^{116}Ag β^- decay (20 s) 2009Ba52,2005Ba94

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Jean Blachot	NDS 111, 717 (2010)	1-Dec-2009

Parent: ^{116}Ag: E=47.9 *1*; J$^\pi$=(3$^+$); $T_{1/2}$=20 s *1*; Q(β^-)=6176 *4*; %β^- decay=93 *4*

^{116}Ag-E,J$^\pi$,$T_{1/2}$: From 2005Ba94. This isomer decays ≈7 *4* % by an isomeric E3 transition of 47.9 keV to g.s., (0$^-$) of ^{116}Ag. Likely configuration=π1/2[301]⊗ν7/2[523].

^{116}Ag-Q(β^-): From 2009AuZZ.

^{116}Ag-%β^- decay: %IT=7 *4* from 2005Ba94.

2009Ba52: ^{116}Ag activity was produced by the 40-MeV protons bombarding a $^{238}UC_x$ target installed at the On-Line Test Facility (oltf) at the Holifield Radioactive Ion Beam Facility (hribf). Fission products was separated and deposited on a moving tape collector (mtc).

Measured Eγ, Iγ, $\gamma\gamma$, conversion electron-γ with the (cards) detector array, composed of the three segmented-clover Ge detectors, plastic scintillators and a high-resolution Si conversion-electron spectrometer (besca).

Transitions arising from the respective short-lived isomers were separated by their half-lives.

The γ-γ and conversion electron-γ coincidences were used to construct the decay scheme in ^{116}Cd after the β decay of the isomer 20 s ^{116}Ag.

^{116}Cd Levels

E(level)†	J$^\pi$‡	Comments
0.0	0$^+$	
513.50 *7*	2$^+$	
1213.11 *7*	2$^+$	
1219.48 *9*	4$^+$	
1642.60 *10*	2$^+$	
1869.78 *14*	4$^+$	
1915.99 *10*	3$^+$	
1921.68 *10*	3$^-$	
1951.41 *8*	2$^+$	
2302.98 *22*		
2340.11 *12*	(4$^-$)	J$^\pi$: 4$^-$ in figure 5 and Table I of 2009Ba52; but this assignment is inconsistent with multipolarities assigned to 418 and 424 γ rays.
2377.31 *18*		J$^\pi$: (3$^+$) in figure 5; not listed in Table I of 2009Ba52.
2392.14 *22*	(3$^-$)	J$^\pi$: from table iv of 2009Ba52 and discussion in text; 2$^+$ in figure 5, not listed in Table I of 2009Ba52.
2493.69 *22*		
2518.38 *9*	(2$^-$)	J$^\pi$: J=2$^-$ in Table I of 2009Ba52. Compilers′ note: there seems problem with the inventory of γ rays from this level as listed in table I of 2009Ba52. Strong transitions as seen in the decay of the ground state are not listed here. It is not clear how the β feeding of 2.2 has been obtained.
2784.2 *3*		
2822.42 *14*		
2844.0 *3*		
2915.41 *22*		
3124.7 *3*		
3228.06 *16*		
3294.41 *16*		
3303.2 *3*		
3304.18 *18*		
3354.90 *20*		

† From least-squares fit to Eγ′s.

‡ From Table iv of 2009Ba52.

^{116}Ag β^- decay (20 s) 2009Ba52,2005Ba94 (continued)

β^- radiations

E(decay)	E(level)	Iβ^- [‡]	Log *ft* [†]	Comments
(2869 *4*)	3354.90	21 *2*	5.21 *5*	av Eβ=1188.1 *19*
(2920 *4*)	3304.18	8.5 *5*	5.64 *4*	av Eβ=1211.8 *19*
(2921 *4*)	3303.2	3.0 *3*	6.09 *5*	av Eβ=1212.2 *19*
(2929 *4*)	3294.41	20 *1*	5.27 *3*	av Eβ=1216.4 *19*
(2996 *4*)	3228.06	3.5 *5*	6.07 *7*	av Eβ=1247.4 *19*
(3099 *4*)	3124.7	1.6 *4*	6.47 *11*	av Eβ=1295.9 *19*
(3308 *4*)	2915.41	0.6 *2*	7.02 *15*	av Eβ=1394.3 *19*
(3380 *4*)	2844.0	5.2 *5*	6.12 *5*	av Eβ=1427.9 *19*
(3401 *4*)	2822.42	10.5 *8*	5.83 *4*	av Eβ=1438.1 *19*
(3440 *4*)	2784.2	1.0 *5*	6.87 *22*	av Eβ=1456.1 *19*
(3706 *4*)	2518.38	2.2 *9*	6.66 *18*	av Eβ=1581.6 *19*
(3730 *4*)	2493.69	0.4 *2*	7.42 *22*	av Eβ=1593.3 *19*
(3832 *4*)	2392.14	1.8 *2*	6.81 *6*	av Eβ=1641.3 *19*
(3847 *4*)	2377.31	2.8 *4*	6.63 *7*	av Eβ=1648.4 *19*
(3884 *4*)	2340.11	1.3 *1*	6.98 *4*	av Eβ=1666.0 *19*
(3921 *4*)	2302.98	0.36 *17*	7.56 *21*	av Eβ=1683.5 *19*
(4272 *4*)	1951.41	2.1 *6*	6.95 *13*	av Eβ=1850.2 *19*
(4302 *4*)	1921.68	4.8 *5*	6.61 *5*	av Eβ=1864.3 *19*
(4308 *4*)	1915.99	5.2 *5*	6.57 *5*	av Eβ=1867.0 *19*
(4354 *4*)	1869.78	2.6 *17*	6.9 *3*	av Eβ=1889.0 *19*
(4581 *4*)	1642.60	1.1 *2*	7.37 *9*	av Eβ=1996.9 *19*

[†] The values are nearly the same as in Table iv of 2009Ba52, the authors state that log *ft* values should be considered as lower limits, especially, for weak β feedings, due to “pandemonium” effect.
[‡] Absolute intensity per 100 decays.

γ(^{116}Cd)

Unplaced γ rays are from the decay of 20-s or the 9.3-s isomer.

E_γ	I_γ [†&]	E_i(level)	J^π_i	E_f	J^π_f	Mult.	α [a]	Comments
^{x}152.8 *3*	0.06 *1*							
^{x}198.7 *3*	0.21 *4*							
^{x}204.2 *3*	0.14 *3*							
^{x}315.1 *3*	0.11 *2*							
^{x}374.3 *3*	0.04 *3*							
418.3 *3*	0.03[‡] *1*	2340.11	(4$^-$)	1921.68	3$^-$			Mult.: E1 proposed by 2009Ba52 based on K/L ratio is inconsistent with ΔJ^π.
423.1 *2*	0.012 *5*	1642.60	2$^+$	1219.48	4$^+$			
423.9 *2*	0.14 *2*	2340.11	(4$^-$)	1915.99	3$^+$			α(K)exp=7×10^{-3} *3* Mult.: M1 proposed by 2009Ba52 is inconsistent with ΔJ^π. α(K)exp=8×10^{-3} *2* is also listed in the text on page 9 of 2009Ba52.
470.5 *3*	0.04[@] *3*	2392.14	(3$^-$)	1921.68	3$^-$			
513.5 *1*	36[‡] *3*	513.50	2$^+$	0.0	0$^+$	E2	0.00617 *9*	α(K)exp=5.3×10^{-3} *1* α(K)=0.00532 *8*; α(L)=0.000693 *10*; α(M)=0.0001335 *19*; α(N)=2.35×10^{-5} *4* α(O)=1.210×10^{-6} *17*; α(N+..)=2.47×10^{-5} *4* α(K)exp: Uncertainty of 0.00001 in Table I of

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^{116}Ag β^- decay (20 s) 2009Ba52,2005Ba94 (continued)

γ(^{116}Cd) (continued)

E_γ	I_γ[†&]	E_i(level)	J^π_i	E_f	J^π_f	Mult.	α[a]	Comments
								2009Ba52 seems unrealistic, the compilers have increased the uncertainty by a factor of 10.
[x]552.1 *3*	0.03 *1*							
567.0 *2*	0.16[@] *3*	2518.38	(2⁻)	1951.41	2⁺			
596.6 *3*	0.15[@] *3*	2518.38	(2⁻)	1921.68	3⁻			
602.7 *2*	0.20[@] *6*	2518.38	(2⁻)	1915.99	3⁺			
650.2 *2*	0.31 *2*	1869.78	4⁺	1219.48	4⁺	M1,E2	0.00340 *17*	α(K)exp=2.9×10^{-3} *4* α(K)=0.00295 *16*; α(L)=0.000361 *10*; α(M)=6.92×10^{-5} *18*; α(N)=1.23×10^{-5} *4*; α(O)=6.9×10^{-7} *5* α(N+..)=1.30×10^{-5} *4*
656.7 *2*	0.65 *5*	1869.78	4⁺	1213.11	2⁺	M1,E2	0.00331 *17*	α(K)exp=3.0×10^{-3} *3* α(K)=0.00288 *16*; α(L)=0.000352 *10*; α(M)=6.75×10^{-5} *18*; α(N)=1.20×10^{-5} *4*; α(O)=6.8×10^{-7} *5* α(N+..)=1.27×10^{-5} *5*
[x]689.0 *3*	0.05 *1*							
696.5 *2*	0.46 *3*	1915.99	3⁺	1219.48	4⁺			
699.6 *2*	8.5 *6*	1213.11	2⁺	513.50	2⁺	M1,E2	0.00284 *17*	α(K)exp=2.4×10^{-3} *4* α(K)=0.00247 *16*; α(L)=0.000300 *11*; α(M)=5.75×10^{-5} *21*; α(N)=1.02×10^{-5} *4*; α(O)=5.8×10^{-7} *5* α(N+..)=1.08×10^{-5} *5*
702.9 *3*	1.0[#] *1*	1915.99	3⁺	1213.11	2⁺			
706.0 *1*	10 *1*	1219.48	4⁺	513.50	2⁺	E2	0.00261 *4*	α(K)exp=2.2×10^{-3} *2* α(K)=0.00227 *4*; α(L)=0.000283 *4*; α(M)=5.43×10^{-5} *8*; α(N)=9.61×10^{-6} *14*; α(O)=5.24×10^{-7} *8* α(N+..)=1.013×10^{-5} *15*
708.6 *2*	0.8[#] *2*	1921.68	3⁻	1213.11	2⁺			
[x]738.7 *3*	0.02 *1*							
[x]754.0 *3*	0.07 *2*							
[x]784.8 *3*	0.07 *3*							
[x]862.4 *5*	0.2 *1*							
[x]873.9 *3*	0.07 *1*							
[x]896.5 *3*	0.14 *7*							
901.0 *2*	0.45 *6*	2822.42		1921.68	3⁻			
[x]930.0 *3*	0.014 *10*							
[x]953.6 *3*	0.03 *2*							
[x]977.3 *3*	0.03 *1*							
1083.5 *2*	0.15 *1*	2302.98		1219.48	4⁺			
1120.7 *1*	0.34 *3*	2340.11	(4⁻)	1219.48	4⁺			
1129.1 *1*	0.22 *2*	1642.60	2⁺	513.50	2⁺			
1157.8 *3*	0.8 *2*	2377.31		1219.48	4⁺			
1164.1 *3*	0.16[‡] *3*	2377.31		1213.11	2⁺			
1179.0 *4*	0.18[‡] *2*	2392.14	(3⁻)	1213.11	2⁺			
[x]1180.6 *4*	0.03 *1*							
1213.1 *1*	4.2 *3*	1213.11	2⁺	0.0	0⁺			
[x]1250.5 *4*	0.03 *1*							
[x]1269.5 *5*	0.014 *9*							
1274.2 *2*	0.18[#] *5*	2493.69		1219.48	4⁺			
1356.4 *3*	0.11 *2*	1869.78	4⁺	513.50	2⁺			

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^{116}Ag β^- decay (20 s) 2009Ba52,2005Ba94 (continued)

$\gamma(^{116}Cd)$ (continued)

E_γ	I_γ[†&]	E_i(level)	J^π_i	E_f	J^π_f
1378.4 *3*	0.7[‡] *1*	3294.41		1915.99	3^+
1381.5 *3*	1.3 *1*	3303.2		1921.68	3^-
1402.5 *1*	1.4 *2*	1915.99	3^+	513.50	2^+
1408.2 *1*	2.8 *2*	1921.68	3^-	513.50	2^+
[x]1422.2 *5*	0.02 *1*				
1437.9 *1*	0.8 *2*	1951.41	2^+	513.50	2^+
[x]1517.2 *3*	0.13 *3*				
[x]1549.5 *5*	0.03 *1*				
1603.0 *3*	1.5 *2*	2822.42		1219.48	4^+
1609.3 *5*	0.7 *1*	2822.42		1213.11	2^+
[x]1630.9 *5*	0.008 *6*				
1642.6 *2*	0.15 *2*	1642.60	2^+	0.0	0^+
[x]1676.8 *4*	0.04 *1*				
1696.0 *3*	0.23 *3*	2915.41		1219.48	4^+
1702.2 *3*	0.23[‡] *3*	2915.41		1213.11	2^+
[x]1858.2 *4*	0.04 *1*				
1863.9 *3*	0.36[‡] *7*	2377.31		513.50	2^+
1878.6 *4*	0.52 *7*	2392.14	(3^-)	513.50	2^+
1911.6 *3*	0.7 *1*	3124.7		1213.11	2^+
[x]1918.0 *5*	0.02 *1*				
[x]1922.4 *5*	0.03 *1*				
1951.4 *1*	0.13 *3*	1951.41	2^+	0.0	0^+
2008.4 *2*	1.0[#] *2*	3228.06		1219.48	4^+
[x]2012.8 *5*	0.04 *1*				
2015.1 *2*	0.39[#] *7*	3228.06		1213.11	2^+
2075.0 *4*	1.1[#] *2*	3294.41		1219.48	4^+
2081.5 *4*	4.4[#] *4*	3294.41		1213.11	2^+
2084.7 *2*	2.1[#] *2*	3304.18		1219.48	4^+
2091.0 *3*	1.3 *2*	3304.18		1213.11	2^+
2135.4 *2*	1.4 *2*	3354.90		1219.48	4^+
2270.7 *3*	0.4 *2*	2784.2		513.50	2^+
2308.6 *2*	1.5 *2*	2822.42		513.50	2^+
2330.6 *3*	1.3 *2*	2844.0		513.50	2^+
2780.8 *2*	2.0[#] *2*	3294.41		513.50	2^+
2841.4 *5*	6.8 *8*	3354.90		513.50	2^+
2843.8 *5*	0.7 *1*	2844.0		0.0	0^+

[†] From singles γ and $\gamma\gamma$ coin spectra, unless otherwise stated.
[‡] From γ singles spectra.
[#] From $\gamma\gamma$ coincidence spectra.
[@] From $^{116}Ag_{gs}$ decay data.
[&] For absolute intensity per 100 decays, multiply by ≈2.6.
[a] 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.
[x] γ ray not placed in level scheme.

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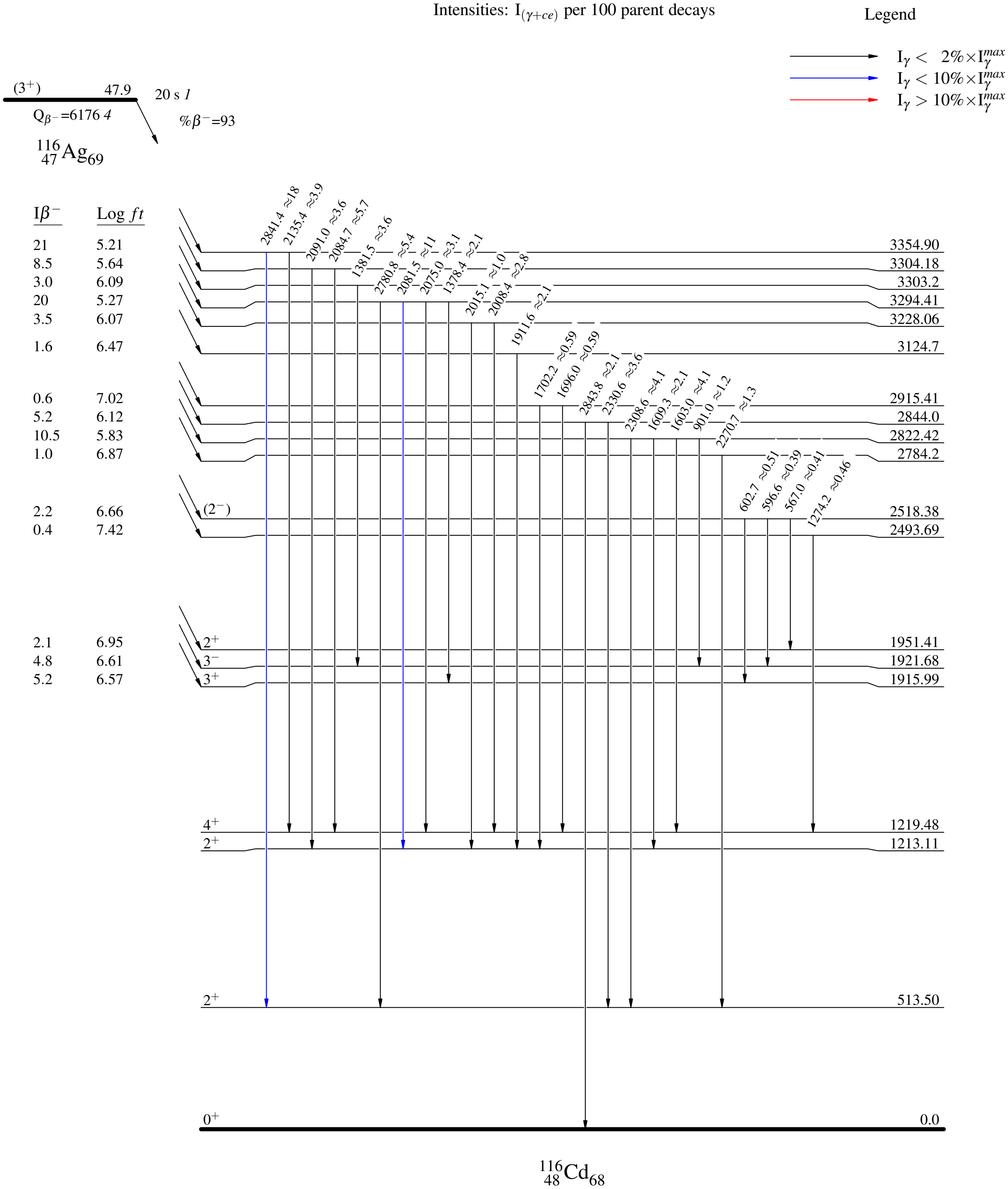
Decay Scheme

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays



^{116}Ag β^- decay (20 s) 2009Ba52,2005Ba94

Decay Scheme (continued)

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays