

Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jun Chen	NDS 174, 1 (2021)	15-Apr-2021

Q(β^-)=6015 20; S(n)=4873 4; S(p)=13600 40; Q(α)=-8432 9 2021Wa16
 S(2n)=12483 3, S(2p)=25810 4 (2021Wa16).

Other measurements:

Mass measurements: 2013Ka08 (isomer, JYFLTRAP), 2012Ha25 (g.s., JYFLTRAP), 2010Br02 (g.s.+isomer unresolved, ISOLTRAP).

Hyperfine structure: 2018Ha30, 2017Ne04, 2016Yo01, 2013Yo02.

Additional information 1.

Structure calculations: 2015Le08, 2015Mi16, 2014Zh02, 2007Na28, 2003Bo06, 1981Al25.

¹²⁴Ag decays by delayed neutrons to ¹²³Cd (1983Re05).

The sequences of high-spin states based on the 11/2⁽⁻⁾ isomer from 2002Hw01 via ²⁵²Cf SF decay and from 2016Re05 via ⁹Be(²³⁸U,X γ) are completely different in level and gamma energies. The evaluator has adopted the data from 2016Re05, which are more complete and have more convincing particle identification with γ rays tagged by both A and Z.

¹²³Cd Levels

Cross Reference (XREF) Flags

- A ¹²³Ag β^- decay
- B ²⁵²Cf SF decay
- C ⁹Be(²³⁸U,X γ)

E(level) [†]	J π	T _{1/2}	XREF	Comments
0.0	3/2 ⁽⁺⁾	2.10 s 3	A	% β^- =100 μ =+0.7896 6; Q=+0.042 5 (2013Yo02) J π : spin=3/2 from collinear laser spectroscopy in 2013Yo02 and 2018Ha30; systematics of odd Cd isotopes indicates 1/2 ⁺ or 3/2 ⁺ ; parity also supported by possible allowed β feeding (log ft=5.5) to parity=(+) state at 1052 in ¹²³ In. T _{1/2} : weighted average of 2.07 s 3 (1983Re05), 2.19 s 10 (1986Go10), 2.11 s 6 (1986Ma42) and 2.12 s 3 (1989Hu03). Other: 2.35 s 5 (2014TeZY) is in disagreement. μ ,Q: from collinear laser spectroscopy in 2013Yo02. See also 2014StZZ and 2016St14 compilations. $\delta\langle r^2 \rangle = -0.028$ mb 3(stat) 2(syst), or -0.042 mb 13(stat) 3(syst), for difference between the (11/2 ⁻) state and the g.s. (2016Yo01). $\delta\langle r^2 \rangle = 0.457$ fm ² 6(uncorrelated) 67(correlated), with respect to ¹¹⁴ Cd (2018Ha30). J π : systematics of odd-A Cd isotopes proposed by 1989Hu10 in ¹²³ Ag β^- decay.
116.40 3	(1/2 ⁺)		A	
144# 4	11/2 ⁽⁻⁾ ‡	1.80 s 3	ABC	% β^- =100 μ =-1.0015 3; Q=+0.135 7 (2013Yo02) E(level): from the direct mass measurement by 2013Ka08. Other: an energy of 316 keV proposed by 1989Hu10 in ¹²³ Ag β^- decay from γ -cascade relations. See detailed comments in that dataset for the position of this isomer. J π : spin=11/2 from collinear laser spectroscopy in 2013Yo02; 11/2 ⁻ from systematics of h _{11/2} states in odd-A Cd isotopes. T _{1/2} : weighted average of 1.81 s 3 (1989Hu03) and 1.88 s 6 (1986Ma42), and 1.74 s 4 (2014TeZY). μ ,Q: from collinear laser spectroscopy in 2013Yo02. See also the 2014StZZ and 2016St14 compilations.
263.867 20	(7/2 ⁺)	80 ns 15	A	J π : possible allowed β feeding (log ft=5.1) from (7/2 ⁺); 263.9 γ to 3/2 ⁽⁺⁾ ; possible 123.7 γ to 11/2 ⁽⁻⁾ . T _{1/2} : from $\gamma\gamma$ (t) (1989Hu10) in ¹²³ Ag β^- decay.

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Adopted Levels, Gammas (continued)

^{123}Cd Levels (continued)

E(level) [†]	J ^π	XREF	Comments
409.76 3	(5/2 ⁺ ,7/2 ⁺)	A	J ^π : possible allowed β feeding (log ft=5.6) from (7/2 ⁺); 409.8γ to (3/2 ⁺).
463.78 7	(5/2 ⁺)	A	J ^π : possible β feeding (log ft=6.0) from (7/2 ⁺); 347.4γ to (1/2 ⁺).
514.65 5	(9/2 ⁺)	A	J ^π : possible allowed β feeding (log ft=5.7) from (7/2 ⁺); 374.0γ to 11/2 ⁽⁻⁾ .
553.72 15	(5/2 ⁺)	A	J ^π : possible β feeding (log ft=6.1) from (7/2 ⁺); 437.5γ to (1/2 ⁺).
591.29 5	(5/2 ⁺ ,7/2 ⁺)	A	J ^π : possible allowed β feeding (log ft=5.7) from (7/2 ⁺); 591.3γ to 3/2 ⁽⁺⁾ .
672.44 12	(5/2 ⁺)	A	J ^π : possible β feeding (log ft=6.1) from (7/2 ⁺); 556.1γ to (1/2 ⁺).
704.92 11	(5/2,7/2,9/2)	A	J ^π : possible β feeding (log ft=6.0) from (7/2 ⁺); 441.1γ to (7/2 ⁺).
743.73 5	(5/2 ⁺ ,7/2 ⁺)	A	J ^π : possible allowed β feeding (log ft=5.7) from (7/2 ⁺); 743.4γ to 3/2 ⁽⁺⁾ .
806.7 [#] 10	(15/2 ⁻) [‡]	C	
829.75 20	(9/2 ⁺)	A	J ^π : possible allowed β feeding (log ft=5.8) from (7/2 ⁺); 689.1γ to 11/2 ⁽⁻⁾ .
885.2 3	(5/2,7/2,9/2)	A	J ^π : possible β feeding (log ft=6.0) from (7/2 ⁺); 621.3γ to (7/2 ⁺).
1010.08 16	(5/2,7/2,9/2)	A	J ^π : possible β feeding (log ft=6.0) from (7/2 ⁺); 600.3γ to (7/2 ⁺).
1061.44 9	(5/2,7/2,9/2)	A	J ^π : possible β feeding (log ft=6.3) from (7/2 ⁺).
1528.86 14	(5/2 ⁺ ,7/2 ⁺)	A	J ^π : possible allowed β feeding (log ft=5.5) from (7/2 ⁺); 1528.2γ to 3/2 ⁽⁺⁾ .
1607.7 [#] 15	(19/2 ⁻) [‡]	C	
2239.88 20	(5/2 ⁺ ,7/2 ⁺ ,9/2 ⁺)	A	J ^π : possible allowed β feeding (log ft=5.4) from (7/2 ⁺).
2377.7 [#] 18	(23/2 ⁻) [‡]	C	
2601.0 3	(5/2 ⁺ ,7/2 ⁺ ,9/2 ⁺)	A	J ^π : possible allowed β feeding (log ft=5.6) from (7/2 ⁺).
2615.7 [#] 20	(25/2 ⁻) [‡]	C	
2787.37 18	(5/2 ⁺ ,7/2 ⁺ ,9/2 ⁺)	A	J ^π : possible allowed β feeding (log ft=5.4) from (7/2 ⁺).
2812.7 [#] 23	(27/2 ⁻) [‡]	C	
2902.42 22	(5/2 ⁺ ,7/2 ⁺)	A	J ^π : possible allowed β feeding (log ft=5.2) from (7/2 ⁺); 2902.7γ to 3/2 ⁽⁺⁾ .
2910.22 24	(5/2 ⁺ ,7/2 ⁺)	A	J ^π : possible allowed β feeding (log ft=5.5) from (7/2 ⁺); 2909.5γ to 3/2 ⁽⁺⁾ .
2968.7 [#] 25	(29/2 ⁻) [‡]	C	

[†] From a least-squares fit to γ-ray energies.

[‡] From γ-decay pattern and shell-model predictions.

[#] Seq.(A): Sequence based on 11/2⁽⁻⁾.

γ(^{123}Cd)

E _i (level)	J _i ^π	E _γ [‡]	I _γ [‡]	E _f	J _f ^π	Mult.	α [†]	Comments
116.40	(1/2 ⁺)	116.41 3	100	0.0	3/2 ⁽⁺⁾	[M1,E2]	0.6 3	α(K)=0.47 2I; α(L)=0.10 7; α(M)=0.019 13 α(N)=0.0032 2I; α(O)=0.00010 4
263.867	(7/2 ⁺)	123.67 [@] 6	16.0 10	144	11/2 ⁽⁻⁾	[M2]	2.19	α(K)=1.81 3; α(L)=0.305 5; α(M)=0.0604 9 α(N)=0.01068 15; α(O)=0.000545 8 E _γ ,Mult.: the placements of 123.67γ and 263.87γ from the same level are proposed by 2013Ka08, with the 123.67γ feeding the 11/2 ⁻ isomer at 144 keV 4 from their direct mass measurement. However, such placement of 123.67γ results in J ^π =(7/2 ⁺), thus Mult=[M2], and consequently an unreasonably large B(M2)(W.u.)=56 ¹⁷⁻¹¹ greatly exceeding RUL=1. This γ is placed from a 440, (9/2 ⁻) level to feed the 11/2 ⁻ isomer at E=316 keV proposed in 1989Hu10. It could also be implied that the 123.67γ could de-excite a different level with a very close

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Adopted Levels, Gammas (continued)

$\gamma(^{123}\text{Cd})$ (continued)								
$E_i(\text{level})$	J_i^π	E_γ^\ddagger	I_γ^\ddagger	E_f	J_f^π	Mult.	α^\dagger	Comments
263.867	(7/2 ⁺)	263.87 2	100.0 8	0.0	3/2 ⁽⁺⁾	[E2]	0.0498	energy. It is the evaluator's opinion that the further investigation is needed to firmly make the placement of the 123.67 γ and the level scheme as well. B(E2)(W.u.)=0.098 +26-18 $\alpha(\text{K})=0.0419$ 6; $\alpha(\text{L})=0.00638$ 9; $\alpha(\text{M})=0.001240$ 18 $\alpha(\text{N})=0.000214$ 3; $\alpha(\text{O})=8.99\times 10^{-6}$ 13
409.76	(5/2 ⁺ , 7/2 ⁺)	409.79 3	100	0.0	3/2 ⁽⁺⁾			
463.78	(5/2 ⁺)	347.38 6	100	116.40	(1/2 ⁺)			
514.65	(9/2 ⁺)	250.78 5	40 3	263.867	(7/2 ⁺)			
		374.00 10	100 4	144	11/2 ⁽⁻⁾			
553.72	(5/2 ⁺)	437.54 20	100 12	116.40	(1/2 ⁺)			
		553.50 20	50 11	0.0	3/2 ⁽⁺⁾			
591.29	(5/2 ⁺ , 7/2 ⁺)	591.30 5	100	0.0	3/2 ⁽⁺⁾			
672.44	(5/2 ⁺)	556.10 20	100 17	116.40	(1/2 ⁺)			
		672.40 15	50 10	0.0	3/2 ⁽⁺⁾			
704.92	(5/2, 7/2, 9/2)	441.05 10	100	263.867	(7/2 ⁺)			
743.73	(5/2 ⁺ , 7/2 ⁺)	334.05 5	29 7	409.76	(5/2 ⁺ , 7/2 ⁺)			
		743.40 10	100 8	0.0	3/2 ⁽⁺⁾			
806.7	(15/2 ⁻)	666 [#] 1	100	144	11/2 ⁽⁻⁾			
829.75	(9/2 ⁺)	689.10 15	100	144	11/2 ⁽⁻⁾			
885.2	(5/2, 7/2, 9/2)	621.3 3	100	263.867	(7/2 ⁺)			
1010.08	(5/2, 7/2, 9/2)	600.31 15	100	409.76	(5/2 ⁺ , 7/2 ⁺)			
1061.44	(5/2, 7/2, 9/2)	470.19 10	88 28	591.29	(5/2 ⁺ , 7/2 ⁺)			
		651.58 15	100 24	409.76	(5/2 ⁺ , 7/2 ⁺)			
1528.86	(5/2 ⁺ , 7/2 ⁺)	1265.15 15	100 12	263.867	(7/2 ⁺)			
		1528.2 3	85 12	0.0	3/2 ⁽⁺⁾			
1607.7	(19/2 ⁻)	801 [#] 1	100	806.7	(15/2 ⁻)			
2239.88	(5/2 ⁺ , 7/2 ⁺ , 9/2 ⁺)	1976.00 20	100	263.867	(7/2 ⁺)			
2377.7	(23/2 ⁻)	770 [#] 1	100	1607.7	(19/2 ⁻)			
2601.0	(5/2 ⁺ , 7/2 ⁺ , 9/2 ⁺)	2337.10 25	100	263.867	(7/2 ⁺)			
2615.7	(25/2 ⁻)	238 [#] 1		2377.7	(23/2 ⁻)			
2787.37	(5/2 ⁺ , 7/2 ⁺ , 9/2 ⁺)	1725.90 20	100 22	1061.44	(5/2, 7/2, 9/2)			
		2523.5 3	83 22	263.867	(7/2 ⁺)			
2812.7	(27/2 ⁻)	197 [#] 1		2615.7	(25/2 ⁻)			
2902.42	(5/2 ⁺ , 7/2 ⁺)	2638.40 25	100 21	263.867	(7/2 ⁺)			
		2902.7 4	44 14	0.0	3/2 ⁽⁺⁾			
2910.22	(5/2 ⁺ , 7/2 ⁺)	2646.7 3	100 27	263.867	(7/2 ⁺)			
		2909.5 4	57 14	0.0	3/2 ⁽⁺⁾			
2968.7	(29/2 ⁻)	156 [#] 1		2812.7	(27/2 ⁻)			

[†] Additional information 2.

[‡] From ^{123}Ag β^- decay, unless noted otherwise.

[#] From $^9\text{Be}(^{238}\text{U}, X\gamma)$.

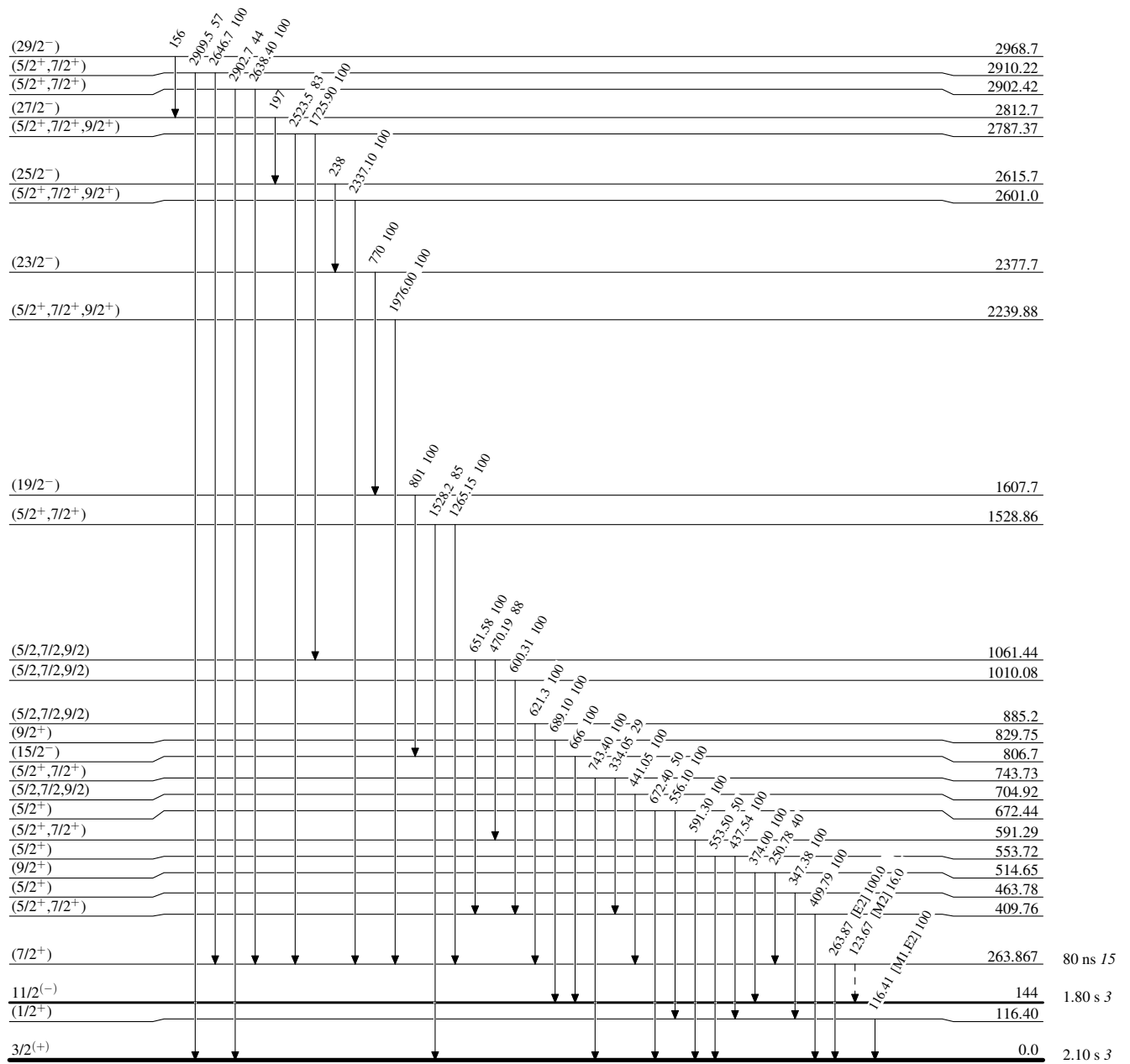
[@] Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

Legend

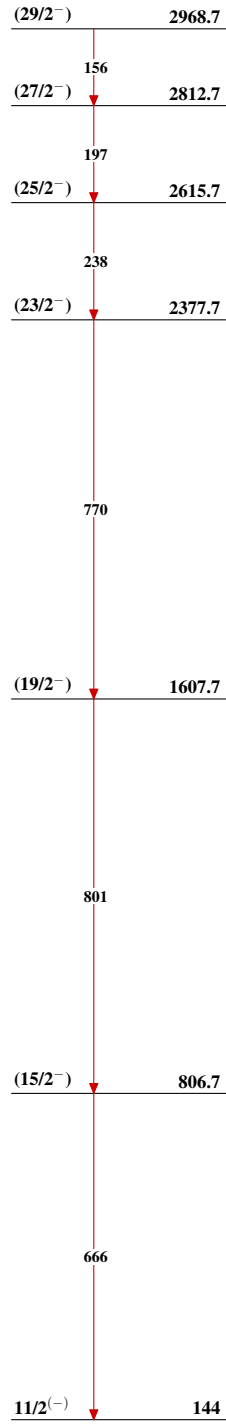
Level Scheme

Intensities: Relative photon branching from each level

-----▶ γ Decay (Uncertain) $^{123}_{48}\text{Cd}_{75}$

Adopted Levels, Gammas

Seq.(A): Sequence based
on $11/2^{(-)}$

 $^{123}_{48}\text{Cd}_{75}$