^{129}Cd β^- decay:mixed 2009Ar04

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Janos Timar and Zoltan Elekes, Balraj Singh	NDS 121, 143 (2014)	31-May-2014

Parent: ^{129}Cd: E=0; $J^\pi=3/2^+$; $T_{1/2}$=242 ms *8*; Q(β^-)=9330 *SY*; %β^- decay=100.0

Parent: ^{129}Cd: E=0+x; $J^\pi=11/2^-$; $T_{1/2}$=104 ms *6*; Q(β^-)=9330 *SY*; %β^- decay=100.0

^{129}Cd(0)-J^π,$T_{1/2}$: From ^{129}Cd Adopted Levels.

^{129}Cd(0)-Q(β^-): 9330 *200* (syst,2012Wa38).

^{129}Cd(0+x)-J^π,$T_{1/2}$: From ^{129}Cd Adopted Levels.

^{129}Cd(0+x)-Q(β^-): 9330 *200* (syst,2012Wa38).

2009Ar04: experiment performed at ISOLDE facility. 1 GeV proton beam hit Ta or W rod producing neutrons close to uranium target where fission is induced. The products were laser ionized after diffusion out the heated target. γ-ray single and coincidence spectra measured with laser on and off by four HPGe detectors. β rays measured by ΔE-E telescope. All gamma rays from the decay of both the 242-ms and 104-ms activities are listed without separating these into two decay schemes. An earlier list of 32 γ rays is provided in 2003DiZY, also from an experiment at ISOLDE-CERN, possibly the same one as described in 2009Ar04. There seems a systematic difference between the Eγ values quoted in 2003DiZY and 2009Ar04; the intensities are in reasonable agreement.

1986Go10: ^{235}U(n,F),E=th, on-line mass; HPGe γ.

Evaluators consider the decay scheme given here as tentative in view of many unplaced transitions and preliminary nature of the 2009Ar04 conference paper.

^{129}In Levels

E(level)[†]	J^π[@]	$T_{1/2}$[@]	Comments
0	($9/2^+$)	611 ms *5*	
459 *5*	($1/2^-$)	1.23 s *3*	%β^-=100 Additional information 1. E(level): from mass measurement using JYFL Penning-trap system (2013Ka08). Earlier value: 369 keV *46* (2004Ga24) determined from β^- end-point energies from the decay of the 1.23-s and 611-ms activities is about 2σ lower than the value from direct mass measurements.
858.8?[‡] *4*	(5/2)		
995.1[#] *4*	($11/2^+$)		
1020.5?[‡] *4*	(5/2)		
1091.0?[‡] *4*	($3/2^-$)		
1354.0[#] *4*	($13/2^+$)		
1422.8[‡] *4*	($5/2^+$)		
1562.0?[‡] *4*	(5/2)		
1585.7[#] *5*	($9/2^+$)		
1632.8?[‡] *7*	($5/2^-$)		
1687.8[#] *5*	($17/2^-$)	8.7 μs *7*	J^π: from 2003Ge04.
2419.1[#] *6*	($13/2^-$)		
2918.9?[‡] *4*	(5/2)		
3150.1[#] *5*	($13/2^-$)		
3183.9[#] *4*			
4578.9?[‡] *4*	($5/2^-$)		

[†] From least-squares fit to Eγ data, keeping energy of the 459-keV isomer as fixed.

[‡] Level populated by the 11/2-, 104-ms activity of ^{129}Cd (2009Ar04).

[#] Level possibly populated by the $3/2^+$, 242-ms activity of ^{129}Cd (2009Ar04,2013Ka08).

[@] From Adopted Levels.

^{129}Cd β^- decay:mixed 2009Ar04 (continued)

$\gamma(^{129}In)$

E_γ [†]	I_γ [†]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [‡]	Comments
333.5 *5*	13.0 *13*	1687.8	(17/2$^-$)	1354.0	(13/2$^+$)	(M2)	Additional information 24.
x338.2 *5*	6.0 *12*						
358.8 *5*	50 *5*	1354.0	(13/2$^+$)	995.1	(11/2$^+$)		Additional information 18.
400.5#@ *5*	7.0 *14*	858.8?	(5/2)	459	(1/2$^-$)		Additional information 13.
x439.7@ *5*	7.0 *14*						Additional information 2.
x537.2 *5*	2.0 *4*						Additional information 3.
541.8 *5*	11.0 *11*	1632.8?	(5/2$^-$)	1091.0?	(3/2$^-$)		Additional information 23.
561.7#a *5*	8.0 *16*	1020.5?	(5/2)	459	(1/2$^-$)		Additional information 15.
x589.1 *5*	5.2 *10*						
x618.3 *5*	4.3 *9*						
631.9 *5*	30 *3*	1091.0?	(3/2$^-$)	459	(1/2$^-$)		Additional information 17.
731.1 *5*	8.5 *17*	2419.1	(13/2$^-$)	1687.8	(17/2$^-$)		Additional information 25.
x839.8 *5*	6.0 *12*						Additional information 4.
858.1# *5*	3.3 *7*	858.8?	(5/2)	0	(9/2$^+$)		
x863.1 *5*	5.5 *11*						
995.0 *5*	100 *10*	995.1	(11/2$^+$)	0	(9/2$^+$)		Additional information 14.
1020.3#a *5*	8.5 *17*	1020.5?	(5/2)	0	(9/2$^+$)		Additional information 16.
1065.2 *5*	8.0 *16*	2419.1	(13/2$^-$)	1354.0	(13/2$^+$)		Additional information 26.
1103.4#a *5*	5.0 *10*	1562.0?	(5/2)	459	(1/2$^-$)		Additional information 21.
x1234.1 *5*	5.0 *10*						
1354.1 *5*	21.0 *21*	1354.0	(13/2$^+$)	0	(9/2$^+$)		Additional information 19.
1422.6 *5*	20 *2*	1422.8	(5/2$^+$)	0	(9/2$^+$)		Additional information 20.
1462.2 *5*	11.0 *11*	3150.1	(13/2$^-$)	1687.8	(17/2$^-$)		
x1499.4 *5*	7.0 *14*						
x1554.8 *5*	5.0 *10*						
x1557.9 *5*	5.0 *10*						
1561.5#a *5*	5.0 *10*	1562.0?	(5/2)	0	(9/2$^+$)		
1585.7 *5*	12.0 *12*	1585.7	(9/2$^+$)	0	(9/2$^+$)		Additional information 22.
x1689.9 *5*	6.0 *12*						Additional information 5.
x1755.3 *5*	4.0 *8*						
1760.9 *5*	19.0 *19*	3183.9		1422.8	(5/2$^+$)		Additional information 30.
x1763.3 *5*	5.0 *10*						
x1770.9 *5*	3.0 *6*						
1796.1 *5*	32 *3*	3150.1	(13/2$^-$)	1354.0	(13/2$^+$)		Additional information 28.
x1835.0& *4*							
x2087.9 *5*	5.5 *11*						Additional information 6.
2155.1 *5*	9.0 *18*	3150.1	(13/2$^-$)	995.1	(11/2$^+$)		Additional information 29.
x2216.7 *5*	8.0 *16*						Additional information 7.
x2330.9 *5*	5.0 *10*						
2460.2#a *5*	6.0 *12*	2918.9?	(5/2)	459	(1/2$^-$)		Additional information 27.
x2628.5 *5*	4.0 *8*						
x2838.4 *5*	2.0 *4*						
x2879.9 *5*	2.5 *5*						
2918.5#a *5*	1.0 *2*	2918.9?	(5/2)	0	(9/2$^+$)		
x2999.0 *5*	2.0 *2*						Additional information 8.
3184.1 *5*	3.0 *6*	3183.9		0	(9/2$^+$)		Additional information 31.
x3348.0 *5*	4.0 *8*						Additional information 9.
x3388.9 *5*	2.0 *4*						
3487.8 *5*	1.0 *2*	4578.9?	(5/2$^-$)	1091.0?	(3/2$^-$)		
x3701.9 *5*	6.0 *12*						Additional information 10.
x3761.9 *5*	6.0 *12*						
x3888.2 *5*	2.0 *4*						
x3914.7 *5*	3.0 *6*						Additional information 11.

Continued on next page (footnotes at end of table)

^{129}Cd β^- decay:mixed 2009Ar04 (continued)

$\gamma(^{129}In)$ (continued)

E_γ [†]	I_γ [†]	E_i(level)	J_i^π	E_f	J_f^π	Comments
[x]3967.5 *5*	4.0 *8*					Additional information 12.
4119.9 *5*	2.0 *4*	4578.9?	(5/2$^-$)	459	(1/2$^-$)	

[†] From 2009Ar04. The energy uncertainty is quoted by 2009Ar04 as ≈0.5 keV. Intensity uncertainty is 10% for strong peaks and 20% for weak lines. Evaluators assign 10% for Iγ≥10 and 20% for for Iγ<10.
[‡] From Adopted Gammas.
[#] Placement proposed by 2013Ka08 based on a difference of 458 keV between some of the unplaced γ rays in 2009Ar04. This placement is treated as tentative by the evaluators.
[@] Tentative placement by 2009Ar04 is either no longer valid or revised in view of Adopted E(level)=459 *5* for (1/2$^-$) β^- decaying isomer.
[&] A doublet from 2003DiZY only, not listed by 2009Ar04. Intensity is not available.
[a] Placement of transition in the level scheme is uncertain.
[x] γ ray not placed in level scheme.

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Decay Scheme

Intensities: Relative I_γ

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)