^{145}Ba β^- decay 1978Pf02,1997Gr09

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	E. Browne, J. K. Tuli	NDS 110, 507 (2009)	1-Oct-2008

Parent: ^{145}Ba: E=0.0; J$^\pi$=5/2$^-$; T$_{1/2}$=4.31 s *16*; Q(β^-)=4923 *65*; %β^- decay=100.0
1982ChZV.
Additional information 1.
Measured: γ, $\gamma\gamma$, γ(t), ce, β, $\beta\gamma$ (1978Pf02), γ, $\gamma\gamma$ (1982ChZV). Others: 1969WiZX, 1970OsZZ, 1971Ho29.
A deduced (using RADLST) average radiation energy of 5198 keV *73* from this decay scheme, is in fair agreement with a Q(β^-)value of 4923 keV *65* from the latest atomic mass adjustment (2003Au03). This agreement suggests the decay scheme is reasonably complete. In addition, this decay scheme is consistent with a total β^- average energy of 1277 keV, a neutrino average energy of 1820 keV, and an average γ-ray energy of 2071 keV. That is, most of the radiation energy is carried by γ rays and neutrinos.

^{145}La Levels

Except for the 2566.4-keV level, all levels above 1177 keV are pseudolevels, deduced from total γ-ray absorption spectrometer measurements.

E(level)	J$^\pi$†	T$_{1/2}$	E(level)	E(level)
0.0	(5/2$^+$)	24.8 s *20*	973.6	2566.4
65.9 *2*	(7/2$^+$)		1033.5?	2600‡
96.6 *2*	($^+$)		1176.8?	2700‡
189.0 *2*	($^+$)		1300‡	2800‡
237.9 *2*	(9/2$^+$)		1400‡	2900‡
351.5 *3*	($^+$)		1500‡	3000‡
475.3 *3*			1600‡	3100‡
492.2			1700‡	3200‡
514.2			1800‡	3300‡
544.0 *3*			2000‡	3400‡
598.9 *2*			2100‡	3500‡
637.5?			2200‡	3600‡
734.0 *2*			2300‡	3700‡
827.0?			2400‡	3800‡
922.4? *5*	(5/2$^+$,7/2)		2500‡	3900‡

† The ^{145}La levels: 0, 96.6, 189.0, 351.5 and probably 65.9 are interconnected by M1,E2 transitions and therefore have the same parity.
‡ "Pseudo level" from total γ-ray absorption spectrometer measurements (1997Gr09).

β^- radiations

Eβ^-=4855 *170*, 4570 *200*, 4500 *200*, 4230 *170* from $\beta\gamma$; Eβ^-=4920 *120* (single β^-spectrum) (1978Pf02).
β^- feedings to the various pseudolevels are from total absorption γ-ray spectrometer measurements (1997Gr09, 1996Gr20).

E(decay)	E(level)	Iβ^-†	Log *ft*	Comments
(1.02×10^3 *7*)	3900	0.161	5.0	av Eβ=353 *27*
(1.12×10^3 *7*)	3800	0.32	4.9	av Eβ=394 *27*
(1.22×10^3 *7*)	3700	0.65	4.7	av Eβ=435 *28*

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^{145}Ba β^- decay 1978Pf02,1997Gr09 (continued)

β^- radiations (continued)

E(decay)	E(level)	Iβ^-†	Log *ft*	Comments
(1.32×10^3 *7*)	3600	0.86	4.7	av Eβ=478 *28*
(1.42×10^3 *7*)	3500	1.08	4.8	av Eβ=520 *28*
(1.52×10^3 *7*)	3400	1.18	4.8	av Eβ=563 *29*
(1.62×10^3 *7*)	3300	1.61	4.8	av Eβ=607 *29*
(1.72×10^3 *7*)	3200	2.15	4.8	av Eβ=651 *29*
(1.82×10^3 *7*)	3100	2.58	4.8	av Eβ=695 *29*
(1.92×10^3 *7*)	3000	3.01	4.8	av Eβ=740 *29*
(2.02×10^3 *7*)	2900	3.98	4.8	av Eβ=784 *30*
(2.12×10^3 *7*)	2800	5.38	4.7	av Eβ=829 *30*
(2.22×10^3 *7*)	2700	5.38	4.8	av Eβ=874 *30*
(2.32×10^3 *7*)	2600	6.24	4.8	av Eβ=920 *30*
(2.36×10^3 *7*)	2566.4	0.8	5.8	av Eβ=935 *30*
(2.42×10^3 *7*)	2500	8.07	4.8	av Eβ=965 *30*
(2.52×10^3 *7*)	2400	2.15	5.4	av Eβ=1011 *30*
(2.62×10^3 *7*)	2300	1.40	5.7	av Eβ=1057 *30*
(2.72×10^3 *7*)	2200	1.40	5.8	av Eβ=1102 *30*
(2.82×10^3 *7*)	2100	4.30	5.3	av Eβ=1148 *30*
(2.92×10^3 *7*)	2000	7.53	5.2	av Eβ=1194 *30*
(3.12×10^3 *7*)	1800	0.54	6.4	av Eβ=1287 *30*
(3.22×10^3 *7*)	1700	1.61	6.0	av Eβ=1333 *31*
(3.32×10^3 *7*)	1600	2.69	5.8	av Eβ=1380 *31*
(3.42×10^3 *7*)	1500	1.35	6.2	av Eβ=1426 *31*
(3.52×10^3 *7*)	1400	0.81	6.5	av Eβ=1472 *31*
(3.62×10^3 *7*)	1300	0.38	6.9	av Eβ=1519 *31*
(3.75×10^3 *7*)	1176.8?	1.83	6.2	av Eβ=1576 *31*
(3.89×10^3 *7*)	1033.5?	0.17	7.3	av Eβ=1643 *31*
(3.95×10^3 *7*)	973.6	0.22	7.3	av Eβ=1671 *31*
(4.10×10^3 *7*)	827.0?	1.02	6.7	av Eβ=1740 *31*
4.23×10^3	734.0	0.54	7.0	av Eβ=1783 *31*
(4.29×10^3 *7*)	637.5?	1.02	6.7	av Eβ=1828 *31*
(4.32×10^3 *7*)	598.9	1.89	6.5	av Eβ=1846 *31*
(4.38×10^3 *7*)	544.0	1.94	6.5	av Eβ=1872 *31*
(4.41×10^3 *7*)	514.2	4.84	6.1	av Eβ=1886 *31*
(4.43×10^3 *7*)	492.2	0.51	7.1	av Eβ=1896 *31*
4.5×10^3 *2*	475.3	0.84	6.9	av Eβ=1904 *31*
(4.57×10^3 *7*)	351.5	3.4	6.3	av Eβ=1962 *31*
(4.69×10^3 *7*)	237.9	0.65	7.1	av Eβ=2015 *31*
(4.73×10^3 *7*)	189.0	2.2	6.6	av Eβ=2038 *31*
4.86×10^3 *17*	96.6	4.4 *3*	6.33 *5*	av Eβ=2081 *31*
4.92×10^3 *12*	65.9	7 *2*	6.14 *13*	av Eβ=2096 *31* Iβ(g.s.+66)=7.0% 22, total absorption γ-ray spectrometer(1997Gr09, 1996Gr20).

† Absolute intensity per 100 decays.

γ(^{145}La)

Iγ normalization: Deduced by evaluators using Iβ(g.s.+66)=7% 2, and Iβ=68% feeding "pseudo levels" between 1300 keV and 3900 keV (from total absorption γ-ray spectrometer measurements (1997Gr09, 1996Gr20). Authors have distributed this β^- intensity in (26) 100-keV bins. Evaluators have assumed about half this intensity to be carried out by γ rays deexciting these levels to the g.s. and 66-keV levels for deducing a γ-ray normalization factor of 0.17 *2*, which agrees very well with a measured value of Iγ(96.6)=17.1% 21 (1987RoZW,1986Ro17).

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^{145}Ba β^- decay 1978Pf02,1997Gr09 (continued)

$\gamma(^{145}La)$ (continued)

E_γ[‡]	I_γ[‡a]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	α[b]	Comments
65.9 *2*	31	65.9	(7/2$^+$)	0.0	(5/2$^+$)	[M1]	3.59 *6*	α(K)=3.07 *5*; α(L)=0.418 *7*; α(M)=0.0869 *15*; α(N+..)=0.0224 *4* α(N)=0.0191 *4*; α(O)=0.00310 *6*; α(P)=0.000239 *4*
91.9 *2*	43	189.0	($^+$)	96.6	($^+$)	M1	1.377	α(K)=1.175 *18*; α(L)=0.1595 *25*; α(M)=0.0332 *5*; α(N+..)=0.00856 *14* α(N)=0.00729 *12*; α(O)=0.001184 *19*; α(P)=9.16×10^{-5} *14* Mult.: K/L=10 *3*, α(K)exp=1.3 *4* (1986RoZU).
96.6 *2*	100	96.6	($^+$)	0.0	(5/2$^+$)	M1	1.193	α(K)=1.019 *16*; α(L)=0.1382 *21*; α(M)=0.0287 *5*; α(N+..)=0.00742 *12* α(N)=0.00631 *10*; α(O)=0.001026 *16*; α(P)=7.95×10^{-5} *12* I_γ: Iγ=17.1% 21 (1987RoZW). Mult.: K/L=8.3 *14* (1986RoZU).
123.2 *2*	7	189.0	($^+$)	65.9	(7/2$^+$)	[M1]	0.598	α(K)=0.511 *8*; α(L)=0.0690 *11*; α(M)=0.01435 *22*; α(N+..)=0.00371 *6* α(N)=0.00315 *5*; α(O)=0.000513 *8*; α(P)=3.98×10^{-5} *6*
162.3 *2*	22	351.5	($^+$)	189.0	($^+$)	(M1)	0.277	α(K)=0.237 *4*; α(L)=0.0318 *5*; α(M)=0.00661 *10*; α(N+..)=0.001708 *25* α(N)=0.001454 *21*; α(O)=0.000236 *4*; α(P)=1.84×10^{-5} *3* Mult.: K/L=5.3 *12*, α(K)exp=0.18 *4* (1986RoZU).
162.3[c] *2*	<22	514.2		351.5	($^+$)			
171.6[@] *2*	7.6	237.9	(9/2$^+$)	65.9	(7/2$^+$)			
189.5 *2*	11	189.0	($^+$)	0.0	(5/2$^+$)	[M1]	0.181	α(K)=0.1548 *23*; α(L)=0.0207 *3*; α(M)=0.00430 *7*; α(N+..)=0.001112 *16* α(N)=0.000946 *14*; α(O)=0.0001540 *22*; α(P)=1.202×10^{-5} *18* Mult.: α(K)exp=0.18 *4* (1986RoZU).
237.9[@] *2*	6.8	237.9	(9/2$^+$)	0.0	(5/2$^+$)			
247.5[#]	3	598.9		351.5	($^+$)			E_γ,I_γ: observed only in 1978Pf02.
254.9 *2*	6	351.5	($^+$)	96.6	($^+$)			
^{x}258.5[@]	1.0							
286.2 *2*	12	475.3		189.0	($^+$)			
286.2	<12	637.5?		351.5	($^+$)			
303.2 *2*	18	492.2		189.0	($^+$)			
313.6[@] *2*	0.8	827.0?		514.2				
^{x}316.3[@]	3.4							
325.2 *2*	12	514.2		189.0	($^+$)			
334.4 *2*	2.2	827.0?		492.2				
^{x}343.7[#]	6							
351.8 *2*	10	351.5	($^+$)	0.0	(5/2$^+$)			
361.1[@] *3*	2.8	598.9		237.9	(9/2$^+$)			
378.8 *2*	24	475.3		96.6	($^+$)			
378.8[c] *2*	<24	922.4?	(5/2$^+$,7/2)	544.0				
^{x}400.0[@]	2							
407.7[#]	4	922.4?	(5/2$^+$,7/2)	514.2				
417.8 *2*	25	514.2		96.6	($^+$)			
^{x}427.2[@]	3.7							
477.8 *2*	8.2	544.0		65.9	(7/2$^+$)			
481.5	0.7	973.6		492.2				

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^{145}Ba β^- decay 1978Pf02,1997Gr09 (continued)

$\gamma(^{145}La)$ (continued)

E_γ[‡]	I_γ[‡a]	E_i(level)	J^π_i	E_f	J^π_f
492.7[@] 2	12	492.2		0.0	(5/2$^+$)
532.8 2	12	598.9		65.9	(7/2$^+$)
544.2 2	29	544.0		0.0	(5/2$^+$)
544.2 2	<29	734.0		189.0	($^+$)
571.9[c]	<9	637.5?		65.9	(7/2$^+$)
571.9 2	9	922.4?	(5/2$^+$,7/2)	351.5	($^+$)
578.6 3	6	1176.8?		598.9	
590.8[@] 2	1.1	827.0?		237.9	(9/2$^+$)
598.8 2	12	598.9		0.0	(5/2$^+$)
[x]610.9[@]	5.3				
[x]643.6[@]	2.3				
[x]655.3[@]	5				
668.2[#]	2	734.0		65.9	(7/2$^+$)
683.8[#c]	<7	922.4?	(5/2$^+$,7/2)	237.9	(9/2$^+$)
683.8[#]	7	1176.8?		492.2	
701.0[#]	3	1176.8?		475.3	
730.6[#]	8	827.0?		96.6	($^+$)
734.1 2	4	734.0		0.0	(5/2$^+$)
[x]747.7[@]	1.3				
784.5	0.6	973.6		189.0	($^+$)
[x]816.5[@]	1.1				
844.5 3	1.0	1033.5?		189.0	($^+$)
[x]849.5[@]	2.7				
[x]944.6[@]	1.9				
[x]1066.3[@]	3.3				
1110.4[#]	7	1176.8?		65.9	(7/2$^+$)
1234[&]	2.2[&]	1300		65.9	(7/2$^+$)
[x]1255.2[@]	1.0				
[x]1263.3[@]	0.5				
[x]1268.7[@]	0.4				
1334[&]	4.7[&]	1400		65.9	(7/2$^+$)
1434[&]	7.9[&]	1500		65.9	(7/2$^+$)
[x]1516.0[@]	2.6				
1534[&]	15.7[&]	1600		65.9	(7/2$^+$)
1634[&]	9.4[&]	1700		65.9	(7/2$^+$)
[x]1692.5[@]	2.1				
[x]1714.1[@]	2.3				
1734[&]	3.2[&]	1800		65.9	(7/2$^+$)
[x]1776.2[@]	1.1				
[x]1846.5[@]	2.2				
1934[&]	44.0[&]	2000		65.9	(7/2$^+$)
[x]1950.9[@]	0.6				
1968.6	1.0	2566.4		598.9	
2021.5	2.2	2566.4		544.0	
[x]2033.6[@]	0.8				
2034[&]	25.0[&]	2100		65.9	(7/2$^+$)
2052.4	0.9	2566.4		514.2	

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^{145}Ba β^- decay 1978Pf02,1997Gr09 (continued)

$\gamma(^{145}La)$ (continued)

E_γ[‡]	I_γ[‡a]	E_i(level)	E_f	J^π_f	E_γ[‡]	I_γ[‡a]	E_i(level)	J^π_i	E_f	J^π_f
[x]2065.5[@]	0.6				2703[&]	31.5[&]	2800		96.6	(+)
2134[&]	8.2[&]	2200	65.9	(7/2+)	[x]2708.7[@]	0.4				
[x]2185.1[@]	1.8				2803[&]	23.3[&]	2900		96.6	(+)
[x]2190.8[@]	1.1				2903[&]	17.6[&]	3000		96.6	(+)
2234[&]	8.2[&]	2300	65.9	(7/2+)	3003[&]	15.1[&]	3100		96.6	(+)
2334[&]	12.6[&]	2400	65.9	(7/2+)	3103[&]	12.6[&]	3200		96.6	(+)
2434[&]	47.2[&]	2500	65.9	(7/2+)	3203[&]	9.4[&]	3300		96.6	(+)
[x]2456.3[@]	2.5				3303[&]	6.9[&]	3400		96.6	(+)
2501.0	0.7	2566.4	65.9	(7/2+)	3403[&]	6.3[&]	3500		96.6	(+)
[x]2515.6[@]	1.3				3503[&]	4.9[&]	3600		96.6	(+)
2534[&]	36.5[&]	2600	65.9	(7/2+)	3603[&]	3.8[&]	3700		96.6	(+)
[x]2565.0[@]	0.8				3703[&]	1.9[&]	3800		96.6	(+)
2603[&]	31.5[&]	2700	96.6	(+)	3803[&]	0.9[&]	3900		96.6	(+)

† α(K)exp were normalized to α(K)(M1)=1.035 for 96.6γ, ce(K) and ce(L) are from 1986RoZU.
‡ From private communication of 1982ChZV, except where noted otherwise.
# Observed only in 1978Pf02.
@ Observed only in 1982ChZV.
& Inferred by evaluators (from total γ-ray absorption spectrometer measurements) to balance the decay scheme.
a For absolute intensity per 100 decays, multiply by 0.17 *2*.
b 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.
c Placement of transition in the level scheme is uncertain.
x γ ray not placed in level scheme.

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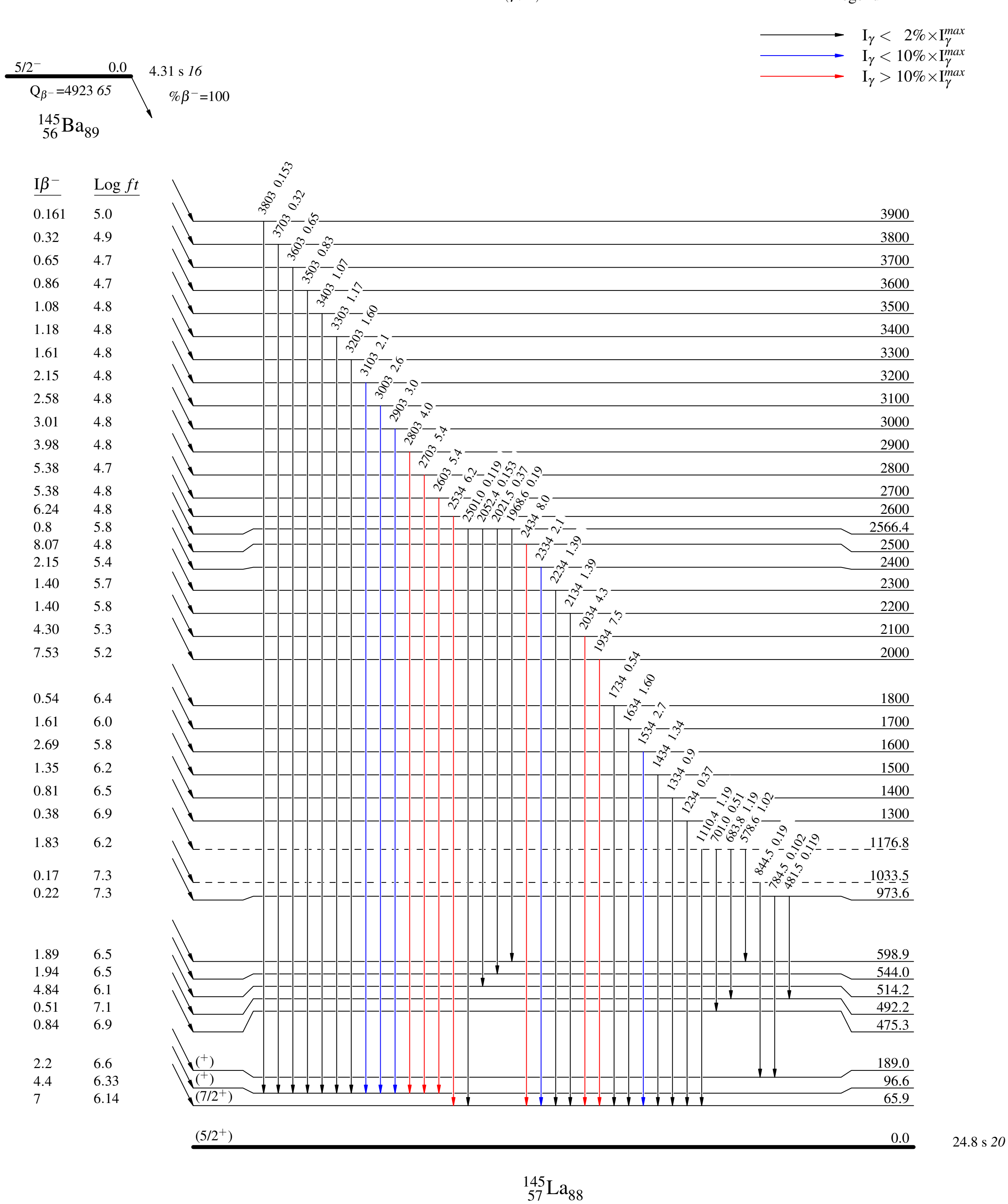
Decay Scheme

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



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Decay Scheme (continued)

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