^{111}In ε decay

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jean Blachot	NDS 110, 1239 (2009)	1-Feb-2008

Parent: ^{111}In: E=0.0; $J^\pi=9/2^+$; $T_{1/2}$=2.8047 d *4*; Q(ε)=862 *5*; %ε decay=100.0

1999BeZS: evaluation by V. P. Chechev, April 1998 including some general comments from previous evaluation (1996Bl12). This evaluation was done as part of a collaboration of evaluators from Laboratoire National Henri Becquerel (LNHB) in France; Physikalisch-Technische Bundesanstalt (PTB) in Germany; HMS Sultan and AEA Technology in the United Kingdom; Khlopin Radium Institute (KRI) in Russia; Centro de Investigaciones Energeticas, Medioambientales, y Tecnologicas (CIEMAT) and Universidad Nacional a Distancia (UNED) in Spain; and Brookhaven National Laboratory (BNL), Lawrence Berkeley National Laboratory (LBNL), and Idaho National Engineering and Environmental Laboratory (INEEL) in the United States.

Other reference: 1968Da24.

^{111}Cd Levels

E(level)	J^π	$T_{1/2}$	Comments
0.0	$1/2^+$	stable	
245.35 *4*	$5/2^+$	84.5 ns *4*	$T_{1/2}$: from ^{111}Cd Adopted Levels.
396.16 *5*	$11/2^-$	48.50 min *9*	$T_{1/2}$: from ^{111}Cd Adopted Levels.
416.63 *5*	$7/2^+$	0.12 ns *3*	$T_{1/2}$: from (ce(K) Auger)(ce(L) 171γ)-coin (1964Sp07).

ε radiations

Limits on the ε branches to the levels at 0 and 245 keV can be deduced from the log *ft* systematics of 1998Si17. The transitions to these levels are 4th and 2nd forbidden with expected log *ft*′s of >22 and >10.6, respectively. The corresponding I_ε limits are $<1.0\times10^{-14}$% and $<5\times10^{-4}$%, respectively.

E(decay)	E(level)	Iε†	Log *ft*	Comments
(445 *5*)	416.63	100.000 *5*	5.02	εK= 0.8516 *15*; εL= 0.1186 *11*; εM+= 0.021 *5* E(decay): εK/ε exp=0.867 *7* (1966Sp05) via (ce(K) Auger)(ce(K) 245γ)-coin. εK,εL: computed from tables of 1998Sc28.
(466 *5*)	396.16	0.005 *5*	≥9.0	εK= 0.8522 *15*; εL= 0.1181 *11*; εM+= 0.0298 *6* Iε: from < 0.01 from 1972MeZD; other: ≈ 0.01 from I_γ(150) = 0.003 and α(150) = 2.30. εK,εL: computed from tables of 1998Sc28.

† Absolute intensity per 100 decays.

γ(^{111}Cd)

E_γ†	I_γ‡	E_i(level)	J_i^π	E_f	J_f^π	Mult.	δ	α#	Comments
150.81 *3*	≈0.003	396.16	$11/2^-$	245.35	$5/2^+$	E3		2.31	α(K)= 1.45; α(L)= 0.69; α(M)= 0.138; α(N+..)= 0.0259 I_γ: from 1975Sh29; other: 0.0028 deduced from %ε=0.0086 (1972MeZD) and < 0.003 from limit of 1972MeZD.
171.28 *3*	90.65 *25*	416.63	$7/2^+$	245.35	$5/2^+$	M1+E2	−0.144 *3*	0.103	Mult.: from ^{111}Cd IT decay (48.50 min). α(K)exp=0.0868 *25* (1966Sp04) α(K)=0.089; α(L)=0.011; α(M)=0.0021; α(N+..)=0.00047

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^{111}In ε decay (continued)

γ(^{111}Cd) (continued)

E_γ [†]	I_γ [‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.	α [#]	Comments
								I_γ: from I_γ = [100.0 − I_β(396)] / [1.0 + α(171)] = 99.995 *5* / 1.103 *3*. δ: average of −0.146 *3* (1956St64) γγ(θ), −0.141 *3* (1973Bu31) γγ(θ); 0.145 (1974Kr03) γγ(θ, linear pol) sign inconsistent. δ=0.196 *+46−55* from L3/L1=0.042 *12* (1966Sp04,1975Sh29). Penetration effects may account for exp L1/L2/L3 ratios (1966Sp04,1975Sh29); incompatible with predictions. Mult.: other α(K)exp: 0.110 *5* (1975Sh29), 0.10 *1* (1951Mc61) normalized to α(K)(245γ)=0.0536 (E2 theory).
245.35 *4*	94.09 *18*	245.35	5/2$^+$	0.0	1/2$^+$	E2	0.0628	α(K)exp=0.0525 *12*; α(K)exp=0.0494 *11* (1966Sp04); α(K)exp=0.054 *5* (1951Mc61) α(K)= 0.0526; α(L)=0.0083; α(M)=0.0016; α(N+..)=0.00032 I_γ: from 100.0/[1.0 + α(245)] = 100.0 / 1.0628 *19* where an uncertainty of 3% has been assigned to α(245). Mult.: from K:L1:L2:L3:M=100 *1*:10.2 *2*:2.30 *15*:2.21 *15*:2.73 *10* (1966Sp04), 100/11.5 *16*/2.06 *25*/1.9 *3*/2.7 *4* (1975Sh29).

[†] From weighted average of values from 1951Mc61, 1966Sp04, 1974HeYW, and 1975Sh29, except 150-keV γ which is from 1975Sh29.

[‡] For absolute intensity per 100 decays, multiply by 1.00 *1*.

[#] 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.

^{111}In ε decay

Decay Scheme

Intensities: $I_{(\gamma+ce)}$ per 100 decays through this branch