A CDEFG	J^π: L(d,t)=2, av res capture.
1006 *4*			F	
1053.627 *20*	3/2+		CDEFG	J^π: L(d,p)=L(d,t)=2, av res capture.
1065.8 *5*	1/2+		CD G	J^π: L(d,t)=0.
1091.0 *5*	5/2+		CDEFG	J^π: L(d,p)=L(d,t)=2,av res capture.
1111.8 *5*	1/2,3/2		CD	J^π: from av res capture.
1134.693 *6*	1/2,3/2		CDE	J^π: from av res capture.
1147.7 *5*	3/2+		CD FG	J^π: L(d,p)=L(d,t)=2 and av res capture.
1176 *4*	5/2−,7/2−		F	J^π: L(d,p)=3.
1232.794 *22*	1/2+		CDEFG	J^π: L(d,p)=L(d,t)=0.
1241 *4*	5/2−,7/2−		F	J^π: L(d,p)=3.
1243.9 *5*	1/2,3/2		CD	J^π: from av res capture.
1267.2[a] *9*	(13/2+)[#]		H	
1269.5 *5*	5/2+,3/2+		CDEFG	XREF: F(1263)G(1269). J^π: L(d,p)=L(d,t)=2.
1289.0[@] *13*	(19/2−)[#]		H	
1308 *4*			F	
1317.23 *19*			A	
1328.4 *5*	5/2		CDE	J^π: from av res capture.
1329 *4*	(1/2−,3/2−)		F	J^π: L(d,p)=1.
1347.7 *5*	1/2+		CD FG	J^π: L(d,p)=L(d,t)=0.
1359.410 *8*	1/2,3/2		CDE	J^π: from av res capture.
1361.1[&] *10*	(17/2−)[#]		H	
1371.1 *5*	5/2+		CDE G	J^π: L(d,t)=2 and av res capture.
1377.7 *8*	1/2,3/2		CD	J^π: from av res capture.
1399.0 *5*	1/2,3/2		CDE	J^π: from av res capture.

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Adopted Levels, Gammas (continued)

^{109}Pd Levels (continued)

E(level)[†]	J^π	XREF	Comments
1448 *4*	3/2$^+$,5/2$^+$	G	J^π: L(d,t)=2.
1478.7 *5*	1/2$^+$	C EFG	J^π: L(d,p)=L(d,t)=0.
1484.9 *5*	(1/2,3/2,5/2$^+$)	C F	J^π: primary-γ from 1/2$^+$ capture state.
1499 *4*		F	
1537.3 *5*	1/2$^+$	C G	XREF: G(1539). J^π: L(d,t)=0.
1540.3 *5*	3/2	C EF	J^π: from $\gamma(\theta)$ in 296 eV res capture.
1601.7 *5*	(1/2$^+$)	C G	J^π: L(d,t)=(0).
1615.8 *5*	(1/2,3/2,5/2$^+$)	C	J^π: primary-γ from 1/2$^+$ capture state.
1623.9 *5*	(1/2,3/2,5/2$^+$)	E	J^π: primary-γ from 1/2$^+$ capture state.
1635.2[b] *13*	(15/2$^+$)[#]	H	
1644.6 *5*	(3/2$^+$,5/2$^+$)	C FG	J^π: L(d,t)=(2).
1647.8 *5*	(1/2,3/2,5/2$^+$)	C E	J^π: primary-γ from 1/2$^+$ capture state.
1656? *4*	(1/2$^+$)	G	J^π: L(d,t)=0.
1664 *4*		F	
1683.5 *5*	1/2$^+$	C F	J^π: L(d,p)=0.
1692 *4*	1/2$^+$	G	J^π: L(d,t)=0.
1710.2 *5*	(1/2,3/2,5/2$^+$)	C	J^π: primary-γ from 1/2$^+$ capture state.
1737 *4*		F	
1773 *4*	5/2$^-$,7/2$^-$	F	J^π: L(d,p)=3.
1789 *4*	1/2$^+$	C FG	XREF: C(?)G(1785). J^π: L(d,t)=0.
1800 *4*	1/2$^+$	FG	XREF: G(1792). J^π: L(d,p)=0.
1819 *4*		F	
1836 *4*	5/2$^-$,7/2$^-$	C F	XREF: C(?). J^π: L(d,p)=3.
1846 *4*		F	J^π: L(d,p)=(1,2).
1848 *4*	1/2$^+$	G	J^π: L(d,t)=0.
1863 *4*	(5/2$^-$,7/2$^-$)	F	J^π: L(d,p)=(3).
1873.2[a] *13*	(17/2$^+$)[#]	H	
1877 *4*	1/2$^-$,3/2$^-$	F	J^π: L(d,p)=1.
1878 *4*	3/2$^+$,5/2$^+$	G	J^π: L(d,t)=2.
1915 *4*	1/2$^-$,3/2$^-$	C F	XREF: C(?). J^π: L(d,p)=1.
1923 *4*	1/2$^-$,3/2$^-$	C FG	XREF: C(?)G(1927). J^π: L(d,p)=L(d,t)=1.
1941 *4*	5/2$^-$,7/2$^-$	F	J^π: L(d,p)=3.
1954 *4*		F	
1972 *4*	5/2$^-$,7/2$^-$	F	J^π: L(d,p)=3.
1977 *4*	1/2$^-$,3/2$^-$	G	J^π: L(d,t)=1.
1999 *4*		C G	XREF: C(?). J^π: L(d,t)=(1,2).
2014 *4*	1/2$^+$	G	J^π: L(d,t)=0.
2021 *4*	1/2$^-$,3/2$^-$	C F	J^π: L(d,p)=1.
2053 *4*		F	
2091 *4*	3/2$^+$,5/2$^+$	C F	XREF: C(?). J^π: L(d,p)=2.
2101 *4*	(3/2$^+$,5/2$^+$)	G	J^π: L(d,t)=(2).
2103.0[@] *17*	(23/2$^-$)[#]	H	
2117 *4*	1/2$^-$,3/2$^-$	F	J^π: L(d,p)=1.
2120 *4*	1/2$^+$	C G	XREF: C(?). J^π: L(d,t)=0.
2135 *4*	(1/2$^-$,3/2$^-$)	F	J^π: L(d,pt)=(1).
2155.1[&] *14*	(21/2$^-$)[#]	H	

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Adopted Levels, Gammas (continued)

^{109}Pd Levels (continued)

E(level)[†]	J^π	XREF	Comments
2160 *4*	$1/2^-,3/2^-$	C F	XREF: C(?). J^π: L(d,p)=1.
2174 *4*	$3/2^+,5/2^+$	G	J^π: L(d,t)=2.
2188 *4*	$1/2^+$	C G	XREF: C(?). J^π: L(d,t)=0.
2209 *4*	$5/2^-,7/2^-$	F	J^π: L(d,p)=3.
2240 *4*	$(3/2^+,5/2^+)$	C G	XREF: C(?). J^π: L(d,t)=(2).
2245 *4*	$1/2^-,3/2^-$	F	J^π: L(d,p)=1.
2259 *4*	$1/2^-,3/2^-$	F	J^π: L(d,p)=1.
2280 *4*	$3/2^+,5/2^+$	F	J^π: L(d,p)=2.
2282 *4*	$1/2^+$	G	J^π: L(d,t)=0.
2295 *4*	$1/2^-,3/2^-$	G	J^π: L(d,t)=1.
2301 *4*	$(1/2^-,3/2^-)$	F	J^π: L(d,p)=(1).
2320 *4*	$3/2^+,5/2^+$	G	J^π: L(d,t)=2.
2346 *4*	$(5/2^-,7/2^-)$	F	J^π: L(d,p)=(3).
2357 *4*	$(1/2^-,3/2^-)$	F	J^π: L(d,p)=(1).
2364.2[b] *16*	$(19/2^+)$[#]	H	
2371 *4*		FG	XREF: G(2371). J^π: L(d,p)=3 and L(d,t)=2 indicate a possible doublet.
2380 *4*	$1/2^+$	G	J^π: L(d,t)=0.
2391 *4*	$5/2^-,7/2^-$	F	J^π: L(d,p)=3.
2415 *4*	$1/2^-,3/2^-$	C F	XREF: C(?). J^π: L(d,p)=1.
2465 *4*	$5/2^-,7/2^-$	F	J^π: L(d,p)=3.
2473 *4*	$1/2^-,3/2^-$	FG	XREF: G(2479). J^π: L(d,p)=1.
2478.2[a] *17*	$(21/2^+)$[#]	H	
2493 *4*	$(5/2^-,7/2^-)$	F	J^π: L(d,p)=(3).
2522 *4*	$3/2^+,5/2^+$	F	J^π: L(d,p)=2.
2541 *4*		F	
3030.0[@] *20*	$(27/2^-)$[#]	H	
3975.0[@] *22*	$(31/2^-)$[#]	H	
4958.0[@] *24*	$(35/2^-)$[#]	H	

[†] From a least-squares fit to Eγ.
[‡] From ^{109}Rh β^- decay (2015Bu15) using $\beta\gamma\gamma$(t), unless otherwise noted.
[#] Band structure.
[@] Band(A): Most likely the K^π=3/2$^-$, ν3/2$^-$[541] ($h_{11/2}$), α=−1/2 band.
[&] Band(B): Most likely the K^π=3/2$^-$, ν3/2$^-$[541] ($h_{11/2}$), α=+1/2 band.
[a] Band(C): K^π=5/2$^+$ band, α=+1/2. A mixture between ν5/2$^+$[413] and ν5/2$^+$[402] Nilsson configurations. Assignment is tentative.
[b] Band(D): K^π=5/2$^+$ band, α=−1/2. A mixture between ν5/2$^+$[413] and ν5/2$^+$[402] Nilsson configurations. Assignment is tentative.

Adopted Levels, Gammas (continued)

$\gamma(^{109}Pd)$

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.‡	δ#	α@	Comments
113.4000	1/2+	113.401 *2*	100	0	5/2+	E2		0.891	α(K)=0.704 *10*; α(L)=0.1527 *22*; α(M)=0.0294 *5* α(N)=0.00463 *7* B(E2)(W.u.)=1.36 *18* Mult.: α(K)exp=0.7 *2* in ^{109}Rh β^- decay (1977Ba57); α(K)exp=0.56 *8*, α(L1)exp=0.053 *8*, α(L2)exp=0.031 *4*, α(L3)exp=0.039 *6*, α(M)exp=0.010 *2* in ^{108}Pd(n,γ) E=thermal (1980Ca02).
188.9903	11/2−	188.990 *1*	100	0	5/2+	E3		0.783	α(K)=0.570 *8*; α(L)=0.1733 *25*; α(M)=0.0340 *5* α(N)=0.00529 *8* B(E3)(W.u.)=0.000397 *3* Mult.: α(K)exp=0.52 *4* (1964We09), 0.60 *1* (1957St87) in ^{109}Rh β^- decay; α(K)exp=0.50 *5*, α(L1)exp=0.049 *7*, α(L2)exp=0.055 *9*, α(L3)exp=0.046 *8*, α(M)exp=0.022 *5* in ^{108}Pd(n,γ) E=thermal (1980Ca02).
245.0807	(7/2)−	245.080 *2*	100	0	5/2+	E1		0.01200	α(K)=0.01050 *15*; α(L)=0.001233 *18*; α(M)=0.000230 *4* α(N)=3.85×10^{-5} *6* B(E1)(W.u.)=1.30×10^{-5} *5* Mult.: α(K)exp=0.010 *1*, α(L1)exp=0.0015 *3* in ^{108}Pd(n,γ) E=thermal (1980Ca02).
248.01	9/2+	59.4 *3*	98 *49*	188.9903	11/2−				E_γ,I_γ: seen only by 2008Kr05 in (n,γ) E=thermal.
		247.96 *11*	100 *17*	0	5/2+				E_γ,I_γ: seen only by 2008Kr05 in (n,γ) E=thermal.
266.3424	1/2+	152.942 *1*	100 *6*	113.4000	1/2+	M1		0.1170	α(K)=0.1018 *15*; α(L)=0.01242 *18*; α(M)=0.00234 *4* α(N)=0.000393 *6* I_γ: weighted average of 100 *11* in (n,γ) E=thermal, 100 *10* in (n,γ) E=2.96 eV, and 100 *8* in ^{109}Rh β^- decay. Mult.: α(K)exp=0.095 *10*, α(L1)exp=0.010 *2*, α(M)exp=0.002 *5* in ^{108}Pd(n,γ) E=thermal (1980Ca02).
		266.346 *3*	31 *2*	0	5/2+	E2		0.0441	α(K)=0.0375 *6*; α(L)=0.00541 *8*; α(M)=0.001025 *15* α(N)=0.0001674 *24* I_γ: weighted average of 29 *3* in (n,γ) E=thermal, 31 *3* in (n,γ) E=2.96 eV, and 42 *8* in ^{109}Rh β^- decay. Mult.: α(K)exp=0.040 *4* in ^{108}Pd(n,γ) E=thermal (1980Ca02).
276.289	7/2+	276.296 *5*	100	0	5/2+	M1+E2	0.5 *3*	0.027 *3*	α(K)=0.0237 *23*; α(L)=0.0030 *5*; α(M)=0.00056 *8* α(N)=9.4×10^{-5} *13* B(M1)(W.u.)=0.07 *3*; B(E2)(W.u.)=2.0×10^{2} *20* Mult.,δ: α(K)exp=0.024 *2* in ^{108}Pd(n,γ) E=thermal (1980Ca02).
287.250	9/2−	98.258 *3*	100	188.9903	11/2−	M1		0.399	α(K)=0.347 *5*; α(L)=0.0427 *6*; α(M)=0.00804 *12* α(N)=0.001352 *19* Mult.: α(K)exp=0.29 *5*, α(L1)exp=0.044 *10* in ^{108}Pd(n,γ) E=thermal (1980Ca02).
291.4339	3/2+	178.034 *1*	100 *4*	113.4000	1/2+	M1		0.0776	α(K)=0.0676 *10*; α(L)=0.00820 *12*; α(M)=0.001543 *22* α(N)=0.000260 *4*

Adopted Levels, Gammas (continued)

$\gamma(^{109}\mathrm{Pd})$ (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.‡	δ#	α@	Comments
									B(M1)(W.u.)=0.0143 9 I_γ: weighted average of 100 10 in (n,γ) E=thermal, 100 10 in (n,γ) E=2.96 eV, and 100 5 in ^{109}Rh β^- decay. Mult.: α(K)exp=0.063 6, α(L1)exp=0.006 1 in ^{108}Pd(n,γ) E=thermal (1980Ca02).
291.4339	3/2$^+$	291.430 4	90 6	0	5/2$^+$	M1+E2	0.6 4	0.024 3	α(K)=0.0210 22; α(L)=0.0027 4; α(M)=0.00050 8 α(N)=8.4×10^{-5} 12 B(M1)(W.u.)=0.0022 8; B(E2)(W.u.)=8 8 I_γ: weighted average of 83 8 in (n,γ) E=thermal, 82 8 in (n,γ) E=2.96 eV, and 99 6 in ^{109}Rh β^- decay. Mult.,δ: α(K)exp=0.021 2, α(L1)exp=0.004 2 (1980Ca02).
325.2836	3/2$^+$	211.884 3	27 3	113.4000	1/2$^+$	M1(+E2)	0.3 +2−3	0.053 6	α(K)=0.046 5; α(L)=0.0058 9; α(M)=0.00108 17 α(N)=0.00018 3 I_γ: weighted average of 28 3 in (n,γ) E=thermal, 25 3 in (n,γ) E=2.96 eV, and 44 8 in ^{109}Rh β^- decay. Mult.,δ: α(K)exp=0.044 5, α(L1)exp=0.007 2 in ^{108}Pd(n,γ) E=thermal (1980Ca02).
		325.284 4	100 7	0	5/2$^+$	M1(+E2)	0.5 +3−5	0.0174 14	α(K)=0.0151 11; α(L)=0.00187 20; α(M)=0.00035 4 α(N)=5.9×10^{-5} 6 I_γ: weighted average of 100 10 in (n,γ) E=thermal, 100 10 in (n,γ) E=2.96 eV, and 100 19 in ^{109}Rh β^- decay. Mult.,δ: α(K)exp=0.015 1, α(L1)exp=0.002 1 in ^{108}Pd(n,γ) E=thermal (1980Ca02).
326.8689	5/2$^+$	35.34 10	2.4 3	291.4339	3/2$^+$	M1		7.65 13	α(K)=6.64 11; α(L)=0.830 14; α(M)=0.156 3 α(N)=0.0262 5 B(M1)(W.u.)=0.0117 19 I_γ: from ^{109}Rh β^- decay. Mult.: α(K)exp=9 5 in ^{109}Rh β^- decay (1978Ka10).
		81.78 5	1.3 1	245.0807	(7/2)$^-$	E1(+M2)	0.3 +2−3	0.9 10	α(K)=0.8 8; α(L)=0.13 15; α(M)=0.02 3 α(N)=0.004 5 I_γ: from ^{109}Rh β^- decay. Mult.,δ: D+Q from α(K)exp=0.7 6 in ^{109}Rh β^- decay (1978Ka10), change in parity between two levels indicates E1(+M2). 1978Ka10 report M1(+E2).
		326.868 4	100 10	0	5/2$^+$	E2(+M1)			E_γ: Note 326.450 10 in ^{109}Rh β^- decay (1979Bo26) is discrepant with the value from the ^{108}Pd(n,γ) E=thermal data. I_γ: from ^{109}Rh β^- decay. Mult.: α(K)exp=0.020 2 in ^{108}Pd(n,γ) E=thermal (1980Ca02).
339.5299	5/2$^-$	94.450 1	31 3	245.0807	(7/2)$^-$	M1+E2	0.33 +13−17	0.57 10	α(K)=0.48 7; α(L)=0.076 22; α(M)=0.014 5 α(N)=0.0023 7

$^{109}_{46}\mathrm{Pd}_{63}$-6

γ(^{109}Pd) (continued)

E$_i$(level)	J$^\pi_i$	E$_\gamma$ †	I$_\gamma$ †	E$_f$	J$^\pi_f$	Mult. ‡	δ #	α @	Comments
									Mult.,δ: α(K)exp=0.43 *9*, α(L1)exp=0.044 *6*, α(L2)exp=0.014 *6*, α(L3)exp=0.018 *8*, α(M)exp=0.018 *8* in ^{108}Pd(n,γ) E=thermal (1980Ca02).
339.5299	5/2$^-$	339.528 *4*	100 *10*	0	5/2$^+$	E1(+M2)	0.12 *+8−12*	0.0058 *14*	α(K)=0.0050 *12*; α(L)=0.00060 *16*; α(M)=0.00011 *3* α(N)=1.9×10^{-5} *5* Mult.,δ: α(K)exp=0.005 *1* in ^{108}Pd(n,γ) E=thermal (1980Ca02).
426.140	7/2$^+$	149.854 *3*	7.6 *5*	276.289	7/2$^+$				I$_\gamma$: weighted average of 8.5 *9* in (n,γ) E=thermal, 6.7 *8* in (n,γ) E=2.96 eV, and 7.7 *7* in ^{109}Rh β^- decay.
		426.135 *4*	100 *6*	0	5/2$^+$	M1		0.00822	α(K)=0.00719 *10*; α(L)=0.000849 *12*; α(M)=0.0001593 *23* α(N)=2.69×10^{-5} *4* B(M1)(W.u.)=0.0036 *4* I$_\gamma$: weighted average of 100 *10* in (n,γ) E=thermal, 100 *11* in (n,γ) E=2.96 eV, and 100 *9* in ^{109}Rh β^- decay.
433.5630	3/2$^+$	106.694 *3*	1.8 *3*	326.8689	5/2$^+$				I$_\gamma$: weighted average of 1.7 *3* in (n,γ) E=thermal and 2.5 *9* in (n,γ) E=2.96 eV (1980Ca02).
		108.280 *1*	7.4 *9*	325.2836	3/2$^+$				I$_\gamma$: weighted average of 8.3 *10* in (n,γ) E=thermal and 6.6 *9* in (n,γ) E=2.96 eV (1980Ca02).
		320.164 *5*	51 *4*	113.4000	1/2$^+$	M1		0.01677	α(K)=0.01464 *21*; α(L)=0.001745 *25*; α(M)=0.000328 *5* α(N)=5.52×10^{-5} *8* I$_\gamma$: weighted average of 47 *5* in (n,γ) E=thermal and 54 *5* in (n,γ) E=2.96 eV (1980Ca02). Mult.: α(K)exp=0.013 *3* in (n,γ) E=thermal(1980Ca02).
		433.552 *4*	100 *7*	0	5/2$^+$	M1		0.00788	α(K)=0.00689 *10*; α(L)=0.000813 *12*; α(M)=0.0001527 *22* α(N)=2.57×10^{-5} *4* I$_\gamma$: weighted average of 100 *10* in (n,γ) E=thermal and 100 *9* in (n,γ) E=2.96 eV (1980Ca02). Mult.: α(K)exp=0.0065 *8* in (n,γ) E=thermal (1980Ca02).
491.589	3/2$^+$	166.306 *8*	8.2 *18*	325.2836	3/2$^+$				I$_\gamma$: weighted average of 9.1 *17* in (n,γ) E=thermal, 10.7 *23* in (n,γ) E=2.96 eV, and 4.4 *22* in ^{109}Rh β^- decay.
		200.153 *4*	45 *5*	291.4339	3/2$^+$	M1		0.0567	α(K)=0.0494 *7*; α(L)=0.00598 *9*; α(M)=0.001125 *16* α(N)=0.000189 *3* B(M1)(W.u.)=0.0101 *14* I$_\gamma$: weighted average of 49 *5* in (n,γ) E=thermal, 55 *6* in (n,γ) E=2.96 eV, and 39 *4* in ^{109}Rh β^- decay. Mult.: α(K)exp=0.041 *10* in (n,γ) E=thermal (1980Ca02).
		378.191 *5*	100 *6*	113.4000	1/2$^+$	E2		0.01395	α(K)=0.01200 *17*; α(L)=0.001598 *23*; α(M)=0.000302 *5* α(N)=4.98×10^{-5} *7* B(E2)(W.u.)=19.4 *20* I$_\gamma$: weighted average of 100 *10* in (n,γ) E=thermal, 100 *10* in (n,γ) E=2.96 eV, and 100 *9* in ^{109}Rh β^- decay. Mult.: α(K)exp=0.012 *3* in (n,γ) E=thermal (1980Ca02).
		491.575 *10*	37 *3*	0	5/2$^+$				I$_\gamma$: weighted average of 40 *4* in (n,γ) E=thermal, 40 *4* in (n,γ) E=2.96 eV, and 30 *4* in ^{109}Rh β^- decay.

From ENSDF

$\gamma(^{109}Pd)$ (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.‡	δ#	α@	Comments
540.6753	5/2+	213.806 *4*	8.5 *8*	326.8689	5/2+				I_γ: weighted average of 9.3 *16* in (n,γ) E=thermal, 7.9 *11* in (n,γ) E=2.96 eV, and 9.3 *19* in ^{109}Rh β^- decay.
		215.390 *2*	31.2 *15*	325.2836	3/2+	M1		0.0467	α(K)=0.0407 *6*; α(L)=0.00492 *7*; α(M)=0.000924 *13* α(N)=0.0001557 *22* B(M1)(W.u.)=0.0139 *22* I_γ: weighted average of 35 *4* in (n,γ) E=thermal, 33 *3* in (n,γ) E=2.96 eV, and 29.6 *19* in ^{109}Rh β^- decay. Mult.: α(K)exp=0.039 *5* in (n,γ) E=thermal (1980Ca02).
		249.238 *11*	100 *5*	291.4339	3/2+	M1		0.0319	α(K)=0.0278 *4*; α(L)=0.00334 *5*; α(M)=0.000628 *9* α(N)=0.0001058 *15* B(M1)(W.u.)=0.029 *5* I_γ: weighted average of 100 *10* in (n,γ) E=thermal, 100 *10* in (n,γ) E=2.96 eV, and 100 *6* in ^{109}Rh β^- decay. Mult.: α(K)exp=0.027 *3* in (n,γ) E=thermal (1980Ca02).
		264.378 *11*	6.7 *14*	276.289	7/2+				I_γ: weighted average of 7.2 *21* in (n,γ) E=thermal, 5 *5* in (n,γ) E=2.96 eV, and 6.5 *19* in ^{109}Rh β^- decay.
		274.328 *7*	3.0 *4*	266.3424	1/2+				I_γ: weighted average of 3.1 *5* in (n,γ) E=thermal, 3.9 *11* in (n,γ) E=2.96 eV, and 1.9 *9* in ^{109}Rh β^- decay.
		295.597 *3*	5.5 *6*	245.0807	(7/2)−				I_γ: weighted average of 7.2 *16* in (n,γ) E=thermal, 4.5 *11* in (n,γ) E=2.96 eV, and 5.6 *9* in ^{109}Rh β^- decay.
		540.697 *10*	8.7 *13*	0	5/2+				I_γ: weighted average of 16 *4* in (n,γ) E=thermal, 15 *8* in (n,γ) E=2.96 eV, and 8.3 *9* in ^{109}Rh β^- decay.
597.1	(9/2)+	320 *1*	50 *25*	276.289	7/2+				E_γ,I_γ: from ^{109}Rh β^- decay (1978Ka10).
		597.3 *5*	100 *50*	0	5/2+				E_γ,I_γ: from ^{109}Rh β^- decay (1978Ka10).
604.5118	5/2−	264.980 *3*	18.5 *14*	339.5299	5/2−	M1+E2	0.9 *+10−6*	0.035 *7*	α(K)=0.030 *6*; α(L)=0.0040 *10*; α(M)=0.00076 *19* α(N)=0.00013 *3* I_γ: weighted average of 19.4 *19* in (n,γ) E=thermal and 17.5 *19* in (n,γ) E=2.96 eV (1980Ca02). Mult.,δ: α(K)exp=0.030 *5* in (n,γ) E=thermal (1980Ca02).
		317.255 *6*	2.8 *5*	287.250	9/2−				I_γ: weighted average of 2.6 *6* in (n,γ) E=thermal and 3.4 *9* in (n,γ) E=2.96 eV (1980Ca02).
		359.426 *6*	100 *10*	245.0807	(7/2)−	M1		0.01253	α(K)=0.01095 *16*; α(L)=0.001300 *19*; α(M)=0.000244 *4* α(N)=4.12×10^{-5} *6* Mult.: α(K)exp=0.010 *1* in (n,γ) E=thermal (1980Ca02).
		604.530 *6*	8.0 *8*	0	5/2+				I_γ: weighted average of 8 *1* in (n,γ) E=thermal and 8.1 *13* in (n,γ) E=2.96 eV (1980Ca02).
623.4813	1/2+	189.920 *3*	23 *3*	433.5630	3/2+				I_γ: weighted average of 22 *3* in (n,γ) E=thermal and 25 *4* in (n,γ) E=2.96 eV (1980Ca02).
		197.333 *8*	4.9 *8*	426.140	7/2+				I_γ: weighted average of 4.8 *8* in (n,γ) E=thermal and 5.7 *28* in (n,γ) E=2.96 eV (1980Ca02).
		298.197 *5*	100 *7*	325.2836	3/2+	M1(+E2)	<3	0.025 *5*	α(K)=0.021 *4*; α(L)=0.0028 *7*; α(M)=0.00052 *13*

$\gamma(^{109}Pd)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[‡]	δ[#]	α[@]	Comments
									α(N)=8.7×10^{-5} *21* I_γ: weighted average of 100 *10* in (n,γ) E=thermal and 100 *10* in (n,γ) E=2.96 eV (1980Ca02). Mult.,δ: α(K)exp=0.019 *6* in (n,γ) E=thermal (1980Ca02).
623.4813	1/2$^+$	332.050 *5*	28 *3*	291.4339	3/2$^+$				I_γ: weighted average of 25 *5* in (n,γ) E=thermal and 30 *4* in (n,γ) E=2.96 eV (1980Ca02).
		347.192 *6*	11.3 *24*	276.289	7/2$^+$				I_γ: weighted average of 14.3 *24* in (n,γ) E=thermal and 9.4 *19* in (n,γ) E=2.96 eV (1980Ca02).
		357.148 *9*	4.8 *8*	266.3424	1/2$^+$				
		623.468 *16*	48 *4*	0	5/2$^+$				I_γ: weighted average of 49 *8* in (n,γ) E=thermal and 47 *5* in (n,γ) E=2.96 eV (1980Ca02).
625.0	(15/2$^-$)	436 *1*	100	188.9903	11/2$^-$				
645.96	7/2$^+$,9/2$^+$	645.96 *4*	100	0	5/2$^+$				
673.4878	3/2$^-$	333.964 *3*	100 *9*	339.5299	5/2$^-$	M1(+E2)	0.5 *+4−5*	0.0162 *15*	α(K)=0.0141 *12*; α(L)=0.00174 *22*; α(M)=0.00033 *5* α(N)=5.5×10^{-5} *7* Mult.,δ: α(K)exp=0.014 *1* in (n,γ) E=thermal (1980Ca02).
		346.622 *6*	0.94 *16*	326.8689	5/2$^+$				I_γ: 4.0 *8* from (n,γ) E=2.96 eV.
		428.396 *3*	30 *3*	245.0807	(7/2)$^-$	E2		0.00948	α(K)=0.00818 *12*; α(L)=0.001064 *15*; α(M)=0.000201 *3* α(N)=3.32×10^{-5} *5* I_γ: 28 *3* from (n,γ) E=2.96 eV. Mult.: α(K)exp=0.008 *1* in (n,γ) E=thermal (1980Ca02).
		673.607 *40*	1.6 *5*	0	5/2$^+$				I_γ: 5.2 *12* from (n,γ) E=2.96 eV.
718.1	(13/2$^-$)	431 *1*		287.250	9/2$^-$				
		529[&] *1*		188.9903	11/2$^-$				
722.043	3/2$^+$,5/2$^+$	230.453 *2*	20.2 *17*	491.589	3/2$^+$				I_γ: weighted average of 20 *2* in (n,γ) E=thermal and 20.6 *30* in (n,γ) E=2.96 eV (1980Ca02).
		288.480 *5*	16.2 *20*	433.5630	3/2$^+$				I_γ: weighted average of 15.7 *22* in (n,γ) E=thermal and 19 *5* in (n,γ) E=2.96 eV (1980Ca02).
		395.171 *17*	22.0 *25*	326.8689	5/2$^+$				I_γ: weighted average of 20.7 *29* in (n,γ) E=thermal and 26 *5* in (n,γ) E=2.96 eV (1980Ca02).
		396.758 *11*	74 *5*	325.2836	3/2$^+$				I_γ: weighted average of 73 *7* in (n,γ) E=thermal and 75 *7* in (n,γ) E=2.96 eV (1980Ca02).
		455.702 *5*	59 *4*	266.3424	1/2$^+$				I_γ: weighted average of 55 *6* in (n,γ) E=thermal and 62 *6* in (n,γ) E=2.96 eV (1980Ca02).
		722.025 *27*	100 *7*	0	5/2$^+$				I_γ: weighted average of 100 *10* in (n,γ) E=thermal and 100 *10* in (n,γ) E=2.96 eV (1980Ca02).
791.425	5/2$^+$,3/2$^+$	365.295 *7*	11.2 *25*	426.140	7/2$^+$				I_γ: weighted average of 11 *5* in (n,γ) E=thermal and 11.3 *28* in (n,γ) E=2.96 eV (1980Ca02).
		464.541 *9*	31 *4*	326.8689	5/2$^+$				I_γ: weighted average of 28 *5* in (n,γ) E=thermal and 35 *6* in (n,γ) E=2.96 eV (1980Ca02).
		515.128 *13*	100 *8*	276.289	7/2$^+$				I_γ: weighted average of 100 *14* in (n,γ) E=thermal and 100 *10* in (n,γ) E=2.96 eV (1980Ca02).
		525.078 *16*	28 *5*	266.3424	1/2$^+$				I_γ: weighted average of 25 *5* in (n,γ) E=thermal and 37 *9* in (n,γ) E=2.96 eV (1980Ca02).

γ(^{109}Pd) (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.‡	δ#	α@	Comments
791.425	5/2+,3/2+	678.040 *35*	28 *5*	113.4000	1/2+				I_γ: from (n,γ) E=thermal, 58 *6* from (n,γ) E=2.96 eV (1980Ca02) (n,γ) E=2.96 eV (1980Ca02).
		791.429 *31*	65 *6*	0	5/2+				I_γ: weighted average of 61 *9* in (n,γ) E=thermal and 68 *7* in (n,γ) E=2.96 eV (1980Ca02).
810.592	3/2+	187.115 *4*	6.9 *7*	623.4813	1/2+				
		377.004 *13*	11.4 *19*	433.5630	3/2+				I_γ: weighted average of 12.4 *21* in (n,γ) E=thermal and 8 *4* in (n,γ) E=2.96 eV (1980Ca02).
		485.311 *7*	37 *3*	325.2836	3/2+				I_γ: weighted average of 35 *4* in (n,γ) E=thermal and 41 *6* in (n,γ) E=2.96 eV (1980Ca02).
		810.547 *13*	100 *8*	0	5/2+				I_γ: weighted average of 100 *15* in (n,γ) E=thermal and 100 *10* in (n,γ) E=2.96 eV (1980Ca02).
907.2	(11/2+)	310 *1*		597.1	(9/2)+				
		631 *1*		276.289	7/2+				
911.253	5/2+	584.505 *51*	9 *4*	326.8689	5/2+				
		585.908 *15*	28 *6*	325.2836	3/2+				
		619.939 *28*	100 *17*	291.4339	3/2+				
		911.283 *24*	74 *13*	0	5/2+				
941.098	3/2−	267.610 *5*	11 *2*	673.4878	3/2−				
		336.584 *3*	100 *7*	604.5118	5/2−	M1(+E2)	0.1 *+8−1*	0.0148 *25*	α(K)=0.0129 *20*; α(L)=0.0015 *4*; α(M)=0.00029 *7* α(N)=4.9×10^{-5} *11* I_γ: weighted average of 100 *10* in (n,γ) E=thermal and 100 *10* in (n,γ) E=2.96 eV (1980Ca02). Mult.,δ: α(K)exp=0.013 *2* in (n,γ) E=thermal (1980Ca02).
		601.575 *6*	68 *6*	339.5299	5/2−				I_γ: weighted average of 74 *9* in (n,γ) E=thermal and 65 *7* in (n,γ) E=2.96 eV (1980Ca02).
		649.650 *29*	3 *1*	291.4339	3/2+				
		674.725 *30*	15 *3*	266.3424	1/2+				I_γ: weighted average of 14.3 *19* in (n,γ) E=thermal and 22 *5* in (n,γ) E=2.96 eV (1980Ca02).
		695.949 *32*	10.7 *14*	245.0807	(7/2)−				I_γ: weighted average of 10.5 *14* in (n,γ) E=thermal and 13 *5* in (n,γ) E=2.96 eV (1980Ca02).
944.967	1/2+	222.922 *6*	4.9 *8*	722.043	3/2+,5/2+				I_γ: weighted average of 5.1 *9* in (n,γ) E=thermal and 4.4 *17* in (n,γ) E=2.96 eV (1980Ca02).
		653.504 *36*	7 *3*	291.4339	3/2+				I_γ: 30 *3* in (n,γ) E=2.96 eV (1980Ca02).
		678.673 *41*	10 *3*	266.3424	1/2+				I_γ: 23 *2* in (n,γ) E=2.96 eV (1980Ca02).
		831.571 *15*	100 *8*	113.4000	1/2+				I_γ: weighted average of 100 *15* in (n,γ) E=thermal and 100 *10* in (n,γ) E=2.96 eV (1980Ca02).
954.164	1/2+	520.597 *10*	93 *13*	433.5630	3/2+				
		628.887 *18*	59 *9*	325.2836	3/2+				
		840.759 *27*	100 *31*	113.4000	1/2+				
981.755	5/2+	555.614 *13*	32 *4*	426.140	7/2+				I_γ: weighted average of 41 *7* in (n,γ) E=thermal and 30 *3* in (n,γ) E=2.96 eV (1980Ca02).
		654.892 *16*	37 *4*	326.8689	5/2+				I_γ: weighted average of 43 *9* in (n,γ) E=thermal and 36 *4* in (n,γ) E=2.96 eV (1980Ca02).

Adopted Levels, Gammas (continued)

$\gamma(^{109}Pd)$ (continued)

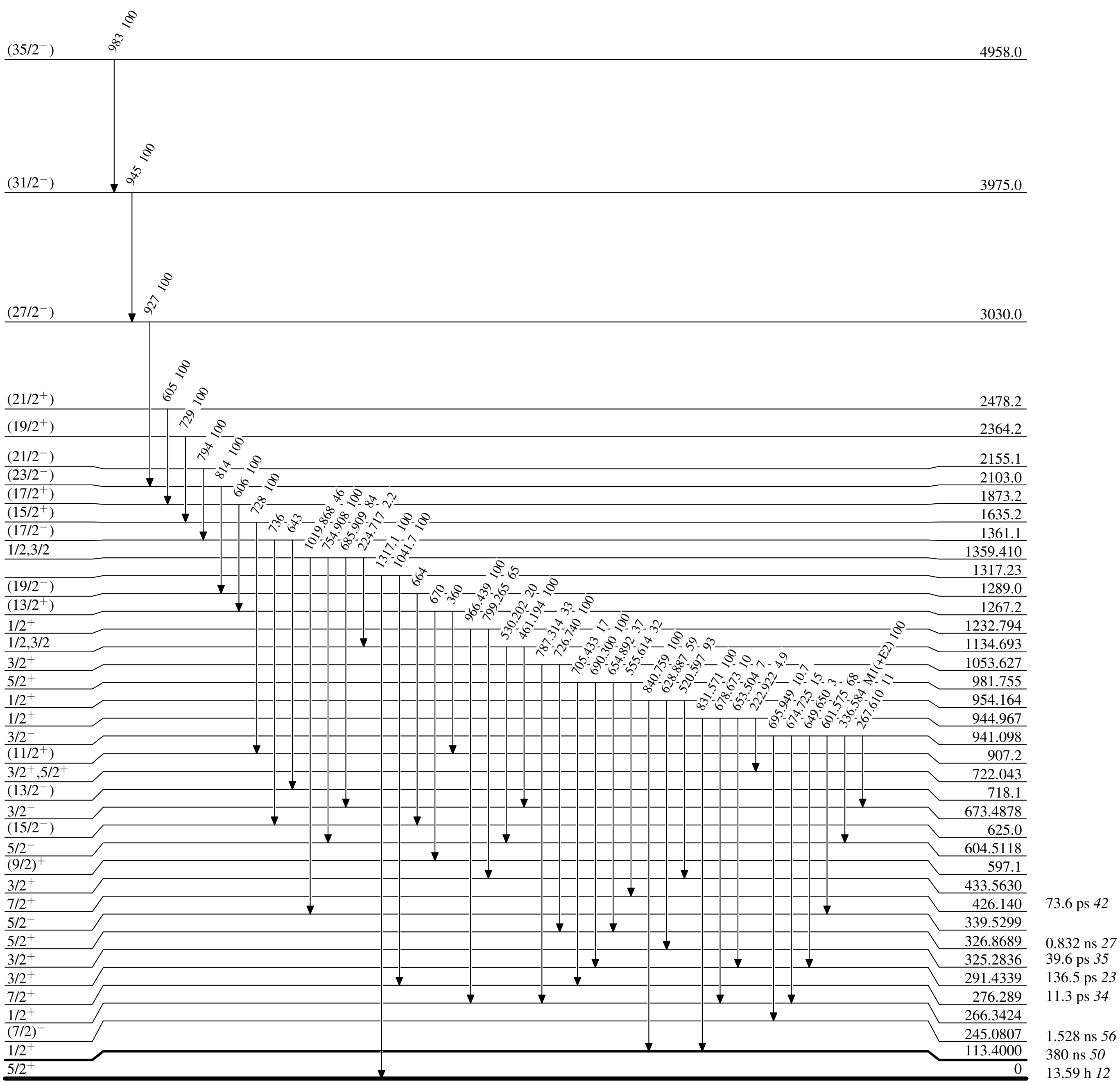
E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Comments
981.755	$5/2^+$	690.300 *26*	100 *7*	291.4339	$3/2^+$	I_γ: weighted average of 100 *11* in (n,γ) E=thermal and 100 *10* in (n,γ) E=2.96 eV (1980Ca02).
		705.433 *47*	17 *3*	276.289	$7/2^+$	I_γ: weighted average of 18 *7* in (n,γ) E=thermal and 16 *3* in (n,γ) E=2.96 eV (1980Ca02).
1053.627	$3/2^+$	726.740 *24*	100 *8*	326.8689	$5/2^+$	I_γ: weighted average of 100 *11* in (n,γ) E=thermal and 100 *12* in (n,γ) E=2.96 eV (1980Ca02).
		787.314 *34*	33 *6*	266.3424	$1/2^+$	I_γ: weighted average of 42 *9* in (n,γ) E=thermal and 29 *6* in (n,γ) E=2.96 eV (1980Ca02).
1134.693	1/2,3/2	461.194 *7*	100 *10*	673.4878	$3/2^-$	
		530.202 *10*	20 *3*	604.5118	$5/2^-$	
1232.794	$1/2^+$	799.265 *51*	65 *8*	433.5630	$3/2^+$	
		966.439 *24*	100 *10*	266.3424	$1/2^+$	
1267.2	$(13/2^+)$	360 *1*		907.2	$(11/2^+)$	
		670 *1*		597.1	$(9/2)^+$	
1289.0	$(19/2^-)$	664 *1*		625.0	$(15/2^-)$	
1317.23		1041.7 *5*	100 *25*	276.289	$7/2^+$	E_γ,I_γ: from ^{109}Rh β^- decay.
		1317.1 *2*	100 *50*	0	$5/2^+$	E_γ,I_γ: from ^{109}Rh β^- decay.
1359.410	1/2,3/2	224.717 *7*	2.2 *4*	1134.693	1/2,3/2	
		685.909 *24*	84 *9*	673.4878	$3/2^-$	
		754.908 *22*	100 *11*	604.5118	$5/2^-$	
		1019.868 *27*	46 *5*	339.5299	$5/2^-$	
1361.1	$(17/2^-)$	643 *1*		718.1	$(13/2^-)$	
		736 *1*		625.0	$(15/2^-)$	
1635.2	$(15/2^+)$	728 *1*	100	907.2	$(11/2^+)$	
1873.2	$(17/2^+)$	606 *1*	100	1267.2	$(13/2^+)$	
2103.0	$(23/2^-)$	814 *1*	100	1289.0	$(19/2^-)$	
2155.1	$(21/2^-)$	794 *1*	100	1361.1	$(17/2^-)$	
2364.2	$(19/2^+)$	729 *1*	100	1635.2	$(15/2^+)$	
2478.2	$(21/2^+)$	605 *1*	100	1873.2	$(17/2^+)$	
3030.0	$(27/2^-)$	927 *1*	100	2103.0	$(23/2^-)$	
3975.0	$(31/2^-)$	945 *1*	100	3030.0	$(27/2^-)$	
4958.0	$(35/2^-)$	983 *1*	100	3975.0	$(31/2^-)$	

† From (n,γ) E=thermal, unless otherwise stated.
‡ From ce data in (n,γ) E=thermal (1980Ca02).
\# From ce data in (n,γ) E=thermal using the BrIccMixing program.
@ 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.
& Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level



$^{109}_{46}Pd_{63}$

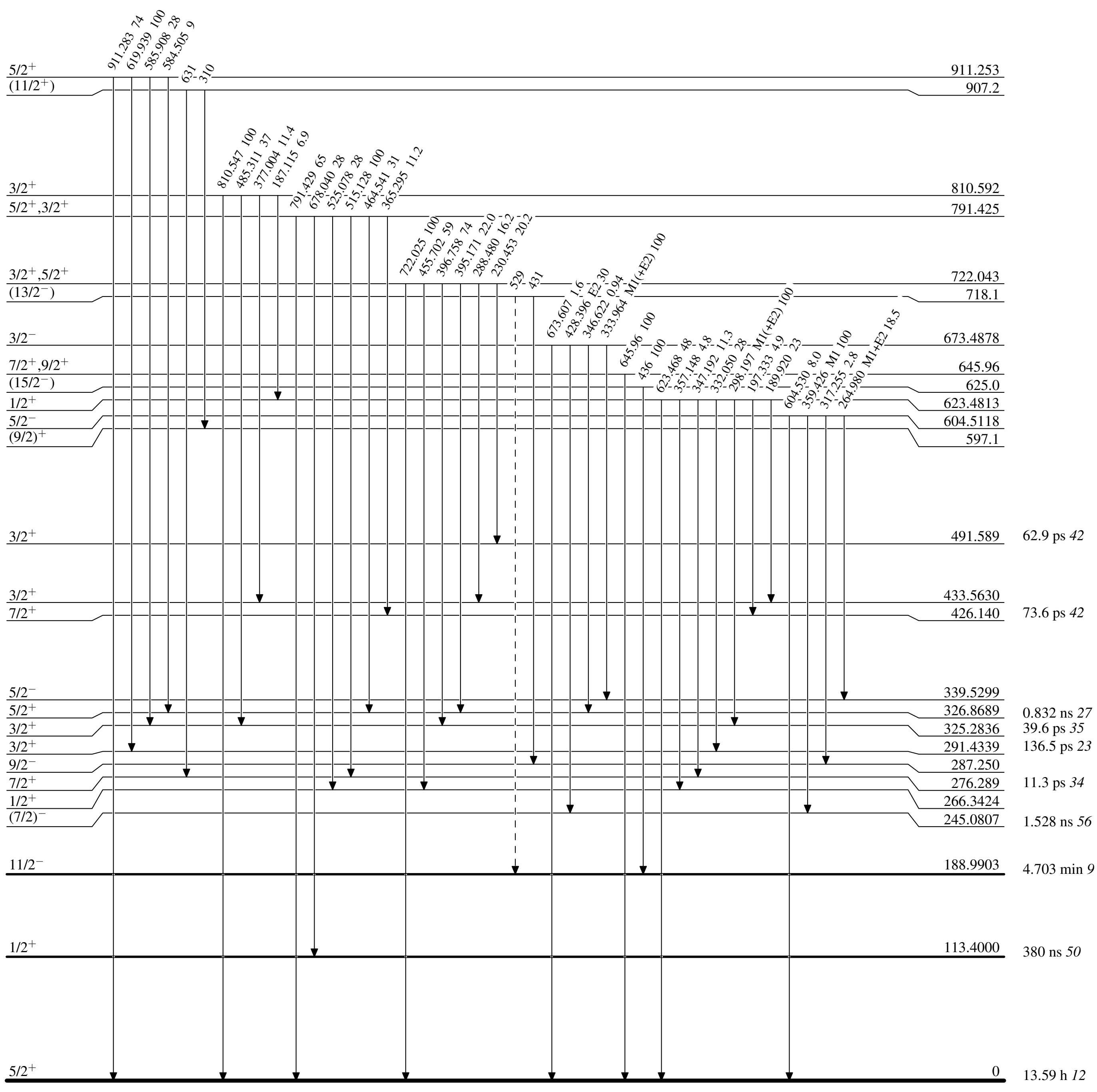
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

- - - - - ► γ Decay (Uncertain)

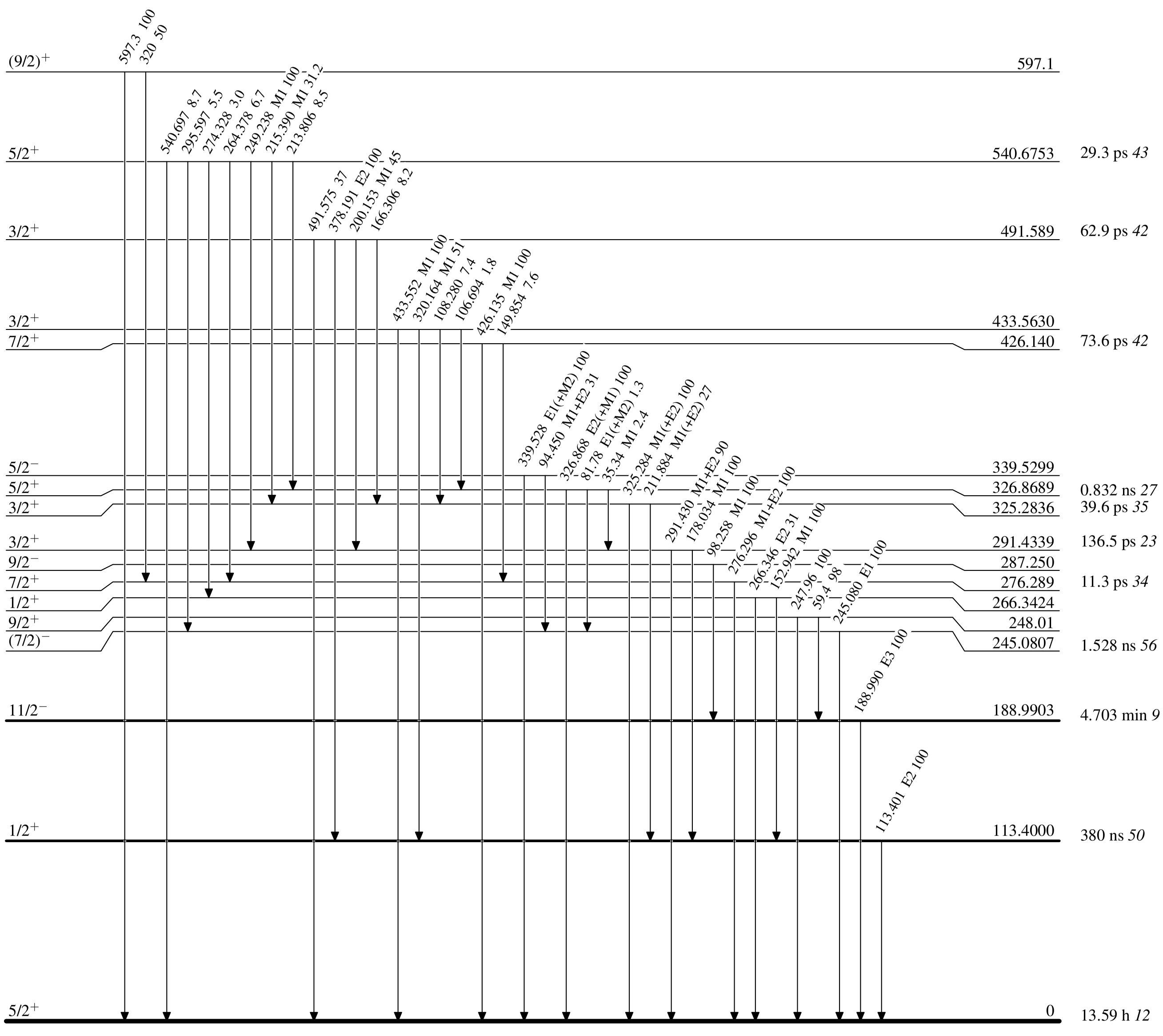


$^{109}_{46}Pd_{63}$

Adopted Levels, Gammas

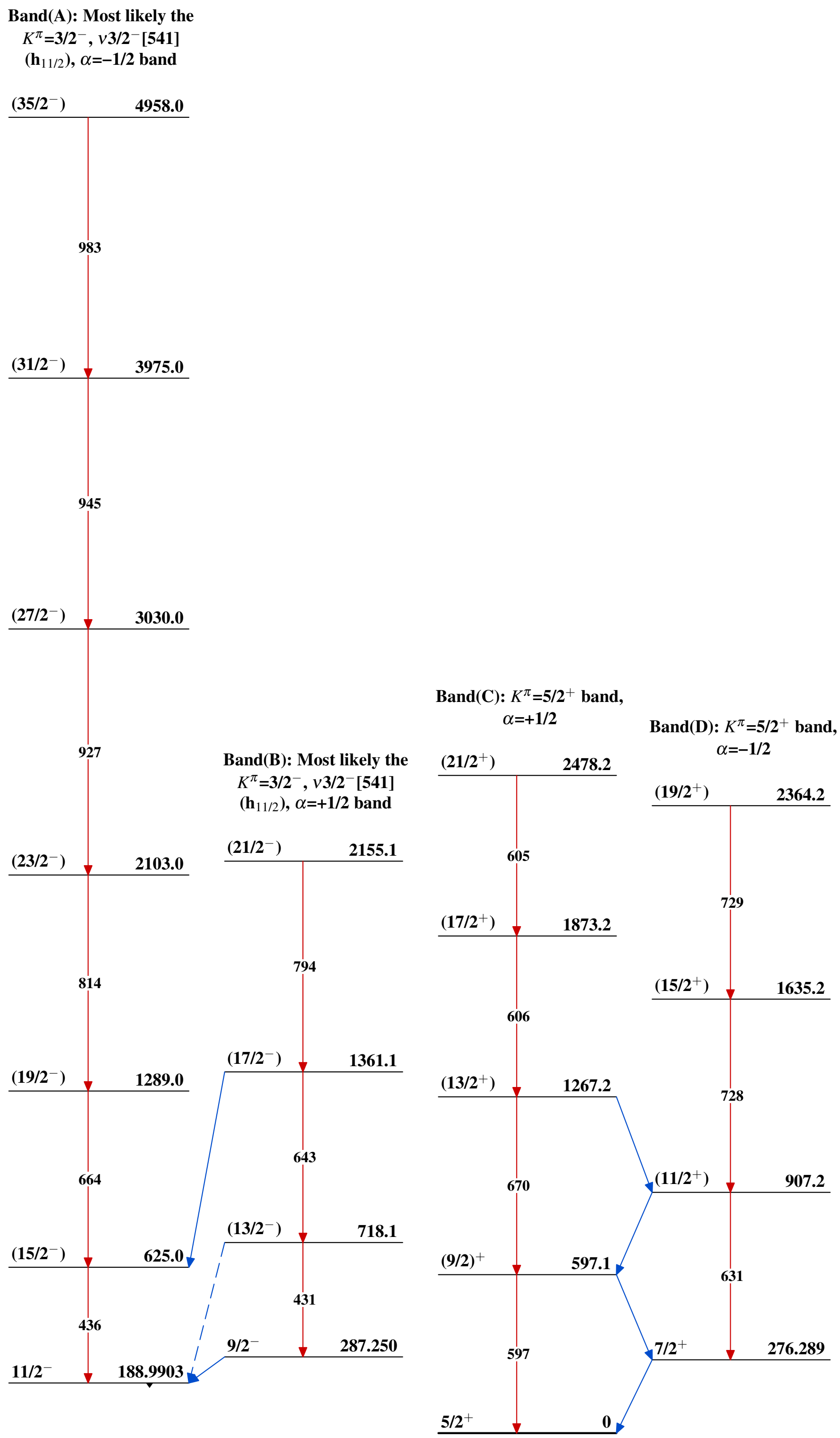
Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{109}_{46}Pd_{63}$

Adopted Levels, Gammas



$^{109}_{46}Pd_{63}$