Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jean Blachot	NDS 111,1471 (2010)	1-May-2009

Q(β^-)=3435 *18*; S(n)=5341 *10*; S(p)=1.115×10^4 *5*; Q(α)=−5280 *12* 2012Wa38
Note: Current evaluation has used the following Q record 3340 305410 4011230 60-5260 80 2003Au03,2009AuZZ.
$T_{1/2}$(128.5γ)=0.91 s *8*, assigned either to ^{113}Pd or ^{111}Pd (1970WiZN) via ^{113}Rh (^{111}Rh) β^- decay, is not seen by 1988Pe13 after mass separation.
α: Additional information 1.

^{113}Pd Levels

Cross Reference (XREF) Flags

A ^{113}Rh β^- decay D ^{238}U(^{12}C,Fγ)
B ^{113}Pd IT decay E ^{252}Cf SF decay
C ^{208}Pb(^{18}O,Fγ)

E(level)‡	J$^\pi$#	$T_{1/2}$†	XREF	Comments
0.0	(5/2$^+$)	93 s *5*	AB	%β^-=100 E(level): tentative g.s. assignment based on $T_{1/2}$ syst. $T_{1/2}$: weighted av of 84 s *6* (1958Al90), 91 s *12* (1970Ar19), 100 s *5* (1975BrYM), 90 s (1981Me17), 90 s *3* (1974Gr29). J$^\pi$: from syst and log *ft*=5.5 to 7/2$^+$.
35.08 *17*	(1/2$^+$)		A	J$^\pi$: E2 γ to (5/2$^+$) and syst.
81.1 *3*	(9/2$^-$)	0.3 s *1*	AB DE	%IT=100 J$^\pi$: M2 γ to (5/2$^+$). Syst gives 11/2$^-$ The evaluator has accepted the arguments of 2005Fo09: The isomeric transition to the ground state has a half-life of 0.3 s. The previous assignment of 11/2 would make the transition an E3. The Weisskopf estimate of the half-life for such a transition is greater than 1 s. Assigning a J of 9/2. allows this transition to be an M2/E3, with a corresponding half-life estimate of less than 1 s. The structure of 113Pd now appears consistent with the discovery of the new 81.0-keV transition. $T_{1/2}$: from 1993Pe11.
151.89 *17*	(3/2$^+$)		A	J$^\pi$: M1 γ's to (5/2$^+$) and (1/2$^+$).
166.1@ *5*	(11/2$^-$)		DE	
172.55 *21*	(1/2$^+$)		A	J$^\pi$: M1 γ to (1/2$^+$) and no γ to (5/2$^+$) g.s.
189.61b *15*	(7/2$^+$)		A E	J$^\pi$: M1 γ to (5/2$^+$) and log *ft*=5.5 from (7/2$^+$).
252.18 *16*	(3/2$^+$,1/2$^+$)		A	J$^\pi$: E2,M1 γ to (5/2$^+$) and M1,E2 γ to (1/2)$^+$.
349.13 *20*	(5/2$^+$,7/2$^+$)		A	J$^\pi$: M1,E2 γ to (5/2$^+$) and log *ft*=4.9 from (7/2$^+$).
372.97 *22*	(1/2$^+$,3/2$^+$,5/2$^+$)		A	J$^\pi$: E2 γ to (1/2$^+$,3/2$^+$).
409.26 *18*	$^+$		A	
409.8 *5*			A	
454.55a *23*			A E	
500.35 *23*			A	
538.7 *4*			A	
549.2@	(15/2$^-$)		CDE	
573.1& *11*	(13/2$^-$)		D	
715.9b *3*	(11/2$^+$)		E	
730.6 *4*			A	
742.3 *5*			A	
861.2 *4*			A	
1031.3a *3*	(13/2$^+$)		E	
1081.2 *6*			A	

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Adopted Levels, Gammas (continued)

^{113}Pd Levels (continued)

E(level)‡	Jπ#	XREF	E(level)‡	Jπ#	XREF	E(level)‡	Jπ#	XREF
1111.0 *4*		E	2030.1[b] *5*	(19/2+)	E	3000.5[a] *6*	(25/2+)	E
1119.7[@]	(19/2−)	CDE	2286.5[c] *16*	(23/2+)	E	3408.3[c] *16*	(31/2+)	E
1149.1[&] *15*	(17/2−)	D	2342.2[a] *6*	(21/2+)	E	3562.1[&] *23*	(29/2−)	D
1345.6[b] *4*	(15/2+)	E	2671.4[@] *6*	(27/2−)	CDE	3562.6[@] *7*	(31/2−)	CDE
1678.3[a] *5*	(17/2+)	E	2684.1[&] *21*	(25/2−)	CD	4517.6[@] *19*	(35/2−)	CD
1841.9[@] *6*	(23/2−)	CDE	2707.3[b] *6*	(23/2+)	E			
1866.1[&] *18*	(21/2−)	DE	2772.4[c] *16*	(27/2+)	E			

† A isomer with $T_{1/2}\geq 100$ s was proposed by 1981Me17. This isomer was proposed from their half-life measurement and also because ^{107,109,111}Pd have isomeric states. This isomer is not reported by 1988FoZY in ^{113}Pd β^- decay and an isomer was found by 1993Pe11 with $T_{1/2}$=0.3 s 1. So this isomer is no more adopted.

‡ From least-squares fit to γ energies.

J^π for levels above 482 keV are based on band assignments.

@ Band(A): $\nu h_{11/2}$, α=−1/2 band.

& Band(a): $\nu h_{11/2}$, α=+1/2 band.

a Band(B): band 3.

b Band(C): band 4.

c Band(D): band 5.

$\gamma(^{113}Pd)$

E_i(level)	J_i^π	E_γ‡	I_γ‡	E_f	J_f^π	Mult.†	α	Comments
35.08	(1/2+)	34.9 *3*	100	0.0	(5/2+)	E2	61.0 *22*	α(K)=22.8 *5*; α(L)=31.2 *14*; α(M)=6.1 *3*; α(N)=0.92 *4*; α(N+..)=0.92 *4*
81.1	(9/2−)	81.1 *3*	100	0.0	(5/2+)	M2	8.55 *17*	α(K)=6.98 *14*; α(L)=1.28 *3*; α(M)=0.250 *6*; α(N)=0.0415 *9*; α(N+..)=0.0415 *9* B(M2)(W.u.)=0.00013 *5*
151.89	(3/2+)	116.8 *2*	100 *5*	35.08	(1/2+)	M1,E2	0.5 *3*	α(K)=0.42 *22*; α(L)=0.08 *6*; α(M)=0.015 *11*; α(N)=0.0025 *17*; α(N+..)=0.0025 *17*
		151.8 *3*	76 *4*	0.0	(5/2+)	M1	0.1194	α(K)=0.1039 *16*; α(L)=0.01267 *19*; α(M)=0.00239 *4*; α(N)=0.000401 *6*; α(N+..)=0.000401 *6*
166.1	(11/2−)	85.1 *3*	100	81.1	(9/2−)			
172.55	(1/2+)	137.5 *2*	100	35.08	(1/2+)	M1	0.1565	α(K)=0.1362 *20*; α(L)=0.01665 *25*; α(M)=0.00313 *5*; α(N)=0.000527 *8*; α(N+..)=0.000527 *8*
189.61	(7/2+)	189.7 *2*	100	0.0	(5/2+)	M1	0.0655	α(K)=0.0570 *9*; α(L)=0.00691 *10*; α(M)=0.001300 *19*; α(N)=0.000219 *4*; α(N+..)=0.000219 *4*
252.18	(3/2+,1/2+)	79.7 *3*	30 *3*	172.55	(1/2+)			
		100.4 *3*	8.0 *10*	151.89	(3/2+)			
		217.0 *2*	100 *5*	35.08	(1/2+)	M1,E2	0.068 *22*	α(K)=0.058 *18*; α(L)=0.008 *4*; α(M)=0.0016 *7*; α(N)=0.00025 *11*; α(N+..)=0.00025 *11*
		252.1 *3*	75 *5*	0.0	(5/2+)	E2,M1	0.042 *12*	α(K)=0.036 *9*; α(L)=0.0049 *17*; α(M)=0.0009 *4*; α(N)=0.00015 *5*; α(N+..)=0.00015 *5*

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Adopted Levels, Gammas (continued)

γ(^{113}Pd) (continued)

E_i(level)	J_i^π	E_γ ‡	I_γ ‡	E_f	J_f^π	Mult. †	α	Comments
349.13	(5/2$^+$,7/2$^+$)	96.8 *3*	38 *6*	252.18	(3/2$^+$,1/2$^+$)			
		159.9 *3*	100 *10*	189.61	(7/2$^+$)			
		197.0 *4*	19 *6*	151.89	(3/2$^+$)			
		348.9 *5*	44 *10*	0.0	(5/2$^+$)	M1,E2	0.0158 *23*	α(K)=0.0136 *19*; α(L)=0.0017 *4*; α(M)=0.00033 *7*; α(N)=5.5×10^{-5} *11*; α(N+..)=5.5×10^{-5} *11* I_γ: from γγ.
372.97	(1/2$^+$,3/2$^+$,5/2$^+$)	120.8 *3*	51 *7*	252.18	(3/2$^+$,1/2$^+$)	E2	0.711 *12*	α(K)=0.567 *10*; α(L)=0.1175 *21*; α(M)=0.0226 *4*; α(N)=0.00356 *7*; α(N+..)=0.00356 *7*
		221.0 *3*	100 *12*	151.89	(3/2$^+$)			
		373.1 *4*	42 *9*	0.0	(5/2$^+$)			
409.26	+	157.1 *3*	14.0 *10*	252.18	(3/2$^+$,1/2$^+$)			
		219.6 *3*	24.4 *14*	189.61	(7/2$^+$)			
		236.7 *4*	2.1 *7*	172.55	(1/2$^+$)			
		409.3 *3*	100 *3*	0.0	(5/2$^+$)	E2	0.01090	α(K)=0.00940 *14*; α(L)=0.001233 *18*; α(M)=0.000232 *4*; α(N)=3.85×10^{-5} *6*; α(N+..)=3.85×10^{-5} *6*
409.8		257.9 *4*	100	151.89	(3/2$^+$)			
454.55		265.0 *3*	100 *14*	189.61	(7/2$^+$)			
		454.7 *4*	100 *14*	0.0	(5/2$^+$)			
500.35		310.8 *4*	22 *5*	189.61	(7/2$^+$)			
		348.5 *6*	40 *9*	151.89	(3/2$^+$)			I_γ: from γγ.
		500.3 *3*	100 *7*	0.0	(5/2$^+$)			
538.7		348.9 *5*	30 *7*	189.61	(7/2$^+$)			
		538.8 *4*	100 *7*	0.0	(5/2$^+$)			
549.2	(15/2$^-$)	383.1 *3*	100	166.1	(11/2$^-$)			
573.1	(13/2$^-$)	425 *1*		151.89	(3/2$^+$)			
715.9	(11/2$^+$)	261.4 *3*		454.55				
		526.1 *3*		189.61	(7/2$^+$)			
730.6		357.6 *3*	100	372.97	(1/2$^+$,3/2$^+$,5/2$^+$)			
742.3		332.7 *3*	100	409.8				
861.2		609.0 *3*	100	252.18	(3/2$^+$,1/2$^+$)			
1031.3	(13/2$^+$)	315.4 *3*		715.9	(11/2$^+$)			
		576.8 *3*		454.55				
1081.2		339.1 *4*	<22.0	742.3				
		671.1 *4*	100 *22*	409.8				
1111.0		656.4 *3*	100	454.55				
1119.7	(19/2$^-$)	570.5 *3*	100	549.2	(15/2$^-$)			
1149.1	(17/2$^-$)	576 *1*	100	573.1	(13/2$^-$)			
1345.6	(15/2$^+$)	629.7 *3*	100	715.9	(11/2$^+$)			
1678.3	(17/2$^+$)	647.0 *3*	100	1031.3	(13/2$^+$)			
1841.9	(23/2$^-$)	722.2 *3*	100	1119.7	(19/2$^-$)			
1866.1	(21/2$^-$)	717. *1*	100	1149.1	(17/2$^-$)			
2030.1	(19/2$^+$)	684.5 *3*	100	1345.6	(15/2$^+$)			
2286.5	(23/2$^+$)	1166.8 *3*	100	1119.7	(19/2$^-$)			
2342.2	(21/2$^+$)	663.9 *3*	100	1678.3	(17/2$^+$)			
2671.4	(27/2$^-$)	829.5 *3*	100	1841.9	(23/2$^-$)			
2684.1	(25/2$^-$)	818 *1*	100	1866.1	(21/2$^-$)			

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Adopted Levels, Gammas (continued)

γ(^{113}Pd) (continued)

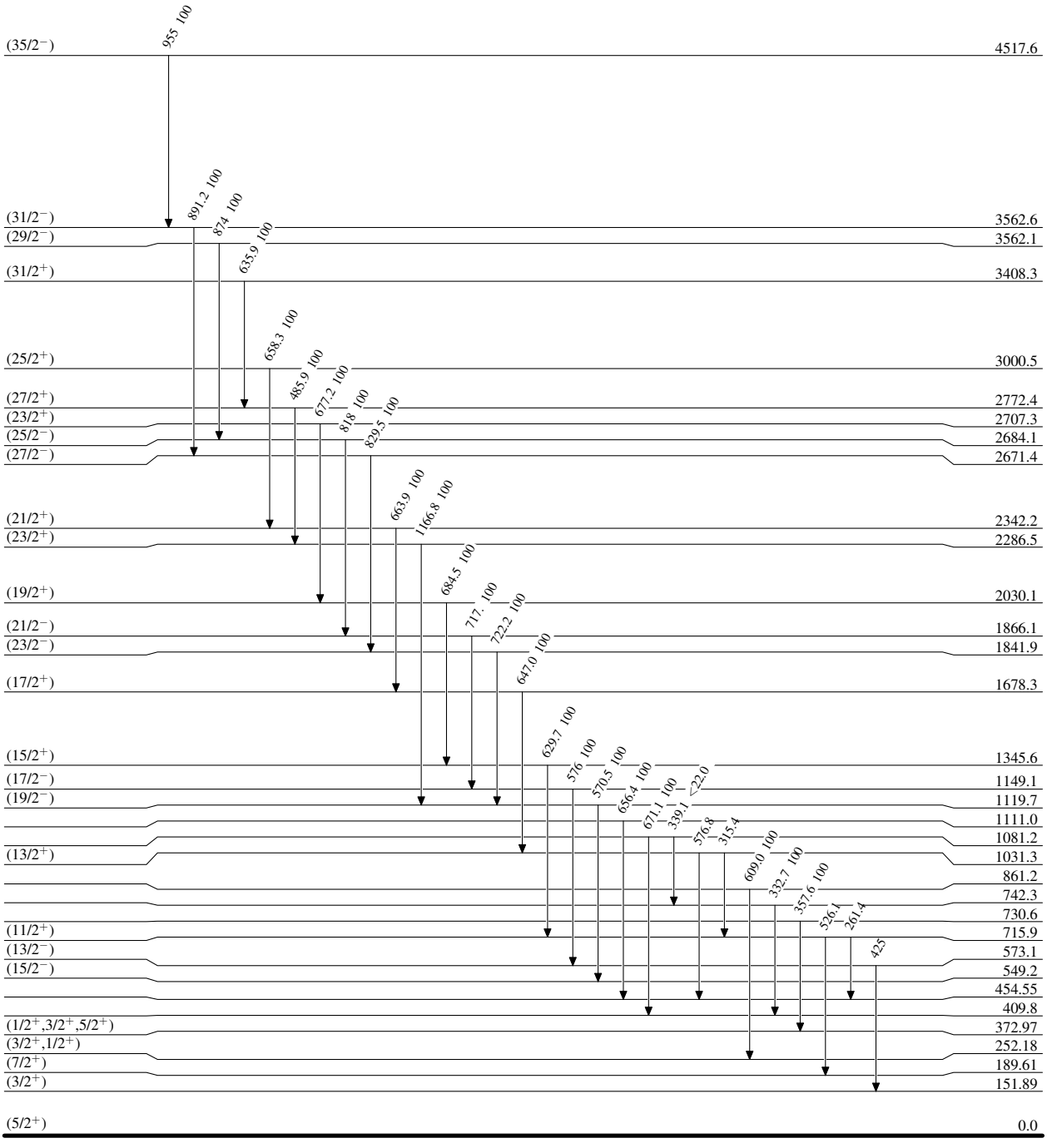
E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π
2707.3	(23/2$^+$)	677.2 *3*	100	2030.1	(19/2$^+$)	3562.1	(29/2$^-$)	874	100	2684.1	(25/2$^-$)
2772.4	(27/2$^+$)	485.9 *3*	100	2286.5	(23/2$^+$)	3562.6	(31/2$^-$)	891.2 *3*	100	2671.4	(27/2$^-$)
3000.5	(25/2$^+$)	658.3 *3*	100	2342.2	(21/2$^+$)	4517.6	(35/2$^-$)	955 *1*	100	3562.6	(31/2$^-$)
3408.3	(31/2$^+$)	635.9 *3*	100	2772.4	(27/2$^+$)						

† From α(K)exp in ^{113}Ru β^- decay.
‡ From ^{113}Ru β^- decay placed below 482 keV and from ^{252}Cf SF for the others.

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level

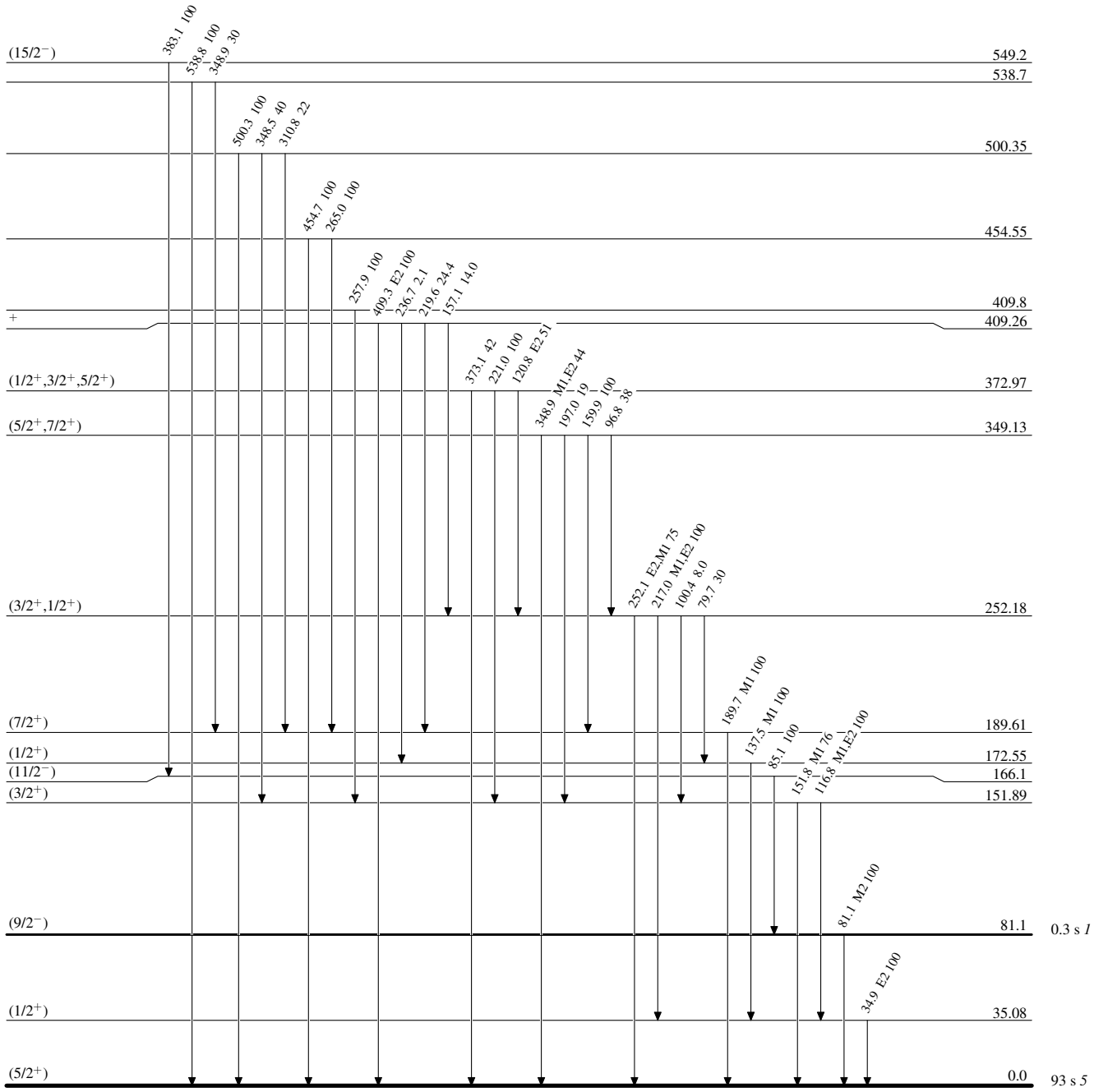


$^{113}_{46}Pd_{67}$

Adopted Levels, Gammas

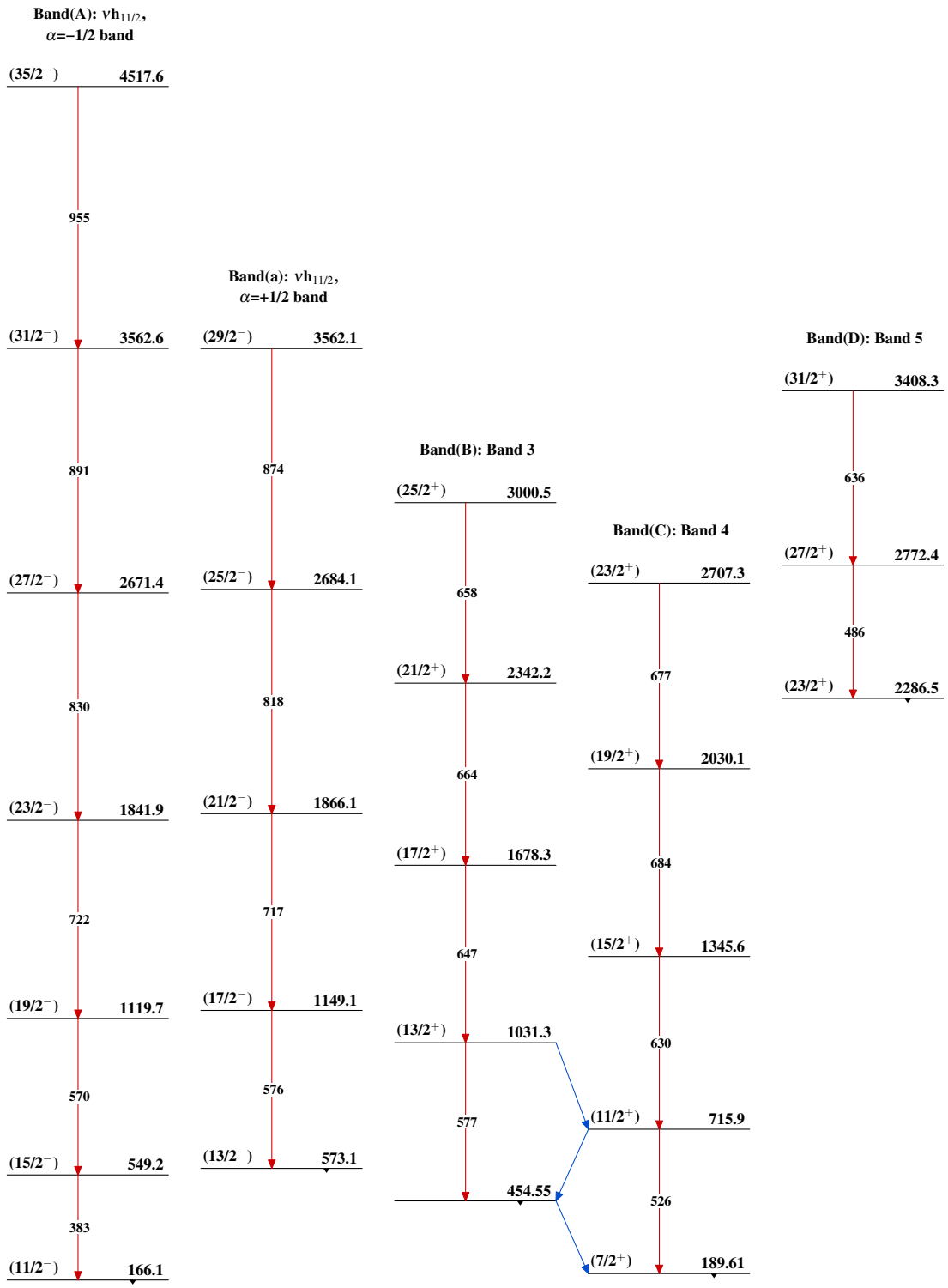
Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{113}_{46}Pd_{67}$

Adopted Levels, Gammas



$^{113}_{46}Pd_{67}$