Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Update	Balraj Singh and Jun Chen	ENSDF	15-Sep-2021

Q(β^-)=−10016.4 *28*; S(n)=12334.8 *23*; S(p)=4771 *6*; Q(α)=−436 *5* 2021Wa16
S(2n)=22700 *50*, S(2p)=7452 *5*, Q(ε)=3943 *5*, Q(εp)=699 *5* (2021Wa16).

Updates on Sept 15, 2021: Q values and particle-separation energies updated from 2021Wi16; $T_{1/2}$ and B(E2)(W.u.) corrected for the first 2^+ level. Evaluated magnetic dipole moment from 2020StZV evaluation included. No new experimental papers on the structure on ^{100}Cd since Jan 31, 2021 update. B(E2) and $T_{1/2}$ were revised in response to e-mail query of Aug 18, 2021 from Dr. M.L. Cortes (T.U. Darmstadt).

Other measurements:
1975HaXF, 1969HaZU: ^{92}Mo(^{12}C,4nγ) E=70-95 MeV, measured γ.

Mass measurements: 2009Br09 (Penning-trap method), 1996Ch32 (also 1996Ch26,1997Le36,1997Mi07). In 1996Ch32, ^{100}Ag used as a standard.

Additional information 1.

Theory references: consult the NSR database (www.nndc.bnl.gov/nsr/) for 36 primary references, 30 dealing with nuclear structure calculations and six with decay modes and half-lives.

^{100}Cd Levels

Cross Reference (XREF) Flags

A	^{100}In ε decay (5.65 s)	D	^{46}Ti(^{58}Ni,2p2nγ)
B	^{101}Sn εp decay (2.20 s)	E	^{64}Zn(^{40}Ca,2p2nγ)
C	^{1}H(^{102}Cd,^{100}Cdγ)	F	Coulomb excitation

E(level)†	J$^\pi$‡	$T_{1/2}$	XREF	Comments
0.0@	0^+#	49.1 s *5*	ABCDEF	%ε+%β^+=100 $T_{1/2}$: from 1989Ry02. Other: 66 s *18* (from β(t),1970Hn03). Measured isotope shift ν(^{114}Cd,^{100}Cd)=6371.6 MHz *31*(stat) *114*(syst) (2018Ha30, high-resolution collinear laser spectroscopy at ISOLDE-CERN). Measured δ<r^2>(^{114}Cd,^{100}Cd)=−1.421 fm^2 *5*(stat) *43*(syst) (2018Ha30).
1004.11@ *10*	2^+#	>1.0 ps	ABCDEF	J$^\pi$: level populated strongly in Coul. ex. $T_{1/2}$: from B(E2)≤0.21 *7* in Coul. ex. (2009Ek01), assuming Q_0=0 from shell-model calculations. B(E2) and comment edited, $T_{1/2}$ revised, B. Singh, Sept 15, 2021, in response to e-mail query of Aug 18, 2021 from Dr. M.L. Cortes (T.U. Darmstadt).
1799.00@ *14*	(4^+)#		A CDE	XREF: C(1764).
1930? *20*	(2^+)		C	
2046.24 *15*	(4^+)		A D	J$^\pi$: 1042.1γ to (2^+) and 411.5γ from (6^+).
2095.40@ *17*	(6^+)#		A DE	J$^\pi$: 296.4γ to (4^+) and 452.6γ from (8^+).
2457.69 *17*	(6^+)		A D	J$^\pi$: 658.4γ to (4^+) and 90.7γ from (8^+).
2548.19@ *18*	(8^+)#	62 ns *6*	A DE	μ=9.9 *5* (1992Al17,2020StZV) $T_{1/2}$: from γ(t), unweighted average of 60 ns *3* (1994Go38) and 52 ns *5* (1992Al17) in (^{58}Ni,2p2nγ), and 73 ns *5* (1988Pi03) in (^{40}Ca,2p2nγ). μ: from g factor=1.24 *6* measured using DPAD method in (^{58}Ni,2p2nγ), corrected for Knight shift and diamagnetic shift (1992Al17). Proposed configuration=$\pi g_{9/2}^{-2}$, consistent with measured g factor (1992Al17).
3163.96 *25*	$(4^+,5,6^+)$		A	J$^\pi$: 1365.3γ to (4^+) and 1068.5γ to (6^+).
3199.5 *3*	(8^+)		A	J$^\pi$: 1104.1γ to (6^+); shell-model prediction.
3656.8 *3*	(10^+)		D	J$^\pi$: 1108.6γ ΔJ=2 to (8^+).
4118.5 *3*	(11^+)		D	J$^\pi$: 461.7γ ΔJ=1 to (10^+).
4344.3 *3*	(12^+)		D	J$^\pi$: 225.8γ ΔJ=1 to (11^+).

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{100}Cd Levels (continued)

E(level)[†]	J$^\pi$[‡]	XREF	Comments
4855.3 *4*	(12)	D	J$^\pi$: 736.8γ ΔJ=1 to (11$^+$).
5319.3 *9*	(12)	D	J$^\pi$: 1200.7γ to (11$^+$).
5508.0 *4*	(14)	D	J$^\pi$: 1163.7γ ΔJ=2 to (12$^+$).
6258.7 *5*	(14)	D	J$^\pi$: 750.7γ ΔJ=0 to (14).
6460.5 *10*	(13)	D	J$^\pi$: 2116.3γ ΔJ=1 to (12$^+$).
6953.4[&] *5*	(14)	D	J$^\pi$: 2609.1γ ΔJ=2 to (12$^+$), 1445.8γ to (14).
6978.3 *10*	(14)	D	J$^\pi$: 517.8γ ΔJ=1 to (13).
7172.1 *10*	(15)	D	J$^\pi$: 193.8γ ΔJ=1 to (14).
7365.0[a] *6*	(14)	D	J$^\pi$: 2508.4γ ΔJ=2 to (12).
7747.9[&] *5*	(15)	D	J$^\pi$: 794.5γ ΔJ=1 to (14).
7910.8[a] *5*	(16)	D	J$^\pi$: 545.8γ ΔJ=2 to (14).
8349.5[&] *5*	(17)	D	J$^\pi$: 601.6γ ΔJ=2 to (15).
8560.4[a] *5*	(17)	D	J$^\pi$: 812.6γ ΔJ=2 to (15), 649.5γ ΔJ=1 to (16).
8823.4[&] *5*	(18)	D	J$^\pi$: 474.0γ ΔJ=1 to (17).
8947.3[a] *5*	(18)	D	J$^\pi$: 386.9γ ΔJ=1 to (17).
9388.2[&] *5*	(20)	D	J$^\pi$: 440.8γ and 564.9γ ΔJ=2 to (18).

† From least-squares fit to Eγ data; normalized χ^2=1.5. Many low-spin (J<8) levels are suggested above 3200 keV by the total-absorption gamma-ray (TAS) measurements. See ^{100}In ε decay for a list of 25 such groups (named as pseudo-levels) in 200 keV intervals from 3600 to 8400 keV.

‡ For high-spin (J>8), ascending order of spins with excitation energy is assumed according to the trend of population of yrast states in ^{46}Ti(^{58}Ni,2p2nγ) and ^{64}Zn(^{40}Ca,2p2nγ) studies.

Yrast states based on the g.s. and systematics of even-even nuclei near closed shells; proposed by 2002Pl03 in ^{100}In ε decay (5.8 s).

@ Seq.(C): g.s. band, yrast cascade.

& Band(A): γ cascade based on (14).

a Band(B): γ cascade based on (14).

γ(^{100}Cd)

E$_i$(level)	J$^\pi_i$	E$_\gamma$[†]	I$_\gamma$[†]	E$_f$	J$^\pi_f$	Mult.[‡]	Comments
1004.11	2$^+$	1004.1 *1*	100	0.0	0$^+$	(E2)	B(E2)(W.u.)<20 E$_\gamma$: weighted average of 1004.1 *1* from ^{100}In ε decay (5.8 s), 1004.2 *2* from (^{58}Ni,2p2nγ), and 1004.03 *17* from (^{40}Ca,2p2nγ). Other: 1004 *15* from (^{102}Cd,^{100}Cdγ). Mult.: supported by $\gamma(\theta)$ in (^{40}Ca,2p2nγ) and level scheme.
1799.00	(4$^+$)	794.95 *10*	100	1004.11	2$^+$		E$_\gamma$: weighted average of 794.9 *1* from ^{100}In ε decay (5.8 s), 795.1 *2* from (^{58}Ni,2p2nγ), and 795.02 *21* from (^{40}Ca,2p2nγ). Other: 760 *15* from (^{102}Cd,^{100}Cdγ).
1930?	(2$^+$)	1930[@] *20*	100	0.0	0$^+$		E$_\gamma$: from (^{102}Cd,^{100}Cdγ) only.
2046.24	(4$^+$)	247.3 *1*	25 *13*	1799.00	(4$^+$)		
		1042.1 *2*	100 *25*	1004.11	2$^+$		E$_\gamma$: weighted average of 1041.9 *2* from ^{100}In ε decay (5.8 s) and 1042.3 *2* from (^{58}Ni,2p2nγ).
2095.40	(6$^+$)	296.4 *2*	100	1799.00	(4$^+$)		E$_\gamma$: unweighted average of 296.8 *1* from ^{100}In ε decay (5.8 s), 296.1 *1* from (^{58}Ni,2p2nγ), and 296.27 *17* from (^{40}Ca,2p2nγ).
2457.69	(6$^+$)	362.6 *2*	100 *8*	2095.40	(6$^+$)		E$_\gamma$: unweighted average of 362.7 *1* from ^{100}In ε decay (5.8 s) and 362.4 *1* from (^{58}Ni,2p2nγ).

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

$\gamma(^{100}Cd)$ (continued)

E_i(level)	J^π_i	E_γ †	I_γ †	E_f	J^π_f	Mult. ‡	α #	Comments
								I_γ: other: 100 *11* from ^{100}In ε decay.
								I_γ: weighted average of 31 *5* from ^{100}In ε decay (5.8 s) and 32 *4* from (^{58}Ni,2p2nγ).
2457.69	(6$^+$)	411.5 *1*	32 *4*	2046.24	(4$^+$)			E_γ: weighted average of 411.7 *3* from ^{100}In ε decay (5.8 s) and 411.5 *1* from (^{58}Ni,2p2nγ).
		658.4 *2*	45 *5*	1799.00	(4$^+$)			E_γ: weighted average of 658.2 *3* from ^{100}In ε decay (5.8 s) and 658.5 *2* from (^{58}Ni,2p2nγ).
								I_γ: weighted average of 47 *5* from ^{100}In ε decay (5.8 s) and 43 *5* from (^{58}Ni,2p2nγ).
2548.19	(8$^+$)	90.7 *1*	4.6 *20*	2457.69	(6$^+$)	[E2]	2.12 *3*	B(E2)(W.u.)=2.2 *+12−10*
								E_γ: also from ^{100}In ε decay (5.8 s).
		452.6 *1*	100 *3*	2095.40	(6$^+$)	[E2]		B(E2)(W.u.)=0.0152 *17*
								E_γ: weighted average of 452.8 *1* from ^{100}In ε decay (5.8 s), 452.5 *1* from (^{58}Ni,2p2nγ), and 452.56 *17* from (^{40}Ca,2p2nγ).
3163.96	(4$^+$,5,6$^+$)	1068.5 *2*	100 *14*	2095.40	(6$^+$)			
		1365.3 *5*	86 *17*	1799.00	(4$^+$)			
3199.5	(8$^+$)	1104.1 *2*	100	2095.40	(6$^+$)			
3656.8	(10$^+$)	1108.6 *2*	100	2548.19	(8$^+$)	Q		
4118.5	(11$^+$)	461.7 *1*	100	3656.8	(10$^+$)	D		
4344.3	(12$^+$)	225.8 *1*	100	4118.5	(11$^+$)	D		
4855.3	(12)	736.8 *2*	100	4118.5	(11$^+$)	D		
5319.3	(12)	1200.7 *10*	100	4118.5	(11$^+$)			
5508.0	(14)	1163.7 *3*	100	4344.3	(12$^+$)	Q		
6258.7	(14)	750.7 *3*	100 *5*	5508.0	(14)	D		Mult.: ΔJ=0 transition.
		1914.4 *12*	22 *4*	4344.3	(12$^+$)			
6460.5	(13)	1141.1 *9*	33 *5*	5319.3	(12)	D		
		2116.3 *12*	100 *15*	4344.3	(12$^+$)	D		
6953.4	(14)	1445.8 *10*	8.8 *18*	5508.0	(14)			
		2098.7 *7*	29 *4*	4855.3	(12)	Q		
		2609.1 *4*	100.0 *23*	4344.3	(12$^+$)	Q		
6978.3	(14)	517.8 *1*	100	6460.5	(13)	D		
7172.1	(15)	193.8 *1*	100	6978.3	(14)	D		
7365.0	(14)	2508.4 *9*	100	4855.3	(12)	Q		
7747.9	(15)	794.5 *2*	100	6953.4	(14)	D		
7910.8	(16)	545.8 *2*	100 *5*	7365.0	(14)	Q		
		1652.2 *11*	68 *8*	6258.7	(14)			
8349.5	(17)	601.6 *2*	100	7747.9	(15)	Q		
8560.4	(17)	649.5 *2*	68 *4*	7910.8	(16)	D		
		812.6 *3*	100 *4*	7747.9	(15)	Q		
8823.4	(18)	474.0 *1*	100	8349.5	(17)	D		
8947.3	(18)	386.9 *1*	100 *4*	8560.4	(17)	D		
		596.9 *6*	34 *9*	8349.5	(17)	(D)		
9388.2	(20)	440.8 *2*	100 *4*	8947.3	(18)	Q		
		564.9 *2*	76 *4*	8823.4	(18)	Q		

† From (^{58}Ni,2p2nγ), unless otherwise noted. Weighted averaged values are taken when values are available from different datasets.
‡ From $\gamma(\theta)$ data in (^{58}Ni,2p2nγ), unless otherwise noted. mult=Q represents ΔJ=2, quadrupole and D represents ΔJ=1, dipole (quadrupole admixture is generally expected), except for one case where D is for ΔJ=0.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

$\gamma(^{100}Cd)$ (continued)

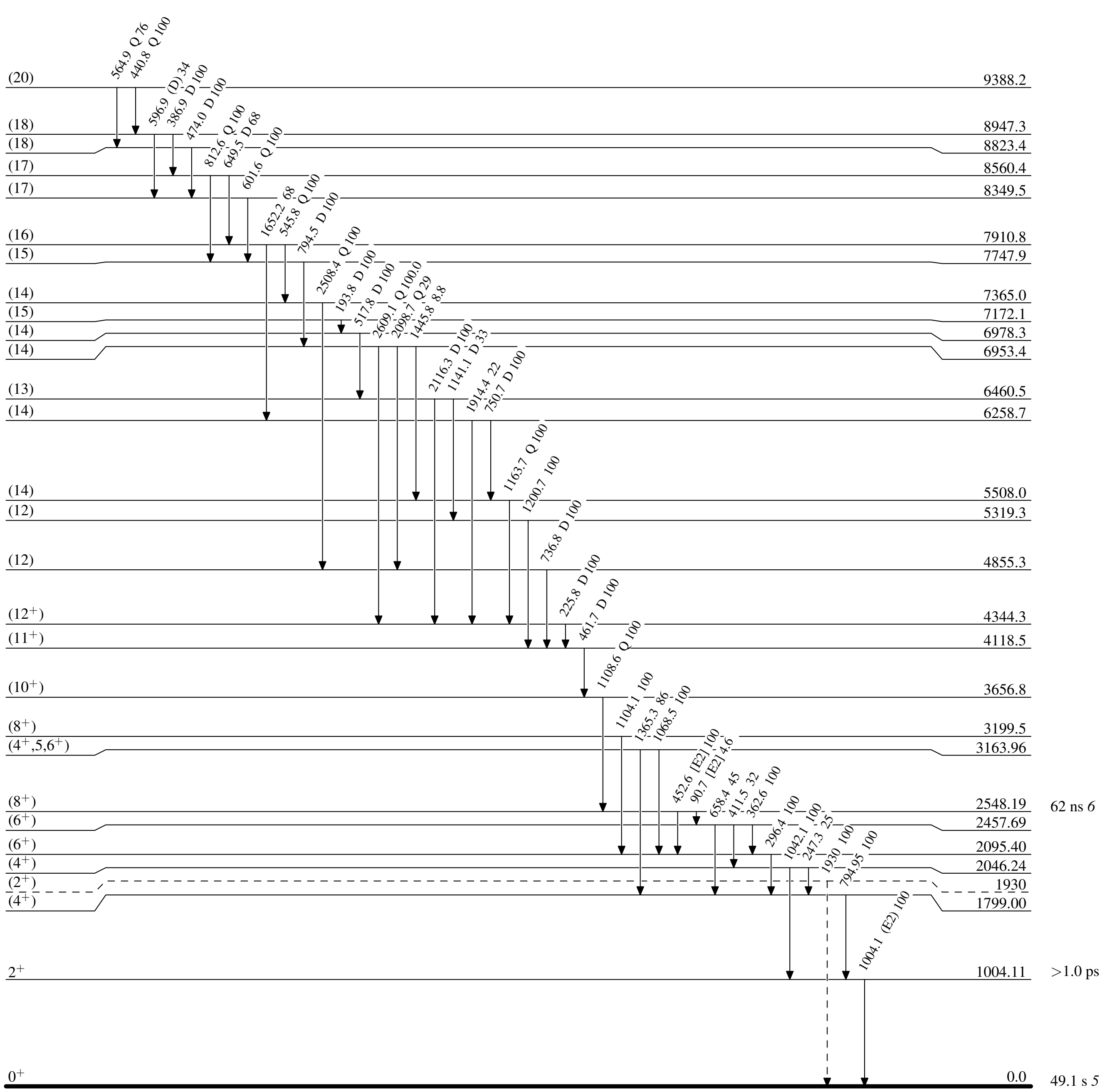
Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

@ Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

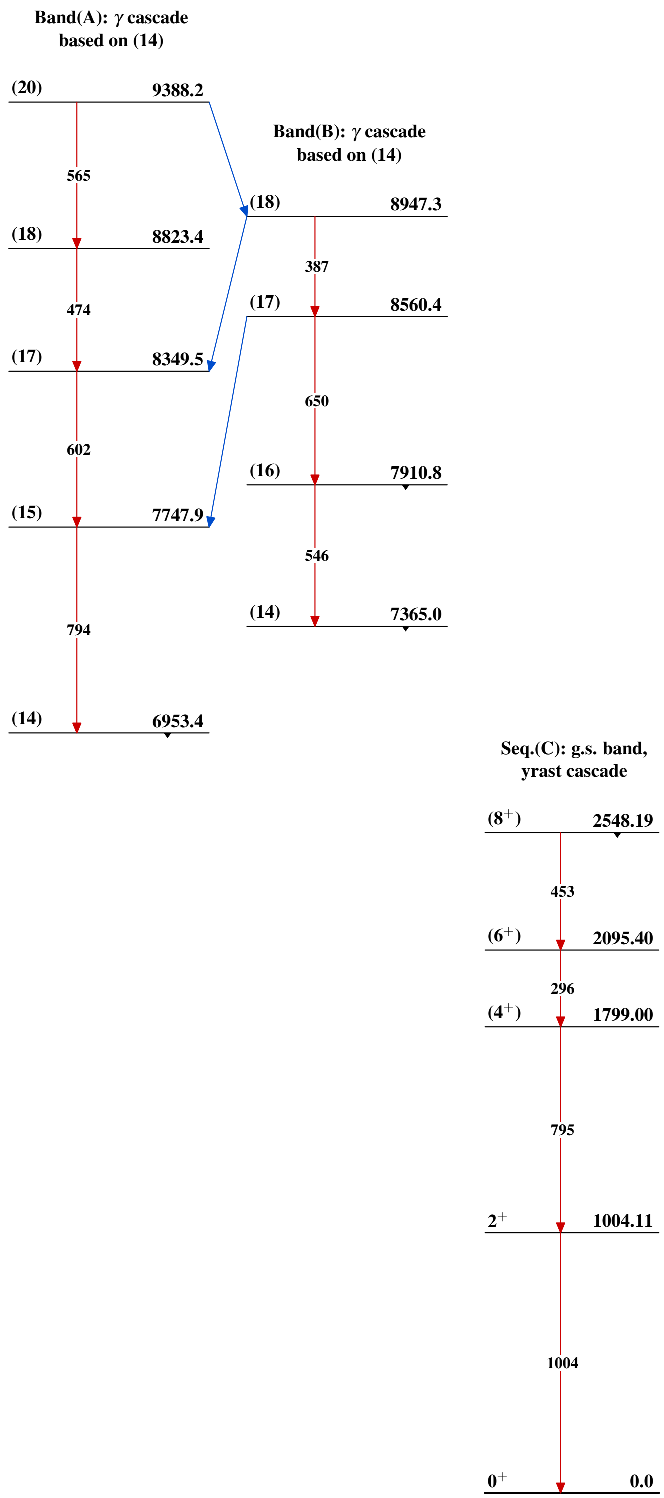
Level Scheme

Intensities: Relative photon branching from each level



$^{100}_{48}Cd_{52}$

Adopted Levels, Gammas



$^{100}_{48}Cd_{52}$