^{109}In $\varepsilon+\beta^+$ decay 1970Ri06,1988Vi03

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

Parent: ^{109}In: E=0.0; $J^\pi=9/2^+$; $T_{1/2}$=4.159 h *10*; Q(ε)=2016 *4*; %ε+%β^+ decay=100

^{109}In-J^π,$T_{1/2}$: From Adopted Levels of ^{109}In.

^{109}In-Q(ε): From 2012Wa38.

1970Ri06: ^{109}In was made by irradiating natural Cadmium target with 28 MeV deuteron and 40 MeV proton. γ rays were detected with Ge(Li) and NaI(Tl) detectors. Measured Eγ, Iγ, $\gamma\gamma$-coin. Deduced level scheme, γ-ray branching ratios.

1988Vi03: ^{109}In was made with ^{111}Cd(p,3n) by irradiating 10 mg/cm^2 cadmium foil (95% enriched) with 30 MeV protons. γ rays were detected with Ge(Li) and NaI(Tl) detectors. Measured Eγ, Iγ, $\gamma\gamma$-coin. Deduced level scheme, γ-ray branching ratios. 1988Vi03 also report data for ^{109}In ε decay. The two measurements share the same data of γ-ray energies.

1972Ch56: ^{109}In activities were produced by bombarding 68.6% enriched ^{108}Cd with proton beams from the Calcutta cyclotron. γ rays were detected with Ge(Li) and NaI(Tl) detectors. Measured Eγ, Iγ, $\gamma\gamma$-coin. Deduced level scheme, γ-ray branching ratios.

1971Ba08: ^{109}In sources were prepared by bombarding 88.4% enriched ^{106}Cd metal with 19-Mev α particles from the Yale Heavy-Ion Accelerator. γ rays were detected with two Ge(Li) detectors. Measured Eγ, Iγ, $\gamma\gamma$-coin. Deduced level scheme, γ-ray branching ratios.

1969Di16: ^{109}In sources were produced using the (α,2n) reaction of 25 Mev α particles on natural silver or enriched ^{107}Ag targets. γ rays were detected with two Ge(Li) detectors (FWHM=5-10 keV at 511 keV). Measured Eγ, Iγ, $\gamma\gamma$-coin. Deduced levels, γ-ray branching ratios.

Other measurements: 1977Be19, 1977Sh05, 1966He11, 1962No06, 1956Pe56, 1951Mc11, 1949Ma20.

The decay scheme is from 1970Ri06 with corrections derived from $\gamma\gamma$-coin in 1988Vi03.

The total average radiation energy released by ^{109}In ε decay is 2009 keV *17* (calculated by evaluators using the computer program radlst). This value agrees well with Q(β^+)=2016 keV *4* (2012Wa38) and shows the completeness of decay scheme.

^{109}Cd Levels

E(level)†	J^π†	$T_{1/2}$†	Comments
0.0	$5/2^+$	461.9 d *4*	
59.60 *7*	$1/2^+$	11.8 μs *16*	
203.40 *5*	$7/2^+$	36 ps *+6−1*	
347.51 *6*	$5/2^+$		J^π: $3/2^+$ in 1970Ri06.
426.42 *6*	$3/2^+$,$5/2^+$		
463.10 *11*	$11/2^-$	10.6 μs *4*	
623.88 *7*	$7/2^+$	41 fs *+25−15*	
673.41 *8*	$3/2^+$	55 fs *+15−12*	J^π: $(1/2^+,3/2^+)$ in 1970Ri06.
721.67 *7*	$5/2^+$	76 fs *+21−13*	
822.04 *7*	$9/2^+$	90 fs *+49−28*	
891.25 *7*	$3/2^+$,$5/2^+$	36 fs *+8−6*	
997.50 *8*	$7/2^+$	64 fs *+20−12*	
1066.09 *11*	$11/2^+$		E(level): this level is derived from (203γ)(862γ)-coin in (p,nγ) in 1988Vi03.
1105.83 *9*	$(9/2^+)$	73 fs *+38−24*	
1132.91 *21*	$7/2^+$	61 fs *+32−18*	
1173.48? *14*	$3/2^+$,$5/2^+$		E(level): reported only in 1988Vi03.
1219.01? *18*			E(level): this level is reported only by 1988Vi03.
1352.15 *7*	$(7/2)^+$		
1388.56 *13*	$(7/2^+,9/2^+)$		E(level): this level is derived from 203γ-1185γ-coin in (p,nγ) (1988Vi03), not reported by 1970Ri06.
1430.1? *4*	$(7/2,9/2^+)$		E(level): not reported by 1988Vi03.
1475.69 *9*	$(7/2,9/2)^+$		
1539.37 *16*	$(7/2^+,9/2^+)$		
1622.46 *8*	$(7/2)^+$		
1772.79 *10*	$(7/2,9/2)^+$		
1846.6? *10*			E(level): only reported by 1970Ri06.
1861.42 *10*	$(7/2^+,9/2^+)$		

† From Adopted Levels.

^{109}In $\varepsilon+\beta^+$ decay 1970Ri06,1988Vi03 (continued)

ε,β^+ radiations

E(decay)	E(level)	Iβ^+ ‡	Iε†‡	Log *ft*	I($\varepsilon+\beta^+$)‡	Comments
(155 *4*)	1861.42		0.033 *6*	6.27 *9*	0.033 *6*	εK=0.8208 *15*; εL=0.1423 *12*; εM+=0.0370 *4*
(243 *4*)	1772.79		1.12 *5*	5.19 *3*	1.12 *5*	εK=0.8392 *5*; εL=0.1281 *4*; εM+=0.03275 *12*
(394 *4*)	1622.46		8.07 *15*	4.785 *13*	8.07 *15*	εK=0.8499 *2*; εL=0.11981 *13*; εM+=0.03032 *4*
(477 *4*)	1539.37		0.27 *5*	6.44 *8*	0.27 *5*	εK=0.8527 *2*; εL=0.11764 *9*; εM+=0.02969 *3*
(540 *4*)	1475.69		4.72 *18*	5.308 *18*	4.72 *18*	εK=0.8542; εL=0.11645 *7*; εM+=0.02934 *2*
(586 *4*)	1430.1?		0.06 *3*	7.28 *22*	0.06 *3*	εK=0.8551; εL=0.11577 *6*; εM+=0.02914 *2*
(627 *4*)	1388.56		0.23 *8*	6.76 *16*	0.23 *8*	εK=0.8558; εL=0.11524 *5*; εM+=0.02898 *2*
(664 *4*)	1352.15		8.05 *19*	5.263 *12*	8.05 *19*	εK=0.8563; εL=0.11483 *5*; εM+=0.02886 *2*
(797 *4*)	1219.01?		0.134 *15*	7.20 *5*	0.134 *15*	εK=0.8578; εL=0.11367 *3*; εM+=0.028526 *9*
(883 *4*)	1132.91		0.22 *3*	7.08 *6*	0.22 *3*	εK=0.8585; εL=0.11311 *3*; εM+=0.028362 *7*
(910 *4*)	1105.83		0.75 *4*	6.576 *24*	0.75 *4*	εK=0.8587; εL=0.11295 *3*; εM+=0.028317 *7*
(950 *4*)	1066.09		0.193 *15*	7.20 *4*	0.193 *15*	εK=0.8590; εL=0.11274 *2*; εM+=0.028257 *6*
(1019 *4*)	997.50		4.6 *2*	5.888 *20*	4.6 *2*	εK=0.8594; εL=0.11243 *2*; εM+=0.028164 *5*
(1194 *4*)	822.04		0.75 *22*	6.82 *13*	0.75 *22*	εK=0.8601; εL=0.11176 *2*; εM+=0.027971 *5*
(1392 *4*)	623.88	0.0223 *14*	5.33 *25*	6.102 *21*	5.35 *25*	av Eβ=172.0 *18*; εK=0.8573 *2*; εL=0.11078 *3*; εM+=0.027705 *8*
(1553 *4*)	463.10	0.0010 *3*	0.060 *18*	8.15 *13*	0.061 *18*	av Eβ=241.7 *18*; εK=0.8469 *4*; εL=0.10906 *6*; εM+=0.02726 *2*
(1813 *4*)	203.40	4.62 *10*	63.4 *6*	5.259 *5*	68.0 *6*	av Eβ=354.4 *18*; εK=0.8033 *10*; εL=0.10300 *13*; εM+=0.02573 *4*

† Deduced from I(γ+ce) intensity balances by assuming no β^- feeding g.s.

‡ Absolute intensity per 100 decays.

^{109}In $\varepsilon+\beta^+$ decay 1970Ri06,1988Vi03 (continued)

$\gamma(^{109}Cd)$

Iγ normalization: from ΣIγ (to g.s.)=100%, by assuming no direct β^+ feeding to the g.s. ($J^\pi=5/2^+$).

E_γ[†]	I_γ[c]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[a]	α[b]	Comments
59.6 *2*	0.25 *6*	59.60	1/2$^+$	0.0	5/2$^+$	E2	9.45 *18*	α(K)=5.72 *10*; α(L)=3.02 *7*; α(M)=0.607 *13* α(N)=0.0990 *21*; α(O)=0.000976 *17* %Iγ=0.19 *5*, using the calculated normalization. E_γ: 59.6 *2* from weighted average of 59.9 *5* (1970Ri06), 59.5 *3* (1971Ba08), 59.6 *5* (1972Ch56) and 60 *1* (1969Di16). I_γ: from 1969Di16. Mult.: α(exp)=13 *3* (1956Pe56), K/L=0.85 *8* (1956Pe56), 1.3 *5* (1962No06).
x74.8[#e]	≈3[#]							
x84.1[#e]	≈4[#]							
169.3[&] *3*	0.008[&] *3*	891.25	3/2$^+$,5/2$^+$	721.67	5/2$^+$			
x174.7[#]	≈0.2[#]							
203.3 *1*	100	203.40	7/2$^+$	0.0	5/2$^+$	M1	0.0658	α(K)=0.0572 *8*; α(L)=0.00704 *10*; α(M)=0.001353 *19* α(N)=0.000241 *4*; α(O)=1.391×10^{-5} *20* %Iγ=74.2 *5*, using the calculated normalization. E_γ: 203.4 *1* from weighted average of 204.6 *4* (1969Di16), 203.5 *2* (1970Ri06), 203.3 *3* (1971Ba08), 203.6 *5* (1972Ch56) and 203.3 *1* (1988Vi03). Mult.: α(exp)=0.07 *1* and K/L=7.6 *4* (1956Pe56), K/(L+M)=7 *1* (1962No06). δ=−0.13 *4* (1977Be19, Hyperfine field).
223.0 *1*	0.26[‡] *5*	426.42	3/2$^+$,5/2$^+$	203.40	7/2$^+$			E_γ: 223.0 *1* from weighted average of 223.1 *2* (1970Ri06), 223.0 *3* (1971Ba08), and 223.0 *1* (1988Vi03). I_γ: 0.16 *5* from weighted average of 0.10 *2* (1970Ri06), 0.20 *3* (1971Ba08), and 0.21 *2* (1988Vi03).
243.8[&] *5*	0.021[&] *3*	1066.09	11/2$^+$	822.04	9/2$^+$	(M1)		
259.7 *1*	0.07 *2*	463.10	11/2$^-$	203.40	7/2$^+$	M2	0.1679	α(K)=0.1428 *20*; α(L)=0.0204 *3*; α(M)=0.00398 *6* α(N)=0.000706 *10*; α(O)=3.85×10^{-5} *6* E_γ: 259.6 *1* from weighted average of 259 *2* (1970Ri06), 259.1 *3* (1971Ba08), and 259.7 *1* (1988Vi03). I_γ: weighted average of 0.08 *1* (1971Ba08) and 0.04 *2* (1988Vi03). Mult.: α(K)exp=0.12 *2* from ratio α(K)exp(259.5γ)/α(K)exp(203.5γ)= 2.06 *23* (1969Be37). K/(L+M)=2.4 *8* (1962No06).
288.1 *1*	2.04[‡] *15*	347.51	5/2$^+$	59.60	1/2$^+$	E2	0.0371	α(K)=0.0314 *5*; α(L)=0.00465 *7*; α(M)=0.000902 *13* α(N)=0.0001564 *22*; α(O)=6.80×10^{-6} *10* E_γ: 288.1 *1* from weighted average of 289.1 *4* (1969Di16), 288.4 *8* (1970Ri06), 287.7 *3* (1971Ba08), 287.8 *5* (1972Ch56), and 288.1 *1* (1988Vi03).

$^{109}_{48}Cd_{61}$-3

^{109}In $\varepsilon+\beta^+$ decay 1970Ri06,1988Vi03 (continued)

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

E_γ [†]	I_γ [c]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [a]	α [b]	Comments
								I_γ: 2.10 *7* from weighted average of 2.29 *18* (1969Di16), 2.4 *2* (1970Ri06), 2.10 *11* (1971Ba08), 1.98 *23* (1972Ch56), and 2.0 *1* (1988Vi03). Mult.: α(exp)=0.04 *1*, K/L=5.0 (1956Pe56), K/(L+M)=6.6 *15* (1962No06).
[x]305.6[@] *3*	0.06[@] *3*							E_γ: unplaced by evaluators. 1988Vi03 placed this γ from the 930 level in (p,nγ).
324.4 *2*	0.52[‡] *4*	997.50	7/2$^+$	673.41	3/2$^+$			E_γ: 324.4 *2* from weighted average of 324.3 *5* (1970Ri06), 324.4 *3* (1971Ba08), 324.7 *5* (1972Ch56), and 324.4 *3* (1988Vi03). Other: 325.3 *5* from 1969Di16. I_γ: 0.51 *2* from weighted average of 0.50 *3* (1971Ba08) and and 0.51 *3* (1988Vi03). Others: 1.2 *1* for the 324.3+326.6 doublet (1970Ri06), 1.39 28 (1972Ch56) for the doublet, 1.24 *14* (1969Di16) for the doublet.
326.3 *2*	0.74[‡] *7*	673.41	3/2$^+$	347.51	5/2$^+$			E_γ: 326.3 *2* from weighted average of 326.6 *5* (1970Ri06), 326.3 *3* (1971Ba08), and 326.3 *2* (1988Vi03). I_γ: 0.73 *3* from weighted average of 0.73 *4* (1971Ba08) and 0.72 *5* (1988Vi03). Others: 1.2 *1* for the 324.3+326.6 doublet (1970Ri06), 1.39 28 (1972Ch56) for the doublet, 1.24 *14* (1969Di16) for the doublet.
347.5 *1*	2.72 *10*	347.51	5/2$^+$	0.0	5/2$^+$	M1,E2	0.0183 *19*	α(K)=0.0157 *15*; α(L)=0.0021 *4*; α(M)=0.00040 *7* α(N)=7.0×10^{-5} *12*; α(O)=3.62×10^{-6} *18* %Iγ=2.02 *8*, using the calculated normalization. E_γ: 347.5 *1* from weighted average of 348.3 *5* (1969Di16), 347.5 *3* (1970Ri06), 347.4 *3* (1971Ba08), 347.5 *5* (1972Ch56), and 347.5 *1* (1988Vi03). I_γ: weighted average of 2.54 *16* (1969Di16), 3.0 *2* (1970Ri06), 2.7 *15* (1971Ba08), 2.5 *3* (1972Ch56), and 2.8 *2* (1988Vi03). Mult.: α(exp)=0.020 *8*, α(exp)=0.020 *8* from K/L=5.1 *5* (1956Pe56), K/(L+M)=7 *5* (1962No06).
374.3[&] *4*	0.025[&] *5*	721.67	5/2$^+$	347.51	5/2$^+$			
420.6 *1*	1.22[‡] *12*	623.88	7/2$^+$	203.40	7/2$^+$	(M1)		E_γ: 420.6 *1* from weighted average of 420.5 *4* (1970Ri06), 420.5 *3* (1971Ba08), 420.9 *5* (1972Ch56), and 420.6 *1* (1988Vi03). I_γ: 1.12 *10* from weighted average of 1.35 *10* (1970Ri06), 1.00 *6* (1971Ba08), 1.63 *19* (1972Ch56), and 1.10 *8* (1988Vi03).
426.3 *1*	5.46 *16*	426.42	3/2$^+$,5/2$^+$	0.0	5/2$^+$	M1,E2	0.0102 *5*	α(K)=0.0089 *4*; α(L)=0.00113 *11*; α(M)=0.000218 *21* α(N)=3.9×10^{-5} *4*; α(O)=2.06×10^{-6} *3* %Iγ=4.05 *12*, using the calculated normalization. E_γ: 426.3 *1* from weighted average of 427.0 *5* (1969Di16), 426.2 *3* (1970Ri06), 426.2 *3* (1971Ba08), 426.4 *5* (1972Ch56), and 426.3 *1* (1988Vi03). I_γ: weighted average of 4.9 *3* (1969Di16), 5.75 *20* (1970Ri06), 5.3 *3* (1971Ba08), 5.7 *4* (1972Ch56), and 5.4 *3* (1988Vi03). Mult.: α(exp)=0.014 *5* from K/L=8 *1* (1956Pe56), K/(L+M)=8 *2* (1962No06).

$^{109}_{48}Cd_{61}$-4

^{109}In $\varepsilon+\beta^+$ decay 1970Ri06,1988Vi03 (continued)

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

E_γ[†]	I_γ[c]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[a]	α[b]	Comments
461.4 *4*	0.14[‡] *2*	1352.15	(7/2)$^+$	891.25	3/2$^+$,5/2$^+$			E_γ: 461.4 *4* from 1970Ri06 only. I_γ: 0.14 *2* from 1970Ri06 only.
464.8[&] *2*	0.026[&] *4*	891.25	3/2$^+$,5/2$^+$	426.42	3/2$^+$,5/2$^+$			
470.4[&] *2*	0.084[&] *12*	673.41	3/2$^+$	203.40	7/2$^+$			
482.3 *2*	0.113[‡] *15*	1105.83	(9/2$^+$)	623.88	7/2$^+$	(M1+E2)		E_γ: 482.3 *2* from weighted average of 482.2 *4* (1970Ri06), 482.6 *3* (1971Ba08), and 482.2 *2* (1988Vi03). I_γ: 0.12 *2* from weighted average of 0.17 *3* (1970Ri06), 0.11 *2* (1971Ba08), and 0.11 *2* (1988Vi03).
497.2[&] *2*	0.28[&] *6*	1219.01?		721.67	5/2$^+$			
518.2 *5*	0.010[&] *5*	721.67	5/2$^+$	203.40	7/2$^+$			E_γ: seen in coincidence with 203γ in 1971Ba08, also in (p,ng) in 1988Vi03.
529.9 *2*	0.75[‡] *5*	1352.15	(7/2)$^+$	822.04	9/2$^+$			E_γ: 529.9 *2* from weighted average of 530.8 *5* (1969Di16), 529.3 *4* (1970Ri06), 529.7 *5* (1971Ba08), 529.7 *7* (1972Ch56), and 530.1 *3* (1988Vi03). I_γ: 0.75 *5* from weighted average of 0.93 *8* (1969Di16), 0.80 *4* (1970Ri06), 0.69 *5* (1971Ba08), 1.02 *19* (1972Ch56), and 0.65 *5* (1988Vi03).
542 *2*	0.10[‡] *1*	1539.37	(7/2$^+$,9/2$^+$)	997.50	7/2$^+$			E_γ: 542 *2* from 1970Ri06 only. I_γ: 0.10 *1* from 1970Ri06 only.
[x]546.1 *4*	0.05 *3*							E_γ: weighted average of 546.0 *6* (1988Vi03) and 546.1 *5* (1971Ba08). I_γ: from 1988Vi03. Other: 0.7 (1971Ba08).
549.4[e] *2*	0.02 *1*	1173.48?	3/2$^+$,5/2$^+$	623.88	7/2$^+$			E_γ: 549.4 *2* from 1988Vi03 only.
571.0 *4*	0.37[‡] *5*	997.50	7/2$^+$	426.42	3/2$^+$,5/2$^+$			E_γ: 570.4 *5* from this dataset. I_γ: 0.09 *4* from this dataset.
[x]580.9 *5*	0.11 *3*							E_γ,I_γ: from 1970Ri06. 1969Di16 placed a 578 *1* transition of Iγ=0.20 *3* from the 1773 level.
584.3 *2*	0.30[‡] *5*	1475.69	(7/2,9/2)$^+$	891.25	3/2$^+$,5/2$^+$			E_γ: 584.3 *2* from weighted average of 583.8 *5* (1970Ri06), 584.2 *5* (1971Ba08), and 584.6 *3* (1988Vi03). I_γ: 0.30 *5* from unweighted average of 0.40 *3* (1970Ri06), 0.24 *2* (1971Ba08), and 0.25 *2* (1988Vi03).
[x]599.6 *5*	<0.3							E_γ: weighted average of 599.3 *5* (1970Ri06) and 600.3 *7* (1972Ch56). I_γ: from 1972Ch56. Iγ<0.3 from 1970Ri06.
613.6 *1*	3.0 *2*	673.41	3/2$^+$	59.60	1/2$^+$	M1	0.00377	α(K)=0.00326 *5*; α(L)=0.000414 *6*; α(M)=7.96×10^{-5} *12* α(N)=1.406×10^{-5} *20*; α(O)=7.49×10^{-7} *11* E_γ: 613.6 *1* from weighted average of 614 *1* (1969Di16), 613.6 *4* (1970Ri06), 614.0 *5* (1971Ba08), and 613.6 *1* (1988Vi03). I_γ: weighted average of 2.8 *4* (1969Di16), 3.4 *3* (1970Ri06), 2.8 *4* (1971Ba08), and 2.8 *3* (1988Vi03).
618.5 *1*	2.6 *2*	822.04	9/2$^+$	203.40	7/2$^+$	M1	0.00400	α(K)=0.00349 *5*; α(L)=0.000415 *6*; α(M)=7.95×10^{-5} *12*

$^{109}_{48}Cd_{61}$-5

^{109}In $\varepsilon+\beta^+$ decay 1970Ri06,1988Vi03 (continued)

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

E_γ[†]	I_γ[c]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[a]	α[b]	Comments
								α(N)=1.421×10^{-5} *20*; α(O)=8.38×10^{-7} *12* E_γ: 618.5 *1* from weighted average of 619.0 *5* (1970Ri06), 619.3 *5* (1971Ba08), 618.8 *10* (1972Ch56), and 618.4 *1* (1988Vi03). I_γ: weighted average of 2.4 *3* (1970Ri06), 2.6 *4* (1971Ba08), 3.0 *3* (1972Ch56), and 2.3 *3* (1988Vi03).
623.8 *1*	7.6 *3*	623.88	7/2$^+$	0.0	5/2$^+$	M1	0.00392	α(K)=0.00342 *5*; α(L)=0.000407 *6*; α(M)=7.79×10^{-5} *11* α(N)=1.392×10^{-5} *20*; α(O)=8.21×10^{-7} *12* %Iγ=5.64 *22*, using the calculated normalization. E_γ: 623.8 *1* from weighted average of 623.0 *5* (1969Di16), 623.5 *4* (1970Ri06), 623.8 *5* (1971Ba08), 623.7 *10* (1972Ch56), and 623.8 *1* (1988Vi03). I_γ: weighted average of 7.9 *8* (1969Di16), 8.2 *4* (1970Ri06), 7.1 *6* (1971Ba08), 7.3 *6* (1972Ch56), and 6.9 *6* (1988Vi03). Mult.: α(exp)=0.0032 *15* (1956Pe56).
630.3 *3*	0.10[‡] *1*	1352.15	(7/2)$^+$	721.67	5/2$^+$			E_γ: 630.3 *3* from weighted average of 629.9 *6* (1970Ri06), 630.8 *5* (1971Ba08), and 630.2 *4* (1988Vi03). I_γ: 0.10 *1* from weighted average of 0.10 *3* (1970Ri06), 0.10 *1* (1971Ba08), and 0.10 *2* (1988Vi03).
650.0 *1*	4.0 *2*	997.50	7/2$^+$	347.51	5/2$^+$	(M1)	0.00324	α(K)=0.00280 *4*; α(L)=0.000353 *5*; α(M)=6.78×10^{-5} *10* α(N)=1.200×10^{-5} *17*; α(O)=6.45×10^{-7} *9* E_γ: 650.0 *1* from weighted average of 651.0 *5* (1969Di16), 649.8 *4* (1970Ri06), 650.1 *5* (1971Ba08), 650.1 *10* (1972Ch56), and 650.0 *1* (1988Vi03). I_γ: weighted average of 4.1 *3* (1970Ri06), 3.8 *4* (1971Ba08), 4.4 *4* (1972Ch56), and 3.7 *3* (1988Vi03). Other: 5.9 *4* (1969Di16).
653.4 *2*	2.2 *2*	1475.69	(7/2,9/2)$^+$	822.04	9/2$^+$			E_γ: 653.4 *2* from weighted average of 652.9 *4* (1970Ri06), 653.4 *5* (1971Ba08), 653.5 *10* (1972Ch56), and 653.6 *3* (1988Vi03). I_γ: unweighted average of 2.6 *2* (1970Ri06), 1.9 *4* (1971Ba08), 2.3 *3* (1972Ch56), and 1.8 *1* (1988Vi03).
678.6 *2*	1.12[‡] *8*	1352.15	(7/2)$^+$	673.41	3/2$^+$			E_γ: 678.6 *2* from weighted average of 677.5 *5* (1969Di16), 678.8 *4* (1970Ri06), 678.9 *5* (1971Ba08), 679.0 *7* (1972Ch56), and 678.8 *3* (1988Vi03). I_γ: 1.12 *7* from weighted average of 0.93 *8* (1969Di16), 1.35 *10* (1970Ri06), 1.12 *7* (1971Ba08), 1.19 *24* (1972Ch56), and 1.2 *1* (1988Vi03).
679.5[&] *5* [x]692.3 *3*	0.060[&] *9* 0.25 *2*	1105.83	(9/2$^+$)	426.42	3/2$^+$,5/2$^+$			E_γ: weighted average of 691.8 *4* (1970Ri06), 692.3 *5* (1971Ba08), 692.6 *7* (1972Ch56) and 692.9 *5* (1988Vi03). I_γ: weighted average of 0.26 *3* (1970Ri06), 0.24 *2* (1971Ba08), 0.35 *23* (1972Ch56) and 0.23 *4* (1988Vi03).

$^{109}_{48}Cd_{61}$-6

^{109}In $\varepsilon+\beta^+$ decay 1970Ri06,1988Vi03 (continued)

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

E_γ [†]	I_γ [c]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [a]	Comments
[x]704.4 *4*	0.10 *2*						E_γ: weighted average of 704.0 *6* (1970Ri06) and 704.6 *5* (1971Ba08). I_γ: from 1971Ba08. $I\gamma<0.1$ in 1970Ri06.
721.8 *1*	0.99 *6*	721.67	$5/2^+$	0.0	$5/2^+$		%Iγ=0.73 *5*, using the calculated normalization. E_γ: 721.8 *1* from weighted average of 721.0 *5* (1969Di16), 721.5 *4* (1970Ri06), 721.5 *5* (1971Ba08), 721.9 *10* (1972Ch56), and 721.8 *1* (1988Vi03). I_γ: weighted average of 0.93 *8* (1969Di16), 1.22 *10* (1970Ri06), 0.91 *5* (1971Ba08), 1.4 *3* (1972Ch56), and 1.05 *8* (1988Vi03).
728.1 *3*	0.36[‡] *2*	1352.15	$(7/2)^+$	623.88	$7/2^+$		E_γ: 728.1 *3* from weighted average of 727.4 *5* (1970Ri06), 728.2 *5* (1971Ba08), 728.8 *10* (1972Ch56), and 728.3 *4* (1988Vi03). I_γ: 0.36 *2* from weighted average of 0.35 *5* (1970Ri06), 0.34 *3* (1971Ba08), 0.56 *18* (1972Ch56), and 0.38 *3* (1988Vi03).
731.0 *4*	0.46[‡] *4*	1622.46	$(7/2)^+$	891.25	$3/2^+,5/2^+$		E_γ: 731.0 *4* from weighted average of 729.7 *5* (1969Di16), 730.9 *5* (1970Ri06), 731.6 *5* (1971Ba08), 732.2 *10* (1972Ch56), and 731.6 *6* (1988Vi03). I_γ: 0.46 *4* from weighted average of 0.68 *7* (1969Di16), 0.53 *5* (1970Ri06), 0.40 *3* (1971Ba08), 0.64 *23* (1972Ch56), and 0.45 *4* (1988Vi03).
746.9[&] *4*	0.008[&] *4*	1173.48?	$3/2^+,5/2^+$	426.42	$3/2^+,5/2^+$		I_γ: normalized to I(549.2γ)=0.02 *1* based on I(746.9γ)/I(549.4γ)=(33 *4*)/(79 *4*) in Adopted Gammas.
753.8 *4*	0.51[‡] *3*	1475.69	$(7/2,9/2)^+$	721.67	$5/2^+$		E_γ: 753.8 *4* from weighted average of 752.5 *5* (1969Di16), 753.9 *6* (1970Ri06), 754.4 *5* (1971Ba08), 754.6 *7* (1972Ch56), and 754.0 *6* (1988Vi03). I_γ: 0.51 *3* from weighted average of 0.41 *6* (1969Di16), 0.6 *1* (1970Ri06), 0.55 *4* (1971Ba08), 0.6 *3* (1972Ch56), and 0.49 *4* (1988Vi03).
764.5[&] *4*	0.032[&] *9*	1388.56	$(7/2^+,9/2^+)$	623.88	$7/2^+$		
[x]765.6 *6*	0.06 *1*						E_γ,I_γ: seen only by 1971Ba08.
793.9 *1*	0.79[‡] *8*	997.50	$7/2^+$	203.40	$7/2^+$		E_γ: 794.0 *3* from weighted average of 793.9 *4* (1970Ri06), 794.0 *5* (1971Ba08), and 794.7 *10* (1972Ch56). Other: 792.5 *5* (1969Di16). I_γ: 0.80 *8* from weighted average of 0.8 *2* (1970Ri06), 0.74 *6* (1971Ba08), 0.99 *13* (1969Di16), and 1.4 *3* (1972Ch56).
800.3 *3*	0.40[‡] *3*	1622.46	$(7/2)^+$	822.04	$9/2^+$		E_γ: 800.3 *3* from weighted average of 800.0 *6* (1970Ri06), 800.3 *5* (1971Ba08), 800.4 *10* (1972Ch56), 800.4 *6* (1988Vi03) and 800 *2* (1969Di16). I_γ: 0.40 *3* from weighted average of 0.48 *5* (1970Ri06), 0.42 *4* (1971Ba08), 0.5 *3* (1972Ch56) and 0.35 *4* (1988Vi03). Other: 0.12 *3* (1969Di16).
822.0 *1*	1.77[‡] *18*	822.04	$9/2^+$	0.0	$5/2^+$	E2	%Iγ=1.31 *14*, using the calculated normalization. E_γ: 822.0 *1* from weighted average of 822 *1* (1969Di16), 822.5 *5* (1970Ri06), 822.5 *5* (1971Ba08), 823.1 *7* (1972Ch56), and 821.9 *1* (1988Vi03). I_γ: 1.75 *6* from weighted average of 1.68 *15* (1969Di16), 1.9 *1* (1970Ri06), 1.74 *8* (1971Ba08), 2.1 *3* (1972Ch56), and 1.6 *1* (1988Vi03).
826.2[&] *2*	0.025[&] *13*	1173.48?	$3/2^+,5/2^+$	347.51	$5/2^+$		I_γ: normalized to I(549.2γ)=0.02 *1* based on I(826.2γ)/I(549.4γ)=(100 *8*)/(79 *4*) in Adopted Gammas.
831.7 *1*	0.34 *3*	891.25	$3/2^+,5/2^+$	59.60	$1/2^+$		E_γ: 831.7 *1* from weighted average of 832 *1* (1969Di16), 832.2 *10* (1970Ri06),

$^{109}_{48}Cd_{61}$-7

^{109}In $\varepsilon+\beta^+$ decay 1970Ri06,1988Vi03 (continued)

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

E_γ [†]	I_γ [c]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [a]	α [b]	Comments
								831.5 *5* (1971Ba08), 831.8 *10* (1972Ch56), and 831.7 *1* (1988Vi03). I_γ: weighted average of 0.34 *5* (1970Ri06) and 0.34 *3* (1971Ba08). Others: 0.18 *2* (1969Di16), 0.24 *2* (1988Vi03), 0.8 *3* (1972Ch56).
[x]843.0 *6*	0.10 *2*							E_γ: weighted average of 842.5 *5* (1971Ba08) and 843.7 *6* (1988Vi03). I_γ: weighted average of 0.10 *2* (1971Ba08) and 0.12 *4* (1988Vi03).
851.8 *3*	0.19[‡] *1*	1475.69	(7/2,9/2)$^+$	623.88	7/2$^+$			E_γ: 851.8 *3* from weighted average of 851 *1* (1969Di16), 852.3 *5* (1970Ri06), 851.6 *5* (1971Ba08), 851.5 *10* (1972Ch56), and 851.9 *5* (1988Vi03). I_γ: 0.19 *1* from weighted average of 0.18 *2* (1969Di16), 0.35 *10* (1970Ri06), 0.23 *4* (1971Ba08), 0.4 *3* (1972Ch56), and 0.19 *2* (1988Vi03).
862.7 *1*	0.26 *2*	1066.09	11/2$^+$	203.40	7/2$^+$	E2	1.60×10^{-3}	α(K)=0.001392 *20*; α(L)=0.0001698 *24*; α(M)=3.26×10^{-5} *5* α(N)=5.78×10^{-6} *8*; α(O)=3.24×10^{-7} *5* E_γ: 862.7 *1* from weighted average of 864 *1* (1969Di16), 862.2 *6* (1970Ri06), 863.2 *5* (1971Ba08), 863.2 *10* (1972Ch56), and 862.7 *1* (1988Vi03). E_γ: this placement is proposed by 1988Vi03 based on observed 203γ-862γ-coin in (p,nγ); 1970Ri06 placed this transition from the 1861 level. I_γ: weighted average of 0.15 *12* (1969Di16), 0.23 *7* (1970Ri06), 0.24 *3* (1971Ba08), 0.4 *3* (1972Ch56), and 0.29 *3* (1988Vi03).
871.8 *3*	0.18 *2*	1219.01?		347.51	5/2$^+$			E_γ: 871.8 *3* from 1988Vi03 only.
891.2 *1*	0.26[‡] *3*	891.25	3/2$^+$,5/2$^+$	0.0	5/2$^+$			%Iγ=0.193 *23*, using the calculated normalization. E_γ: 891.2 *1* from weighted average of 890 *1* (1969Di16), 890.5 *6* (1970Ri06), 890.8 *5* (1971Ba08), and 891.2 *1* (1988Vi03). I_γ: 0.31 *3* from weighted average of 0.29 *3* (1969Di16), 0.38 *7* (1970Ri06), 0.28 *3* (1971Ba08), and 0.35 *3* (1988Vi03).
901.7[d] *2*	0.50[d‡] *3*	1622.46	(7/2)$^+$	721.67	5/2$^+$			E_γ: 901.7 *2* from weighted average of 901 *1* (1969Di16), 900.7 *6* (1970Ri06), 901.6 *5* (1971Ba08), 901.9 *10* (1972Ch56) and 901.8 *2* (1988Vi03). Also placed as a transition from E=1622 level. I_γ: 0.50 *3* from weighted average of 0.44 *5* (1969Di16), 0.64 *10* (1970Ri06), 0.50 *4* (1971Ba08), 0.7 *3* (1972Ch56) and 0.6 *1* (1988Vi03).
901.8[d] *2*	0.17[d‡] *3*	1105.83	(9/2$^+$)	203.40	7/2$^+$	(M1+E2)		E_γ: 901.7 *2* from weighted average of 901 *1* (1969Di16), 900.7 *6* (1970Ri06), 901.6 *5* (1971Ba08), 901.9 *10* (1972Ch56) and 901.8 *2* (1988Vi03). Also placed as a transition from E=1622 level. I_γ: 0.50 *3* from weighted average of 0.44 *5* (1969Di16), 0.64 *10* (1970Ri06), 0.50 *4* (1971Ba08), 0.7 *3* (1972Ch56) and 0.6 *1* (1988Vi03).
925.6 *3*	0.96[‡] *7*	1352.15	(7/2)$^+$	426.42	3/2$^+$,5/2$^+$			E_γ: 925.6 *3* from weighted average of 925.8 *5* (1970Ri06), 925.8 *5* (1971Ba08), 926.4 *10* (1972Ch56), and 925.3 *4* (1988Vi03).

$^{109}_{48}Cd_{61}$-8

^{109}In $\varepsilon+\beta^+$ decay 1970Ri06,1988Vi03 (continued)

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

E_γ [†]	I_γ [c]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [a]	Comments
							I_γ: 0.96 *7* from weighted average of 1.2 *2* (1970Ri06), 1.00 *7* (1971Ba08), 1.2 *3* (1972Ch56), and 0.8 *1* (1988Vi03).
929.5 *2*	0.30 *4*	1132.91	$7/2^+$	203.40	$7/2^+$		E_γ: 929.5 *2* from weighted average of 930.3 *5* (1970Ri06), 930.4 *5* (1971Ba08), 931.3 *10* (1972Ch56), and 929.4 *1* (1988Vi03). 1988Vi03 placed this transition from the 930 level in (p,nγ). I_γ: weighted average of 0.4 *1* (1970Ri06), 0.27 *5* (1971Ba08), and 0.3 *1* (1988Vi03). Other: 1.0 *3* (1972Ch56).
948.9 *2*	1.96[‡] *7*	1622.46	$(7/2)^+$	673.41	$3/2^+$		E_γ: 948.9 *2* from weighted average of 949.1 *5* (1970Ri06), 949.2 *5* (1971Ba08), and 949.3 *10* (1972Ch56). I_γ: 1.96 *7* from weighted average of 2.1 *3* (1970Ri06), 2.00 *12* (1971Ba08), and 2.1 *3* (1972Ch56). Other: 1.24 *9* (1969Di16).
962.2 *2*	0.044[‡] *12*	1388.56	$(7/2^+,9/2^+)$	426.42	$3/2^+,5/2^+$		E_γ: 962.2 *2* from weighted average of 962.2 *3* (1988Vi03) and 962.6 *7* (1970Iγ)6). Placed by 1988Vi03, this γ was unplaced in 1970Ri06. 1988Vi03 also also placed this γ from the 1425 level in (p,nγ). I_γ: 0.03 *2* from 1988Vi03. Other: 0.13 *3* (1970Ri06).
[x]969.5[@] *3*	0.12[@] *7*						
998.5[d] *3*	0.87[d‡] *8*	997.50	$7/2^+$	0.0	$5/2^+$		%Iγ=0.65 *6*, using the calculated normalization. E_γ: 998.5 *3* from weighted average of 998 *1* (1969Di16), 998.5 *6* (1970Ri06), 998.7 *5* (1971Ba08), 998.2 *10* (1972Ch56), and 998.5 *4* (1988Vi03). I_γ: 0.87 *5* from weighted average of 0.99 *13* (1969Di16), 0.97 *5* (1970Ri06), 0.77 *5* (1971Ba08), 1.1 *3* (1972Ch56), and 0.8 *1* (1988Vi03).
998.5[d] *3*	0.87[d‡] *5*	1622.46	$(7/2)^+$	623.88	$7/2^+$		E_γ: 998.5 *3* from weighted average of 998 *1* (1969Di16), 998.5 *6* (1970Ri06), 998.7 *5* (1971Ba08), 998.2 *10* (1972Ch56), and 998.5 *4* (1988Vi03). I_γ: 0.87 *5* from weighted average of 0.99 *13* (1969Di16), 0.97 *5* (1970Ri06), 0.77 *5* (1971Ba08), 1.1 *3* (1972Ch56), and 0.8 *1* (1988Vi03).
1004.8 *3*	0.30[‡] *2*	1352.15	$(7/2)^+$	347.51	$5/2^+$		E_γ: 1004.8 *3* from weighted average of 1004.1 *7* (1970Ri06), 1005.0 *5* (1971Ba08), 1004.9 *10* (1972Ch56), and 1005.0 *6* (1988Vi03). I_γ: 0.30 *2* from weighted average of 0.30 *3* (1970Ri06), 0.30 *3* (1971Ba08), 0.35 *20* (1972Ch56), and 0.25 *6* (1988Vi03).
1049.4 *2*	1.58[‡] *5*	1475.69	$(7/2,9/2)^+$	426.42	$3/2^+,5/2^+$		E_γ: 1049.4 *2* from weighted average of 1048.5 *5* (1969Di16), 1049.7 *6* (1970Ri06), 1049.8 *5* (1971Ba08), 1049.6 *10* (1972Ch56), and 1049.5 *3* (1988Vi03). I_γ: 1.58 *5* from weighted average of 1.76 *18* (1969Di16), 1.58 *8* (1970Ri06), 1.5 *1* (1971Ba08), 1.5 *3* (1972Ch56), and 1.6 *1* (1988Vi03).
[x]1061.5[@] *2*	0.05[@] *2*						E_γ: unplaced by evaluators. 1988Vi03 placed this γ from the 1121 level in (p,nγ).
[x]1066.2[e] *2*	0.09						E_γ: unplaced by evaluators. 1988Vi03 placed this γ from the 1789 level in (p,nγ).

$^{109}_{48}Cd_{61}$-9

^{109}In $\varepsilon+\beta^+$ decay 1970Ri06,1988Vi03 (continued)

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

E_γ[†]	I_γ[c]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[a]	α[b]	Comments
1105.9 *1*	0.39 *2*	1105.83	(9/2$^+$)	0.0	5/2$^+$	(E2)	9.15×10^{-4}	α(K)=0.000797 *12*; α(L)=9.52×10^{-5} *14*; α(M)=1.82×10^{-5} *3* α(N)=3.24×10^{-6} *5*; α(O)=1.86×10^{-7} *3*; α(IPF)=6.25×10^{-7} *9* %Iγ=0.289 *15*, using the calculated normalization. E$_\gamma$: 1105.9 *1* from weighted average of 1106.0 *5* (1969Di16), 1106.2 *8* (1970Ri06), 1106.0 *5* (1971Ba08), 1105.9 *10* (1972Ch56), and 1105.9 *1* (1988Vi03). I$_\gamma$: weighted average of 0.43 *4* (1970Ri06), 0.38 *4* (1971Ba08), 0.4 *3* (1972Ch56), and 0.36 *4* (1988Vi03). Other: 0.74 *7* (1969Di16).
1113.0 *3*	0.11[‡] *6*	1539.37	(7/2$^+$,9/2$^+$)	426.42	3/2$^+$,5/2$^+$			E$_\gamma$: 1113.0 *3* from 1988Vi03 only. I$_\gamma$: 0.11 *6* from 1988Vi03 only.
1128.4 *3*	0.15[‡] *6*	1475.69	(7/2,9/2)$^+$	347.51	5/2$^+$			E$_\gamma$: 1128.4 *3* from 1988Vi03 only. I$_\gamma$: 0.15 *6* from 1988Vi03 only.
1148.5 *2*	6.3 *2*	1352.15	(7/2)$^+$	203.40	7/2$^+$			E$_\gamma$: 1148.5 *2* from weighted average of 1148.0 *5* (1969Di16), 1149.1 *6* (1970Ri06), 1148.8 *5* (1971Ba08), 1148.6 *10* (1972Ch56), and 1148.5 *2* (1988Vi03). 1971Ba08 also placed this γ from the 1773 level. I$_\gamma$: weighted average of 6.2 *4* (1969Di16), 5.9 *5* (1970Ri06), 7.0 *4* (1971Ba08), 6.4 *6* (1972Ch56), and 6.0 *4* (1988Vi03).
1185.0 *3*	0.032[‡] *9*	1388.56	(7/2$^+$,9/2$^+$)	203.40	7/2$^+$			E$_\gamma$: 1186.8 *10* from 1970Ri06 only. This γ was not seen by 1988Vi03 in ^{109}In ε decay but seen in their (p,nγ) measurements. Placed by evaluators based on (p,nγ). I$_\gamma$: <0.4 from 1970Ri06 in this dataset.
1195.7 *2*	2.21[‡] *8*	1622.46	(7/2)$^+$	426.42	3/2$^+$,5/2$^+$			E$_\gamma$: 1195.7 *2* from weighted average of 1195 *1* (1969Di16), 1196.5 *6* (1970Ri06), 1196.2 *5* (1971Ba08), 1196.1 *10* (1972Ch56), and 1195.6 *2* (1988Vi03). I$_\gamma$: 2.21 *8* from weighted average of 2.5 *2* (1969Di16), 2.4 *3* (1970Ri06), 2.20 *12* (1971Ba08), 2.6 *4* (1972Ch56), and 2.1 *1* (1988Vi03).
1272.6 *2*	0.77[‡] *3*	1475.69	(7/2,9/2)$^+$	203.40	7/2$^+$			E$_\gamma$: 1272.6 *2* from weighted average of 1272.9 *7* (1970Ri06), 1272.6 *5* (1971Ba08), 1272 *1* (1972Ch56), 1271 *2* (1969Di16) and 1272.6 *3* (1988Vi03). 1972Ch56 also placed this γ from a level at 1272. I$_\gamma$: 0.77 *3* from weighted average of 0.80 *5* (1970Ri06), 0.77 *5* (1971Ba08), 0.8 *3* (1972Ch56), 0.81 *8* (1969Di16) and 0.72 *6* (1988Vi03).
1336.1[&] *4*	0.09[&] *2*	1539.37	(7/2$^+$,9/2$^+$)	203.40	7/2$^+$			
1346.4 *1*	0.79 *5*	1772.79	(7/2,9/2)$^+$	426.42	3/2$^+$,5/2$^+$			E$_\gamma$: 1346.4 *1* from weighted average of 1346.9 *7* (1970Ri06), 1346.6 *5* (1971Ba08), 1346.3 *15* (1972Ch56), and 1346.4 *1* (1988Vi03). I$_\gamma$: weighted average of 0.80 *5* (1970Ri06), 1.0 *3* (1972Ch56), and 0.72 *10* (1988Vi03). Other: 0.28 *3* (1971Ba08).
1352.3 *1*	0.96[‡] *4*	1352.15	(7/2)$^+$	0.0	5/2$^+$			%Iγ=0.71 *3*, using the calculated normalization. E$_\gamma$: 1352.3 *1* from weighted average of 1352.3 *7* (1970Ri06), 1352.2 *5*

$^{109}_{48}Cd_{61}$-10

^{109}In $\varepsilon+\beta^+$ decay 1970Ri06,1988Vi03 (continued)

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

E_γ [†]	I_γ [c]	E_i(level)	J_i^π	E_f	J_f^π	Comments
						(1971Ba08), 1351.9 *15* (1972Ch56), and 1352.3 *1* (1988Vi03). I_γ: 0.96 *4* from weighted average of 1.0 *1* (1970Ri06), 0.99 *6* (1971Ba08), 1.2 *3* (1972Ch56), and 0.86 *8* (1988Vi03).
1388.6 *2*	0.08 *2*	1388.56	$(7/2^+,9/2^+)$	0.0	$5/2^+$	%Iγ=0.059 *15*, using the calculated normalization. E_γ: 1388.8 *3* from weighted average of 1388.2 *10* (1970Ri06), 1389.9 *5* (1971Ba08), and 1388.6 *2* (1988Vi03). Placed by 1988Vi03, but 1970Ri06 placed this γ from a level at 1847. I_γ: weighted average of 0.05 *2* (1970Ri06), 0.11 *2* (1971Ba08), and 0.07 *4* (1988Vi03).
1419.0 *1*	1.68[‡] *6*	1622.46	$(7/2)^+$	203.40	$7/2^+$	E_γ: 1419.0 *1* from weighted average of 1418 *1* (1969Di16), 1419.2 *7* (1970Ri06), 1419.1 *5* (1971Ba08), 1419.3 *10* (1972Ch56), and 1419.0 *1* (1988Vi03). I_γ: 1.68 *6* from weighted average of 1.47 *15* (1969Di16), 1.8 *2* (1970Ri06), 1.74 *11* (1971Ba08), 1.9 *3* (1972Ch56), and 1.66 *10* (1988Vi03).
1430.1 *4*	0.08 *4*	1430.1?	$(7/2,9/2^+)$	0.0	$5/2^+$	%Iγ=0.06 *3*, using the calculated normalization. E_γ: 1430.1 *4* from weighted average of 1429.8 *10* (1970Ri06) and 1430.2 *4* (1988Vi03). Seen by 1988Vi03 in both ^{109}In ε decay and (p,nγ) but 1988Vi03 placed this γ from the 1633 level in (p,nγ), which is not populated in ^{109}In ε decay. I_γ: unweighted average of 0.12 *3* (1970Ri06) and 0.04 *2* (1988Vi03).
1475.6 *2*	0.66[‡] *4*	1475.69	$(7/2,9/2)^+$	0.0	$5/2^+$	%Iγ=0.49 *3*, using the calculated normalization. E_γ: 1475.6 *2* from weighted average of 1473 *1* (1969Di16), 1475.8 *7* (1970Ri06), 1475.6 *5* (1971Ba08), 1475.6 *10* (1972Ch56), and 1475.7 *2* (1988Vi03). I_γ: 0.66 *4* from weighted average of 0.74 *15* (1969Di16), 0.6 *1* (1970Ri06), 0.69 *5* (1971Ba08), 0.74 *22* (1972Ch56), and 0.61 *7* (1988Vi03).
[x]1521.7[@] *2*	0.09[@] *5*					E_γ: unplaced by evaluators. 1988Vi03 placed this γ from the 1869 level in (p,nγ).
[x]1535[e] *2*	0.18 *2*					E_γ,I_γ: from 1969Di16 only.
1539.3 *2*	0.16 *2*	1539.37	$(7/2^+,9/2^+)$	0.0	$5/2^+$	%Iγ=0.119 *15*, using the calculated normalization. E_γ: 1539.4 *2* from weighted average of 1539.3 *10* (1970Ri06), 1539.8 *5* (1971Ba08), 1539.0 *15* (1972Ch56), and 1539.3 *2* (1988Vi03). I_γ: weighted average of 0.19 *3* (1970Ri06), 0.15 *2* (1971Ba08), 0.33 *16* (1972Ch56), and 0.13 *5* (1988Vi03).
1569.9 *4*	0.15[‡] *2*	1772.79	$(7/2,9/2)^+$	203.40	$7/2^+$	E_γ: 1569.9 *4* from weighted average of 1567 *2* (1969Di16), 1569 *1* (1970Ri06), 1570.7 *5* (1971Ba08), 1570.0 *15* (1972Ch56), and 1569.5 *5* (1988Vi03). I_γ: 0.15 *2* from weighted average of 0.12 *2* (1969Di16), 0.18 *3* (1970Ri06), 0.18 *3* (1971Ba08), 0.18 *12* (1972Ch56), and 0.15 *5* (1988Vi03).
1622.3 *3*	2.8 *1*	1622.46	$(7/2)^+$	0.0	$5/2^+$	%Iγ=2.08 *8*, using the calculated normalization. E_γ: 1622.3 *3* from weighted average of 1620 *1* (1969Di16), 1622.3 *8* (1970Ri06), 1622.5 *5* (1971Ba08), 1621.6 *10* (1972Ch56), and 1622.5 *3* (1988Vi03). I_γ: weighted average of 2.9 *2* (1969Di16), 2.8 *3* (1970Ri06), 3.0 *2* (1971Ba08), 3.2 *5* (1972Ch56), and 2.6 *2* (1988Vi03).
1772.5 *2*	0.57[‡] *3*	1772.79	$(7/2,9/2)^+$	0.0	$5/2^+$	%Iγ=0.423 *23*, using the calculated normalization. E_γ: 1772.5 *2* from weighted average of 1774 *2* (1969Di16), 1771.9 *8* (1970Ri06), 1772.6 *5*

$^{109}_{48}Cd_{61}$-11

^{109}In ε+β$^+$ decay 1970Ri06,1988Vi03 (continued)

γ(^{109}Cd) (continued)

E_γ †	I_γ [c]	E_i(level)	J_i^π	E_f	J_f^π	Comments
						(1971Ba08), 1772.1 *10* (1972Ch56), and 1772.6 *3* (1988Vi03). I_γ: 0.57 *3* from weighted average of 0.57 *4* (1969Di16), 0.6 *1* (1970Ri06), 0.60 *5* (1971Ba08), 0.65 *16* (1972Ch56), and 0.54 *5* (1988Vi03).
1846.6[e] *10*	<0.02	1846.6?		0.0	5/2$^+$	E_γ,I_γ: from 1970Ri06 only.
1861.4 *1*	0.045 *8*	1861.42	(7/2$^+$,9/2$^+$)	0.0	5/2$^+$	%Iγ=0.033 *6*, using the calculated normalization. E_γ: 1861.4 *1* from 1988Vi03. Others: 1860.6 *10* (1970Ri06), 1863 *3* (1969Di16). I_γ: weighted average of 0.047 *9* (1969Di16), 0.04 *2* (1970Ri06), and 0.04 2 (1988Vi03).

† From Adopted Gammas, unless otherwise noted. Values from this dataset are given in comments. Unplaced γ rays are from this dataset.

‡ Values are obtained by normalizing relative intensities from each level in Adopted Gammas to the intensity of the strongest transition from each level in this dataset. Values originally from this dataset are given under comments where indicated. All values are relative to Iγ(203γ)=100.

From 1970Ri06 only.

@ From 1988Vi03 only.

& Not observed in this dataset and data are taken from Adopted Gammas. Intensities have been normalized to that of the strongest transition from each level in this dataset.

[a] From Adopted Gammas, unless otherwise noted. ce data in this dataset are from 1956Pe56 and given in comments.

[b] Additional information 1.

[c] For absolute intensity per 100 decays, multiply by 0.742 *5*.

[d] Multiply placed with undivided intensity.

[e] Placement of transition in the level scheme is uncertain.

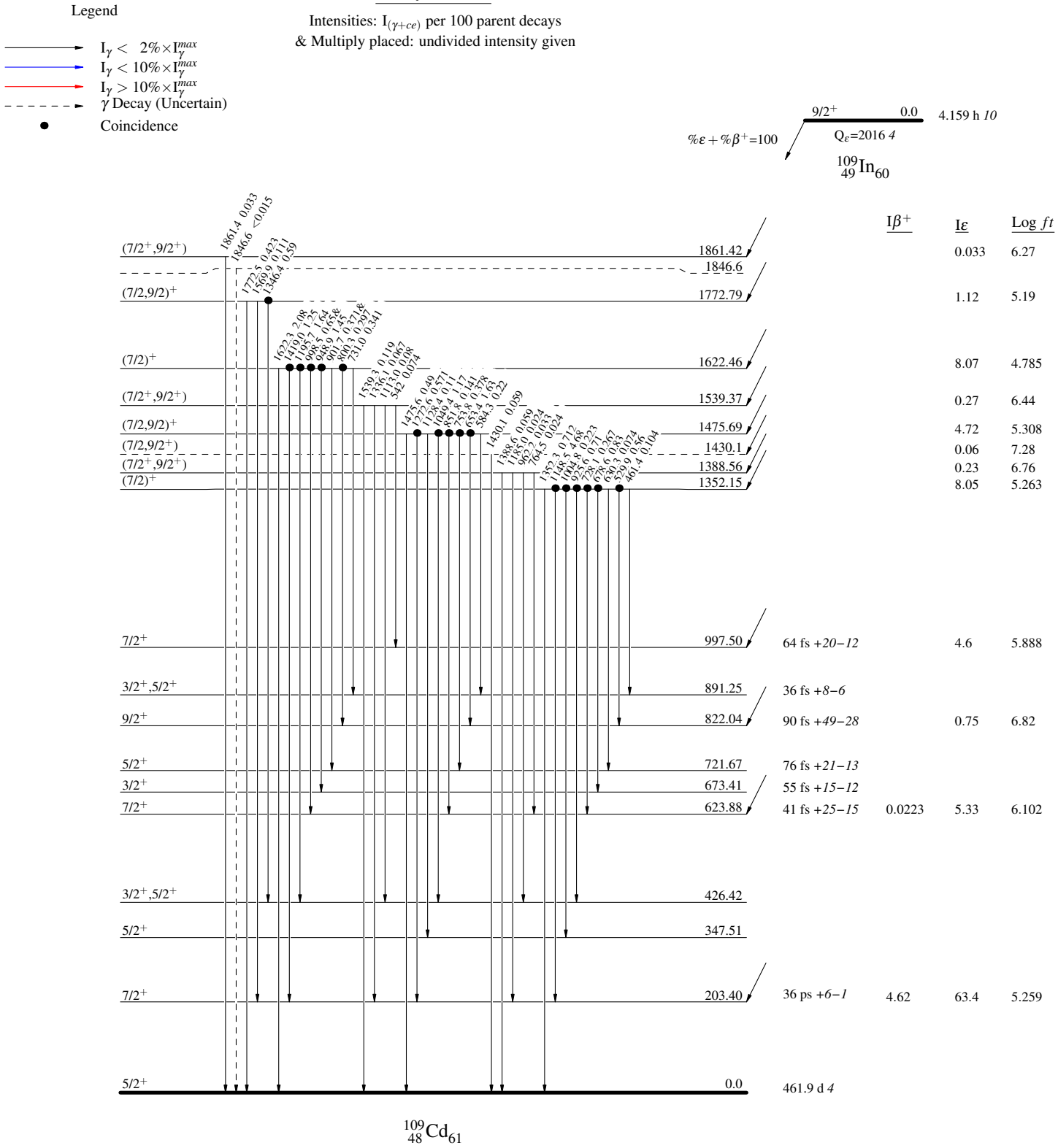
[x] γ ray not placed in level scheme.

$^{109}_{48}Cd_{61}$-12

^{109}In ε decay 1970Ri06,1988Vi03

Decay Scheme

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
& Multiply placed: undivided intensity given



^{109}In ε decay 1970Ri06,1988Vi03

Decay Scheme (continued)

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
& Multiply placed: undivided intensity given