^{108}Pd(n,γ) E=thermal 1980Ca02

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

S(n)=6153.59 *15* from 2012Wa38.

1980Ca02: Thermal neutron beam was produced by the Brookhaven National Laboratory High Flux Beam Reactor (HFBR). Target is 5.52 g ^{108}Pd enriched to 98.11%. γ rays were detected with Ge(Li) detectors (FWHM=7 keV at Eγ=6 MeV). A separate study of primary transitions was performed with a three crystal pair spectrometer and a 7.7 g enriched target. Another study of low energy γ rays with high energy-precision and conversion electrons was performed with curved crystal spectrometers (FWHM=2-25 eV) for γ rays and the BILL spectrometer for electrons (resolution=ΔE/E $\approx 10^{-3}$ at the Institute Laue Langevin (ILL) in Grenoble, France. Measured Eγ, Iγ, ce. Deduced levels, J^π, γ multipolarities.

2008Kr05: Thermal neutron beams was produced from the 10-MW Budapest Reactor. Target is a 1.6 g $PdCl_2$ with a thickness of 0.4 g/cm^2. γ rays were detected by a 25% efficient coaxial HPGe detector with Compton suppression by a BGO scintillator. Measured Eγ, Iγ, absolute cross section. Deduced levels, J^π.

Other measurement: 1977Ba87.

^{109}Pd Levels

E(level)†	J^π@	E(level)†	J^π@	E(level)†	J^π@
0	5/2+	944.967 *6*	1/2+	1683.5 *8*	1/2+
113.4000 *14*	1/2+	954.164 *9*	1/2+	1709.7 *8*	(1/2,3/2,5/2+)
188.9903 *10*	11/2−	981.755 *10*	5/2+	1728.1‡ *6*	
245.0808 *16*	(7/2)−	1053.628 *19*	3/2+	1789.0‡ *7*	
248.01# *11*	9/2+	1065.8 *5*	1/2+	1840.8‡ *5*	
266.3424 *15*	1/2+	1091.0 *5*	5/2+	1914.9‡ *6*	
276.289 *3*	7/2+	1111.8 *8*	1/2,3/2	1923.4‡ *6*	
287.250 *3*	9/2−	1134.694 *6*	1/2,3/2	1996.7‡ *7*	
291.4339 *16*	3/2+	1147.2 *5*	3/2+	2024.3‡ *5*	
325.2835 *16*	3/2+	1232.796 *22*	1/2+	2087.4‡ *6*	
326.8690 *22*	5/2+	1243.9 *8*	1/2,3/2	2119.5‡ *6*	
339.5299 *17*	5/2−	1268.1 *8*	3/2+,5/2+	2158.1‡ *7*	
426.140 *3*	7/2+	1328.4 *5*	5/2,(3/2)	2192.4‡ *9*	
433.5630 *16*	3/2+	1347.7 *5*	1/2,3/2,5/2+	2227.9‡ *7*	
491.5892 *24*	3/2+	1359.411 *8*	1/2,3/2	2241.9‡ *6*	
540.6753 *19*	5/2+	1371.1 *5*	5/2+	2363.0‡ *6*	
604.5118 *24*	5/2−	1377.7 *8*	1/2,3/2	2414.7‡ *6*	
623.4813 *23*	3/2+	1399.0 *5*	1/2,3/2	2569.9‡ *6*	
645.9 *5*	7/2+,9/2+	1479.3 *8*	1/2+	2589.9‡ *7*	
673.4879 *24*	3/2−	1484.9 *8*	(1/2,3/2,5/2+)	2763.5‡ *10*	
722.043 *3*	3/2+,5/2+	1536.9 *8*	1/2+	2885.6‡ *9*	
791.425 *5*	3/2+,5/2+	1540.3‡ *5*	3/2	2924.4‡ *7*	
810.592 *4*	3/2+	1601.3 *8*	(1/2+)	2984.8‡ *8*	
846.1 *5*	5/2+	1615.4 *8*	(1/2,3/2,5/2+)	(6153.51 *10*)	1/2+&
911.250 *12*	5/2	1644.2 *8*	(3/2+,5/2+)		
941.098 *3*	3/2−	1647.8 *5*	(1/2,3/2,5/2+)		

† From a least-squares fit to γ-ray energies.
‡ Seen only by 1977Ba87.
# Seen only by 2008Kr05.
@ From Adopted Levels.
& s-wave capture in J^π=0+ ^{108}Pd g.s.

γ(^{109}Pd)

Conversion electron intensities per 1000 captures from 1980Ca02 are given under comments.

E_γ[†]	I_γ[&]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[a]	δ[b]	α[cd]	Comments
59.4[#] 3		248.01	9/2$^+$	188.9903	11/2$^-$				I_γ: 5 3 from σ=0.04 b 2 in 2008Kr05.
94.450 1	35 4	339.5299	5/2$^-$	245.0808	(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 I_γ: 19.6 17 from σ=0.145 b 8 in 2008Kr05. I(ce)(K)=15.0 23, I(ce)(L1)=1.53 15, I(ce)(L2)=0.49 19, I(ce)(L3)=0.63 25, I(ce)(M)=0.63 25 (1980Ca02). Mult.: 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.
98.258[@] 3	16.5 17	287.250	9/2$^-$	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 I_γ: 11.1 11 from σ=0.082 b 6 in 2008Kr05. I(ce)(K)=4.7 7 I(ce)(L1)=0.73 15 (1980Ca02). Mult.: α(K)exp=0.29 5, α(L1)exp=0.044 10 (1980Ca02).
106.694 3	1.0 2	433.5630	3/2$^+$	326.8690	5/2$^+$				I_γ: 1.5 10 from σ=0.011 b 7 in 2008Kr05.
108.280[@] 1	4.9 6	433.5630	3/2$^+$	325.2835	3/2$^+$				I_γ: 3.9 11 from σ=0.029 b 8 in 2008Kr05.
113.401 2	3.0×10^2 3	113.4000	1/2$^+$	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 I_γ: 171 12 from σ=1.266 b 19 in 2008Kr05. I(ce)(K)=166 17, I(ce)(L1)=15.7 16, I(ce)(L2)=9.21 92, I(ce)(L3)=11.6 12, I(ce)(M1)=2.97 30, I(ce)(M2+M3)=4.16 42 (1980Ca02). Mult.: 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 (1980Ca02).
149.854 3	1.0 1	426.140	7/2$^+$	276.289	7/2$^+$				I_γ: 0.15 4 from σ=0.0011 b 3 in 2008Kr05.
152.942 1	95 10	266.3424	1/2$^+$	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: 74 5 from σ=0.549 b 8 in 2008Kr05. I(ce)(K)=9.04 45, I(ce)(L1)=0.952 95, I(ce)(M)=0.190 32 (1980Ca02). Mult.: α(K)exp=0.095 10, α(L1)exp=0.010 2, α(M)exp=0.002 5 (1980Ca02).
166.306 4	2.2 4	491.5892	3/2$^+$	325.2835	3/2$^+$				I_γ: 2.1 3 from σ=0.0159 b 23 in 2008Kr05.
^{x}170.561 1	2.4 2								
178.034 1	72 7	291.4339	3/2$^+$	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 I_γ: 56 4 from σ=0.413 b 8 in 2008Kr05. I(ce)(K)=4.54 14, I(ce)(L1)=0.432 86 (1980Ca02). Mult.: α(K)exp=0.063 6, α(L1)exp=0.006 1 (1980Ca02).
187.115 4	1.0 1	810.592	3/2$^+$	623.4813	3/2$^+$				I_γ: 0.81 from σ=0.0060 b in 2008Kr05.

$^{109}_{46}$Pd$_{63}$-2

γ(^{109}Pd) (continued)

$E_γ$[†]	$I_γ$[&]	E_i(level)	$J^π_i$	E_f	$J^π_f$	Mult.[a]	δ[b]	α[cd]	Comments
188.990 *1*	16.5 *17*	188.9903	11/2⁻	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* $I_γ$: 13.9 *12* from σ=0.103 b *6* in 2008Kr05. I(ce)(K)=8.32 *25*, I(ce)(L1)=0.809 *81*, I(ce)(L2)=0.91 *14*, I(ce)(L3)=0.76 *12*, I(ce)(M)=0.363 *73* (1980Ca02). Mult.: 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* (1980Ca02).
189.920 *3*	2.8 *4*	623.4813	3/2⁺	433.5630	3/2⁺				$I_γ$: 2.30 from σ=0.017 b in 2008Kr05.
197.333 *8*	0.6 *1*	623.4813	3/2⁺	426.140	7/2⁺				
200.153 *4*	12.0 *12*	491.5892	3/2⁺	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* $I_γ$: 9.9 *10* from σ=0.073 b *5* in 2008Kr05. I(ce)(K)=0.49 *10* (1980Ca02). Mult.: α(K)exp=0.041 *10* (1980Ca02).
ˣ202.971 *13*	0.3 *1*								
ˣ207.697 *3*	0.3 *1*								
211.884 *3*	34 *3*	325.2835	3/2⁺	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* $I_γ$: 27.6 *21* from σ=0.204 b *7* in 2008Kr05. I(ce)(K)=1.48 *6*, I(ce)(L1)=0.235 *71* (1980Ca02). Mult.: α(K)exp=0.044 *5*, α(L1)exp=0.007 *2* (1980Ca02).
213.806 *4*	1.8 *3*	540.6753	5/2⁺	326.8690	5/2⁺				$I_γ$: 1.49 from σ=0.011 b in 2008Kr05.
215.390 *2*	6.7 *7*	540.6753	5/2⁺	325.2835	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* $I_γ$: 7.8 *9* from σ=0.058 b *5* in 2008Kr05. I(ce)(K)=0.261 *26* (1980Ca02). Mult.: α(K)exp=0.039 *5* (1980Ca02).
ˣ216.487 *9*	0.5 *1*								
222.922 *6*	0.6 *1*	944.967	1/2⁺	722.043	3/2⁺,5/2⁺				$I_γ$: 0.51 from σ=0.0038 b in 2008Kr05.
224.717 *7*	0.6 *1*	1359.411	1/2,3/2	1134.694	1/2,3/2				$I_γ$: 0.54 from σ=0.0040 b in 2008Kr05.
ˣ228.194 *4*	0.7 *1*								
230.453 *2*	2.8 *3*	722.043	3/2⁺,5/2⁺	491.5892	3/2⁺				$I_γ$: 3.0 *6* from σ=0.022 b *4* in 2008Kr05.
245.080 *2*	154 *15*	245.0808	(7/2)⁻	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* $I_γ$: 128 *9* from σ=0.945 b *15* in 2008Kr05. I(ce)(K)=1.54 *5*, I(ce)(L1)=0.231 *46* (1980Ca02). Mult.: α(K)exp=0.010 *1*, α(L1)exp=0.0015 *3* (1980Ca02).
247.96[#] *11*		248.01	9/2⁺	0	5/2⁺				$I_γ$: 5.5 *10* from σ=0.041 b *7* in 2008Kr05.
249.238 *11*	19.4 *19*	540.6753	5/2⁺	291.4339	3/2⁺	M1		0.0319	α(K)=0.0278 *4*; α(L)=0.00334 *5*; α(M)=0.000628 *9*

From ENSDF

γ(^{109}Pd) (continued)

E_γ[†]	I_γ[&]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[a]	δ[b]	α[cd]	Comments
									α(N)=0.0001058 15 I_γ: 17.3 16 from σ=0.128 b 8 in 2008Kr05. I(ce)(K)=0.524 42 (1980Ca02). Mult.: α(K)exp=0.027 3 (1980Ca02).
^{x}263.403 6	2.0 4								
264.378 11	1.4 4	540.6753	$5/2^+$	276.289	$7/2^+$				I_γ: 1.20 from σ=0.0089 b in 2008Kr05.
264.980 3	13.4 13	604.5118	$5/2^-$	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: 11.4 9 from σ=0.084 b 3 in 2008Kr05. I(ce)(K)=0.402 60 (1980Ca02). Mult.: α(K)exp=0.030 5 (1980Ca02).
266.346 3	28 3	266.3424	$1/2^+$	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: 26.4 19 from σ=0.195 b 4 in 2008Kr05. I(ce)(K)=1.10 3 (1980Ca02). Mult.: α(K)exp=0.040 4 (1980Ca02).
267.610 5	2.2 4	941.098	$3/2^-$	673.4879	$3/2^-$				I_γ: 1.89 from σ=0.014 b in 2008Kr05.
274.328 7	0.6 1	540.6753	$5/2^+$	266.3424	$1/2^+$				I_γ: 0.351 from σ=0.0026 b in 2008Kr05.
276.296 5	33 3	276.289	$7/2^+$	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 I_γ: 28.6 22 from σ=0.212 b 7 in 2008Kr05. I(ce)(K)=0.782 23 (1980Ca02). Mult.: α(K)exp=0.024 2 (1980Ca02).
288.480 5	2.2 3	722.043	$3/2^+,5/2^+$	433.5630	$3/2^+$				I_γ: 2.4 6 from σ=0.018 b 4 in 2008Kr05.
291.430 4	60 6	291.4339	$3/2^+$	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 I_γ: 53 4 from σ=0.393 b 8 in 2008Kr05. I(ce)(K)=1.27 4, I(ce)(L1)=0.24 12 (1980Ca02). Mult.: α(K)exp=0.021 2, α(L1)exp=0.004 2 (1980Ca02).
295.597 3	1.4 3	540.6753	$5/2^+$	245.0808	$(7/2)^-$				I_γ: 1.4 4 from σ=0.010 b 3 in 2008Kr05.
298.197 5	12.6 13	623.4813	$3/2^+$	325.2835	$3/2^+$	M1(+E2)	<3	0.025 5	α(K)=0.021 4; α(L)=0.0028 7; α(M)=0.00052 13 α(N)=8.7×10^{-5} 21 I_γ: 9.7 10 from σ=0.072 b 6 in 2008Kr05. I(ce)(K)=0.239 72 (1980Ca02). Mult.: α(K)exp=0.019 6 (1980Ca02).
^{x}299.119 5	1.9 3								
317.255[@] 6	1.8 4	604.5118	$5/2^-$	287.250	$9/2^-$				I_γ: 1.6 6 from σ=0.012 b 4 in 2008Kr05.
320.164 5	28 3	433.5630	$3/2^+$	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_γ: 20 6 from σ=0.15 b 4 in 2008Kr05. I(ce)(K)=0.361 65 (1980Ca02). Mult.: α(K)exp=0.013 3 (1980Ca02).
^{x}321.082 15	0.9 5								

$^{109}_{46}Pd_{63}$-4

^{108}Pd(n,γ) E=thermal 1980Ca02 (continued)

γ(^{109}Pd) (continued)

E_γ[†]	I_γ[&]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[a]	δ[b]	α[cd]	Comments
325.284 *4*	122 *12*	325.2835	3/2$^+$	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: 106 *7* from σ=0.786 b *11* in 2008Kr05. I(ce)(K)=1.83 *6*, I(ce)(L1)=0.244 *41* (1980Ca02). Mult.: α(K)exp=0.015 *1*, α(L1)exp=0.002 *1* (1980Ca02).
326.868 *4*	50 *5*	326.8690	5/2$^+$	0	5/2$^+$	E2		0.0223	α(K)=0.0191 *3*; α(L)=0.00262 *4*; α(M)=0.000495 *7* α(N)=8.14×10^{-5} *12* I_γ: 41 *3* from σ=0.300 b *8* in 2008Kr05. I(ce)(K)=0.978 *39* (1980Ca02). Mult.: α(K)exp=0.020 *2* (1980Ca02).
332.050 *5*	3.2 *6*	623.4813	3/2$^+$	291.4339	3/2$^+$				I_γ: 2.43 from σ=0.018 b in 2008Kr05.
333.964 *3*	64 *6*	673.4879	3/2$^-$	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* I_γ: 29.7 *23* from σ=0.220 b *9* in 2008Kr05. I(ce)(K)=0.897 *27* (1980Ca02). Mult.: α(K)exp=0.014 *1* (1980Ca02).
336.584 *3*	21.0 *21*	941.098	3/2$^-$	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: 17.4 *15* from σ=0.129 b *7* in 2008Kr05. I(ce)(K)=0.273 *19* (1980Ca02). Mult.: α(K)exp=0.013 *2* (1980Ca02).
^{x}337.828 *5*	1.2 *3*								
339.528 *4*	114 *11*	339.5299	5/2$^-$	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* I_γ: 100 *7* from σ=0.737 b *11* in 2008Kr05. I(ce)(K)=0.570 *57* (1980Ca02). Mult.: α(K)exp=0.005 *1* (1980Ca02).
^{x}343.869 *9*	1.9 *4*								
346.622 *6*	0.6 *1*	673.4879	3/2$^-$	326.8690	5/2$^+$				I_γ: 0.257 from σ=0.0019 b in 2008Kr05.
347.192 *6*	1.8 *3*	623.4813	3/2$^+$	276.289	7/2$^+$				I_γ: 1.49 from σ=0.011 b in 2008Kr05.
^{x}355.694 *6*	1.5 *5*								
357.148 *9*	0.6 *1*	623.4813	3/2$^+$	266.3424	1/2$^+$				I_γ: 0.49 from σ=0.0036 b in 2008Kr05.
^{x}358.697 *10*	8.5 *11*								
359.426 *6*	69 *7*	604.5118	5/2$^-$	245.0808	(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* I_γ: 61 *4* from σ=0.453 b *11* in 2008Kr05. I(ce)(K)=0.687 *27* (1980Ca02). Mult.: α(K)exp=0.010 *1* (1980Ca02).
365.295 *7*	0.6 *3*	791.425	3/2$^+$,5/2$^+$	426.140	7/2$^+$				I_γ: 1.35 from σ=0.010 b in 2008Kr05.
^{x}371.125 *10*	2.4 *4*								
377.004 *13*	1.8 *3*	810.592	3/2$^+$	433.5630	3/2$^+$				I_γ: 1.35 from σ=0.010 b in 2008Kr05.

γ(^{109}Pd) (continued)

E_γ[†]	I_γ[&]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[a]	α[cd]	Comments
378.191 *5*	24.3 *24*	491.5892	3/2$^+$	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* I_γ: 20.9 *18* from σ=0.155 b *8* in 2008Kr05. I(ce)(K)=0.292 *58* (1980Ca02). Mult.: α(K)exp=0.012 *3* (1980Ca02).
^{x}386.75 *4*	1.1 *3*							
^{x}392.395 *25*	0.4 *1*							
395.171 *17*	2.9 *4*	722.043	3/2$^+$,5/2$^+$	326.8690	5/2$^+$			I_γ: 3.4 *10* from σ=0.025 b *7* in 2008Kr05.
396.758 *11*	10.2 *10*	722.043	3/2$^+$,5/2$^+$	325.2835	3/2$^+$			I_γ: 11.8 *17* from σ=0.087 b *11* in 2008Kr05.
^{x}407.124 *10*	1.5 *4*							
^{x}414.342 *7*	6.0 *6*							
^{x}416.738 *20*	0.4 *1*							
^{x}418.298 *7*	1.8 *3*							
^{x}421.049 *11*	1.5 *3*							
426.135 *4*	11.7 *12*	426.140	7/2$^+$	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* I_γ: 8.1 *11* from σ=0.060 b *7* in 2008Kr05. I(ce)(K)=0.064 *16* (1980Ca02). Mult.: α(K)exp=0.0055 *20* (1980Ca02).
428.396 *3*	19.0 *19*	673.4879	3/2$^-$	245.0808	(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: 1.4 *3* from σ=0.010 b *2* in 2008Kr05. I(ce)(K)=0.152 *15* (1980Ca02). Mult.: α(K)exp=0.008 *1* (1980Ca02).
433.552 *4*	59 *6*	433.5630	3/2$^+$	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_γ: 50 *4* from σ=0.367 b *11* in 2008Kr05. I(ce)(K)=0.383 *31* (1980Ca02). Mult.: α(K)exp=0.0065 *8* (1980Ca02).
^{x}436.185 *11*	0.6 *1*							
^{x}438.160 *12*	1.4 *3*							
^{x}441.839 *9*	2.3 *5*							
^{x}452.524 *16*	0.8 *1*							
455.702 *5*	7.7 *8*	722.043	3/2$^+$,5/2$^+$	266.3424	1/2$^+$			I_γ: 7.2 *8* from σ=0.053 b *5* in 2008Kr05.
461.194 *7*	13.1 *13*	1134.694	1/2,3/2	673.4879	3/2$^-$			I_γ: 11.8 *10* from σ=0.087 b *5* in 2008Kr05.
464.541 *9*	1.6 *3*	791.425	3/2$^+$,5/2$^+$	326.8690	5/2$^+$			I_γ: 3.38 from σ=0.025 b in 2008Kr05.
^{x}466.511 *10*	2.2 *5*							
^{x}467.333 *12*	1.0 *5*							
485.311 *7*	5.1 *6*	810.592	3/2$^+$	325.2835	3/2$^+$			I_γ: 6.2 *8* from σ=0.046 b *5* in 2008Kr05.
491.575 *10*	9.6 *10*	491.5892	3/2$^+$	0	5/2$^+$			I_γ: 2.35 *17* from σ=0.0174 b *5* in 2008Kr05.
515.128 *13*	5.7 *8*	791.425	3/2$^+$,5/2$^+$	276.289	7/2$^+$			I_γ: 12.2 *14* from σ=0.090 b *8* in 2008Kr05.
520.597 *10*	4.3 *6*	954.164	1/2$^+$	433.5630	3/2$^+$			I_γ: 5.3 *8* from σ=0.039 b *5* in 2008Kr05.
525.078 *16*	1.4 *3*	791.425	3/2$^+$,5/2$^+$	266.3424	1/2$^+$			I_γ: 3.11 from σ=0.023 b in 2008Kr05.

γ(^{109}Pd) (continued)

E_γ [†]	I_γ [&]	E_i(level)	J^π_i	E_f	J^π_f	Comments
^{x}526.411 *21*	0.5 *1*					
530.202 *10*	2.6 *4*	1134.694	1/2,3/2	604.5118	5/2$^-$	I_γ: 3.5 *6* from σ=0.026 b *4* in 2008Kr05.
^{x}539.35 *3*	0.6 *3*					
540.697 *10*	3.1 *7*	540.6753	5/2$^+$	0	5/2$^+$	I_γ: 2.03 from σ=0.015 b in 2008Kr05.
^{x}554.59 *4*	0.8 *3*					
555.614 *13*	1.8 *3*	981.755	5/2$^+$	426.140	7/2$^+$	I_γ: 4.2 *6* from σ=0.031 b *4* in 2008Kr05.
^{x}566.672 *20*	0.4 *3*					
^{x}579.90 *3*	0.8 *3*					
584.51 *5*	0.5 *2*	911.250	5/2	326.8690	5/2$^+$	I_γ: 6.5 from σ=0.048 b in 2008Kr05.
585.908 *15*	1.5 *3*	911.250	5/2	325.2835	3/2$^+$	I_γ: 2.2 *8* from σ=0.016 b *6* in 2008Kr05.
601.575 *6*	15.6 *18*	941.098	3/2$^-$	339.5299	5/2$^-$	I_γ: 16.5 *15* from σ=0.122 b *7* in 2008Kr05.
604.530 *6*	5.5 *7*	604.5118	5/2$^-$	0	5/2$^+$	I_γ: 6.6 *16* from σ=0.049 b *11* in 2008Kr05.
^{x}608.672 *9*	1.8 *4*					
^{x}612.047 *12*	2.1 *4*					
619.94 [@] *3*	5.4 *9*	911.250	5/2	291.4339	3/2$^+$	I_γ: 7.0 *13* from σ=0.052 b *9* in 2008Kr05.
^{x}620.441 *16*	5.2 *8*					
623.468 *16*	6.2 *10*	623.4813	3/2$^+$	0	5/2$^+$	I_γ: 7 *4* from σ=0.05 b *3* in 2008Kr05.
628.887 *18*	2.7 *4*	954.164	1/2$^+$	325.2835	3/2$^+$	I_γ: 3.0 *10* from σ=0.022 b *7* in 2008Kr05.
^{x}632.363 *18*	1.6 *3*					
^{x}634.907 *23*	2.9 *5*					
645.96 *4*	0.8 *3*	645.9	7/2$^+$,9/2$^+$	0	5/2$^+$	
649.65 *3*	0.5 *2*	941.098	3/2$^-$	291.4339	3/2$^+$	I_γ: 0.51 from σ=0.0038 b in 2008Kr05.
653.50 *4*	0.8 *3*	944.967	1/2$^+$	291.4339	3/2$^+$	I_γ: 0.68 from σ=0.0050 b in 2008Kr05.
654.892 *16*	1.9 *4*	981.755	5/2$^+$	326.8690	5/2$^+$	I_γ: 5.0 *8* from σ=0.037 b *5* in 2008Kr05.
^{x}655.501 *16*	3.1 *5*					
^{x}657.57 *3*	4.4 *5*					
^{x}660.13 *3*	0.6 *3*					
^{x}670.09 *6*	0.7 *4*					
673.61 [@] *4*	1.0 *3*	673.4879	3/2$^-$	0	5/2$^+$	I_γ: 0.47 from σ=0.0035 b in 2008Kr05.
674.73 *3*	3.0 *4*	941.098	3/2$^-$	266.3424	1/2$^+$	I_γ: 0.46 *9* from σ=0.0034 b *6* in 2008Kr05.
678.04 *4*	1.6 *3*	791.425	3/2$^+$,5/2$^+$	113.4000	1/2$^+$	I_γ: 3.38 from σ=0.025 b in 2008Kr05.
678.67 *4*	1.2 *3*	944.967	1/2$^+$	266.3424	1/2$^+$	I_γ: 0.97 from σ=0.0072 b in 2008Kr05.
^{x}680.97 *3*	1.8 *3*					
685.909 *24*	22.8 *23*	1359.411	1/2,3/2	673.4879	3/2$^-$	I_γ: 22 *4* from σ=0.16 b *3* in 2008Kr05.
690.30 *3*	4.4 *5*	981.755	5/2$^+$	291.4339	3/2$^+$	I_γ: 4.2 *10* from σ=0.031 b *7* in 2008Kr05.
695.95 *3*	2.2 *3*	941.098	3/2$^-$	245.0808	(7/2)$^-$	I_γ: 3.9 *10* from σ=0.029 b *7* in 2008Kr05.
705.43 *5*	0.8 *3*	981.755	5/2$^+$	276.289	7/2$^+$	I_γ: 0.76 from σ=0.0056 b in 2008Kr05.
^{x}711.40 *6*	1.3 *4*					
^{x}713.389 *20*	3.8 *5*					
722.02 *3*	14.0 *14*	722.043	3/2$^+$,5/2$^+$	0	5/2$^+$	I_γ: 11.8 *12* from σ=0.087 b *7* in 2008Kr05.
726.740 *24*	5.5 *6*	1053.628	3/2$^+$	326.8690	5/2$^+$	I_γ: 7.3 *11* from σ=0.054 b *7* in 2008Kr05.
754.908 *22*	27 *3*	1359.411	1/2,3/2	604.5118	5/2$^-$	I_γ: 24.2 *19* from σ=0.179 b *7* in 2008Kr05.
^{x}772.096 *20*	4.4 *6*					

$^{109}_{46}$Pd$_{63}$-7

γ(^{109}Pd) (continued)

E$_\gamma$ [†]	I$_\gamma$ [&]	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Comments
787.31 *3*	2.3 *5*	1053.628	3/2$^+$	266.3424	1/2$^+$	I$_\gamma$: 4.5 *9* from σ=0.033 b *6* in 2008Kr05.
791.43 *3*	3.5 *5*	791.425	3/2$^+$,5/2$^+$	0	5/2$^+$	I$_\gamma$: 3.6 *7* from σ=0.027 b *5* in 2008Kr05.
^{x}793.570 *23*	3.4 *5*					
799.26[@] *5*	5.1 *6*	1232.796	1/2$^+$	433.5630	3/2$^+$	I$_\gamma$: 5.8 *9* from σ=0.043 b *6* in 2008Kr05.
810.547[@] *13*	14.5 *22*	810.592	3/2$^+$	0	5/2$^+$	I$_\gamma$: 11.2 *17* from σ=0.083 b *11* in 2008Kr05.
^{x}815.228 *24*	3.6 *8*					
^{x}820.242 *25*	3.3 *7*					
831.571 *15*	11.7 *18*	944.967	1/2$^+$	113.4000	1/2$^+$	I$_\gamma$: 9.7 *9* from σ=0.072 b *5* in 2008Kr05.
840.76 *3*	4.6 *14*	954.164	1/2$^+$	113.4000	1/2$^+$	I$_\gamma$: 6.8 *8* from σ=0.050 b *5* in 2008Kr05.
^{x}846.328 *13*	11 *3*					
^{x}902.98 *4*	3.4 *5*					
911.283 *24*	4.0 *7*	911.250	5/2	0	5/2$^+$	I$_\gamma$: 5.4 *8* from σ=0.040 b *5* in 2008Kr05.
966.439[@] *24*	7.8 *8*	1232.796	1/2$^+$	266.3424	1/2$^+$	I$_\gamma$: 9.9 *12* from σ=0.073 b *7* in 2008Kr05.
1019.87 *3*	12.5 *13*	1359.411	1/2,3/2	339.5299	5/2$^-$	I$_\gamma$: 11.4 from σ=0.084 b in 2008Kr05.
3168.7[‡] *8*	6.7 *15*	(6153.51)	1/2$^+$	2984.8		
3229.1[‡] *7*	10.2 *25*	(6153.51)	1/2$^+$	2924.4		
3267.9[‡] *9*	3.7 *20*	(6153.51)	1/2$^+$	2885.6		
3390[‡] *1*	5.4 *7*	(6153.51)	1/2$^+$	2763.5		
3563.5[‡] *7*	5.4 *15*	(6153.51)	1/2$^+$	2589.9		
3583.5[‡] *6*	3.0 *7*	(6153.51)	1/2$^+$	2569.9		
3738.7[‡] *6*	19.3 *20*	(6153.51)	1/2$^+$	2414.7		
3790.4[‡] *6*	5.0 *7*	(6153.51)	1/2$^+$	2363.0		
3911.5[‡] *6*	13.2 *15*	(6153.51)	1/2$^+$	2241.9		
3925.5[‡] *7*	8.5 *15*	(6153.51)	1/2$^+$	2227.9		
3961.0[‡] *9*	4.2 *7*	(6153.51)	1/2$^+$	2192.4		
3995.3[‡] *7*	5.4 *7*	(6153.51)	1/2$^+$	2158.1		
4033.9[‡] *5*	14.5 *7*	(6153.51)	1/2$^+$	2119.5		
4066.0[‡] *5*	10.0 *15*	(6153.51)	1/2$^+$	2087.4		
4129.1[‡] *4*	10.0 *7*	(6153.51)	1/2$^+$	2024.3		
4156.7[‡] *7*	3.7 *7*	(6153.51)	1/2$^+$	1996.7		
4230.0[‡] *5*	10.0 *7*	(6153.51)	1/2$^+$	1923.4		
4238.5[‡] *6*	8.5 *7*	(6153.51)	1/2$^+$	1914.9		
4312.6[‡] *4*	13.3 *7*	(6153.51)	1/2$^+$	1840.8		
4364.4[‡] *7*	4.2 *7*	(6153.51)	1/2$^+$	1789.0		
4425.3[‡] *5*	8.5 *7*	(6153.51)	1/2$^+$	1728.1		
4443.7 *8*	8 *3*	(6153.51)	1/2$^+$	1709.7	(1/2,3/2,5/2$^+$)	
4469.9 *8*	4.2 *17*	(6153.51)	1/2$^+$	1683.5	1/2$^+$	

$^{109}_{46}$Pd$_{63}$-8

γ(^{109}Pd) (continued)

E_γ †	I_γ &	E_i(level)	J^π_i	E_f	J^π_f	Comments
4509.2 8	11 4	(6153.51)	1/2$^+$	1644.2	(3/2$^+$,5/2$^+$)	
4538.0 8	6.5 19	(6153.51)	1/2$^+$	1615.4	(1/2,3/2,5/2$^+$)	
4552.1 8	6.0 15	(6153.51)	1/2$^+$	1601.3	(1/2$^+$)	
4616.5 8	5.1 25	(6153.51)	1/2$^+$	1536.9	1/2$^+$	
4668.5 8	2.1 4	(6153.51)	1/2$^+$	1484.9	(1/2,3/2,5/2$^+$)	
4674.1 8	6.6 15	(6153.51)	1/2$^+$	1479.3	1/2$^+$	
4775.7 8	12 4	(6153.51)	1/2$^+$	1377.7	1/2,3/2	
4793.81 23	68.3	(6153.51)	1/2$^+$	1359.411	1/2,3/2	I_γ: 57 7 from σ=0.42 b 4 in 2008Kr05. E_γ: weighted average of 4794.0 8 (1980Ca02) and 4793.79 24 (2008Kr05).
4885.3 8	0.7 4	(6153.51)	1/2$^+$	1268.1	3/2$^+$,5/2$^+$	
4909.5 8	4.3 15	(6153.51)	1/2$^+$	1243.9	1/2,3/2	
4920.2 3	17.8 20	(6153.51)	1/2$^+$	1232.796	1/2$^+$	I_γ: 16.4 19 from σ=0.121 b 11 in 2008Kr05. E_γ: weighted average of 4920.3 8 (1980Ca02) and 4920.2 3 (2008Kr05).
5006.2 4	6.4 6	(6153.51)	1/2$^+$	1147.2	3/2$^+$	I_γ: 6.1 15 from σ=0.045 b 11 in 2008Kr05. E_γ: weighted average of 5006.1 8 (1980Ca02) and 5006.3 5 (2008Kr05).
5018.9 5	5.8 6	(6153.51)	1/2$^+$	1134.694	1/2,3/2	I_γ: 7.3 16 from σ=0.054 b 11 in 2008Kr05. E_γ: weighted average of 5018.9 8 (1980Ca02) and 5018.8 6 (2008Kr05).
5041.6 8	2.5 11	(6153.51)	1/2$^+$	1111.8	1/2,3/2	
5100.0 5	7.5 6	(6153.51)	1/2$^+$	1053.628	3/2$^+$	I_γ: 3.5 15 from σ=0.026 b 11 in 2008Kr05. E_γ: weighted average of 5099.7 8 (1980Ca02) and 5100.1 6 (2008Kr05).
5171.6 8	3.0 12	(6153.51)	1/2$^+$	981.755	5/2$^+$	
5211.8 3	27 3	(6153.51)	1/2$^+$	941.098	3/2$^-$	I_γ: 31 3 from σ=0.231 b 19 in 2008Kr05. E_γ: weighted average of 5211.8 8 (1980Ca02) and 5211.8 3 (2008Kr05).
5431.9 4	11.7 14	(6153.51)	1/2$^+$	722.043	3/2$^+$,5/2$^+$	I_γ: 8.6 16 from σ=0.064 b 11 in 2008Kr05. E_γ: weighted average of 5431.7 8 (1980Ca02) and 5432.0 5 (2008Kr05).
5479.8 3	12.9 14	(6153.51)	1/2$^+$	673.4879	3/2$^-$	I_γ: 7.4 13 from σ=0.055 b 9 in 2008Kr05. E_γ: weighted average of 5480.3 8 (1980Ca02) and 5479.7 3 (2008Kr05).
5612.9 8	0.9 4	(6153.51)	1/2$^+$	540.6753	5/2$^+$	
5661.9 8	1.8 13	(6153.51)	1/2$^+$	491.5892	3/2$^+$	
5719.5 3	21.2 20	(6153.51)	1/2$^+$	433.5630	3/2$^+$	I_γ: 16.4 23 from σ=0.121 b 15 in 2008Kr05. E_γ: weighted average of 5720.3 8 (1980Ca02) and 5719.4 3 (2008Kr05).
5829.0 3	19.1 20	(6153.51)	1/2$^+$	325.2835	3/2$^+$	I_γ: 16.4 19 from σ=0.121 b 11 in 2008Kr05. E_γ: weighted average of 5828.6 8 (1980Ca02) and 5829.0 3 (2008Kr05).
5887.3 5	7.5 14	(6153.51)	1/2$^+$	266.3424	1/2$^+$	I_γ: 6 3 from σ=0.042 b 19 in 2008Kr05. E_γ: weighted average of 5887.5 8 (1980Ca02) and 5887.2 7 (2008Kr05).
6152.9 8	1.1 2	(6153.51)	1/2$^+$	0	5/2$^+$	

† From 1980Ca02, unless otherwise noted. Secondary γ-ray transitions were measured with high-precision curved crystal spectrometers while the primary transitions were measured by a Ge(Li) detector.

‡ Seen only by 1977Ba87.

\# Seen only by 2008Kr05.

γ(^{109}Pd) (continued)

[@] Tentative placement by 1980Ca02.

[&] From 1980Ca02, normalized to I(4794γ)=68.3 *78* per 1000 neutron captures, which is deduced by 1980Ca02 from the adopted absolute intensities Iγ=0.049, 0.32 and 0.244 per 1000 ^{109}Pd decays for 309.1, 311.4 and 647.3 keV γ rays, respectively. 2008Kr05 give cross sections for γ-ray transitions and deduce a total cross section of 7.4 b *5* including thermal captures to both g.s. (7.2 b *5*) and the 11/2$^-$ isomer (0.185 b *11*) after correction for internal conversion, and simulated level feedings. Based on the total cross section, the evaluators have normalized the cross sections to photons per 1000 captures, as given in the comments.

[a] From ce data in 1980Ca02.

[b] Deduced from ce data using the BrIccMixing program.

[c] From BrIcc v2.3 (29-Mar-2013) 2008Ki07, "Frozen Orbitals" appr.

[d] Additional information 1.

[x] γ ray not placed in level scheme.

$^{109}_{46}$Pd$_{63}$-10

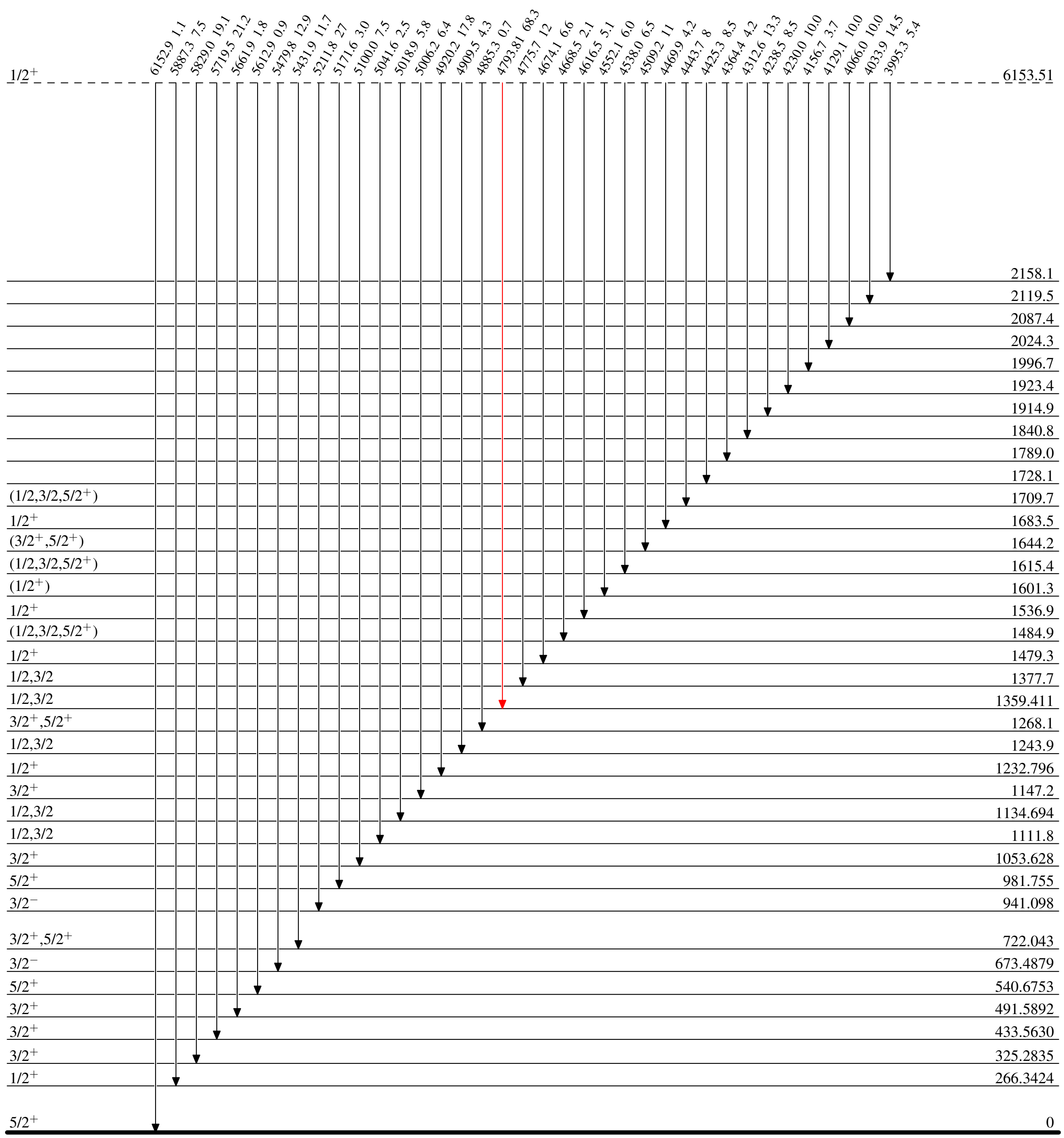
^{108}Pd(n,γ) E=thermal 1980Ca02

Legend

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

Level Scheme

Intensities: Iγ per 1000 neutron captures



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

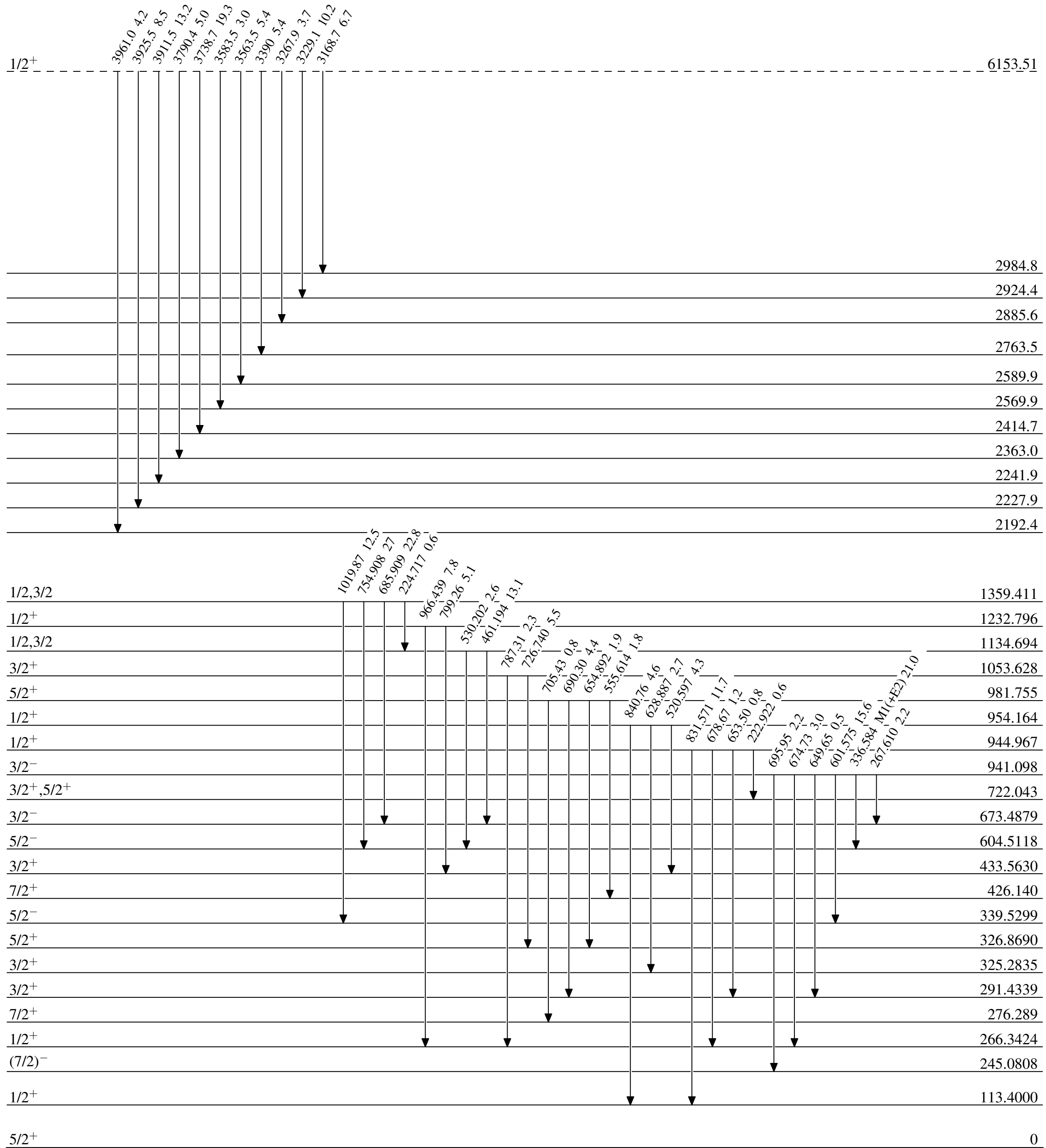
^{108}Pd(n,γ) E=thermal 1980Ca02

Legend

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

Level Scheme (continued)

Intensities: Iγ per 1000 neutron captures

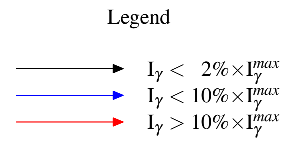


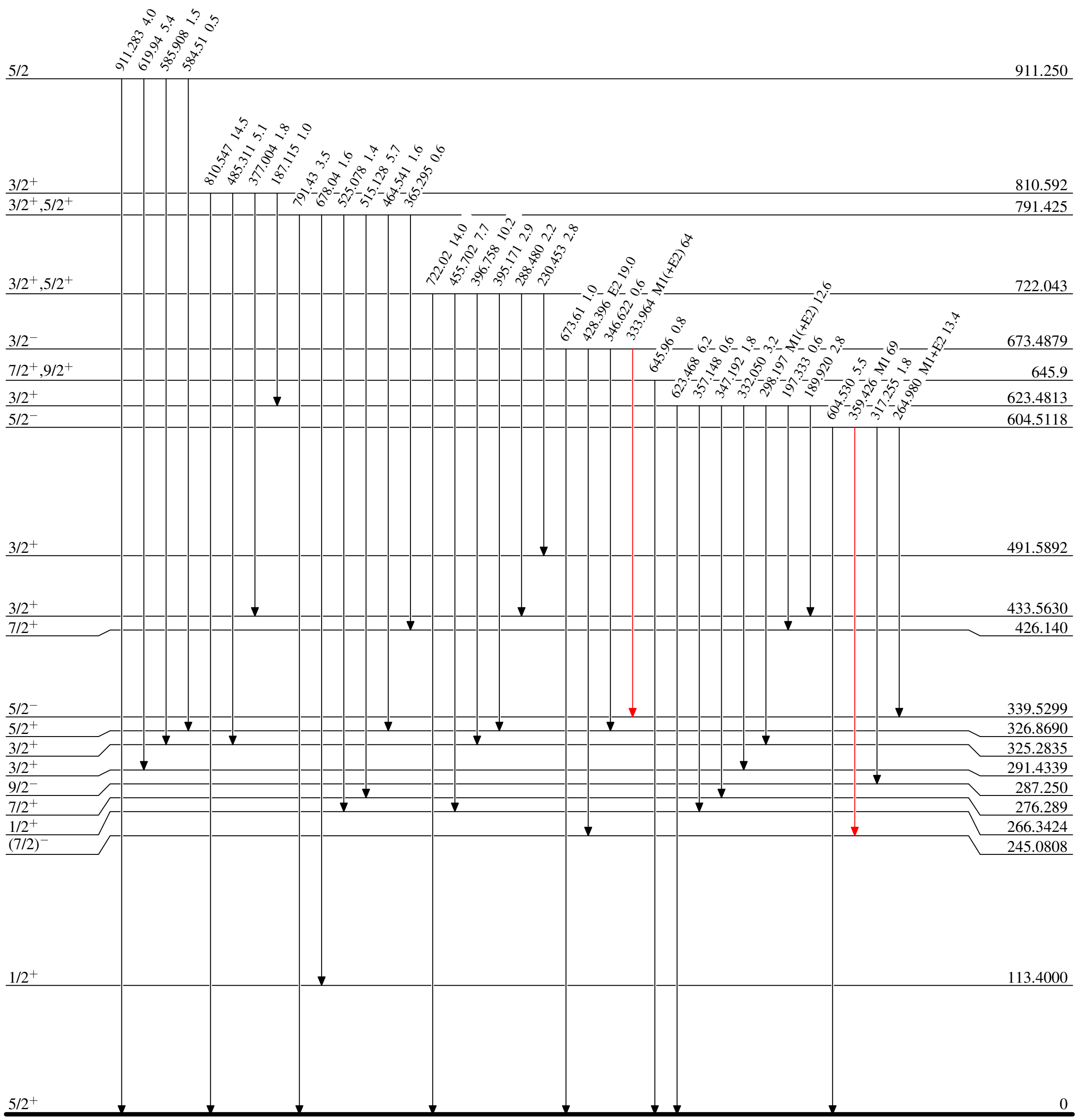
$^{109}_{46}Pd_{63}$

^{108}Pd(n,γ) E=thermal 1980Ca02

Level Scheme (continued)

Intensities: Iγ per 1000 neutron captures





^{108}Pd(n,γ) E=thermal 1980Ca02

Level Scheme (continued)

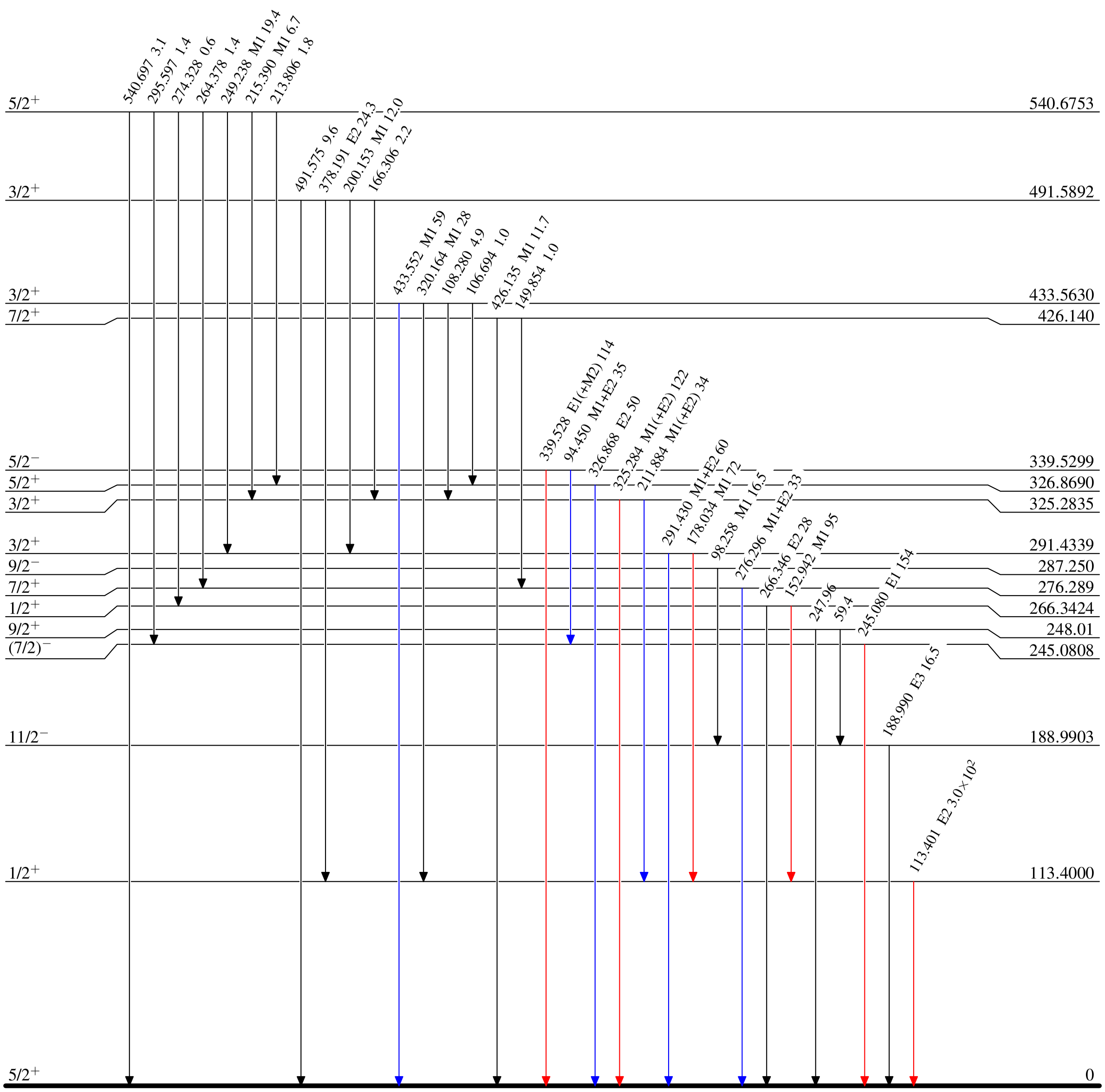
Intensities: $I\gamma$ per 1000 neutron captures

Legend

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

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

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



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