^{105}Pd(n,γ),(n,e) E=thermal 1987Co03,1970Or05

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	D. De Frenne and A. Negret	NDS 109, 943 (2008)	1-May-2007

1987Co03: measured Eγ, Iγ with HPGe, ce with double-focusing electron spectrometer. Deduced: ^{106}Pd levels, J^{π}, B(E0)/B(E2) ratios.

1970Or05: thermal n capture γ spectra on natural target measured (semi) primary γ-ray mass assignments are in accordance with uniquely high S(n) for ^{106}Pd and corresponding Eγ via av res n-capture (1970Bo29). Low-energy γ-ray assignments and placements are consistent with level schemes via (n,n$'\gamma$) and decay experiments.

Others: 1965Gr30, 1967Ba79.

^{106}Pd Levels

B(E0)/B(E2) from 1987Co03.

E(level)[†]	J^{π}[‡]	Comments
0.0	0^+	
511.87 *6*	2^+	
1128.15 *6*	2^+	
1133.86 *7*	0^+	B(E0; 1133 to g.s.)/B(E2; 1133 to 511)=0.0154 *14*.
1229.17 *8*	4^+	
1557.74 *7*	3^+	
1562.24 *6*	2^+	
1706.57 *9*	0^+	B(E0; 1706 to g.s.)/B(E2; 1706 to 511)<0.038. B(E0; 1706 to g.s.)/B(E2; 1706 to 1128)<0.003. B(E0; 1706 to 1133)/B(E2; 1706 to 511)<2.0. B(E0; 1706 to 1133)/B(E2; 1706 to 1128)<0.13.
1904.31? *10*	$2^-,3^-$	E(level): level questioned by 1997De21.
1909.45 *9*	2^+	
1932.27 *9*	4^+	
2001.48 *11*	0^+	B(E0; 2001 to g.s.)/B(E2; 2001 to 511)=12 *3*. B(E0; 2001 to g.s.)/B(E2; 2001 to 1128)=0.020 *4*. B(E0; 2001 to 1133)/B(E2; 2001 to 511)<37. B(E0; 2001 to 1133)/B(E2; 2001 to 1128)<0.28. B(E0; 2001 to 1706)/B(E2; 2001 to 511)<220. B(E0; 2001 to 1706)/B(E2; 2001 to 1128)<1.7.
2076	6^+	
2077.57 *9*	$(4)^+$	
2084.50 *8*	3^-	
2242.54 *7*	2^+	
2278.48 *14*	0^+	B(E0; 2278 to g.s.)/B(E2; 2278 to 511)<0.35. B(E0; 2278 to 1128)/B(E2; 2278 to 511)<7.5.
2282.72 *11*	4^+	
2306.19 *13*	4^-	
2308.70 *9*	2^+	
2350.95 *10*	4^+	
2366.21 *11*	5^+	
2397.46 *13*	$(5)^-$	
2400.7? *11*	$2^-,3^-$	
2439.18 *9*	2^+	
2472.19 *13*	$1^+,2^+$	
2485.33 *13*	(1^-)	
2500.10 *13*	2^-	
2578.63 *10*	(4^-)	
2624.40 *5*	0^+	E(level): taken from Adopted Levels.

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^{105}Pd(n,γ),(n,e) E=thermal 1987Co03,1970Or05 (continued)

^{106}Pd Levels (continued)

E(level)†	Jπ‡	E(level)†	Jπ‡	E(level)†	Jπ‡	E(level)†	Jπ‡
2626.87 *9*	(2,3)$^+$	2826.99 *13*	0$^+$	2902.13 *13*	2$^+$	3056.20 *12*	1$^+$
2713.86 *10*	2$^+$,3$^+$	2850.80 *13*	2$^+$,3$^+$	2908.64 *18*	(1$^-$)	3071.17 *21*	(2,3)$^-$
2747.72 *15*	(2$^-$,3$^-$)	2861.06 *10*	($^+$)	2918.55 *10*	2$^+$	3173.77 *11*	(2$^+$,3$^+$)
2775.94 *9*	(4$^+$)	2878.36 *14*	0$^+$	2935.96 *18*	(2$^-$,3$^-$)	3221.70 *15*	0$^+$
2783.75 *13*	2$^+$	2886.26 *18*	($^-$)	2968.65 *19*	3$^-$	3319.57 *23*	0$^+$
2821.03 *9*	2$^+$	2897.35 *13*	(1$^-$,4$^-$)	3037.28 *13*	1,2	(9561.2 *3*)	2$^+$,3$^+$

† As no detailed level scheme was given by 1987Co03, a level scheme was constructed by the evaluators based on adopted level scheme and γ's observed by 1987Co03.
‡ From Adopted Levels.

γ(^{106}Pd)

Conversion electron data from 1987Co03.
For a large number of unplaced γ's see 1987Co03.

Eγ†	Iγ‡	Ei(level)	Jiπ	Ef	Jfπ	Mult.	Comments
x346.59 *15*	≤8.9					E1	Iγ: from Iγ(346.59+347.14)=7.9 *10*. Mult.: from α(K)exp=0.0041 *10* for the 346.59+347.14 γ transitions.
347.14 *13*	≤8.9	1904.31?	2$^-$,3$^-$	1557.74	3$^+$	E1	Iγ: Iγ=7.9 *10* for 346.59γ +347.14γ doublet in (n,γ). Mult.: from α(K)exp=0.0041 *10* for the 346.59+347.14 γ transitions. Eγ: No final level within 0.49 keV.
374.00 *14*	2.3 *3*	1932.27	4$^+$	1557.74	3$^+$		
418.4 *7*	1.6 *11*	2350.95	4$^+$	1932.27	4$^+$		
428.32 *10*	4.8 *6*	1562.24	2$^+$	1133.86	0$^+$		α(K)exp=0.00047 *6* Iγ: calculated based upon Iγ(428γ from 1562 level)/Iγ(1050γ)= 0.0453 *15* and Iγ(429γ from 1557 level)/Iγ(1045γ)=0.445 *19* in adopted gammas. However, a large fraction of the 429 peak, with Iγ=102 *12*, remains unassigned.
429.65 *10*	43 *6*	1557.74	3$^+$	1128.15	2$^+$		α(K)exp=0.0041 *5*; α(L)exp=0.00061 *8* Iγ: calculated based upon Iγ(428γ from 1562 level)/Iγ(1050γ)= 0.0453 *15* and Iγ(429γ from 1557 level0/Iγ(1045γ)=0.445 *19* in adopted gammas. However, a large fraction of the 429 peak, with Iγ=102 *12* remains unassigned.
434.0 *3*	4.2 *12*	1562.24	2$^+$	1128.15	2$^+$		
511.86 *12*	150×10[1]	511.87	2$^+$	0.0	0$^+$		Eγ,Iγ: calculated from ce measurement. Iγ is obscured in the singles spectrum by interference with 511γ annihilation radiation. Therefore the intensity of that γ was calculated from the conversion electron spectra. No uncertainty on Iγ was given in the paper.
522.31 *12*	1.5 *2*	2084.50	3$^-$	1562.24	2$^+$		
533.53 *12*	2.3 *3*	2775.94	(4$^+$)	2242.54	2$^+$		
578.60 *11*	3.8 *5*	1706.57	0$^+$	1128.15	2$^+$		
616.23 *11*	281 *34*	1128.15	2$^+$	511.87	2$^+$		K/L=8.0 *15*
622.02 *12*	57 *7*	1133.86	0$^+$	511.87	2$^+$		K/L=6 *3*
680.26 *11*	14.1 *17*	2242.54	2$^+$	1562.24	2$^+$	M1,E2	α(K)exp=0.0017 *3*

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^{105}Pd(n,γ),(n,e) E=thermal 1987Co03,1970Or05 (continued)

γ(^{106}Pd) (continued)

E_γ †	I_γ ‡	E_i(level)	J_i^π	E_f	J_f^π	Mult.	Comments
							Mult.: α(K)exp also consistent with E1+M2 with δ=0.4.
684.78 *11*	5.3 *6*	2242.54	2^+	1557.74	3^+		
703.18 *11*	14.1 *17*	1932.27	4^+	1229.17	4^+		α(K)exp=0.0020 *3*
717.44 *11*	310 *38*	1229.17	4^+	511.87	2^+		K/L= 7.7 *13*
748.45 *11*	31 *4*	2306.19	4^-	1557.74	3^+		α(K)exp=0.00080 *12*
765.67 *12*	1.0 *1*	2472.19	1^+,2^+	1706.57	0^+		
775.75 *11*	4.5 *5*	1904.31?	2^-,3^-	1128.15	2^+		
793.30 *11*	7.0 *8*	2350.95	4^+	1557.74	3^+		
804.38 *11*	34 *4*	1932.27	4^+	1128.15	2^+		α(K)exp=0.0013 *2* I_γ: from Iγ(848γ from 2077 level)/Iγ(949γ+1565γ)=2.3 *8* in ^{106}Ag ε decay.
808.39 *11*	9.5 *12*	2366.21	5^+	1557.74	3^+		
848[c]	20 *9*	2076	6^+	1229.17	4^+		I_γ: deduced from Iγ(848γ from 2077)/Iγ(949γ+1565γ)=2.3 *8* in ^{106}Ag ε decay and Iγ=38 *5* for the doubly placed 848.
848.12 *11*	18 *7*	2077.57	$(4)^+$	1229.17	4^+		α(K)exp=0.0015 *2*
873.56 *11*	6.6 *8*	2001.48	0^+	1128.15	2^+	[E2]	
949.53 *11*	1.8 *2*	2077.57	$(4)^+$	1128.15	2^+		
956.41 *11*	5.2 *6*	2084.50	3^-	1128.15	2^+		
1020.88 *11*	6.3 *8*	2578.63	(4^-)	1557.74	3^+		
1045.93 *11*	96 *12*	1557.74	3^+	511.87	2^+		K/L=8.5 *13*
1050.42 *11*	106 *13*	1562.24	2^+	511.87	2^+		α(K)exp=0.0011 *2*; α(L)exp=0.00014 *3*
1053.70 *11*	17.8 *22*	2282.72	4^+	1229.17	4^+	M1,E2	α(K)exp=0.00097 *13*
1062.14 *11*	1.5 *2*	2624.40	0^+	1562.24	2^+		
1064.60 *11*	1.0 *1*	2626.87	$(2,3)^+$	1562.24	2^+		
1108.69 *11*	4.1 *5*	2242.54	2^+	1133.86	0^+		
1114.42 *11*	8.2 *10*	2242.54	2^+	1128.15	2^+		α(K)exp=0.0015 *3*
1128.11 *11*	94 *12*	1128.15	2^+	0.0	0^+	E2	K/L=9.5 *19*
1133.8 *2*		1133.86	0^+	0.0	0^+	E0	ce(K)=0.021 *10*
1137.13 *12*	0.6 *1*	2366.21	5^+	1229.17	4^+		
1156.28 *12*	4.6 *6*	2713.86	2^+,3^+	1557.74	3^+		
1168.28 *11*	17.1 *21*	2397.46	$(5)^-$	1229.17	4^+		α(K)exp=0.00053 *19*
1180.24 *13*	5.1 *7*	2308.70	2^+	1128.15	2^+		
1194.55 *11*	9.3 *11*	1706.57	0^+	511.87	2^+	M1,E2	α(K)exp=0.00061 *9* Mult.: M1 excluded if $J^\pi(511)=2^+$.
1218.26 *14*	3.6 *6*	2775.94	(4^+)	1557.74	3^+		
1258.65 *16*	1.3 *2*	2821.03	2^+	1562.24	2^+		
1267.18 *16*	0.6 *1*	2826.99	0^+				E_γ: No final level within 0.77 keV.
1302.98 *11*	2.7 *3*	2861.06	$(^+)$	1557.74	3^+		
1305.43 *11*	1.5 *2*	2439.18	2^+	1133.86	0^+		
1316.15 *18*	0.3 *1*	2878.36	0^+	1562.24	2^+		
1349.50 *11*	9.0 *11*	2578.63	(4^-)	1229.17	4^+		
1356.46 *14*	0.6 *1*	2918.55	2^+	1562.24	2^+		
1360.92 *11*	1.7 *2*	2918.55	2^+	1557.74	3^+		
1397.62 *11*	25 *3*	1909.45	2^+	511.87	2^+		
1484.49 *11*	2.3 *3*	2713.86	2^+,3^+	1229.17	4^+		
1489.09 *16*	0.7 *1*	2001.48	0^+	511.87	2^+	E2	α(K)exp=0.00033
1495.17 *14*	1.0 *1*	2624.40	0^+	1128.15	2^+		
1498.75[a] *11*	8.3[a] *10*	2626.87	$(2,3)^+$	1128.15	2^+		
1498.75[a] *11*	8.3[a] *10*	3056.20	1^+	1557.74	3^+		
1546.64 *16*	1.3 *2*	2775.94	(4^+)	1229.17	4^+		
1554.50 *15*	0.4 *1*	2783.75	2^+	1229.17	4^+		
1562.26 *11*	9.7 *12*	1562.24	2^+	0.0	0^+		
1565.76 *11*	5.9 *7*	2077.57	$(4)^+$	511.87	2^+		
1572.60 *11*	61 *7*	2084.50	3^-	511.87	2^+		α(K)exp=0.00020 *3*

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^{105}Pd(n,γ),(n,e) E=thermal 1987Co03,1970Or05 (continued)

γ(^{106}Pd) (continued)

E_γ †	I_γ ‡	E_i(level)	J_i^π	E_f	J_f^π	Mult.	Comments
1616.99 *12*	4.8 *6*	3173.77	$(2^+,3^+)$	1557.74	3^+		E_γ: No final level within 0.59 keV.
1621.62 *11*	6.4 *8*	2850.80	$2^+,3^+$	1229.17	4^+		
1632.22 *11*	1.9 *2*	2861.06	$(^+)$	1229.17	4^+		
1655.66 *17*	0.8 *1*	2783.75	2^+	1128.15	2^+		
1668.17 *11*	3.7 *4*	2897.35	$(1^-,4^-)$	1229.17	4^+		
1687.05 *15*	0.5 *1*	2821.03	2^+	1133.86	0^+		
1693.08 *12*	1.0 *1*	2821.03	2^+	1128.15	2^+		
1730.56 *12*	1.3 *2*	2242.54	2^+	511.87	2^+		
1766.60 *12*	3.5 *4*	2278.48	0^+	511.87	2^+	E2	α(K)exp=0.00031 *7*
1770.49 *16*	1.7 *2*	2282.72	4^+	511.87	2^+		
1773.74 *15*	3.3 *5*	2902.13	2^+	1128.15	2^+		
1796.87 *11*	11.7 *14*	2308.70	2^+	511.87	2^+		
1838.96 *12*	2.8 *3*	2350.95	4^+	511.87	2^+		
1909.36[b] *12*	7.8[b] *18*	1909.45	2^+	0.0	0^+		I_γ: deduced from Iγ(1909γ from 1909 level)/Iγ(1398γ)=0.31 *6* in (n,n′γ).
1909.36[b] *12*	6.1[b] *25*	3037.28	1,2	1128.15	2^+		I_γ: from Iγ=13.9 *17* for the doubly placed 1909γ.
1927.19 *12*	14.5 *17*	2439.18	2^+	511.87	2^+		
1960.17 *20*	1.2 *2*	2472.19	$1^+,2^+$	511.87	2^+		
1973.75 *15*	1.8 *3*	2485.33	(1^-)	511.87	2^+		
1988.23 *12*	22 *3*	2500.10	2^-	511.87	2^+		
2002 *1*		2001.48	0^+	0.0	0^+	E0	ce(K)=1.4 *2*
2044.26 *14*	3.6 *6*	3173.77	$(2^+,3^+)$	1128.15	2^+		
2083.96 *27*	0.5 *1*	2084.50	3^-	0.0	0^+		
2093.52 *13*	3.4 *5*	3221.70	0^+	1128.15	2^+		
2112.27 *14*	1.8 *3*	2624.40	0^+	511.87	2^+		
2114.95 *13*	4.1 *6*	2626.87	$(2,3)^+$	511.87	2^+		
2185.68 *21*	1.2 *2*	3319.57	0^+	1133.86	0^+		
2202.07 *15*	1.4 *2*	2713.86	$2^+,3^+$	511.87	2^+		
2235.81 *14*	17 *3*	2747.72	$(2^-,3^-)$	511.87	2^+		
2242.87 *15*	1.6 *3*	2242.54	2^+	0.0	0^+		
2263.84 *17*	2.3 *4*	2775.94	(4^+)	511.87	2^+		
2271.84 *15*	10.9 *17*	2783.75	2^+	511.87	2^+		
2309.00[b] *16*	≤0.86[b]	2308.70	2^+	0.0	0^+		I_γ: from Iγ(2309γ from 2309 level)/Iγ(1180γ+1797γ)≤0.051 *8* in ^{106}Ag ε decay.
2309.00[b] *16*	6.1[b] *12*	2821.03	2^+	511.87	2^+		I_γ: from Iγ(2309γ from 2309 level) as given, and Iγ=6.6 *10* for the doubly placed 2309γ.
2317.20 *16*	3.5 *6*	2826.99	0^+				E_γ: No final level within 0.77 keV.
2366.42 *17*	1.8 *3*	2878.36	0^+	511.87	2^+		
2374.36 *17*	6.3 *10*	2886.26	$(^-)$	511.87	2^+		
2390.52 *17*	7.5 *12*	2902.13	2^+	511.87	2^+		
2396.74 *17*	15.6 *24*	2908.64	(1^-)	511.87	2^+		
2406.02 *19*	6.0 *10*	2918.55	2^+	511.87	2^+		
2424.06 *17*	8.6 *13*	2935.96	$(2^-,3^-)$	511.87	2^+		
2439.09 *18*	5.4 *8*	2439.18	2^+	0.0	0^+		
2456.68 *18*	6.3 *10*	2968.65	3^-	511.87	2^+		
2484.80 *19*	22 *4*	2485.33	(1^-)	0.0	0^+		
2523.8 *3*	1.2 *2*	3037.28	1,2	511.87	2^+		E_γ: No final level within 1.3 keV.
2543.19 *21*	4.8 *8*	3056.20	1^+	511.87	2^+		E_γ: No final level within 0.96 keV.
2559.24 *20*	12.9 *20*	3071.17	$(2,3)^-$	511.87	2^+		
6489.1[#] *10*	0.08[@]	(9561.2)	$2^+,3^+$	3071.17	$(2,3)^-$		
6590.1[#] *10*	0.09[@]	(9561.2)	$2^+,3^+$	2968.65	3^-		
6624.8[#] *10*	0.18[@]	(9561.2)	$2^+,3^+$	2935.96	$(2^-,3^-)$		
6652.2[#] *10*	0.16[@]	(9561.2)	$2^+,3^+$	2908.64	(1^-)		

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^{105}Pd(n,γ),(n,e) E=thermal 1987Co03,1970Or05 (continued)

$\gamma(^{106}Pd)$ (continued)

E_γ [†]	I_γ [‡]	E_i(level)	J_i^π	E_f	J_f^π	Comments
6735.4[#] *10*	0.24[@]	(9561.2)	$2^+,3^+$	2826.99	0^+	
6812.0[#] *10*	0.12[@]	(9561.2)	$2^+,3^+$	2747.72	$(2^-,3^-)$	
7061.7[#] *10*	0.08[@]	(9561.2)	$2^+,3^+$	2500.10	2^-	
7075.1[#] *10*	0.05[@]	(9561.2)	$2^+,3^+$	2485.33	(1^-)	
7122.2[#] *10*	0.09[@]	(9561.2)	$2^+,3^+$	2439.18	2^+	
7160.2 *10*	0.10[&] *3*	(9561.2)	$2^+,3^+$	2400.7?	$2^-,3^-$	E_γ: from 1970Bo29, av res n-capture; other: 7150 *7* (1965Gr30).
7476.0[#] *10*	0.08[@]	(9561.2)	$2^+,3^+$	2084.50	3^-	
7629.0 *11*	0.14[&] *4*	(9561.2)	$2^+,3^+$	1932.27	4^+	E_γ: from 1970Bo29, av res n-capture; other: 7614 *6* (1965Gr30).
7996.3[#] *10*	0.05[@]	(9561.2)	$2^+,3^+$	1562.24	2^+	
8002.6[#] *10*	0.05[@]	(9561.2)	$2^+,3^+$	1557.74	3^+	
8331.2[#] *10*	0.11[@]	(9561.2)	$2^+,3^+$	1229.17	4^+	
8433.6 *10*	0.05[&] *1*	(9561.2)	$2^+,3^+$	1128.15	2^+	E_γ: from 1970Bo29, av res n-capture; other: 8417 *9* (1965Gr30).
9049.8 *10*	0.020[&] *5*	(9561.2)	$2^+,3^+$	511.87	2^+	E_γ: from 1970Bo29, av res n-capture; other: 9029 *8* (1965Gr30).

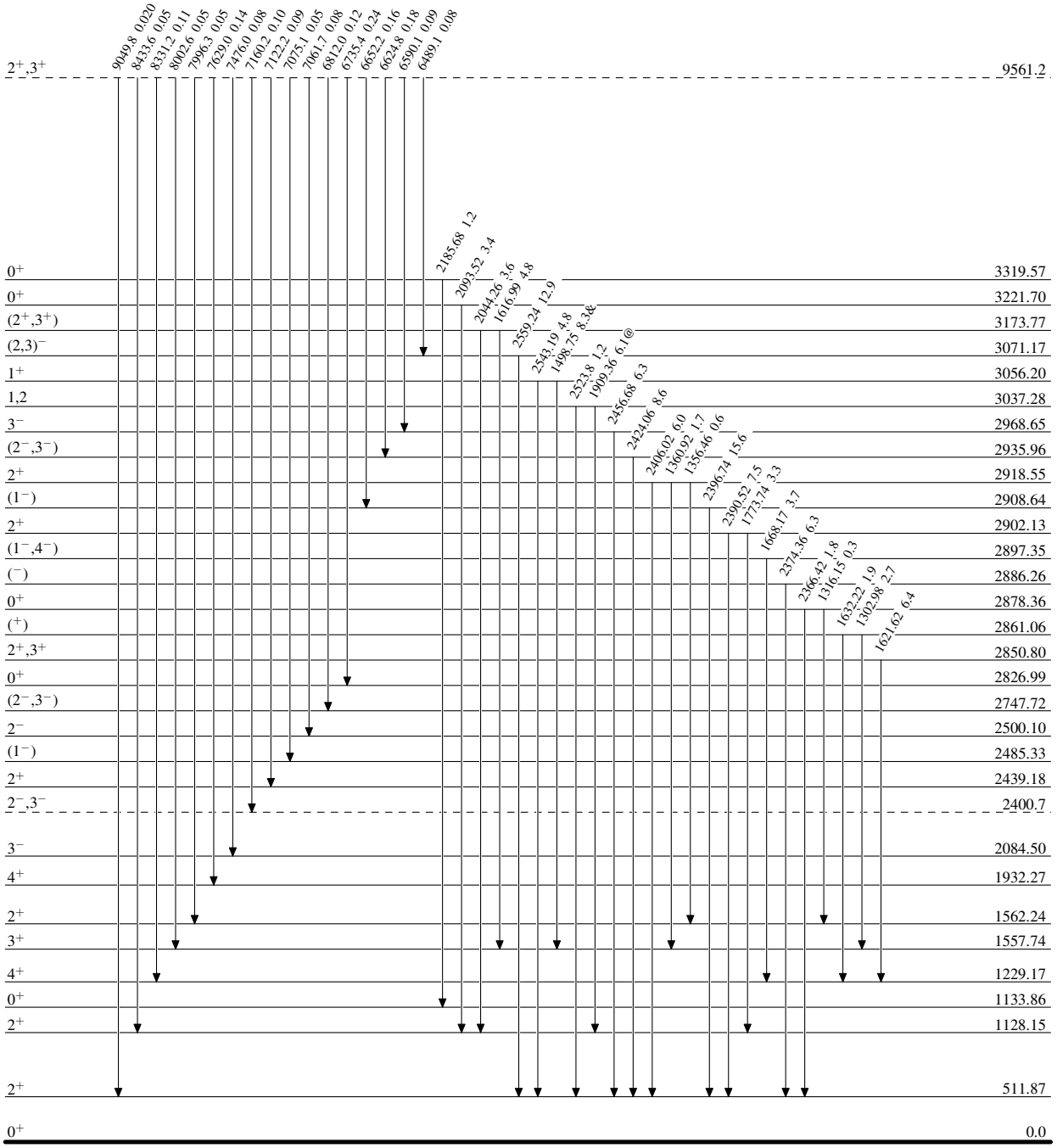
[†] Unless noted otherwise, from 1987Co03.
[‡] From 1987Co03. Intensity normalization of the γ-ray and ce data was performed assuming that the 622, 717, 804, 1128 and 1195γ's are E2.
[#] From 1970Or05.
[@] From 1970Or05: photons per 100 n-captures in natural palladium, $\Delta I\gamma$ not given.
[&] From 1965Gr30.
[a] Multiply placed with undivided intensity.
[b] Multiply placed with intensity suitably divided.
[c] Placement of transition in the level scheme is uncertain.
[x] γ ray not placed in level scheme.

^{105}Pd(n,γ),(n,e) E=thermal 1987Co03,1970Or05

Level Scheme

Intensities: Type not specified
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

Legend
$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$



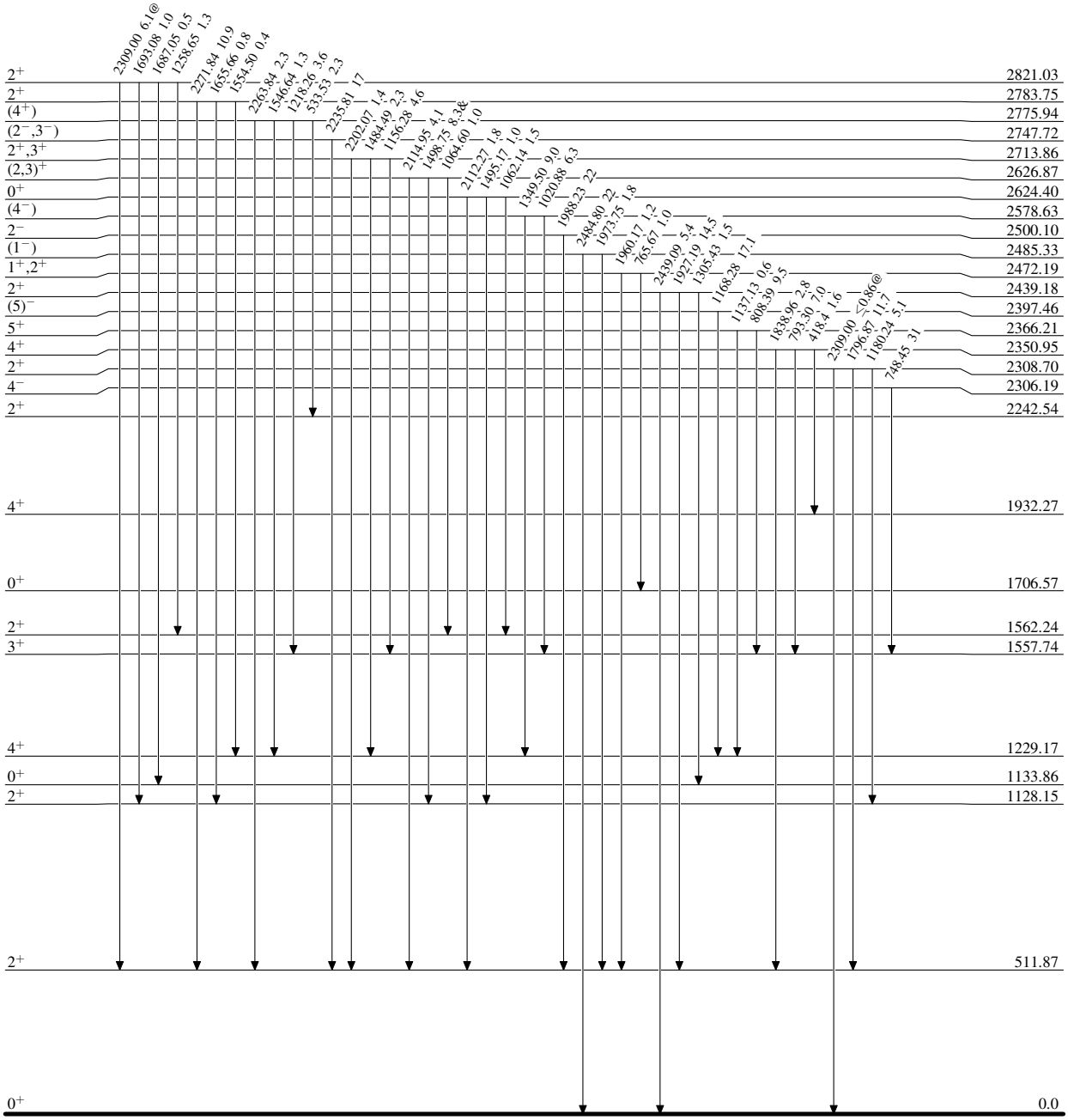
$^{106}_{46}Pd_{60}$

^{105}Pd(n,γ),(n,e) E=thermal 1987Co03,1970Or05

Level Scheme (continued)

Intensities: Type not specified
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

Legend
$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$



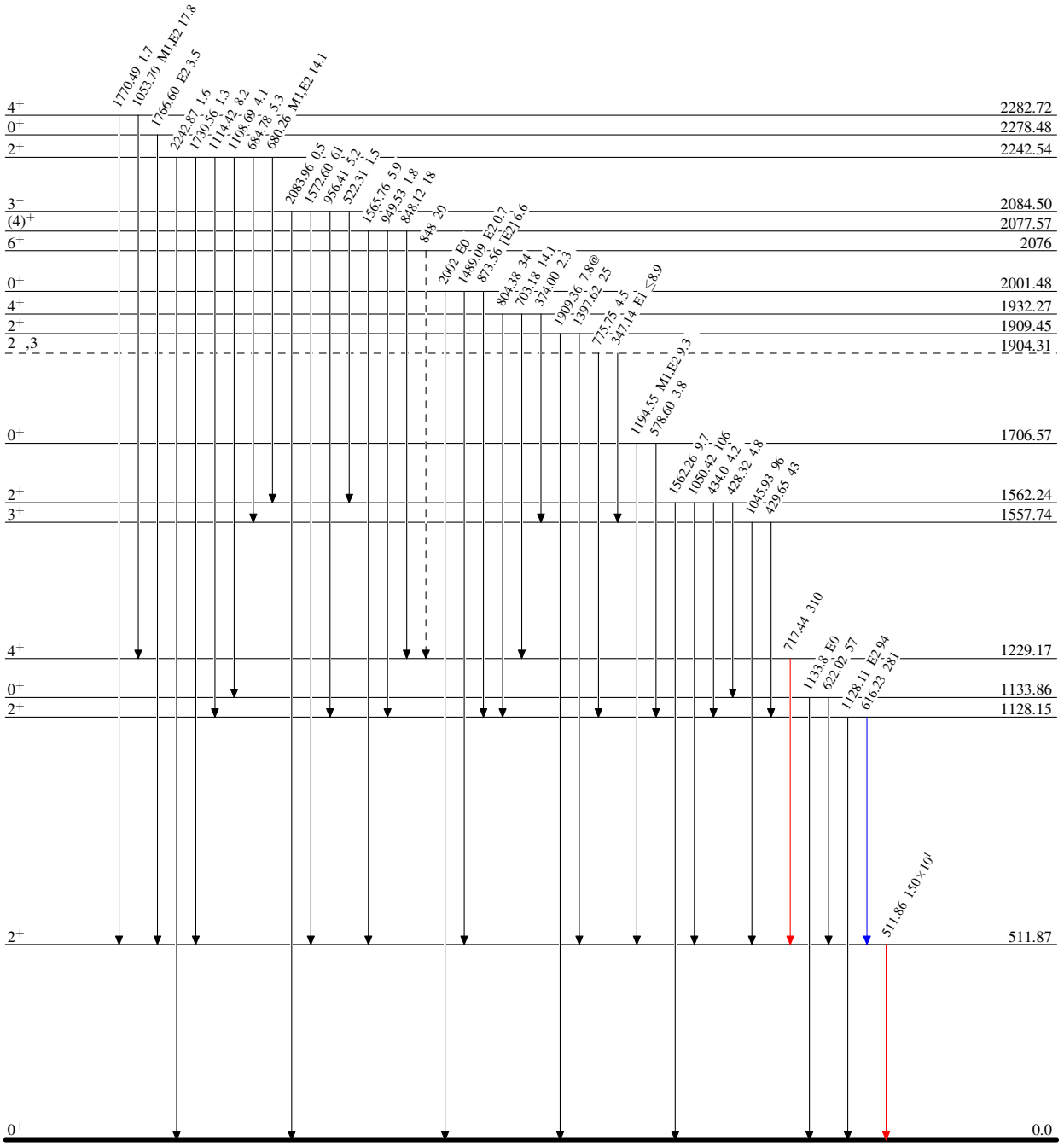
$^{106}_{46}Pd_{60}$

^{105}Pd(n,γ),(n,e) E=thermal 1987Co03,1970Or05

Level Scheme (continued)

Intensities: Type not specified
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

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)



$^{106}_{46}Pd_{60}$